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Proceedings of the

18th European Conference on Innovation and Entrepreneurship

hosted by Universidade Portucalense

Porto, Portugal

21-22 September 2023



Volume One

Edited by

Fernando Moreira and Shital Jayantilal

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Proceedings of the

18th European Conference on Innovation and Entrepreneurship

ECIE 2023

Hosted By

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Volume 1

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ECIE Preface

These proceedings represent the work of contributors to the 18th European Conference on Innovation and Entrepreneurship (ECIE 2023), hosted by Universidade Portucalense, Porto, Portugal on 21-22 September 2023. The Conference Co-Chairs are Fernando Moreira and Shital Jayantilal both from Universidade Portucalense, Porto, Portugal.

ECIE is now a well-established event on the academic research calendar and now in its 18th year the key aim remains the opportunity for participants to share ideas and meet the people who hold them. The scope of papers will ensure an interesting two days. The subjects covered illustrate the wide range of topics that fall into this important and ever-growing area of research.

The opening keynote presentation is given by Prof Doutor Eurico Brilhante Dias, ISCTE Business School, University of Lisbon, Portugal speaking on "*The Importance of an Innovation Ecosystem as a Driver for Exports and Economic Growth*". The second day of the conference will open with an address from Giuseppe Sofo, McKinsey Fintech, UK and Germany, on the topic of "*Fintech and the new Generation of Entrepreneurs Changing the way Business is done*".

With an initial submission of 260 abstracts, after the double blind, peer review process there are 112 Academic research papers, 6 PhD research papers, 4 Masters Research papers, and 6 work-in-progress papers published in these Conference Proceedings. These papers represent research from Australia; Austria; Brazil; China; Colombia; Cyprus; Czechia; Denmark; Finland; France; Germany; Greece; India; Ireland; Israel; Italy; Lebanon; Lithuania; Malaysia; Malta; Netherlands; New Zealand; NIGERIA; Norway; Peru; Poland; Portugal; Republic of Korea; ROMANIA; Singapore; Slovakia; South Africa; Spain; Switzerland; Thailand; Tunisia; UK; United Arab Emirates; UK and the USA.

We hope you enjoy the conference.

Fernando Moreira and Shital Jayantilal
Universidade Portucalense, Porto
Portugal
September 2023

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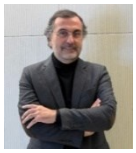
Biographies

Conference Chairs



Fernando Moreira has been a member of the Science and Technology Department at Portucalense University since 1992, currently as a Full Professor, and a visiting professor at the University of Porto Business School. He was the head of the Science and Technology Department from May 2018 until February 2022. He is graduated in Computer Science (1992), M.Sc. in Electronic Engineering (1997) and PhD in Electronic Engineering (2003), both at the Faculty of Engineering of the University of Porto and Habilitation (2018). He teaches subjects related to undergraduate and post-graduate studies. He supervises several PhD and M.Sc. students. He is a (co-)author of more than 200 scientific publications with peer-review on national and international journals and conferences. He serves as a member of the Editorial Advisory Board for several journals and books. He organized several special issues from JCR journals. He has already regularly served as a member of Programme and Scientific committees of national and international conferences. He was the MSc in Computation coordinator during the last ten years. He holds editorial experience, and he is co-editor of several books. He is associated with NSTICC, ACM and IEEE. His principal research areas are mobile computing, ICT in Higher Education, Mobile learning, Social business and Digital transformation. He was awarded Atlas Elsevier Award in April 2019



Shital Jayantilal currently, is the Head of the Department of Economics and Management at Portucalence University. She lectures under graduate and graduate courses in Strategy and Strategic Management. She, has a PhD in Business Studies from Extermadura University (2016) and a degree in Economics from the Faculty of Economics, University of Porto (1999). She is also a practitioner and an experienced Senior consultant, with more than 15 years hands-on experience in aiding more than 50 SMEs and family firms, across diverse industries promoting their sustainability and enhancing trans-generational family business wealth. Presently, she is a member of the research unit REMIT – Research on Economics, Management and Information Technologies, Porto. Her main topics of research are Main research interests: Family Firms; Strategy; and Game Theory, and has published in various international journals. Having been awarded by Entrepreneurship and Innovation Exchange and Family Business editorial teams, the 2021 Schulze Publication award.

Keynote Speakers



Eurico Brilhante Dias holds a degree in Business Management, a Master's degree in Business Sciences, and a Ph.D. in Business Sciences. He is a Professor at ISCTE-IUL (ISCTE Business School) and served as a Deputy in the XIII, XIV, and XV Legislatures. He was also the Secretary of State for Internationalization during the XXI and XXII Constitutional Government. As a Member of Parliament, he served as the Vice-Chairman of the Committee on European Affairs and as a member of the Committee on Budget, Finance, and Administrative Modernization. He has served as the Director of the Management Degree at ISCTE and as the Coordinator of Master and Postgraduate Studies at INDEG ISCTE. He has spoken at national and international events, including EIBA 2012, the World Investment Forum, and the Progressive Economy Conference. He has published work in Business Logistics, Macro logistics, and the determinants of attracting Foreign Direct Investment and the Internationalization of SMEs. He is a member of the Order of Economists and the National Secretariat of the PS. Currently, he is the President of the PS Parliamentary Group.



Giuseppe Sofo is a Fintech Expert and Client Advisor, part of McKinsey Fintech Practice leadership. He lives and works between London and Berlin, where he leads client relationships with fintech companies and investors. He also runs the EMEA McKinsey Fintech Connect programmes, which are bootcamps for senior executives of banks, investment funds, tech and fintech companies to engage and start working together. In his client service, Giuseppe serves a number of fintech startups, PE firms, VC funds, large banks and some fintech hubs. He supports clients mainly on B2B Sales acceleration and shaping equity narrative, and focuses on Digital Banking, Core Banking, Open Finance and Sustainability. Beyond the McKinsey work, Giuseppe is a passionate music lover and DJ and also cofounded a few startups, including a global community for music producers.

Mini-Track Chairs



Nasser Abouzakhar is the director of Anzar Property Investment Limited which was founded in 2017 and the author of the book Real Estate Investment: In the pursuit of building income-producing assets to grow your wealth. He is an award-winning author and a regular guest on the BBC Arabic TV channel. Between 2004 and 2019, he worked at different universities in the UK as an academic, teaching and researching different technology-related subjects. Nasser has a good understanding of the property investment business and finances. He has firm relationships with professionals in banking, legal, accounting, and valuation which assist with his responsibility as the company director. He leads a highly professional and experienced property management team.



Carol Air has a PhD in entrepreneurship and is a Lecturer in purchasing and supply chain management at Aberdeen Business School, in Aberdeen, Scotland. Carol is currently working on a number of business innovation and pedagogical projects in which she is exploring the application of design thinking approaches. Carol is supervising doctoral students undertaking projects in innovation, entrepreneurship and design thinking.



Nikolaos Apostolopoulos, PhD, is an Assistant Professor in European Policies in Sustainability and Entrepreneurship at the University of Peloponnese and visiting fellow at the Neapolis University Pafos. He also acts as scientific advisor at the Labour Institute of General Confederation of Labour (INE/GSEE) in Greece. He is co-editor of the edited volumes entitled: "Universities and Entrepreneurship: Meeting the Educational and Social Challenges", "Entrepreneurship and the Sustainable Development Goals and Entrepreneurship", "Institutional Framework and Support Mechanisms in the EU".



Teresa Dieguez, Specialist on Strategy and Entrepreneurship at Polytechnic Institute of Cávado and Ave (IPCA), Portugal. She founded her first company in 1995 and in 2007 she took a Master on Innovation and Technological Transfer. Now, Teresa is a professor and a co-promotor of different businesses and activities. She is a Social Judge, and she is taking her PhD on Social Sustainability and Development.



Isabel Ferreira, PhD in IS and Technology, from the University of Minho, Portugal. Research collaborator in the group IS and Technologies for the Transformation of Organizations and Society, University of Minho. Isabel, has been teaching in Higher Education since 2001, Polytechnic Institute of Cávado and Ave. Research interests: e-government, electronic public procurement, public policies, social innovation, and active learning methodologies.



Heather Fulford has experience leading research and knowledge transfer projects with small business and third sector organizations in the UK. Her research interests lie in enterprise and social innovation. Heather is currently leading a project exploring the use of design thinking for business process improvement in SMEs, and is also engaged in a social innovation project work using systems thinking and design thinking approaches. Heather is supervising several doctoral projects focused on aspects of innovation, enterprise and design thinking.



Paula Loureiro, PhD student in Business Sciences, with several publications in the areas of Human Resources Management and Organizational Behavior. Paula has been teaching in Higher Education since 1998. Experience in coordinating disciplinary areas of the Management Department. Research interests: Career Management, Skills management, Equal opportunities, and diversity management.



Alexandros Kakouris, PhD, PhD, is an Assistant Professor in entrepreneurial learning and education at the Departmnt of Management Science and Technology of the University of Peloponnese and at the Hellenic Open University. He holds PhD in Physics, PhD in Entrepreneurship and a MSc in Adult Education. His special interests concern: fostering entrepreneurship and innovation to science graduates, context-aware entrepreneurship,

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Margaret Mangion holds a Doctorate in Social Sciences from the University of Leicester (UK), She is Director and Senior Lecturer at The Edward de Bono Institute for Creative Thinking and Innovation at the University of Malta, where she has been lecturing on creativity, innovation and leadership since 2012. Dr Mangion represents Malta as an ambassador for World Creativity and Innovation Week/Day events. She is a member of a number of International Societies and her work has been published in peer-reviewed conference proceedings, edited books and journals. Margaret has considerable experience in the public and private sector.



Florinda Matos is a Professor at Iscte Business School - University Institute of Lisbon and an Integrated Researcher at DINÂMIA'CET – Iscte, Centre for the Study of Socioeconomic Change and the Territory. She is the founder and president of the Intellectual Capital Association (ICAA). She is researching the area of Intellectual Capital and Knowledge Management, Innovation, Organizational Resilience, Digital Transformation & Sustainable Development.



Renato Pereira, PhD in Management Sciences, is Professor of Entrepreneurship, Innovation, and International Business at Iscte Business School, Lisbon, Portugal. His research interests cover the organizational implications if creativity and innovation, the role of emerging technologies on new business opportunities, and valuation methods of innovative start-ups.



Jordan Srour is an associate professor of operations management at the Lebanese American University (LAU). She holds a PhD in Logistics Management from the Rotterdam School of Management, Erasmus University. With a background in both mathematics (BA from Carleton College) and transportation (MSE from UT Austin), her research and teaching focuses on data analytics for management problems across a variety of domains. Dr. Srour also serves as the Assistant Provost for Educational Resources and Innovation.



Christy Suciu works in the College of Business and Economics at Boise State University. Her research into design thinking is published in the Academy of Management Learning and Education with a paper titled, “The Need for Design Thinking in Business Schools.” Her book “Design Thinking and Strategy” (Suciu & Kaupins) is used in 3 different MBA “Design Thinking and Strategy” courses. She is the director for “The COBE Innovation Challenge.” She is also a consultant for major global companies such as HP, Blue Cross, Micron, and Wells Fargo.



Andreas Walmsley, PhD, is Associate Professor in Business at Plymouth Marjon University. He conducts research in entrepreneurship, especially entrepreneurship education, graduate entrepreneurship and responsible entrepreneurship. He is on the editorial boards of the journals Entrepreneurship Education and Pedagogy and the International Journal of Entrepreneurial Behaviour and Research.



Birgitte Wraae, PhD, is an Associate Professor in Entrepreneurship at the Faculty of Business and Technology and the Department of Applied Business Research at UCL University College Denmark. Her research interests are in entrepreneurship, especially entrepreneurship education: identity formation, emancipation, and employability. She excels in doing research in connection with the entrepreneurial learning space. She has recently published a book on the entrepreneurial learning journey.

Workshop Facilitators



Rajiv Vaid Basaiawmoit, Ph.D., MBA, is the Head of Sci-Tech Innovation & Entrepreneurship at Aarhus University, Denmark. He is an award-winning Entrepreneurship Educator and works at the intersection between innovation, entrepreneurship, interdisciplinary-collaboration and gamification. He designs and embeds Entrepreneurship into curricular education. He is an invited speaker at many conferences and events around the globe and he has spoken on various well-known platforms such as TEDx, ECS and NATO-CoE.

Author Biographies

Nasser Abouzakhar is the director of Anzar Property Investment Limited, founded in 2017 and the author of the book Real Estate Investment: In the Pursuit of building income-producing Assets to grow your wealth. Nasser is a TEDx speaker, award-winning author, and a regular guest on the BBC TV channel for over 100 live TV interviews, including the Homes Under the Hammer TV show. Between 2004 and 2019, he worked at different universities in the UK as an academic, teaching and researching different technology-related subjects. Nasser has a good understanding of the property investment business and finances. He has firm relationships with professionals in banking, legal, accounting, and real estate valuation, assisting with his responsibility as the company director. He leads a highly professional and experienced property management team.

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Idayuwati Binti Ahmad from Malaysia and currently doing my PhD from Universiti Tun Hussein Onn Malaysia (UTHM) Malaysia. My major field of research is SMEs development in the rural areas of Malaysia. Moreover, I am a Director of Twinmarissa Group Resources, running my own business setup as an entrepreneur in Johor and Malacca.

Toluwanimi Akaehomen is an entrepreneur and a researcher, with research interests in immigrant entrepreneurship/innovation, enterprise/entrepreneurship education and training, and leadership. She has published in a peer-reviewed publication in the areas of female immigrant entrepreneurship and Entrepreneurship education and training. She is in her final year of her PhD programme at Coventry University, UK.

Susana Aldeia is an Assistant Professor at the Portucalense Universy (UPT) and Polytechnic Institute of Maia (IPMAIA) . She holds a Phd in Taxation and a DEA from the Vigo University (Spain) in Tax Law; a postgraduation in Taxation from the IPCA and a degree in Accounting, also from the IPCA.

Muazam Ali is a PhD student of Universiti Tun Hussein Onn Malaysia, recently completed and submitted my final thesis. My interest fields of research are entrepreneurship development, entrepreneurial intention and digital entrepreneurship. Moreover, I have also presented and published more than six research papers in international conferences and research journals. And I have five years' professional experience of government and international organizations.

Esli Sichem Almazan-Rivera is a Business Faculty student in the Banking and Financial Administration career at the Universidad Privada del Norte in Lima, Peru.

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Jorge Antunes obtained a bachelor's degree in modern and contemporary history, and a master's degree in science, innovation, and society, obtained at ISCTE-IUL. He also holds a postgraduate diploma in science and technology management and policies from NOVA University of Lisbon. Currently, Jorge Antunes is a R&D project director at COIN – Innovation Consulting.

Ján Bajčan is a Comenius University graduate from Bratislava, who attained a management degree and honoured their skills in the energy industry. Fuelled by a desire to make a lasting impact in the environmental and green energy sector, they strive to lead the way towards sustainable solutions. Passionate, knowledgeable, and driven, they are poised to revolutionize the future of energy for a greener world.

Raphael Bar-El is Professor Emeritus at Ben Gurion University and faculty member of the of the Applied Economics Department at Sapir College. He specializes in regional economic development and innovation policy, with extensive experience in Israel, Brazil, Ethiopia and other countries. Was head of the Economic Planning Authority in Israel.

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Patrícia Beličková has been a PhD student at the Faculty of Mass Media Communication since 2022. Her work primarily revolves around conducting scientific research and publishing in the field of emotions in marketing and neuromarketing. She places significant emphasis on integrating knowledge from behavioral sciences and customer psychology.

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Tiina Brandt is a principal lecturer of leadership and HR at Haaga-Helia University of Applied Sciences, Finland. Her doctoral dissertation was about personality and leadership in 2005. She is actively publishing in international journals, and she has interest building up the projects with companies. Her research interests are related to individual qualities in organizations and fostering entrepreneurship.

Kristiina Brusila-Meltovaara holds a PhD in economics and business administration with specialization in Finance and Financial analysis. She also holds a General Pedagogical Teacher's Qualification from Haaga Helia University of applied sciences in Finland. Dr. Kristiina Brusila-Meltovaara has a long experience in industry as finance and HR director as well as years of experience in lecturing, curriculum development, e-learning, development of teaching and learning materials as well as commercializing trainings and university services. Current research interests include innovation work, leadership and management, ethics, sustainability and corporate governance and in particular the leadership thereof.

Katherine Nicole Cabrera-Cordova has a degree in Administration and Marketing from the Universidad Privada del Norte in Lima, Peru. She has specialized in consulting for the application of experiential marketing and neuromarketing tools, especially in service businesses. She has worked in the private sector working with digital marketing and social media tools.

Martin Cepel, Ph.D., MBA, DBA, is an Associate Professor at the University of Entrepreneurship and Law in Prague, Czech Republic, at the Faculty of Economics and Entrepreneurship, Pan-European University in Bratislava, Slovakia and a Senior Researcher in European Centre for Business Research (ECBR), Czech Republic. His research and research activities focus on Entrepreneurship, Entrepreneurial Economics, Business Environment, Financial Risk Management, Business Administration and Marketing. He is an author of many scientific articles in international journals and proceedings of international scientific conferences indexed in Web of Science (H-index 11) and Scopus (H-index 13).

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Portuguese SMEs: Strategies for Collaborative R&D and Participation in the Framework Programme

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Abstract: The European Union Framework Programme can create and/or strengthen research networks and cooperation, namely between SMEs and higher education institutions. However, in Portugal, SMEs represent only 16,7% of allocated funds, falling below the European Commission's target (Agência Nacional de Inovação, 2020). Low SME participation can result from factors particularly related to SMEs, such as organizational characteristics and past R&D experience. In fact, previous collaborative R&D experience is an important factor determining participation in Framework Programmes (Barajas & Huergo, 2010), suggesting a virtuous cycle. How and why do SME gain collaborative experience with HEI? In what kind of collaborative experiences with HEIs do SMEs engage? What are the characteristics of SMEs that engage in these experiences? What obstacles and risks do SMEs face when applying for the FP and which strategies do they adopt to face them? To answer these questions, we conducted an exploratory survey with SMEs that collaborate with HEIs (N = 26). Additionally, we conducted semi-structured interviews with three H2020 participant SMEs and three non-participants to further explore their collaborative practices and R&D strategies.

Keywords: SME; collaborative R&D; framework programme; H2020; higher education institutions

1. Introduction

European funding for collaborative research and development (R&D), such as the Framework Programme (FP) can encourage or strengthen collaborative R&D, such as between small and medium enterprises (SMEs) and higher education institutions (HEIs). It can thus work as a useful lens through which to observe SMEs' engagement and strategies in collaborative R&D. Nonetheless, as HEIs' participation increased over the years, that of enterprises registered a tendency to decrease (European Parliament and Directorate General for Internal Policies of the Union, 2013), and the goals set by the European Commission (EC) for SMEs' participation have seldom been met (European Parliament and Directorate General for Internal Policies of the Union, 2013). Given the importance of SMEs in the European economy, accounting for 99% of the companies operating in the non-financial business sector (European Court of Auditors, 2020), the EC has developed specific instruments in the FPs directed at SMEs. In Horizon 2020 (H2020) – the FP implemented between 2014 and 2020 – SMEs represented 24% of allocated funds. This means the EC's goal was finally met and even surpassed (European Commission, 2020). However, this is not the case for every Member-State, such as Portugal that registered a SME participation of 16,7% (Agência Nacional de Inovação, 2020).

Most literature on FP participation focuses on HEIs, and already points to possible explanations for low participation by peripheral States such as Portugal. Enger and Castellacci (2016) and Enger (2018) have signaled 'closed clubs' that make it difficult for new organizations to participate in the FPs. 'Club' participants enjoy cumulative advantages – more resources for R&D from the start, and central network positions – that reinforce themselves overtime creating a virtuous cycle that results in 'bias', or a Matthew Effect (Merton, 1969 as cited in Enger and Castellacci, 2016; Enger, 2018). This 'bias' also translates geographically favoring large consortia located in North-West Europe (Amoroso, Coad and Grassano, 2018). Although this 'bias' seems like a plausible explanation for lower SME participation, significant organizational differences between SMEs and HEIs must be considered, namely different R&D strategies and motivations to apply for the FP.

When mentioning participation, we refer to organizations applying regardless of their applications' outcome. For HEIs, FP funding can work as a strategy to tackle reduced national research budgets (Enger, 2018). In turn, for SMEs, FP funding can counter usually faced barriers relating to R&D, such as lack of financial resources for investment in technology, and qualified human resources (Lesáková, 2009; Barajas and Huergo, 2010) – the latter being a crucial difference between SMEs and HEIs. Differences in motivation are central since participation

depends on self-selection. Thus, we are interested in what drives SMEs to be interested in collaborative R&D and applying for European funding.

2. Research questions and literature review

Overall, SMEs' decision to participate in the FP is based on trade-offs between expected benefits of cost sharing and expected short-term costs of participation (Faber, van Dijk and van Rijnsoever, 2016). Costs of participation involve demanding administrative requirements that discourage SMEs from applying (Barajas and Huergo, 2010). However, beyond an objective cost-benefit analysis, their decision can also result from perceptions about the FPs, such as 'loss of control' of the company or a perceived inadequacy of the FP (Romero-Martínez, Ortiz-de-Urbina-Criado and Ribeiro Soriano, 2010). Given the focus on collaborative R&D, perceptions about R&D partners, R&D goals, such as R&D outputs, R&D strategies and different risk-taking patterns should also be considered. For example, SMEs tend to value products as R&D outputs (Luukkonen, 2002) as market-driven organizations, whereas HEIs are more research-driven (Hervás-Oliver *et al.*, 2021; Grimpe, Sofka and Distel, 2022). A perceived incompatibility of goals and/or strategies may hinder cooperation. Hence, previous collaborative R&D experience is a key factor determining FP participation, inspiring confidence and making it easier to find adequate partners (Barajas and Huergo, 2010). We henceforth ask: how and why do SMEs gain collaborative experience with HEIs? In what kind of collaborative experiences with HEIs do SMEs engage? What are the characteristics of SMEs that engage in these experiences? What obstacles and risks do SMEs face when applying for the FP and which strategies do they adopt to face them? To answer these questions, we draw on literature regarding the relation between organizational characteristics and FP participation, which focuses mainly on HEIs. We combine this literature with literature on corporate R&D, especially respecting SMEs, hoping to better understand this specific type of organization in the context of the FPs and collaborative R&D.

Organizational size, as measured by the number of researchers, is considered a determinant of HEIs' participation in the FPs (Enger and Castellacci, 2016). Similarly, Kelly and Arora (1996) as cited by Catarino and Teixeira (2009) point that SMEs only engage in collaborative R&D when they have sufficient human resources (HR) to do so, suggesting a positive relation between size and collaborative R&D and, thus, a possible relation between size and FP participation. However, Barajas and Huergo (2010) found a negative relation between the number of employees and propensity to apply for FP funding amongst Spanish SMEs. Notwithstanding, the authors point that this may be explained by specific Spanish policies directed at increasing SMEs' participation in the FP. Besides size, HR stability is another important factor. Work force turnover negatively impacts SMEs' engagement in R&D (Grego-Planer and Kus, 2020). Additionally, the level of professional qualifications in the firm is also a key factor for R&D (Aschhoff, 2010; Lepori *et al.*, 2015). It is also important that firms have specific employees dedicated to R&D (Wang, Wang and Horng, 2010) - a formal R&D organization, such as a department or manager, is an important factor for R&D activity (Damanpour, 1991; Terziovski, 2010). Additionally, cross-employment practices, such as hosting PhD candidates through partnerships with doctoral programs, is a characteristic of R&D driven firms, pointing to partnerships as eventual factors. Finally, exporter SMEs are more likely to engage in collaborative R&D (Lesáková, 2009) and apply for FP funding (Barajas and Huergo, 2010). Based on this literature review, we analyze a sample of Portuguese SMEs to assess collaborative R&D practices, strategies, risks, and obstacles, against the background of FP participation, by answering the already outlined research questions.

3. Methodology

We conducted a survey with 'Leader' Portuguese SMEs that engage in collaborative R&D with HEIs (N = 26). Amongst these, 15,4% have not participated in H2020 (N = 4), and 84,6% have participated (N = 22). All surveyed SMEs share the 'Leader' seal of approval of the Portuguese Agency for Competitiveness and Innovation for high performance SMEs, indicating a sample of highly competitive SMEs. Additionally, we interviewed three H2020 participant 'Leader' SMEs and three non-participants, regardless of them engaging in collaborative R&D or not, to further understand their practices and perceived R&D obstacles. The interviews were fully transcribed, answers were sorted and analyzed through a common analysis grid.

4. Data Analysis

This section is divided into five subjects: 1) organizational characteristics and practices of SMEs engaging in collaborative R&D; 2) importance of HR related factors; 3) specific R&D strategies of SMEs; 4) different risk profiles associated with SMEs' R&D practices; 5) obstacles perceived by SMEs that already engage in

collaborative R&D with HEIs when applying for FP funding, and related counterstrategies. Finally, we outline recommendations that policymakers and stakeholders can draw on to improve and foster collaborative R&D, especially considering the FPs.

Table 1:Organizational characteristics of SMEs with collaborative R&D

	Yes	No
Hiring PhD students	46,2%	53,8%
Partnerships with doctoral programs	38,5%	61,5%
Department, section, or R&D group	96,2%	3,8%
R&D manager or person in charge	80,8%	7,7%

Source: authors' survey

Table 1 suggests the importance of a formalized R&D department, section, or group, with 80,8% stating to have a R&D manager, indicating a strong commitment to R&D and the importance of leadership in driving R&D efforts. Amongst the interviewees, besides a R&D department and manager, the only spin-off SME had a person in charge of FP projects, since FP participation is the key strategy of the firm to engage in 'riskier' R&D projects with uncertain results. This points to at least a R&D dedicated person as a driver for collaborative R&D initiative.

Table 1 also shows that nearly half of the surveyed SMEs recognize the value of having highly educated researchers on their teams, since 46,2% hire PhD candidates. However, only 38,5% are involved in such partnerships with doctoral programs, suggesting that hiring does not result from formal partnerships. When asked about hiring PhD students and partnerships with doctoral programs, most interviewed SMEs' representatives recognized the importance of these practices. Nevertheless, only one had a formal PhD partnership to host PhD researchers - the spin-off SME. The other interviewed SMEs pointed a small structure combined with a heavy workflow as an obstacle to hosting PhD candidates. However, several representatives highlighted internship protocols with HEIs at the bachelor and/or master level. When asked about the origin of these partnerships, most pointed to personal connections to HEIs.

Our sample of SMEs engaged in collaborative R&D with HEI revealed that 76,9% are exporters; 84,6% participate or have participated in FPs; 34,6% have 10-49 workers, 23,1% have 50-99 workers, and 30,8% have 100-249 workers. These results point to SMEs with R&D partnerships with HEIs as sharing some characteristics. Most of them have a R&D department, group, or section, and a R&D manager; more than half have up to 100 workers; and are exporters. Most of them are, or have been, FP participants, have official partnerships with doctoral programs and/or hire PhD candidates.

Table 1: Importance of human resourses strategies for R&D

	N	Minimum	Maximum	Mean	Std. Deviation
It is difficult to recruit qualified human resources for R&D	23	1	5	3,57	1,24
R&D activities are performed by human resources that are already in the company	23	2	5	4,13	0,69
For R&D activities, it is important to have stable human resources in the company	23	4	5	4,70	0,47

Source: authors' survey

The data shows a moderate level of difficulty in recruiting qualified R&D personnel, with a mean score of 3,57 (1,24). This suggests that SMEs face challenges in attracting and hiring the right talent for their R&D initiatives. The data also reveals that most SMEs (4,13 (0,69)) rely on their existing workforce for R&D activities, potentially due to the difficulties in recruiting new talent or a desire to leverage in-house expertise. Finally, the high mean score of 4,70 (0,47) for the statement regarding HR stability emphasizes the need for a stable workforce in R&D endeavours. All interviewed SMEs value stability, taken the 'long' period of adaptation of new employees for demanding activities such as R&D. However, they also struggle to find and maintain appropriate HR, which they perceive as being the result of a younger generation of workers more willing to rotate; competing for HR with other sectors, and foreign companies offering better conditions – aggravated by the possibility of remote work

– but also an increasing demand and scare supply of talent, especially in the IT sector. Two of the interviewees stated to hiring very young professionals and offering incremental salaries over the years to achieve stability. However, both admitted that this strategy is no longer effective and lack alternatives. In general, the interviewed SMEs perceived collaborations with HEI also as a HR strategy, allowing them to get in contact with young professionals at a very early stage in their careers.

Based on Table 1 and Table 2, SMEs that have a formal R&D organization might be more likely to invest in stable human resources and engage in collaborations, such as partnering with doctoral programs. Encouraging these organizations to actively participate in the FP can contribute to the creation and strengthening of collaborative R&D.

Table 3: Importance of R&D strategies for SMEs

	N	Minimum	Maximum	Mean	Std. Deviation
Developing R&D through internal resources	26	2	5	4,65	0,75
Develop R&D through the contracting of external resources	26	2	5	3,81	0,94
Developing R&D continuously	26	3	5	4,73	0,53
Open new lines of research	26	3	5	4,58	0,70

Source: authors' survey

Table 3 shows that SMEs value the importance of developing R&D through internal resources (4,65 (0,75)), continuously developing R&D (4,73 (0,53)) and opening new lines of research (4,58 (0,75)). However, they acknowledge the need to contract external resources (3,81 (0,94)) to reach R&D goals. These results indicate that SMEs are engaging in R&D partnerships with HEIs to acquire and develop new internal skills and create new products. From the interviews, we were able to conclude that while some SMEs resort to HEIs to compensate for their lack of internal resources, others regard partnerships with HEIs as a strategy to be up to date within their sector and, thus, be more innovative and competitive. These findings contribute to understanding the motivations of SME-HEI collaborations and point to the need of policies that can help inform and support/facilitate them.

Table 4: Risk Profiles in SMEs' R&D Strategies

	N	Minimum	Maximum	Mean	Std. Deviation
The company develops high-risk projects with the possibility of high profits	26	1	4	3,08	0,98
The company adopts a cautious stance to minimize the likelihood of making costly choices	26	2	5	3,58	0,81
The company explores its context gradually in order to make incremental progress	26	3	5	4,04	0,60
The company tends to support projects with certain results	26	2	5	3,50	0,81

Source: authors' survey

Table 4 explores the risk profiles of SMEs in their approach to R&D and their impact on decision-making. The data reveals varying attitudes towards risk-taking, which can influence their strategies for innovation. On the one hand, the data shows that SMEs are somewhat open to pursuing high-risk projects that offer potential for high profits (3.08 (0.98)). On the other hand, the data also indicates that SMEs tend to adopt a cautious stance to minimize costly choices (3.58 (0.81)). This can be interpreted as a balancing act between seeking new opportunities and mitigating potential downsides. Furthermore, the highest mean score of 4.04 (0.60) is attributed to companies gradually exploring their context to make incremental progress. This indicates a preference for an iterative approach to innovation, which can help manage risks and ensure steady growth. Lastly, the data suggests that companies tend to support projects with assured outcomes, scoring a mean of

3.50 (0.812). This shows a tendency towards risk-averse decisions, indicating a focus on projects with predictable results. In sum, while SMEs appear to be open to taking on high-risk and high-reward projects, they also demonstrate a cautious approach that prioritizes incremental progress and projects with predictable outcomes. Policymakers and stakeholders can use this understanding to design support mechanisms that respect this risk profile and encourage R&D activities within SMEs.

Table 5: Obstacles of SMEs with HEI partnerships in applying for European Funding

	N	Minimum	Maximum	Mean	Std. Deviation
Different perceptions of cost, time and/or productivity among partners	15	3	5	3,93	0,46
Difficulty in obtaining immediate results	15	2	5	3,67	0,90
Sharing of information on intellectual property	15	2	5	3,47	0,92
Lack of stability of R&D public policies	15	2	5	4,00	1,00
Difficulty in obtaining R&D funding	15	2	5	4,00	1,00
Difficulty in finding R&D partners	15	1	4	2,80	1,15
Abstract academic research topics	15	2	5	3,53	0,99

Source: authors' survey

According to our data, difficulty in obtaining partners for R&D projects (2,80 (1,15)) and different perceptions of cost, time and/or productivity among partners (3,93 (0,46)) are two relevant obstacles. This indicates that partners may struggle to align priorities and expectations, which hinders the success of collaborative projects. Other obstacles include the difficulty in obtaining immediate results (3,67 (0,90)), sharing information on intellectual property (3,47 (0,92)) and abstract academic research topics (3,53 (0,99)). This suggests that organizations face some difficulties in achieving quick outcomes, dealing with intellectual property issues, and bridging the gap between academic research and practical applications. However, regarding confidentiality, the interviewed SMEs stated that even though it poses problems, it doesn't refrain them from engaging in collaborative R&D. Additionally, these findings also highlight the importance of stable public policies and adequate funding to support R&D collaboration, as well as the need for effective networking to identify suitable partners. For example, one of the interviewees perceives publicly funded R&D projects as sporadic and poorly funded, not taking into consideration SMEs' R&D strategies. On another note, H2020 participants stated that being connected to big organizations, such as prestigious HEIs is key to finding new partners. When asked about the origin of relations with HEIs, SMEs' representatives usually referred to personal connections. This, once again, points the need for other networking mechanisms that do not leave SMEs dependent on individuals' social background.

In the interviews, regarding FPs, SMEs complained about the administrative burden they represent. While some view partnering up with HEIs as a strategy to deal with this burden, others point the need for adequate in-house HR to manage these projects. For example, one of the representatives suggested that business associations could play a central role if they provided these services.

5. Discussion and conclusion

Our findings underline the importance of specific strategies and organizational characteristics of SMEs that engage in collaborative R&D with HEI. The existence of a formalized R&D organization is critical to drive research and collaboration (Damanpour, 1991; Terziovski, 2010). Most firms seek skilled personnel able to perform in-house R&D activities (Aschhoff, 2010; Lepori *et al.*, 2015), but qualified personnel seem limited. Collaborative R&D with HEIs seems like a strategy to counter this difficulty. However, some conditions are necessary to undertake these collaborations, namely access to HEI, which seems dependent on personal connections from previous collaborative R&D experiences (Barajas & Huergo, 2010), pointing to the need for better networking arrangements and better-defined strategies. Collaborations with HEIs are valued and can lead to hiring PhD students or partnering with doctoral programs. However, this trend is still embryonic. Addressing difficulties such as lacking resources to properly host PhD students can be crucial to enable this strategy. Additionally, our findings reveal difficulties between partners such as different perceptions on cost, time, and productivity;

difficulties regarding sharing information, obtaining funding and results (Faber, van Dijk and van Rijnsoever, 2016). These difficulties need to be better identified and faced so that the obstacles to collaboration and networking can be surpassed. When taking these difficulties into account, it is also important to bear in mind SMEs' R&D strategies and their risk profile, which as market-driven organizations differs from HEIs. SMEs appear to be interested in taking on high-risk and high-reward projects. However, they tend to be cautious, prioritizing incremental progress (Luukkonen, 2002). This interested countered with cautiousness should inform new support mechanisms that encourage SMEs to pursue this interest, engage in collaborative R&D and apply for the FP.

Lastly, the importance of participating, of learning by doing, of promoting learning behavior of SMEs and network formation can help address the 'bias' observed in FPs by promoting short-term strategies that can lead to more long-term innovative capabilities of SMEs. To know and consider current SME experience is key to promote this behavior and motivate SMEs to participate in competitive research projects such as the FP.

In sum, this study enriches academic discussion by providing a detailed examination of small and medium enterprises' (SMEs) collaborations with higher education institutions (HEIs) within the European Union FP. It highlights the crucial role of structured R&D systems, skilled human resources, and effective partnership formation in SMEs' R&D participation, while also discussing the complexities of managing diverse risk profiles

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Analysing the Influence of Components of Entrepreneurial Ecosystem on the Entrepreneurial Process

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Abstract: The entrepreneurial ecosystem is a popular concept because of its systematic approach to analysing entrepreneurship and promoting entrepreneurial activity in the region. However, studies on EE have lacked a framework for indicating the influence that EE components have on entrepreneurship. The authors fill this gap in our research by investigating the influence of the components of the entrepreneurial environment on the entrepreneurial process. Entrepreneurial Intention Development, Entrepreneurial Exploration, and Entrepreneurial Exploitation are the three stages of the entrepreneurial process that were identified. To investigate complex systems and grasp the system's causal linkages, fuzzy cognitive modelling approach was employed. This study provides insights into the relationships between the components of the entrepreneurial ecosystem and the entrepreneurial process, which helps to support entrepreneurship during its different phases.

Keywords: Entrepreneurial Ecosystem, Fuzzy Cognitive Modelling, Entrepreneurial Intention, Entrepreneurial Exploration, Entrepreneurial Exploitation

1. Introduction

Entrepreneurial ecosystem (EE) is a concept through which holistic interventions could be done in order to increase the entrepreneurial capability of the region (Stam, 2015; Alvedalen & Boschma, 2017; Bertello et al., 2022). EE is an interconnected combination of factors such as network, policy, financial capital etc, that help in entrepreneurship (Spiegel, 2017; Mack & Mayer, 2016). Both academics and politicians are interested in the idea of the entrepreneurial ecosystem since it gives them a way to foster an atmosphere and possibilities for entrepreneurship (Malecki, 2018; Feld, 2020; Mason & Brown, 2014) with the aim of strengthening the economy (Liguori et al., 2019; Acs & Szerb, 2007). In spite of the possibilities that the EE provides, there is a gap in the implementation of the concept and establishment of new ecosystems. This can be attributed to the fact that studies exploring the impact of the components of EE on the entrepreneurial process are very few in the literature (Motoyamaet al., 2014; Maroufkhani et al., 2018). There is a need to analyse the impact of the components of EE on entrepreneurship, which will help policymakers to know how each factor of EE affects entrepreneurship and make informed decisions in developing an EE.

In thus study, the authors address this gap and analyse the impact of the components of EE on the three phases of the entrepreneurial process (Shane & Venkatraman, 2006; Ajzen, 1991). The three phases are Entrepreneurial Intention Development, Entrepreneurial Exploration and Entrepreneurial Exploitation. EE gained popularity when Isenberg (2010) suggested using a comprehensive strategy to create an environment that fosters entrepreneurship. For this study, the Isenberg EE model was adopted which consist of six components, namely Policy, Financial capital, Culture, Human Capital, Support and Market. The authors first determine the causal link and the intensity of the connections between the components of EE and the stages of the entrepreneurial process using fuzzy cognitive modelling (FCM). Then simulations of the model is run to examine how the Entrepreneurial process is impacted under certain scenarios.

The remaining part of the article is as follows: the aricle starts by discussing the methodology. In the following sections, the authors identify the causal relationships between the components of EE and the entrepreneurial process, determine the weights of relationships and develop the fuzzy cognitive model. Finally, the authors end our article by providing the conclusion.

2. Methodology

Fuzzy cognitive modelling is a technique for determining the causal links between the constituent parts of complex systems (Özesmi & Özesmi, 2004; Nair et al., 2019; Dursun & Goker, 2022) through the decisions made by experts. Concepts take fuzzy values that are represented by value Ai in the interval [0,1]. The relationships

between concepts are described using a degree of causality using linguistic variables for every weight, so weight w_{ij} for any interconnection can range from -1 to 1.

The degree of the causal association between distinct FCM factors-concepts can have either positive or negative signs in the FCM structure, and weight values represent the degree of the causal relationship. The fuzzy cognitive model is governed by the inference rule and a transfer function. This study has used inference rule as the Kosko's activation rule (Kosko,1986) which is given by Equation (1). Fuzzy values are assigned to concepts, and as a result, all concepts store specific numeric values. Transfer functions are used to control transformation of inputs to produce appropriate outputs i.e to maintain the values of the concepts between -1 and +1 (Zare et al., 2022). Researchers use a variety of transfer functions, including a hyperbolic tangent, trivalent, and linear Sigmoid. The hyperbolic transfer function was chosen in this study due to its dependability and correctness, as well as its broad range of output values capacity, and it follows Equation (2).

$$A_i^{(t+1)} = f\left(\sum_{\substack{j=1 \\ i\neq j}}^{M} w_{ji}.A_j^t\right) \quad \ldots\ldots\ldots\

Table 2: Fuzzy Value Corresponding to Linguistic Value

Linguistic Value	Numeric Value	Fuzzy Value
Very Low Influence (VL)	1	(0, 0, 0.25)
Low Influence (L)	2	(0, 0.25, 0.5)
Medium Influence (M)	3	(0.25, 0.5, 0.75)
High Influence (H)	4	(0.5, 0.75,1.00)
Very High Influence (VH)	5	(0.75,1.00,1.00)

The authors acquired five sets of relationships after the interviews, one from each expert. Combining all of the sets yielded 13 associations; however, to improve our model's performance and create the fuzzy cognitive map, the relationships reported by at least three experts were chose, yielding the following ten relationships. These relationships examined by our model is listed below.

R1: Policy has positive influence on Entrepreneurial Intention

R2: Policy has positive influence on Entrepreneurial Exploitation

R3: Finance has positive influence on Entrepreneurial Exploration

R4: Finance has positive influence on Entrepreneurial Exploitation

R5: Culture has positive influence on Entrepreneurial Intention

R6: Support has positive influence on Entrepreneurial Exploration

R7: Support has positive influence on Entrepreneurial Exploitation

R8: Human Capital has positive influence on Entrepreneurial Exploration

R9: Market has positive influence on Entrepreneurial Exploration

R10: Market has positive influence on Entrepreneurial Exploitation

4. Finding the Causal Relationships Weights

Finding the strength of the associations comes next after determining the causal relationships, which are done using the linguistic weights provided by the panel. Triangular fuzzy numbers (TFN) are used to first transform the linguistic concepts into fuzzy numbers, after which they are defuzzified back into crisp numbers. According to Opricovic and Tzeng (2003), defuzzification is the process of choosing a particular crisp set element from an original output fuzzy set that transforms fuzzy numbers into crisp set scores. This study applied the Opricovic and Tzeng (2003) defuzzification procedure known as Converting Fuzzy Data into Crisp Scores (CFCS). The final combined strength of the relationships is shown in table 3.

Table 3: Strength of the Causal Relationships

	Entrepreneurial Intention	Entrepreneurial Exploration	Entrepreneurial Exploitation
Policy	0.813		0.79
Finance		0.73	0.866
Culture	0.774		
Support		0.681	0.754
Human Capital		0.659	
Market		0.676	0.836

5. Fuzzy Cognitive Mapping & Dynamic Scenario Analysis

Using the "Mental Modeller" software for our study the Fuzzy Cognitive Map of enttrepreneurial ecosystem was developed which is shown in figure 1. The authors run simulations of the created model to assess the effect on the system's outcome for various situations. Six simulations were chosen for our research. Each EE component received the maximum activation value of 1 in each of the six scenarios, while the activation values for the other EE components remained at 0.

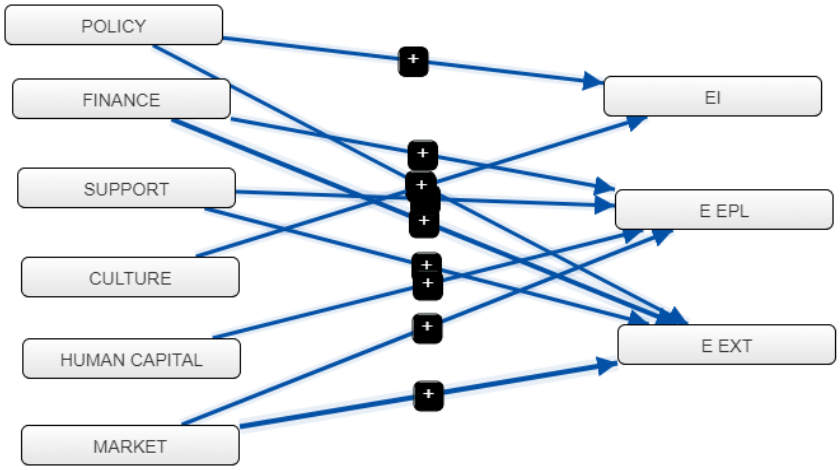

Figure 1: Fuzzy Cognitive Model of Entrepreneurial Ecosystem

The findings show that each component of EE has a specific function and has the most impact in one or two phases of the entrepreneurial process. The policy has a significant impact on entrepreneurial intention and entrepreneurial exploitation, but it has not much impact during the entrepreneurial exploration phase. Results also indicate that material components like financial capital and support have a great impact during the exploration and exploitation phase, but their impact in the intention development phase is not seen. Human capital has an impact only during the exploration phase. Market component also has a substantial impact during the exploration and exploitation phase. The culture component of the EE highly influences the entrepreneurial intention of the entrepreneur, but it does not provide much influence on the exploration and exploitation phase. The result of each scenario indicating the impact of each component on the different phases of the entrepreneurial process is shown in Table 4.

Table 4: Simulation scenarios and the Impact on Phases of Entrepreneurial Process

Scenario #	Scenario	Impact Activation value of Phases of Entrepreneurial Process (IAV)		
		Entrepreneurial Intention	Exploration	Exploitation
1	Act Value(Policy=1; Other Components=0)	0.67		0.66
2	Act Value(Finance=1; Other Components=0)		0.62	0.71
3	Act Value(Culture=1; Other Components=0)	0.65		
4	Act Value(Support=1; Other Components=0)		0.56	0.64
5	Act Value(Human Capital=1; Other Components=0)		0.58	
6	Act Value(Market=1; Other Components=0)		0.59	0.68

6. Discussion

6.1 Holistic Intervention to Develop EE and Facilitate Entrepreneurial Process

Entrepreneurship helps in the region's economic and social development, resulting in policymakers increasing the entrepreneurial activity (Ferreira et al., 2023; Leendertse et al., 2022). The studies dealing with entrepreneurship ahead mostly focused on examining the entrepreneur's characteristics and some phases of entrepreneurship like ideation, funding, development of infrastructure etc. The entrepreneurial ecosystem provides a systematic approach towards building a conducive environment for entrepreneurship (Alam et al., 2023). In the following section, we will discuss how policymakers can take action in supporting the entrepreneurial process through the EE approach

The first phase of the entrepreneurial process is developing the entrepreneurial intention. The essential components for entrepreneurship are generally considered to be infrastructure, support, and finance, among others, but our results show that this is not the case for developing entrepreneurial intention. Finance has the least impact on intention, and the components having the most impact are culture and policy. Thus in the initial stages of the entrepreneurial ecosystem development, the main focus should be on developing the culture of entrepreneurship and creating policies for the easy starting of a business. In the entrepreneurial exploration phase, the most important components that the policymakers should be focusing on is support, human capital and market. Finance also is a critical component at this stage that supports the startup to carry out its activities. As the phases of entrepreneurship progress from intention to exploration to exploitation, the impact of finance increases. To support the startups in their growth, the most impactful components are finance and policy. During this stage much of the business model and operations are determined and funding provides the impetus for its operation and expansion. Policy also plays an important role during this stage by creating a conductive environment for doing business**.**

6.2 Contribution:

EE has gained immense focus over the years as a systematic approach towards supporting entrepreneurship in the region (Spiegel, 2017; Alaassar et al., 2022). However, the lack of study focusing on the influence of the components of ecosystem on entrepreneurship has hindered the development of EE. Our study addresses this gap in the EE literature by analyzing the impact of each component of the EE on the different stages of entrepreneurship. Our use of fuzzy cognitive modelling to examine a complex system such as EE is unique to the literature and can open new doors for analysis of the EE. Our study enables policymakers to take more informed intervention for development of EE. Entrepreneurship is not an activity but a journey that starts from the desire to stand out from the rest and do something different (Adam and Fayolle, 2015; Van Gelderen et al., 2015); which finally leads to establishing a new venture that changes the way things are done in society. This journey has different phases, and the needs and requirements for each phase are entirely different. Through our study, we have identified the type of facility that an entrepreneur needs at each phase of the journey. Policymakers can gain insights into the requirement of each stage of entrepreneurship and arrange the same for the entrepreneurs. Thus our study aims to provide new directions for EE research and contribute to the development of a robust EE framework.

7. Conclusion

This study has identified the impact that the components of EE have on each phase of entrepreneurship which will help policymakers make informed decisions about which resources to provide during which stage of entrepreneurship and understand the influence of the EE on entrepreneurship. The study also identified the type of facility an entrepreneur needs at each phase of the journey. Our examination of a complex system like EE uses fuzzy cognitive modelling, which is novel in the literature and may lead to new insights into EE analysis. Thus our study aims to provide new directions for EE research and contribute to the development of a robust EE framework.

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System of Tax Incentives in Research and Business Development. An Analysis of the Recent Case Law of Portuguese Tax Arbitration

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Abstract: The main objective of this work is to analyse the understanding of the tax authority regarding the application of the tax benefit in support of research and development in professional societies and whether this understanding complies with the legal provision. Additionally, to understand the sense of the recent decisions of the arbitral court in this matter. For this purpose, the study applies the legal research methodology. Several legal sources have been analysed, such as the personal income tax law, the corporate income tax law, the investment tax law, administrative doctrine and the jurisprudence of the Portuguese arbitration court. The study shows that the tax authority has been assuming an understanding that does not fit in the legislation currently in force and administrative doctrine concerning tax benefits for the research and development of professional companies. The public authority limits the tax deduction to these entities, and this limitation would not apply in the case of commercial, industrial or service companies. Moreover, the Portuguese arbitral court recently confirmed this discriminatory understanding and agreed with this view. Thus, case law contributes significantly to the clarification of the application of the law.

Keywords: Tax benefits to research and development expenses, Tax policy, Portugal, Professional societies

1. Introduction

The process of innovation and business development is crucial in the life of companies since it allows the development of new products and services relevant to maintaining the company's activity (Ferreira, 2017). It is a matter of tax equity to grant tax benefits for innovation and development, regardless of the company's corporate tax framework. Therefore, the Tax Incentive System for Corporate R&D is an essential instrument allowing companies to recuperate part of their investment in Research and Development projects. This recovery is made within the scope of IRC. In this tax area in Portugal, professional companies are treated differently from companies in the area of industry, services or commerce. The taxation is made on the sphere of the partners under the pretext of avoiding tax evasion and observing tax neutrality. Having a differentiated treatment, they are expected to be not negatively discriminated against when benefiting from tax incentives such as SIFIDE. However, sometimes the legal provisions are not always correctly understood in applying the law, which generates conflicts between companies and taxpayers.

There are few international studies dealing with the tax transparency regime, as far as we know, there are no studies dealing with the applicability of SIFIDE in professional firms. In this sense, analysing the Tax Authority's understanding of applying the tax benefit to support research and development in professional companies and whether this understanding follows the legal provision is important. Additionally, to understand the meaning of the recent decisions of the arbitration court on this matter. For this purpose, legal research is used in order to answer the paper's objective. The use of this methodology in this research paper is appropriate because legal research methodology allows to explore and interpret concepts, theories, principles, and the law's application, including case law analysis. Several legal sources have been analysed, such as the personal income tax law, the corporate income tax law, the investment tax law, administrative doctrine and the jurisprudence of the Portuguese arbitration court. The rest of the text consists of three sections. The first one refers to the literature review and methodology. The following presents the results and their analysis. And finally the third, presents the discussion and conclusions.

2. Literature review and methodology (incentivos fiscais à inovação)

Vishnevsky, Goncharenko, Dementiev, and Gurnak (2022) establish that tax and fiscal policy requirements depend on the life cycle of technologies. In their early stages, they require the most tax support. This support is more important for catching-up countries than for advanced countries, as emerging economies do not have enough experience in promoting technological innovations, relevant institutions and high incomes generated by mature technologies of previous generations. The authors explain that to stimulate new technologies, it is advisable to apply sectoral, system-wide, and matrix.

Gracheva, Artemov, and Ponomareva (2021) study the legal regulation of tax relations in the digital economy, applied to the Russian case. According to the results of the study, it is concluded that it is necessary to ensure the fulfilment of the state's fiscal interests. This requires the transformation of the essential approaches to the legal regulation of tax relations, both in the context of determining the appropriate legal forms to regulate the tax base levied in Russia in the context of the emerging digital economy, and to influence international tax policy in order to use all the advantages provided by international tax cooperation and neutralise the threats caused by international tax competition.

Rosenblatt and Cabral (2017) discusses the applicability of the international tax transparency regime to the taxation of profits earned abroad (CFC Rules regime), analysing its characteristics and its role in the transnational scenario. As a specific objective, the existing conflicts in Brazilian law are examined, due to the adoption of a model different from that practiced worldwide, through taxation on a universal basis, regardless of the availability of profits. The work concludes that the anti-elusive scope of Brazil's international tax transparency regime is just another broad way of taxing income.

Dias and Dinis (2021) critically analyse the legal assumptions of its application, its purpose and the associated constraints. It addresses some of its limitations and inconsistencies, namely the fact that tax transparency is not very attractive to some companies, which seek to free themselves from being subject to this special regime, contrary to the assumptions underlying the creation of the tax transparency regime.

In this conceptual background, this research aims to address one objective: This work aims to analyse the tax authority's understanding of tax benefits for research and development in professional societies and ensure it aligns with legal provisions. It also aims to comprehend recent arbitral court decisions on the matter. In order to answer them, an analysis of the legal structures of Portugal was presented. Portuguese data sources were included: the corporate income tax, the investment tax law, administrative doctrine and the jurisprudence of the Portuguese arbitration court.

3. Results

3.1 Professional companies

Professional companies are those incorporated for the exercise of a professional activity provided for in the list of activities referred to in Article 151 of the personal income tax law, and in which the partners, taxable persons, are professionals in that activity (Sousa, 2023) .

Thus, professional societies are legal persons whose main purpose is the common exercise of professional activities organized in a single public professional association. In addition, they are the companies where the formation of profit is made to depend exclusively or almost exclusively on the activities of the respective professional members (Silva, 2023).

Generally the societies of professionals that are subject to public professional associations (professional associations and professional chambers), as is the case of the Certified Public Accountants Association, the Bar Association or the Engineers Association. There are several areas to which a professional company can be associated, such as technical engineering, notary, auditing; architecture, biology, nursing, medicine, veterinary, nutrition, psychology, and soliciting, among others (Esteves, 2019). All these professional societies are subject to the corresponding Professional Associations.

Professional companies are not subject to corporate income tax, except for autonomous taxation. The company's net income (after deductions) is directly imputed to the personal sphere of the partners and is, therefore, taxed under personal income tax (da Costa, 2012).

The special regime for professional companies is justified by the human component necessary for developing the activity to the detriment of the capital component (Lopes, 2018).

The legal framework of the incentive and understanding of the tax authority

The 2011 State Budget Law - Law nº55-A/2010, of December 31, and subsequent amendment in 2013 approved the SIFIDE II to continue increasing companies' competitiveness by supporting their efforts in Research and Development (R&D). Thus, the Entrepreneurial Research and Development Tax Incentives System II (SIFIDE II), in force from 2013 to 2025, aims to support Research and Development activities (Basto & Nogueira, 2021). This incentive includes activities related to the creation or improvement of a product, process, program or equipment which presents a significant improvement and which do not result from simple use of the current state of existing techniques (Ferreira, 2017).

Within the scope of this incentive, the following are considered (1) research expenses are those incurred by the taxpayer to acquire new scientific or technical knowledge, (2) development expenses are those incurred by the taxpayer through the exploitation of the results of research work or other scientific or technical knowledge with a view to the discovery or relevant improvement of raw materials, products, services or manufacturing processes (Santos, 2021).

SIFIDE II can benefit companies (1) resident in Portuguese territory, carrying out, as main business or not, an agricultural, industrial, commercial or services activity and (2) non-resident companies with a permanent establishment in that territory, which have research and development (R&D) expenses (Aldeia, Mota, & Monteiro, 2021).

These supports allow to recover up to 82.5% of the Investment in R&D, in the part that has not been the object of a non-refundable State financial contribution, carried out in the taxation periods from January 1, 2013 to December 31, 2025. Base Rate: Tax deduction applicable to the total expenditure on R&D in the current year - 32.5%; Incremental Rate: 50% of the increase in expenditure over the average of the previous two years (maximum of 1.5M€).

For IRC taxpayers who are SMEs, who have not yet completed two financial years and have not benefited from the Incremental Rate, a 15% surcharge on the Base Rate (47.5%) applies.

However, considering that professional companies fall under the tax transparency regime and therefore benefit from an income tax exemption in the sphere of the company, since the taxation occurs in the sphere of the partners (Nabais, 2021). It has been considered that since there is no calculation of a taxable income, it is not possible to make deductions from this benefit.

Recently, the Tax Administration has been presenting another understanding. Although it is recognized that the expenses incurred are likely to include "research and development expenses", the Tax Authorities consider that the amounts to be deducted in the sphere of the partner, regardless of the corresponding amount, cannot exceed the limit of €1,000 imposed by the personal income tax law. This application criterion hinders the application of the tax benefit in the sphere of the partners due to the existing tax transparency situation. This understanding proved essential for the application of the law and restored justice through the non-negative discrimination of these societies.

3.2 The CAAD court ruling

Decree-Law No. 10/2011, of January 20 and subsequent amendments, approves and regulates tax arbitration as a jurisdictional means of dispute resolution. The Legal Regime of Tax Arbitration (RJAT) has changed with the seventh amendment introduced by article 12 of Law No. 7/2021, February 26. Tax arbitration has its own autonomous and exhaustive regime at the regulatory level. This regime provides for the possibility of resolution, through arbitration, of disputes involving the assessment of the legality of tax acts. In particular, tax arbitration was created to strengthen the effective protection of taxpayers' legally protected rights and interests. Thus, it aims to reduce pendency in administrative and tax courts and provide greater speed in resolving tax disputes.

The CAAD - Center for Administrative Arbitration is an institutionalized center of specialized character and has its competence in tax matters established by the Legal Regime of Arbitration in Tax Matters, approved by Decree-Law No. 10/2011 of January 20. This regime sets the rules for resolving tax disputes through arbitration at the Center. This means of dispute resolution is guided by the principles of celerity, rigor and transparency, which is why it is called to pronounce in tax litigation.

Recently the Portuguese arbitration court was called upon to pronounce the question of the application of tax benefits in these companies.. The CAAD issued an arbitral award in case no. 93/2022-T on September 26, 2022,

with the claimants being the partners of a law firm subject to the tax transparency regime and the defendant being the tax authorities.

The Arbitration Court considered it relevant to clarify whether the deduction of research and development expenses, eligible under SIFIDE II, is subject to the limit established in the Personal Income Tax Law, which provides for an amount of €1,000. This limit is applicable when there is an imputation of the taxable income to the taxable income of the partners of professional companies, under the tax transparency regime.

The arbitrator of the arbitral tribunal considered that even if the income of the partners of the company subject to tax transparency is taxed in the legal sphere of the partners, the tax base is determined under the terms of the corporate tax law. The second law regulates the terms under which the assessment is made and specifies the deductions that can be made from the amount assessed, including tax benefits.

In addition, the Arbitral Tribunal clarifies that the deductions to the collection related to entities subject to the tax transparency regime are imputed to the respective partners or members and, therefore, deducted from the amount calculated based on the taxable income that has taken into consideration for imputation purposes.

4. Discussion and conclusions

The objectives of the tax transparency regime are to combat tax evasion, ensure tax neutrality, and eliminate economic double taxation. Therefore, this regime covers professional companies, implying taxation in the partners' sphere and not the company. Although they constitute an exception to the tax principle of generality, tax benefits have the financial incentive of a certain practice. In this case, encouraging investment in research and development is essential to improve and increase the activity of companies. However, the application applying tax incentives allows the company to reduce tax payable, representing less tax revenue. In this sense, the tax authority takes a limiting position when it comes to using these benefits by company partners. Several doubts have arisen on the benefit of SIFIDE, within the scope of this activity, due to the differentiated interpretation by the tax authority, which eventually led some companies to complain in court. The pronouncement of the arbitral tribunal constitutes an important step in the clarification of the application of the law, namely in the benefit of incentives such as SIFIDE. This study has some limitations, in particular, it only studies the Portuguese case and it analyses the tax and jurisprudential perspective. It would be relevant in future research to develop a multidisciplinary research that involves not only tax aspects but also accounting and commercial. It would also be useful a comparative analysis using other countries.

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A Cross-Culture Study of Entrepreneurial Intention: The Moderating Role of National Culture

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Abstract: The effects of entrepreneurship are many and multifaceted; they include the creation of new employment possibilities, the effective and efficient use of national resources and a positive improvement in the general well-being of the country residence. Various studies conducted on the Entrepreneurial Intention (EI); however, student EI are very fascinating and still demanding. Moreover, entrepreneurial cross-culture studies provide broad understanding about the EI internationally. Hence, this study is conducted on the EI of the university students in Pakistan and Malaysia. Its major goal is to pinpoint the factors that influence the EI of the university students of the emerging and developing countries. A quantitative research method is used for the data analysis. The data were collected from the public sector universities of Pakistan and Malaysia. A total number of 328 questionnaires were used for the data analysis. The hypothesis testing and empirical analysis are performed by the Smart PLS-SEM version 4.0. The findings of the research reveal that TPB equally affected the EI of the university students of Pakistan and Malaysia with the exception of subjective norms variable, which had a negative effect on Malaysian students. Moreover, the culture variable did not moderate the relationship between TPB and EI of the Pakistani students, although it is partially moderate the relationship of TPB and EI of the Malaysian university students. As a result, the research findings are crucial for policymakers in emerging and developing countries to comprehend and promote entrepreneurship both locally and internationally.

Keywords: Entrepreneurial Intention, TPB, University Student, Cross-Culture, Entrepreneurship

1. Introduction

Entrepreneurship has a significant role in job creation and overall economic development which is universally evidenced (González-Serrano *et al*., 2021). The impact of entrepreneurship is diverse and multidimensional such as it creates new employment opportunities, effectively and efficiently utilized national resources and positively enhance the overall well-being of the country residence (Ceresia & Mendola, 2020). Moreover, it supports in poverty reduction and fill the gap between rich and less marginalized people. Hence, importance of entrepreneurship studies is undisputed and priority area for the researchers (Audretsch, 2022).

Particularly, in developing countries its role has become more important which is also documented by the previous researchers (Ezeh *et al*., 2019). The basic trigger in entrepreneurship research is the understanding of when people decide to become an entrepreneurial (Lee *et al.,* 2006). Although previous research studies find entrepreneurial as a planned action which is the result of intention (Kautonen *et al*., 2015). Similarly, Ajzen (1991) proposed an entrepreneurial intention theory namely called it theory of planned behavior which is widely used in entrepreneurship research studies.

Consequently, most of the research scholars preferred the theory of planned behavior for entrepreneurial studies. According to research the theory of planned behavior better explains the EI as compared to the other theories Kautonen *et al*., (2015). Similarly, Liñán *et al*., (2013) proposed another theoretical model, EI model while adding the demographic variables in the theory of planned behavior.

The decision to become an entrepreneur is not only affected by the behavioural factors, but also by the prevailing culture norms and practices. The national culture of the country also played a significant role in developing EI and new business creation (Bogatyreva, *et al*., 2019). Culture affect the entrepreneurial manners, which make a contribution to entrepreneurial evolution. Hence, the current study explores intentions to become an entrepreneur in two countries drawing on the Theory of Planned Behavior (TPB) as one of the best-established theories to predict intentions and Hofstede national culture dimension of individualism (Farrukh *et al*., 2019).

Various studies conducted on the EI however, student EI are very fascinating and still demanding González-Serrano *et al*., (2021). The prime focus on youth entrepreneurial studies are to overcome the challenge of unemployment among the future generation. Hence, the policymakers and government institutions are formulating policies and creating entrepreneurship awareness in the university students (Farooq *et al*., 2018). The business graduates are more likely to join entrepreneurship activities due to their particular skills and business understanding (Su *et al*., 2021). Thus, the main focus of the study are the business graduates of public sector universities.

Previous research studies explained various aspects of EI with respect to the country of origin. However, only limited number of studies have focused on the comparative research studies (Díaz-Casero *et al* 2012). Every country has distinguished features which directly and indirectly influence the EI. The nature of entrepreneurship is heterogeneous among various countries due to its particular features, cultural and socio-economic conditions. Similarly, previous studies further empathized to conduct research on the underdeveloped and developing countries (Al Bati, 2021). Moreover, Farrukh *et al*., (2019) and Naqvi & Siddiqui, (2020), also suggested conducting a multi-country study to gain more generalizable and holistic results. Hence, while considering the dare need this study focused on the EI of the university students of Pakistan and Malaysia. In this research we conducted survey from 328 business administration students at degree to master level in Malaysia and Pakistan to test the theory of planned behaviour. The cross-cultural research will disclose that entrepreneurial intention are affected or not by the country of origin.

2. Literature review

Early in the 1700s, the concept of entrepreneurship first appeared. Schumpeter, (1954) has defined and described entrepreneurship in terms of context and environment. The definition of entrepreneurship given by the Global Entrepreneurship Monitor (2022) is "Any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business."

2.1 Entrepreneurial Intention

Remeikiene and Startiene (2013) defined EI as an active state of mind that motivates people to look for new business possibilities or advancements in the existing industry described EI. According to Bird (1988), is essentially the first step in the decision-making process for launching a new business. It primarily forecasts the expected entrepreneurial behavioral commitment. Different models of EI were provided by previous researchers, including theory of self-efficacy, the entrepreneurial event model and theory of planned behavior. But according to Yazdanpanah and Forouzani (2015), one of the most significant and frequently applied theories for forecasting people's behavior is the idea of planned behavior.

According to the TPB, PBC and subjective norms are additional factors that influence behavioral intentions in addition to attitudes (Ajzen, 1991, p. 182). Young people's intent to start their own businesses are thus influenced by their own admiration of entrepreneurship, the expectations of their closest friends and family, and their own perceptions of their entrepreneurial potential. We may build a model that assumes entrepreneurial attitude, subjective norms, and perceived control influence EI by integrating the theory of planned behavior and the notion of the indirect impact of individualism.

2.2 Theory of planned behaviour

According to Ajzen (2005), the theory of reasoned action (TRA) served as the theoretical foundation for the theory of planned behavior (TBP), which was first put forth by Ajzen and Fishbein in 1980. The link between attitude, intentions, and behavior was the primary goal for establishing the theory of reasoned action (Fishbein, 1967). With the addition of a new construct for perceived behavior control and a second aspect of behavioral intention, the "theory of reasoned action" was expanded to better explain how much control individuals have over their actions. According to Rogers et al. (2008), people base their decisions on the results they anticipate from carrying out specific behavioral tasks. Three key factors perceived behavioral control, subjective norms and attitude towards behavior are maintained by the "theory of planned behavior" and together they make up the EI (Ali *et al*., 2023).

2.2.1 Attitude towards behaviour

According to Shane and Venkataramam (2000), the study of entrepreneurship focuses on how one might look for opportunities to learn about both explicit and implicit goods and services while assessing and exploring available resources. Gaining the anticipated future opportunities and advantages heavily relies on the entrepreneur's perception.

The beliefs that people hold when engaging in a particular conduct serve as the foundation for attitude. According to Ajzen and Fishbein (2005), behavioral beliefs, expected results, or benefits and costs are considered to constitute the outcomes of behavior. Similar to how Krueger et al. (2000) confirmed Ajzen's perspective on entrepreneurial intention, they concluded that favorable attitudes among people foster entrepreneurship, which makes the intentions useful for carrying out entrepreneurial behavior. Alharbi *et al*. (2020) research also showed that people's attitudes had a beneficial impact on their intention to start a business.

H1: There is a significant positive relationship between (ATB) and the EI of the university students.

2.2.2 Subjective norms

According to Azjen (2005), a Subjective Norms (SN) is a social force that people draw from society and that has a significant impact on whether they engage in or refrain from a particular behavior. Individual family members, relatives, coworkers, colleagues, and fellows are among the other important people. They may also be experts in the behavior of interest (Perveen, 2015). Usman (2019) asserts that people experience pressure from society to engage in behaviors that are expected of them and that they feel compelled to do so.

Various management researchers have supported the prominent role played by SN upon intentional behavior to commence a new business venture (Otuya *et al*., 2013). The study of Malebana (2014) also advocated the positive participation of SN towards enhancing EI. Therefore, based on the results of earlier studies, it can be deduced that the majority of people decided to start a business whenever members of their immediate social group acknowledged and encouraged them while engaging in such unusual economic activities.

H2: There is a significant positive relationship between SN and the EI of the university students.

2.2.3 Perceived behavioral control

Previous research studies confirmed that the majority of people decided to start a business whenever members of their immediate social group acknowledged and encouraged them while engaging in such unusual economic activities. According to Ajzen and Cote (2008), the personal evaluations by which people can learn about their capacities to act a specific behavior referred to as Perceived Behavioral Control (PBC). It can be determined from the control belief about the availability of circumstances that may facilitate or impair performance of the behavior. According to Linan *et al*., (2013), people are more at ease and driven to engage in entrepreneurial activities when other members of the community respect, value, and acknowledge their choices.

According to Linan *et al*. 2013, personal capability is the belief an individual has in his or her own ability to execute a given task. This belief has an impact on the emergence of entrepreneurial ambitions. The impression of entrepreneurial activities as being positive and significantly influenced by the social and internal environments, which in turn affects how control behavior is, regarded (Gieure *et al*., 2020).

H3: There is a significant positive relationship between PBC and the EI of the university students.

2.3 Culture and entrepreneurial intention

Academics scholars and researchers also recognized that culture has a significant impact on how people form their intents and behavior (Farrukh et al., 2019). Culture has a big effect in forecasting people's intentions to launch new businesses. The majority of research studies on entrepreneurship, like Farrukh *et al*. (2019), include the cultural variable that Hofstede (2001) suggested. Hofstede's seminal work identified how cultural can be expressed in various ways and how individual and community level cultural norms are influenced by national cultural.

After concluding the Hofstede cultural study (2001), it may be stated the popular features of “individualism” are likely to be extremely advantageous in resolving the question of why and how university student affiliate themselves among activities of entrepreneurship (Shirokova *et al.*, 2018).

2.3.1 Individualism

Although the notion of collectivism provides importance to the benefits of holistic actions in order to win their support and loyalty, individuality indicates preferences of doing for the personal and near household interest. People in individualistic societies support and value entrepreneurs because they make creative decisions and maintain a high level of self-assurance (Mueller & Thomas 2000).

People in individualistic societies believed that they were more diversified, autonomous, and self-directed than people in collectivist societies. They value their own goals and interests over those of the group because they have self-confidence (Shinnar *et al*., 2012). The decision to launch a new firm is primarily an individualized trait (Mitchell *et al*., 2000). The person does not wish to join a formal institution where he or she is required to abide by set rules, regulations, and security measures. In civilizations that value individualism, researchers have discovered a stronger propensity for entrepreneurship (Shirokova *et al*., 2018).

H4: The Hofstede national culture dimension of individualism positively moderate the relationship between TPB and EI of the university student.

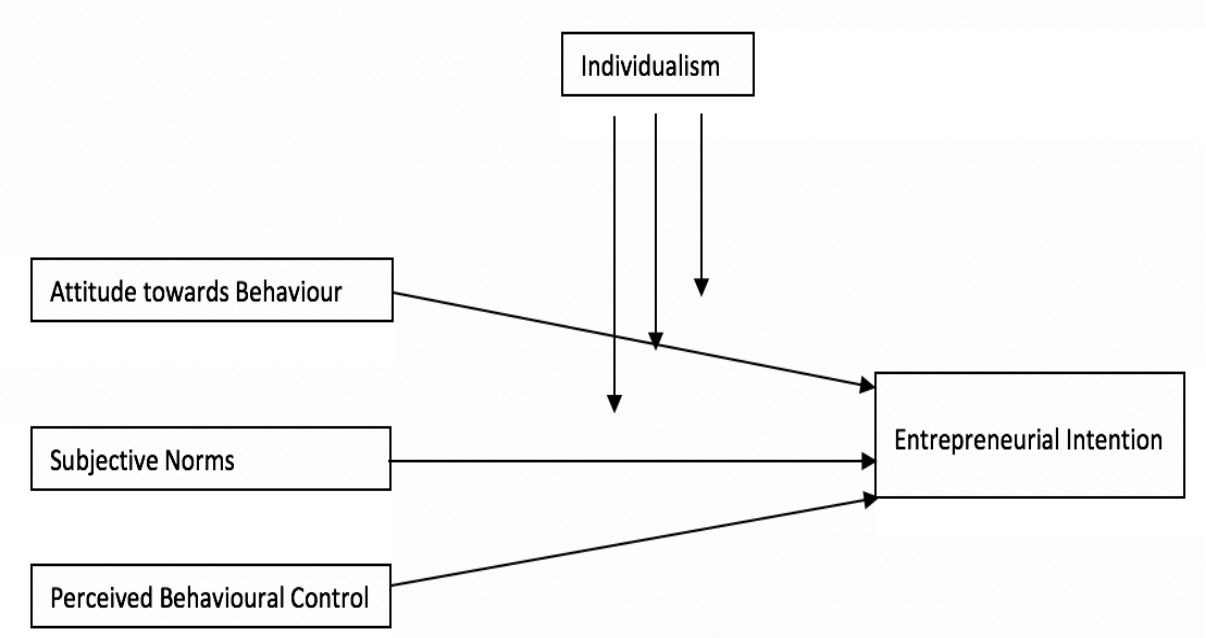

Figure 1: Conceptual framework of the study

3. Research Methodology

The survey data were collected from the public sector universities of Pakistan and Malaysia. The research questionnaire was used from the previous research studies and the scale of 5-point Likert scale 1-strongly disagree to 5-strongly agree were used to measure the constructs. The EI and TPB questionnaires adopted from the previous research study of Perveen, (2015). Similarly, the national culture dimension of individualism was adopted from the research of (Farukkh *et al*., 2017). The data were collected through random probability sampling technique from the university students via google online data collection forms.

The respondents of this research study are the final year students of business administration departments from Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia and Karakorum International University (KIU) Gilgit, Pakistan. The basic motivation of the selection of the last year students in this research was their certain position of entering in the practical life. In the final year most of the students decide their future plan and career intention (Perveen, 2016). The total number of 328 questionnaires were used for the data analysis 182 from KIU Pakistan and 146 from UTHM Malaysia. Moreover, the nature of the research was an exploratory study hence, the Smart PLS (SEM) was used for the data analysis as suggested (Zeb *et al*., 2020).

4. Descriptive Statistics

Table 1: Demographic profile of the respondents

Attributes	Pakistan		Malaysia	
	Frequency	Percentage	Frequency	Percentage
Gender				
Male	127	69.7%	84	57.5%
Female	55	30.2%	62	42.5%
Age				
21-25	95	51.5%	52.5	48.8%
26-30	63	26.2%	37.5	26.2%
31 & above	24	17.4%	10	17.4%
Program				
BBA	102	57.4%	54	36.5%
Master/MBA	74	32.8%	66	45.8%
MS/M.Phil.	06	9.60%	26	18.2%
Semester				
Second last	98	49.4%	98	67.5%
Last semester	80	50.5%	48	32.5%
University				
KIU, Pakistan	182	55.4%		
UTHM, Malaysia			146	44.5%
Father's occupation				
Government job	84	46.1%	84	36.5%
Private job	22	12.1%	22	38.5%
Own business	49	26.7%	49	16.5%
Agricultural work	27	14.9%	27	8.5%

The final number of respondents were 328, 162 from KIU Pakistan and 146 from UTHM Malaysia. The demographic analysis reveals that, the number of male students from Pakistan is higher than Malaysia. Similarly, most of the respondents age falls in the range of 21-25 both in Pakistan and Malaysia 51.5% and 52.5% respectively. Most of the Pakistani respondents were studying in the BBA program however the Malaysian students were in the program of MBA. The final semester students were 49.5% from Pakistan and 67.5% from Malaysia. The result of the father's occupation shows some unique information. In Pakistan majority of people employed in the govt. sectors 46.1%, however, in Malaysia most of the people in the private sector 38.5%. It shows the opportunities and the preference of the general public of Pakistan and Malaysia.

5. Measures

It is an exploratory research hence, the Smart PLS-SEM is used for the model testing and analysis of the hypothesis. The theory of planned behaviour variables; ATB, SN and PBC were measured by six items each having the Cronbach alpha value of 0.833, 0.732 & 0.791 respectively. Similarly, the moderating variable of individualism was measured by six items and having the Cronbach alpha value of 0.803. Finally, the dependent variable of EI was measure by five items having the Cronbach alpha value of 0.643. All the alpha values fall in the acceptable range of greater than 0.60 as suggested (Zeb *et al*., 2022). Moreover, the reliability validity, Cronbach alpha, average variance extracted, and composite reliability were validated before the path analysis. The detailed results of the structural model are presented in the following table.

5.1 Measurement model

As mentioned earlier that the data were collected from Pakistani and Malaysian universities namely, KIU Pakistan and UTHM, Malaysia. The data were analyzed while applying the Smart PLS-SEM technique. First of all, the validity and reliability of the survey questionnaire was checked which shows the appropriate factor loading of more than 0.6 of all the constructs. Similarly, the Cronbach alpha values of all the dimensions are also more than 0.70 and the average variance extracted, and composite reliability are also meet their respective criteria of more than 0.70 and 0.50 accordingly. Hence, our research questionnaire meets the validity and reliability criteria presented in the Table 2 below.

Table 2: Reliability, consistency and validity

Constructs	Items	Factor loadings	Alpha value	AVE	C.R
Attitude Towards Behaviour			0.833	0.640	0.876
	ATB1	0.888			
	ATB2	0.843			
	ATB3	0.881			
	ATB4	0.925			
	ATB5	0.874			
Subjective Norms			0.732	0.626	0.833
	SN1	0.825			
	SN2	0.854			
	SN3	0.905			
	SN4	0.763			
	SN5	0.780			
Perceived behavioural control			0.791	0.600	0.856
	PCB1	0.714			
	PCB2	0.786			
	PCB3	0.877			
	PCB4	0.859			
	PBC5	0.868			
	PBC6	0.747			
Individualism			0.803	0.632	0.871
	IC1	0.844			
	IC2	0.897			
	IC3	0.818			
	IC4	0.834			
	1C5	0.749			
	1C6	0.846			
Entrepreneurial intention			0.643	0.770	0.877
	IE1	0.881			
	IE2	0.940			
	IE3	0.877			
	IE4	0.905			
	IE5	0.777			

5.1.1 Discriminant validity

Discriminant validity is a statistical tool that measures the degree to which a construct is distinct from other constructs, which are supposed to be disparate. According to Hair *et al*. (2014), the discriminant validity shows that how a particular construct is unique and covered phenomena not presented by other constructs of the model. Similarly, the discriminant validity is empirically calculated with the help of Fornell and Larker criteria.

Table 3: Discriminant validity (Fornell-Larcker criterion)

Constructs	VIF	ATB	EI	IC	PBC	SN
ATB	3.07	0.906				
EI	3.89	0.883	0.878			
IC	2.28	0.243	0.327	0.832		
PBC	2.93	0.755	0.704	0.339	0.811	
SN	1.90	0.586	0.477	0.222	0.534	0.827

The above Fornell and Larcker criterion shows that each construct is dissimilar with the preceding constructs. As endorsed by Fornell and Larcker (1981), AVE values of all study constructs and their respective square root were greater than the correlations among constructs. Our results also show that all the constructs are well different and discriminant from each other. In addition to the discernment validity, the multicollinearity test also performed with the help of variance inflation factor (VIF) analysis. All the values of the VIF is greater 5.0, which reveals that there is no any multicollinearity issue among the different constructs.

5.2 Structural model

The second important phase of assessment is the structural model measurement. Coefficient of determination or commonly know it the R^2 is one of the crucial criteria in the assessment of the structural model in Smart PLS-SEM through bootstrapping. According to the Hair *et al*, (2017) the R-square and path analysis are the most important tool to assess the model inner evaluation. The vales of R^2 and path analysis presented in the following tables below.

Table 4: Coefficient of determination

Constructs	Values of R^2	
	Pakistan	Malaysia
Attitude towards behavior Subjective norms Perceived behavioral control Individualism	0.343	0.823

Cohen et al. (1989) recommended the acceptable values of R^2 which are 0.26, 0.13 or 0.02 respectively representing strong, moderate and weak effect of the exogenous variable on the endogenous variable. The total effect of the exogenous variables on the endogenous variable is 0.343 of Pakistan and 0.823 of Malaysia. Both countries R^2 vales are greater than 0.26 as suggested (Cohen *et al*., 1989).

5.2.1 Path analysis

The last phase of structural model testing is to evaluate the proposed research hypothesis while performing the path coefficient analysis. The path coefficient explained the correlation among the independent, moderation and dependent variables of the theoretical model.

Table 5: The summary result of the path analysis

Hypothesis	Pakistan					Malaysia				
	Beta	Std	T-value	P-value	Decision	Beta	Std	T-value	P-value	Decision
H1	0.280	0.031	9.032	0.001	Supported	0.885	0.102	8.652	0.000	Supported
H2	0.356	0.054	6.614	0.000	Supported	0.103	0.141	2.893	0.004	Supported
H3	0.119	0.045	2.667	0.004	Supported	-0.02	0.154	0.082	0.934	Not Supported
The indirect effect of moderation										
H4	0.110	0.063	1.748	0.081	Not Supported	0.029	0.226	0.128	0.898	Not Supported

H5	0.040	0.059	0.678	0.498	Not Supported	0.157	0.151	1.042	0.297	Supported
H6	0.029	0.066	0.443	0.658	Not Supported	0.119	0.151	2.144	0.032	Not Supported

The path coefficient values of the variable ATB with respect to the EI on Pakistani (p = 0.646) and Malaysian (p = 0.646) students are significant, hence H1 is accepted in both cases. Similarly, the path coefficient values of the variable SN with respect to the EI of the Pakistani (p = 0.646) and Malaysian significant (p = 0.646) students are also significant, hence H2 is also accepted. Moreover, the path coefficient value of PBC with respect to EI on Pakistani students are significant (p = 0.646) however, the case of Malaysian students is insignificant (p = 0.646).

The indirect analysis showed that the moderating variable of individualism on the relationship between ATB and EI is insignificant in respect of the Pakistani (p-vale =.978) and Malaysian (p-vale =.978) students. Similarly, the moderating role of individualism on the relationship between SN and EI in respect of Pakistani students are insignificant (p-vale =.978), however, in the case of Malaysian students are significant (p-vale =.978). The third moderating role of individualism on the relationship between PBC and EI in respect of the Pakistani (p-vale =.978), and Malaysian (p-vale =.978) are insignificant.

6. Discussion

Through the identification of research gap from the relevant literature, this study tried to find the factors which effect the EI of the university students by proposing a comparative research model (González-Serrano *et al*., 2021). The results reveal some interesting information regarding the EI. The three independent variables ATB, SN & PBC have a significant effect on the EI of the university students of Pakistan, however the result is different in the case of Malaysian students. Two variables namely ATB and SN has positive effect on the EI of the Malaysian students, however the independent variable of PBC does not play any significant role.

In addition, the moderating variable of individualism does not support the relationship between ATB, SN, PBC and EI of the university student of Pakistan. However, the results are different with the Malaysian university students. The moderating variable of individualism has a significant effect on the relationship between SN and EI. Although it does not affect the relationship of ATB, PBC and the EI of the Malaysian students. Additionally, this study supports the previous research notion of "the relationships among the TPB components are equally strong and comparable across Pakistani and Malaysian university student's cultures – the only exception being the relation of social norms with intentions". But as we observed that the moderating effect is partially different in the case of Pakistan and Malaysia.

7. Conclusion

Overall, this cross cultural study makes a theoretical and empirical contribution in the EI literature while studying the moderating role of national cultural on the relationship between TPB and EI of the developing country Pakistan and the emerging country Malaysia. Moreover, the results confirm that the TPB has significant impact in the development of the EI among the university students of Pakistan and Malaysia except the variable PBC which shows insignificant result. Similarly, there is no any moderating role of individualism on the EI of the university students in Pakistan. The results are consistence with the previous research studies conducted by (Naqvi & Siddiqui, 2020). However, the variable of individualism moderates the relationship between SN and EI of the Malaysian students. The dissimilar results are found due to the cultural and socio-economic difference, which exist between Pakistan and Malaysia. Hofstede's national culture categorize Pakistan and Malaysia as a collectivist culture country, but this study found difference between Pakistan and Malaysia.

The comparative study of Pakistan and Malaysia bring some new insights about the EI and role of national cultural. The govt. institution and universities can utilize this study to promote entrepreneurship in their respective countries. However, this study has some limitation in applying the findings. Like, the research did not use the random sampling and the data were collected from the university students only. Hence, the finding may not be equally applicable to the other sectors and participants. Further longitudinal studies give more understanding and clear picture of the process of transforming intention into actual action. Despite having certain limitations, this study still fulfilled the scientific requirements and provide new understanding about the EI.

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Malcolm Baldrige National Quality Award (MBNQA) Quality Tool in Education: A Systematic Literature Review

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Abstract: Purpose – The purpose of this study is to determine the effects of the Malcolm Baldrige National Quality Award (MBNQA) quality tool in education. Identifying the main themes of these effects is an additional aim of the present study. Understanding these issues can enable higher and secondary education centres to direct their management towards achieving outstanding results. **Design/methodology/approach** – A systematic literature review was conducted based on data from two academic publishers, Emerald, Taylor and Francis. The 41 peer-reviewed journals articles were published between 1990 and 2023 and presented the results of the MBNQA quality tool in education. **Findings** – According to this research, several implications of the MBNQA quality tool in education are presented. The review of the literature reveals that there are many results found about the application of the quality tool in Tertiary and Secondary education, the challenges they face in terms of innovation, human resources and operations, as well as the achievement of excellent results from the application of the methodology. The main topics supported in the literature are human resources, knowledge management and the quality of services offered for the satisfaction of teachers and students. **Research limitations/implications** – An important limitation is that data were drawn from only two major journals (Emerald, Taylor and Francis), as implementation of the MBNQA quality tool is mainly found in the private sector. In addition, many keywords such as Quality Assurance and Business Excellence, led to application of the quality tool in businesses and organisation and little is its application in the public sector and education as a result the findings of articles were limited. An equally important limitation is that the authors did not always have got access to all databases and peer-reviewed journals, as well as in any review articles in languages other than English. **Practical implications** – This research is of interest to academic researchers, scholars and key decision makers in the field of education. The advantages recorded from the implementation of the MBNQA quality tool and the limitations from the study and presentation of the 41 articles motivate academic researchers to further study service quality in order to create a climate focused on learning for the satisfaction of students and teachers so as to fill the gap of limited publications in the field of education. **Originality/value** – Many models have been adapted to higher education including the MBNQA quality tool. The MBNQA appears to have the largest number of historical applications in higher education, with its focus on customer satisfaction and improvement information. However, the systematic literature review reveals the increasing trend of using quality tools in the field of education in recent years. Moreover, literature reviews on the use of models in this field are limited. Therefore, more research is needed to determine the benefits, as well as limitations and outcomes of applying qualitative tools in Education in the future.

Keywords: MBNQA, Systematic literature review, Total Quality Management, Business Excellence and Education, Baldrige award, Quality Assurance.

1. Introduction and motivation

Promoting the quality management of organisation and businesses is a goal of many public organisation and private businesses (Anastasiadou & Zirinoglou, 2015a;2015b;2020a;2020b;2020c; Taraza & Anastasiadou, 2019a;2019b; Papadimitriou, et al., 2022; Anastasiadou & Papadaki, 2019). Many statistical tools and quality models have been used to improve processes. Productivity and efficiency of these organisations including the quality tool of Baldrige, known for his work in promoting quality management and for the creation of the Baldrige Award, which is awarded to companies and organisations that demonstrate excellence in their activities (Anastasiadis et al., 2016; Anastasiadou & Anastasiadis, 2019; Anastasiadou, 2015;2016;2018a;2018b;2018c;2018d; Taraza et al., 2023; Papadaki & Anastasiadou, 2019). While Baldrige's legacy is primarily associated with his contributions to the business world, his ideas about quality management and performance excellence can be applied to many other areas, including education (Anastasiadou et al., 2016a; 2016b; Anastasiadou et al., 2014; Anastasiadou & Taraza, 2019a;2019b;2019c; 2020a;2020b). Educational institutions are increasingly evaluated based on their ability to deliver results and achieve specific goals (Fisher et al., 2001). The importance of quality in education is a matter of priority for nations and many efforts have been made to improve it. The international literature presents many examples of quality principles with significant results in the administration of higher education institutions (Yeo and Li, 2014; Min et al., 2012; Vauterin et al., 2011; Nadir et al., 2009; Owlia and Aspinwall, 1996). If a company or public agency does not meet

the Malcolm Aldridge standard's required references for the evaluation it is rejected and does not receive the corresponding award (NIST, 1995).

In 1999, with the Bologna treaty, the way to its upgrade was opened of higher education of the EU countries. The establishment of the European Council in 2006 had intended to encourage Higher Education institutions to introduce or develop internal quality assurance systems following specific standards, including the Malcolm Aldridge quality tool. There were a total of 15 Minas awarded over the period 2001-2021, representing 15 different higher education institutions that were recognised and awarded for their quality (Table 1).

Table 1: Malcolm Aldridge National Quality Award Winners

Year	Secondary and Tertiary Education	Journal
2021	The Charter School of San Diego	It shows an overall increase in successful school transitions (graduation) from 95.7% to 98.1%. It established market leadership as the largest independent charter school in its service area and had the largest market share in San Diego.
2019	Howard Community College	Howard Community College has consistently outperformed local and national benchmarks for degrees and certificates by more than 200%. The educational institution managed to triple the graduation rate of black students within two years of entering the college. State funding of the college is the best in the state in the 10 last years.
2018	Alamo Colleges District	Alamo Colleges District's four year graduation rate increased by 150%, with a simultaneous increase in the number of students accepted on scholarship. Students' satisfactions with the overall educational experience is 88.4% more than two percentage points higher than the national norm, as measured by the Community College Survey of Student Engagement
2018	Tri County Tech	Student completion and transition rates have been in the top 25 percent nationally for eight fiscal years. At the same time seventy percent of its high school graduates go on to further education in adult colleges or technical schools with an increased rate of vocational rehabilitation
2015	The Charter School of San Diego	The school maintained overall student and parent satisfaction levels close to 100 percent from 2010 to 2015, with the same teaching staff at 90 percent, which it selects on strict degree criteria. The innovation of the school is the continuous evaluation of financial performance
2013	Pewaukee School District	Teachers with the goal of empowering students and their needs use indicators and conduct continuous assessments to adjust instruction in the classroom. Action plans are reviewed every 90 days. Staff satisfaction scores for pay, benefits and initiative exceed the national average
2010	Montgomery County Public Schools	In 2010, half of graduates scored a college readiness score of 3 or higher on at least one Advanced Placement exam, twice the state rate and three times the national rate. To achieve this he focused on the students' knowledge and skills necessary to achieve the goal
2008	Iredell Statesville Schools	Outstanding continued collaboration of the district with the school to improve student learning. He used the Plan – Do – Study – Act cycle system to identify and implement opportunities for student improvement and increased student performance. To meet the '21st century skills for leaders and teachers' strategy, he implemented assessment rubrics that led to improves staff capacity
2005	Jenks Public Schools	Academic Performance Index scores exceed state and national level. The school's innovation was its student exchange programs with schools in China
2005	Richland College	The school implemented for measures of continuous grading of students regarding the convenience, variety of courses and intellectual development. The school gained a reputation for leadership in field of education and many professors became presidents of other colleges
2004	Kenneth W. Montfort College of Business	Montfort College of Business was ranked top in student satisfaction measures. Montfort College of Business is one of five undergraduate only business schools in the nation accredited in both business and accounting
2003	Community Consolidated School District 15	Student performance increased from 42 percent to 82 percent for reading from 42 percent to 82 percent for science
2001	Chugach School District	Reading achievement test scores increased by a large percentage. In the four subject areas tested on the Alaska High School Graduation Qualifying Exam, Chugach School District exceeded the stage average
2001	Pearl River School District	Student and parent satisfaction increased to a great extent. A complex set of scan able progress indicators provides continuous up to date monitoring of area performance
2001	University of Wisconsin Stout	Immediate vocational rehabilitation of graduates was achieved at a rate of 98 percent. This has been achieved with a Mission Driven Market Smart focus on a range of programs leading to professional careers mainly in industry and education

In the field of education, many institutions have become recipients of the MBNQA. In the USA the MBNQA is considered the most prestigious quality award in education as well as in the public sector (NIST, 1995;1996;1997;1998;1999;2000a;2000b). Universities based on the standard quality tool carry out regular evaluations of their services in order to keep pace with the rapid changes of technology and economics related to learning and competition in the field of their services (Kim et al., 2014). Despite the widespread use of the MBNQA quality management system by businesses and public organisations few studies have been carried out in the field of education (Manville et al., 2019; Breus et al., 2017; Eltobgy and Radwan, 2010; Beard, 2009). The lack of a literature review of the MBNQA quality model in this area prompts further research and creates the

need for further investigation focusing on the practical implications of the tool. This study seeks to review the literature in order to identify and answer the question:

How is the MBNQA quality tool used in education and what is its contribution to future research?

The present study aims to systematically review the literature on the MBNQA quality management system in order to identify and record examples or highlight the benefits of implementing the model in the field of education.

2. Methodology

After the selection of the research topic and the thorough study of corresponding researches regarding the assurance about the quality in education, the research question was formulated according to the aims and objectives of the study. In recent years, academic interest in quality assurance has continued and more and more research has been undertaken (Aamodt et al., 2016).

This systematic literature review focuses on the implementation of the MBNQA quality system in the field of education highlighting significant benefits at the organisational level (Buytendijk et al., 2011). In the field of education, the interest in the application of the tool is increasingly, while academic interest makes it necessary to carry out more studies and publications to further facilitate research and conduct comparative results (Al – Dahiyat, 2020). In order to achieve the search, there was a gathering and recording of articles related to the achievement of the purpose of this research, moreover, articles were obtained from academic journals that are considered reliable (Alblooshi et al., 2021), and published after a critical selection. The selection of these journals Emerald and Taylor and Francis was based on the fact that they are universally known and reliable and the articles are published after checking their reliability and validity by specialized review staff, while their evaluation was also done by the members of the writing team, who held continuous meetings for the analysis of the data, the evaluation, the rejection of irrelevant articles and the final recording of conclusions.

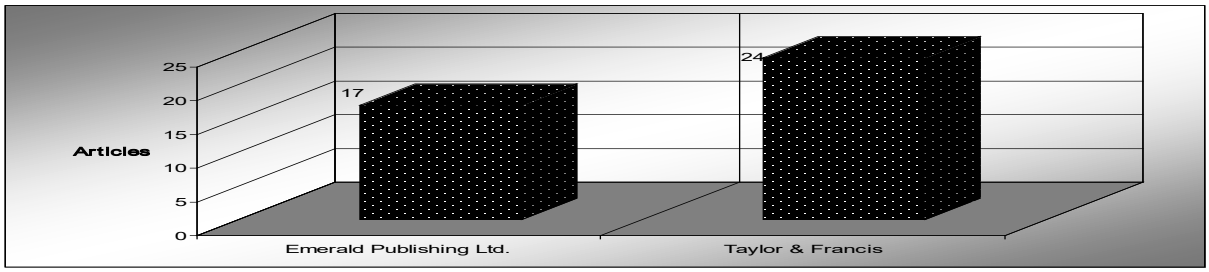

Figure: 1: Malcolm Baldrige National Quality Award and its applications in education

The investigation brought to the surface a number of studies and after thorough study those relevant to the subject were identified, taking into account the title, the summary and the conclusions of each research. The 41 published articles presented in Figure 1. Of these articles 17 were selected from Emerald magazine and 24 from Taylor and Francis. Although in the field of education there are not many publications regarding the Malcolm Baldrige quality tool (Ronko & Mezquida, 2018), however, the literature review records the benefits of applying the model.

At the review stage, the specific articles of the present study were selected based on their reliability and evaluation (Trainfield et al., 2003). The literature search was based on the following terms: MBNQA, Systematic literature review, Total Quality Management, Business Excellence and Education, Baldrige award, Quality Assurance. The specific articles were selected taking into account the title, abstract and conclusions contained in them. The credibility of the articles was based on their judgment by specialised staff, before their publication and their evaluation was done by the members of the writing team. In Table 2, the title of the articles, the year of publication, the authors and the journal of publication are presented in detail, while the final conclusions are recorded in a column in order to compare them and help in further research (Hu et al., 2015).

Table 2: Malcolm Baldrige National Quality Award and results in Education

Study	Title	Journal
Chatterji & Kiran (2022)	The influence of human, organizational and relational capital of universities on their performance: a developing economy perspective	Journal of Intellectual Capital Emerald Publishing Limited 1469-1930
Alauddin & Yamada (2022)	TQM model based on Deming prize for schools	International Journal of Quality and Service Sciences Vol. 14 No. 4, 2022 p.p. 635-651 Emerald Publishing Limited
Cook & Zhang (2019)	The Baldrige Award's falling fortunes	Benchmarking: An International Journal Vol. 26, No. 6, 2019 p.p. 1972-1994 Emerald Publishing Limited
Bluin & Smith (2019)	Measuring the continuous quality improvement orientation of medical education programs. A validity study of the Baldrige: Are We Making Progress questionnaire	International Journal of Health Care Quality Assurance Vol. 33, No. 2, 2020 p.p. 158-171 Emerald Publishing Limited
Ah – Teck & Starr (2012)	Principals' perceptions of quality in Mauritian schools using the Baldrige Framework	Journal of Educational Administration Vol. 51, No. 5, 2013 p.p. 680-704 Emerald Publishing Limited
Sampaio et al (2012)	A comparison and usage overview of business excellence models	The TQM Journal Vol. 24, No. 2, 2012 p.p. 181-200 Emerald Publishing Limited
Arif (2007)	Baldrige theory into practise: a generic model	International Journal of Educational Management Vol. 21, No. 2, 2007 p.p. 114-125 Emerald Publishing Limited
Ruben et al. (2006)	Evaluating the impact of organizational self assessment in higher education. The Malcolm Baldrige Excellence in Higher Education framework	, 2007 p.p. 230-250 Emerald Publishing Limited
Mizikaci (2006)	A systems Approach to program evaluation model for quality in higher education	Quality Assurance in Education Vol. 14, No. 1, 2006 p.p. 37-53 Emerald Publishing Limited
Alshare & Grandon (2005)	The Baldrige Education Criteria or Performance Excellence Framework Empirical test and validation	International Journal of Quality & Reliability Management Vol. 23, No. 9, 2006 p.p. 1118-1157 Emerald Publishing Limited
Jacob et al. (2004)	An empirical assessment of the financial performance of Malcolm Baldrige Award winners	International Journal of Quality and Reliability Management Vol. 21, No. 8, 2004 p.p. 897-914 Emerald Publishing Limited
Harer (2003)	Performance measures of Quality for academic libraries. Implementing continuous improvement projects. A Delphi study	Advances in Library Administration and Organization Vol.20, 2003 p.p. 229-296 Emerald Publishing Limited
Pannirselvam & Ferguson (2000)	A study of the relationships between the Baldrige categories	International Journal of Quality & Reliability Management, Vol. 18, No. 1, 2001 p.p. 14-34 Emerald Publishing Limited
Lee et al. (2000)	Strategy formulation framework for vocational education: integrating SWOT analysis, balanced scorecard, QFD methodology and MBNQA education	Managerial Auditing Journal 2000 p.p. 407 – 423 Emerald Publishing Limited
Loomba & Johannessen (1997)	Malcolm Baldrige National Quality Award Critical issues and inherent values	Benchmarking for Quality Management & Technology, Vol. 4, No. 1, 1997 p.p. 59-77 Emerald Publishing Limited
Tumalla & Tang (1994)	Strategic quality management Malcolm Baldrige. Malcolm Baldrige and European Quality Awards and ISO 9000 certification Core concepts and comparative analysis	International Journal of Quality & Reliability Management Vol.13, No. 4, 1996 p.p.8-38
Feurer & Chaharbaghi (1992)	Baldrige Winners	Emerald Backfiles 1992
Tran & Kula (2023)	Juggling quality labels with centralised analytics: How the first Nordic triple crowned business school does it	Total Quality Management & Business Excellence 2023
Mendes & Alves (2022)	The balanced scorecard in the education sector. A literature review	International Journal of Educational Management Cogent Education, 2023, 10:2160120
Chen et al. (2017)	Critical quality indicators of higher education	Total Quality Management & Business Excellence Vol. 28, Issue 1-2
Martinez Caro et al. (2015)	An application of the performance evaluation model for e-learning quality in higher education	Total Quality Management and Business Excellence Vol.26, Issue 5-6
Sadeh & Garkaz (2015)	Explaining the mediating role of service quality between quality management enablers and students' satisfaction in higher education institutes: the perception of managers	Total Quality Management & Business Excellence, Vol. 26, Issue 11-12
Ree et al. (2014)	A study on education quality using the Taguchi method	Total Quality Management & Business Excellence Vol. 25, 2014, Issue 7-8 p.p. 935-943
Yeo & Li (2014)	Beyond SERVQUAL: The competitive forces in higher education in Singapore	Total Quality Management & Business Excellence Vol. 25, Issue 1-2 p.p. 95-123
Garcia & Martinez (2014)	Development and validation of a measure of the quality management practices in education	Total Quality Management & Business Excellence Vol 25, Issue 1-2, p.p. 57-79
Karimi et al. (2013)	A study of the Baldrige Award framework using the applicant scoring data	Total Quality Management & Business Excellence Vol.25, Issue 5-6 p.p. 461-477
He et al. (2011)	Validation of the theoretical model underlying the Baldrige criteria: Evidence from China	Total Quality Management & Business Excellence Vol. 22, Issue 2 p.p. 243-263
Ali et al. (2010)	Testing the critically of HR TQM factors in the Malaysian high education context	Total Quality Management & Business Excellence Vol. 21, Issue 11 p.p.1177-1188
Quinn et al. (2009)	Service quality in higher education	Total Quality Management & Business Excellence Vol. 20, Issue 2 p.p.139-152
Bayraktar et al. (2008)	An instrument for measuring the critical factors of TQM in Turkish higher education	Total Quality Management & Business Excellence Vol. 19, Issue 6 p.p. 551-574

Tambi et al. (2008)	The ranking of higher education institutions: A deduction or delusion?	Total Quality Management & Business Excellence Vol. 19, Issue 10 p.p. 997-1011
Wen et al. (2008)	The quality movement: where are we going? Past, present and future	Total Quality Management & Business Excellence Vol. 33, Issue 1-2 p.p. 92-112
Asan & Taynas (2007)	Integrating Hoshin Kanri and the Balanced Scorecard for Strategic Management: The Case of Higher Education	Total Quality Management & Business Excellence Vol. 18, Issue 9 p.p.999-1014
Calco Mora et al. (2005)	Relationships between EFQM Model Criteria: A case study in Spanish Universities	Total Quality Management & Business Excellence Vol. 16, Issue 6 p.p. 741-770
Grant et al. (2004)	A Comparative Quality Management in US and International Universities	Total Quality Management & Business Excellence Vol. 15, Issue 4 p.p. 423-438
Aksu (2003)	TQM readiness level perceived by the administrators working for the central organization of the Ministry of National Education in Turkey	Total Quality Management & Business Excellence Vol. 14, Issue 5 p.p.595-608
Grant et al. (2002)	Quality management in US higher education	Total Quality Management & Business Excellence Vol. 13, Issue 2 p.p. 207-215
Przasnyski & Tai (2002)	Stock performance of Malcolm Baldrige National Quality Award Winning Companies	Total Quality Management & Business Excellence Vol. 13, Issue 4 p.p. 475-488
Zink et al. (1994)	Quality assessment: instruments for the analysis of quality concepts based on EN 29000 the Malcolm Baldrige Award and the European Quality Award	Total Quality Management & Business Excellence Vol. 5, Issue 4, p.p. 329-343
Taylor & Adair (1994)	Evolution of quality awards and self assessment practices in Europe: a case for considering organization study	Total Quality Management & Business Excellence Vol. 5, Issue 4, p.p. 227-237
Kanji & Searstone (1990)	Quality control is the way of thinking of quality assurance	Total Quality Management & Business Excellence Vol. 1, Issue 2 p.p. 259-268

From the 41 sample articles examined, an evaluation was carried out by each researcher and after recording the personal conclusions a meeting was held to discuss the results, compare them, evaluate them and record them in the final table. The last column shows the great contribution of the Baldrige quality tool to the field of education and the improvement of procedures in this area, with the simultaneous satisfaction of parents, teachers, pupils and students. It must be emphasised that with the bibliographic review of the articles it was possible to identify limitations. Table 1 presents tertiary institutions that have been awarded the Malcolm Award and the benefits of its implementation, while in table 2 it becomes clear that the application of this single purpose even in schools or institutions that have not been awarded has consistently confirmed significant changes and benefits in education.

3. Results

The 41 sample articles presented in this research refer to the application of the Baldrige quality tool in primary, secondary and tertiary education, higher education (Chen et al., 2017; Martinez et al., 2015; Ali et al., 2010; Calvo-Mora et al., 2005). The published articles show an ever-increasing interest among researchers and academics. The quality tool of the Malcolm Baldrige model plays an important role in education and despite the challenges faced by modern institutions the purpose of the quality tool is to improve any kind of process, thus increasing the satisfaction not only of students and learners, but also of educational researchers, academics, parents.

Of the 41 articles studied in this research, 17 are published in Emerald and 24 more in Taylor & Francis and these journals are globally recognized by the academic and research community. As can be seen in Figure 2, the MBNQA quality system from very early in 1990 began to be applied in the field of education. After 2001 there was a growing interest in the implementation of MBNQA quality system in education. Figure 2 shows the annual increase in publications on MBNQA quality system implementation from 1990 to present. From 2001 to 2011 there was a big interest in the application of the tool in education. After 2012, the interest in this specific quality tool in education remains undiminished, which attests to the literature that some authors continue to recommend that higher education use the Malcolm Award to document performance (Chen et al., 2017).

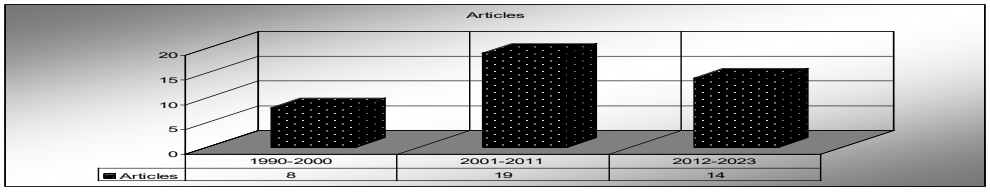

Figure 2: Number of relevant publications from 1990 to 2023

The selected articles were read repeatedly by experienced team members, who continuously took notes to document the research. The team members met to reach an agreement on the recording of the final data, because this method of analysis requires the researchers to have special experience and knowledge to draw valid conclusions. The application of the quality model at all levels of education shows that leadership plays an important role in shaping vision. What should be realised is that effective implementation of MBNQA quality system must be treated with due care and commitment from manager in order to deliver benefits to the organisation that will enable and bring about the effective implementation.

Quality tools are essential in education as they can improve efficiency, evaluation with simultaneous feedback and saving time. The MBNQA was created to measure and reward excellence and can be successfully applied to educational institutions, helping to improve the quality of education they provide. The model offers a practical framework for collecting data on educational institutions, which can be used to evaluate their performance. By recognizing the importance of quality and incorporating the model into their strategic planning, organisations can make positive changes that will benefit their students and their future as well.

4. Discussion

During the bibliographic review, 41 articles were selected from Emerald and Taylor and Francis journals, after their study and evaluation by all members of the research team. The credibility of these articles is based on their evaluation by specialised staff and their publication. These articles analyse the MBNQA quality tool and its contribution to the field of education. However, during the search for articles it was found that minimal research has been carried out for the use of statistical and quality tools in the field of education, as it is known that they were originally designed for their application in the private sector (Lukrafka et al., 2020). While exploring the articles in the respective Emerald and Taylor and Francis journals, which allow access to a wealth of online articles in all disciplines, several key words, such as MBNQA, Systematic literature review, Total Quality Management, Business Excellence and Education, Baldrige award, Quality Assurance, were used to facilitate their identification.

It is a fact that the model shows great adaptability in the field of education and many educational organisations have successfully used this model and have received the National Quality Award in higher and secondary education in many parts of the world, regardless of size and demographic characteristics.

5. Conclusions, limitations and agenda for future studies

The application of the MBNQA quality tool has not been widely studied in the field of education, with the consequence that there is insufficient literature regarding the standard and other related quality models. For this reason, it was also difficult to find articles aimed at education, of all levels. It is necessary to further investigate the standard of quality in the educational sector, as well as to record and publish future proposals by researchers and academics. This research seeks to collect and record the results of the application of the Baldrige quality tool in the educational sector, with the aim of recording the benefits, establishing the need for further research on the use of the tool at each level of education separately and the recording beneficial outcomes and weaknesses.

The findings of this research prove that the application of the model in primary, secondary and tertiary education can bring significant benefits in the implementation of processes, in the saving of financial and human resources, with the simultaneous satisfaction of educational staff, pupils, students and parents. In addition, through the detailed presentation of the advantages of applying the model in schools and universities, all levels are encouraged to make a corresponding application in order to achieve their goals and improve their efficiency. The present review study faced some limitations, one major limitation is the fact that the articles selected from only two journals (Emerald, Taylor and Francis). It should be noted that the researchers did not have got access to all databases. Another limitation is that because quality tools such as Baldrige's were originally designed for the private sector, minimal studies have been conducted in the field of education. It is suggested that more studies should be conducted on the model with the help of big data sets considering algorithms connected with programming of Big Data Brooks in the Cloud (Souravlas et al., 2020;2021a;2021b;2021c;2022; Tantaraki et al., 2020; Souravlas & Anastasiadou 2022a;2022b; Souravlas 2019; Souravlas & Katasavonis, 2019), especially during the period of pandemic where the Social Media Technology were used (Papademetriou et al., 2022) and that conclusions and weaknesses be recorded and published.

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A Literature Review and Emerging Trends on key Topics of Risks and Challenges Facing Tourism real Estate Investments

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Abstract: Tourism real estate entrepreneurs and general real estate investments face a multitude of risks and challenges that can impact their success. These risks can stem from economic, environmental, and political factors. Economical risks such as inflation and recession can affect the demand for real estate investments. Environmental risks such as natural disasters or climate change can lead to damage to the property and the desirability of the location. Political risks such as changes in regulations or geopolitical tensions can also affect the success of the investment. This paper conducts a literature review in order to mitigate these risks for entrepreneurs and real estate investors before making investment decision. This paper includes analyzing the local market, understanding the demographic trends, and identifying potential challenges that may arise. Moreover, the implementation of risk management strategies and the existence of a contingency plan can contribute to the stability and sustainability of this type of investment with a focus on real estate, especially tourism real estate. Further research and analysis are needed to better understand the impacts of technological advancements on the real estate industry. Advancements such as virtual reality and blockchain technology have the potential to revolutionize the industry, but there is still much to learn about how they will affect the market. Additionally, the impacts of climate change on the real estate industry need to be further explored. As extreme weather events become more frequent, it is important to understand how this will impact the desirability of certain locations and the potential for property damage. In conclusion, the risks and challenges facing tourism real estate entrepreneurs and general real estate investments are numerous and varied. It is essential for investors to conduct thorough research and analysis before making any investment decisions and to implement risk management strategies to protect against unexpected events.

Keywords: Tourism Real Estate, Risks, Challenges, Strategies, Economic, Environmental, Political Impact

1. Introduction

Despite the attractiveness and implicit returns of real estate investment in the tourism industry, a significant number of risks and challenges exist, as observed in former studies. These challenges vary from broad economic enterprises to more specific issues related to the position and demographics of the property. Historically, the real estate market has been significantly affected by macroeconomic factors such as inflation and recessions, which can dramatically alter the investment landscape. Economic instability can discourage consumer spending, potentially leading to a decline in demand for tourism and latterly for tourism-related real estate.

Additionally, environmental risks pose another layer of complexity. As noted the increasing frequence of extreme weather events due to climate change could lead to property damage or loss, depreciating the value of the investments and discouraging potential tourists. Likewise, political insecurity, changes in regulations, and geopolitical pressures can drastically alter the investment landscape, posing significant threats to tourism real estate investments. More lately, the 2019 global health crisis has underscored the necessity of preparing for unlooked-for challenges and their implicit to disrupt the real estate market within the tourism industry (Tanrıvermiş, 2020).

The last decade has seen swift transformations worldwide, leading to numerous risks and hardships for various enterprises, among them investing in the tourism real estate industry (Lane, Kastenholz and Carneiro, 2022). Protecting investors' interests within said industry necessitates substantial knowledge and proactive management amidst a fluid environment facing economic upheavals, environmental change, political indecisiveness, and other social matters (Cunha, Kastenholz and Carneiro, 2020). To prepare individuals for making informed decisions based on strategic visions, this paper utilizes extensive literature analysis that helps identify the major risks as well as obstacles' investors face when dealing with real estate holdings within the tourism industry (Post et al, 2022).

The global financial crisis that occurred in 2008 resulted in significant losses for investors and a decline in real estate values. In Canh and Thanh's (2020) research, they emphasize the need for tourism real estate companies to prepare for potential economic challenges. The broader economy was also impacted severely worldwide as noted by Garriga, Gete and Tsouderou (2023), highlighting the necessity of understanding and planning for such downturns, especially within the tourism industry.

Over the past decade, the environment and its potential impact on real estate investment have garnered significant attention (Pacelli, Pampurini and Quaranta, 2023). This surge in focus is driven in part by an increasing frequency of extreme weather events associated with climate change that can result in considerable property damages and decrease tourism attraction to certain areas. Our study specifically highlights the pressing necessity for a comprehensive evaluation of how climate change influences real estate investments in the tourism sector (Voumik et al, 2023). Furthermore, from a sociological perspective, changing demographics and evolving tourist preferences present both prospects and challenges for investors operating within the tourism industry (Fawzy and Saad, 2023).

Political risks hold significant weight in real estate investments within the tourism industry (Caporale et al, 2023). Investment performance can be adversely affected by factors such as alterations in regulations, geopolitical unrest and instability, therefore a deep understanding of these variables is crucial for effective planning and risk reduction of real estate projects (Weaver, Moyle and McLennan, 2023).

The 2019 worldwide health emergency and its ensuing financial repercussions on genuine domain ventures have highlighted the significance of potential arrangements for unexpected calamities (Alves et al, 2020). The pandemic's far-reaching impact has been especially felt within the visitor segment, affecting genuine domain ventures inside the trade (Balemi, Füss and Weigand, 2021).

As a portion of its endeavors to discover feasible arrangements, the visitor sector has been especially fascinated by green building and energy-saving innovation. This has ended up basic within the genuine domain advertising, especially in light of the around-the-world vitality emergency of 2021. As a result of this inclination, genuine domain contribution is encountering a worldview alter. Rudnicki, Vagner, Demko, and others have been included in the dialogue.

The real estate industry has also been intensely affected by innovative breakthroughs. Blockchain and other troublesome innovations are now beginning to alter the way contributions are made, particularly in the tourism domain. Understanding these advancements and how they influence genuine domain speculation may be a key component (Barkham, Bokhari, & Saiz, 2022).

This consideration aims to address the complicated risks associated with tourism real estate investment. We will review significant political, environmental, economic, and technological challenges. We examine macroeconomic variables like expansion and contraction as well as their impact on investment demand and reasonability in our research. We will examine environmental threats, specifically climatic change and extreme weather, and their recommendations for property damage. The topic will further explore how political insecurity and emerging technologies, such as virtual reality and blockchain, can alter the state of the tourism industry. The goal is to provide actionable strategies for business owners, investors, and policymakers while highlighting potential areas for future research, particularly in the areas of technology and climate change.

The purpose of this record is to better understand and verbalize the vital administrative procedures required to oversee these complex risks and challenges. This in-depth examination points to the need to assist financial specialists, commerce proprietors, and policymakers in considering genuine bequest speculations in tourism to make more educated choices and create successful change administration methods (De Paola et al, 2022).

2. Theoretical background

2.1 Economic, political and social risks, and challenges for real estate investments in the tourism sector

This review discusses the complexities of real estate investments in the tourism sector, including how supply-demand dynamics, changes in travel behavior, and political risks have a significant impact on these assets. It highlights how political unrest may have a negative impact on travel demand and, consequently, investment returns. In order to emphasize how crucial it is to take these factors into account when making investment decisions, the paper also highlights sociological challenges brought on by changing consumer preferences and demographic shifts. The research emphasizes the significant influence of macroeconomic factors on real estate investments related to the tourism industry when considering economic risks (Karadag, 2021). Numerous elements, including inflation, economic downturns, interest rates, and currency exchange rates, have a significant impact on the profitability and longevity of these investments (Chen, Huang and Wu, 2020). Additionally, changes in travel habits and the interaction between supply and demand have a significant impact on the economic viability of these assets (Wang et al, 2022).

The tourism industry's real estate investments can be greatly influenced by political risks, such as alterations in government regulations, conflicts in geopolitics, and changes in the regulatory framework (Sandra and Nnamdi, 2022). Research has shown that political instability can negatively impact the demand for travelers and, consequently, the industry's return on investment (Zhang et al, 2022). Moreover, sudden changes in tax laws and land use regulations can also impact investment returns (Ghadami et al, 2022). Sociological issues, such as changing customer preferences and demographic shifts, pose a potential threat to the sector (Kowalczyk-Anioł, 2023). Investors should consider challenges such as the aging populations in developed countries and the rising number of millennial travelers who prioritize experiences over traditional tourism offerings (Lee et al, 2021).

2.2 Risks, challenges related to climate change and impacts on tourism real estate investments

Climate change poses a variety of risks to real estate investments in the tourism industry, with inadequate exploration being done on this connection. Environmental risks like sea position rise and extreme weather events can damage property and affect traveler appeal. Transition risks brought on by legal and request changes brought on by climate change make effects more complex. Tourism is getting more environmentally conscious, favoring sustainable lodging, but this can come with reputational risks, particularly in high- carbon regions. This section seeks to explore these unresearched difficulties.

Environmental hazards play a significant role in the tourism real estate market. The occurrence of natural disasters and the effects of climate change can lead to substantial property damage, ultimately influencing the desirability of an area as an investment (Blázquez-Salom et al, 2019). For example, a study conducted by Li and Grant in 2022 revealed that investments in coastal tourism real estate may experience devaluation due to rising sea levels and global warming. Furthermore, the profitability of specific property types can be affected by the growing environmental awareness among tourists and the shifting preferences towards eco-friendly accommodations (Park and Kang, 2022).

Tourism real estate investments face unprecedented climate change risks (Vardopoulos et al, 2023). The first hazard arises from the increasing intensity and frequency of extreme weather events such as floods, storms and heat waves and their physical impacts. Due to the potential for widespread damage, real estate values may decline, especially in areas where such incidents are more likely to occur (Akhtar, 2020). Additionally, the cost of insuring these properties may increase to cover any losses, which will impact investment returns (Pathak et al, 2021).

The second difficulty is related to the sector's vulnerability to transition risks posed by climate change. These include legal adjustments to address climate change, which may require substantial investment in real estate to increase its resilience or reduce its carbon footprint (Steiger et al, 2022). The growth of sustainable tourism may also mean that real estate cannot keep pace loses value over time (Paramati and Roca, 2019).

Reputational risk is the third impact of climate change. As people become more aware of climate change and its impacts, consumer tastes may shift towards more sustainable travel options, which may affect demand for certain accommodations. Real estate held in areas with high carbon footprints may lose value as customers choose greener options (Nunes and Cooke, 2021).

2.3 Impact of technological advances on the tourism real estate industry

Technological progress impacts multitudinous industries, including tourism real estate, introducing new functional avenues and risks. Arising technologies like blockchain and virtual reality offer implicit revolutions, yet live in a sphere of unclear legislation and misreading. Issues of unequal technology access and data security further complicate this crossroad. This discussion aims to understand these complications to harness benefits and alleviate risks.

The tourism real estate market is not an exception to the technological revolutions that have occurred in many other industries. According to studies published in prestigious journals, emerging technologies, particularly blockchain and virtual reality, have brought about both new market risks and challenges as well as promising opportunities (Koohang et al, 2023). The real estate market is about to undergo a transformation thanks to the decentralized ledger technology known as blockchain, which is best known for its use in cryptocurrencies. It offers potential solutions to lower fraud, simplify transactions, and increase transparency (Laroiya, Saxena and Komalavalli, 2020). The legislative ambiguity and widespread investor ignorance regarding blockchain (Ferreira, 2021) present significant challenges at the same time.

Another ground-breaking innovation, virtual fact (VR), is revolutionizing how prospective buyers view and interact with houses, especially inside the tourism real estate industry (Narang, 2023). Research shows how VR can offer immersive, real-looking tours of homes to potential traders anywhere they'll be. This could develop the pool of possible buyers, enhance the effectiveness of advertising and marketing, and finally improve belongings values (Anderson, Freybote and Manis, 2022). However, there are risks associated with this convenience. Unequal entry to these new tools may come from the virtual gap among geographic regions with state-of-the-art generation infrastructure and others without it, which might also marginalize a few buyers (Rotz et al, 2019).

The potential effects and risks of these and other new technologies on the tourism real estate industry need to be further investigated. Recent studies show that technology's influence on the real estate market extends far beyond transactional processes and property viewing (Fields and Rogers, 2021). Real estate firms (Farida and Setiawan, 2022) may experience changes in investor behavior, market dynamics, and competitive environment as a result of technological developments. For instance, using big data and artificial intelligence to forecast market trends and support investment decisions (Thayyib et al, 2023) is a rapidly developing field that calls for more research. To ensure that technological advancement benefits all parties involved and supports the sustainable growth of the tourism real estate industry (Dwivedi et al, 2022), future research should carefully examine the potential risks and challenges related to data security, privacy, and potential information misuse.

3. Need and Relevance of the Study

The landscape of tourism real estate investment is influenced by a plethora of economic, political, and environmental factors. The tourism industry, while lucrative, is particularly vulnerable to risks and challenges from these diverse spheres. The ongoing climate change crisis, the evolution of technology, and changing global political and economic scenarios significantly contribute to these risks. Moreover, the Covid-19 pandemic has further underlined the inherent volatility of the tourism industry (Yousef, 2020). Thus, understanding these risks and the need to manage them effectively is crucial. However, there is a scarcity of comprehensive studies that focus on these risks within the context of tourism real estate investment. Thus, the need and relevance of the present study lie in its aim to fill this gap in literature, offering a holistic review of risks and challenges in the field of tourism real estate investment. This research is intended to help investors navigate this complex landscape and make informed decisions based on detailed analyses of potential risks and challenges (Kieltyka et al, 2022). Through an in-depth understanding of market trends, risk management strategies, and the impact of technological and environmental changes, investors can better prepare for uncertainties and ensure the stability and sustainability of their investments (Li et al, 2020). Additionally, the study's relevance is underscored by its potential to contribute valuable insights into the future direction of the tourism real estate industry in a rapidly changing global context.

4. Methodology

The methodological approach to this paper, considering the reviewer's comment, is essentially descriptive and narrative, where the analysis is primarily based on secondary data sources. This approach is often utilized in comprehensive literature reviews to ascertain a comprehensive understanding of the topic at hand.

Our methodology follows a systematic technique (Shaffril, Samsuddin and Samah, 2021) with the intention to thoroughly examine, evaluate, and interpret all available research pertaining to the risks and challenges that tourism real estate investments face from economic, environmental, societal, and political standpoints, and the effects of technological advancements on this sector.

We constructed our review questions (e.g. what risks, environmental worries, political troubles, and social problems do investments in tourism real estate present? what results and difficulties does climate alternate present to investments in tourism real estate? what impact do technology advancements have on the real estate tourism property marketplace?), based on the abstract and key sections of the article. We sought to understand the economic risks, environmental issues, political challenges, social problems, the impacts of climate change, and technological advancements on tourism real estate investments. Acknowledging our approach as not being strictly systematic (Petticrew, 2015), we affirm that our purpose is not simply to aggregate data but to synthesize, interpret and generate insights from the literature to inform practice, policymaking, and future research (Adams, Smart and Huff, 2017).

A broad search of multiple databases was conducted, including Web of Science, Scopus, JSTOR, and Google Scholar, using a combination of keywords such as "tourism real estate", "risks", "challenges", "economic impact", "environmental impact", "political impact", "climate change", "technological advancements" and "blockchain technology". This broad search strategy was intended to capture diverse perspectives on the topic from around the globe, focusing on recent literature to provide a current understanding of the issues.

After data extraction, we summarized and synthesized the collected information to weave a narrative around the key risks and challenges faced by tourism real estate investments, outlining the findings in relation to each research question and highlighting areas for future research, particularly those focused on the potential impacts of technological advancements and climate change.

5. Discussions

Assessing risks in tourism real estate investments necessitates a multifaceted approach. Economic risks involve request cycles, macroeconomic factors, affectation, and recession, taking dynamic investment strategies (Jelonek et al, 2022). Environmental challenges like climate change and extreme rainfall events call for strategic position selection and climate- flexible property features (Hiep et al, 2021). Political risks, including regulatory changes and geopolitical pressures, can suddenly alter investment geographies. Comprehending these trends and employing comprehensive risk operation strategies are essential for investor adaptability. Effectively managed risks can drive innovation and growth, furnishing openings for visionary investors in this unpredictable sector.

5.1 Economic, political, and social risks and challenges

Economic, political, and social risks produce a complex landscape for tourism real estate investments. Astute understanding and expectation of challenges are pivotal. Economically, Alheet et al. (2021) and Fauzel (2021) affirm that macroeconomic oscillations like affectation and recessions directly impact investment profitability. While these risks are inevitable, their effects can be mitigated via diversification, investing in low- correlation means, and staying updated on global economic trends.

Wang and Bramwell (2012) and Hartman (2023) indicate political stability is vital for successful investments. Policy changes and geopolitical pressures may induce uncertainties. laboriously covering the political geography and considering political risk insurance can help alleviate these uncertainties.

Consumer preferences and demographic shifts underline social risks, impacting the demand side of the request. Investors need to keenly observe these trends and adapt their offerings to cater to shifting demand.

In summary, economic, political, and social risks offer a comprehensive understanding of the multi-dimensional risks in tourism real estate investments. The key to success lies in the investor's visionary management and mitigation strategies.

5.2 Climate change risks and implications

Climatic transformations profoundly affect tourism real estate investments, involving not only physical damages from extreme weather events but also transition pitfalls due to regulatory shifts aiming at climate change mitigation (Volz et al, 2020). Reputational risks are also arising, as consumers favor sustainable tourism, potentially impacting traditional ventures.

Similar risks demand revisiting investment strategies within this sector. Simply admitting risks is inadequate; visionary strategies are pivotal for investment opinions. Physical threats from extreme weather necessitate investments favoring climate- flexible regions and properties. Also, transition risks from nonsupervisory changes punctuate the significance of investing in destinations compliant with new norms (Scott, Gössling and Hall, 2012).

The growing preference for sustainable tourism underscores the necessity of aligning investments with this trend, conceivably shifting towardseco-friendly developments (Bramwell and Lane, 2011). The raising challenges of climate change in this sector underline the need for continuous learning, adaption, and recalibration of strategies to ensure sustainable investments(Deshmukh and Bhagat, 2020). This underscores the significance of farther empirical studies for comprehending these dynamics and implicit mitigation measures.

5.3 Technological Advancements Impacts

Blockchain and virtual reality technologies promise transformative potential for the real estate industry, specially tourism real estate. Still, their full impact remains under- realized. Blockchain can enhance translucency and effectiveness in deals by reconsidering property exchanges. Its implementation, however, is hindered by legal misgivings, limited investor understanding, and uneven structure access (Jain et al, 2023).

Virtual reality offers immersive property viewing experiences, yet it presents challenges like data privacy, isolation, and implicit misuse of information (Filimonau and Naumova, 2020). Despite these issues, which can be eased with adaptive regulatory frameworks and effective strategies, these technologies could give new opportunities for stakeholder engagement in the tourism real estate sector. While they promise inclusivity and robustness, these inventions should not overshadow the need for thorough research, careful consideration, and risk management in investment decisions. Their successful operation hinges on integrating them into the industry with a keen understanding of implicit risks and rewards.

6. Suggestion for Future Research

The first suggestion is a deep dive into the impacts and opportunities presented by emergent technologies, namely blockchain and virtual reality, on the real estate market, specifically focusing on the tourism real estate sector. The possible shifts and developments brought about by these technologies may transform investment strategies and market dynamics, and thus warrant comprehensive exploration. Further research could focus on assessing the potential of these technologies to create transparent, efficient, and secure investment landscapes, as well as their capacity to enhance property showcasing and customer engagement, respectively.

Secondly, it is essential to conduct an in-depth analysis of climate change effects on tourism real estate investments. This would involve investigating how the increasing frequency of extreme weather events impacts property values, attractiveness of locations, and, consequently, investor decision-making processes. The research should also aim at developing effective strategies for mitigating these impacts, incorporating elements of sustainability into investment practices, and capitalizing on potential opportunities arising from shifts towards more environmentally conscious travel preferences. A third area of exploration could be the influence of changing tourist preferences and demographics on tourism real estate, particularly in relation to sustainable and resilient travel offerings. It would be beneficial to understand how these societal shifts are reshaping the industry and how investors can adapt to cater to evolving demands.

Lastly, an analysis of the responses from governments and regulatory bodies to the challenges in the tourism real estate sector could shed light on the evolving policy landscape, legal implications, and potential support structures available for investors. This knowledge could inform investment strategies and risk mitigation measures, providing a more robust framework for successful tourism real estate investments in the future.

7. Conclusion

This literature review identifies crucial risks and challenges related to tourism real estate investments. Economic factors, similar as macroeconomic dynamics and recessions, play a substantial role in shaping investment landscapes, highlighting the need for robust strategies during economic downturns.

Environmentally, climate change and extreme weather events pose redoubtable challenges, affecting property integrity and point attractiveness, necessitating the integration of climate change protrusions in investment opinions. Political regulatory changes and geopolitical pressures add unpredictability, threatening investment stability and profitability.

Rapid technological advancement, including disruptive technologies like blockchain and digital reality, reshape the industry, presenting openings and challenges.

These insights emphasize the need for comprehensive risk management strategies, accounting for economic trends, environmental projections, political developments, and technological advancements. They also suggest further exploration into the impact of technological advancement and climate change on the industry.

Despite their complexity, these challenges are navigable with thorough research, comprehensive risk management, and awareness of arising trends. This review serves as a foundation, providing insights and highlighting avenues for further exploration.

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Aligning Agri-food Business with Sustainable Development and Quality of Life in Rural Areas: Stakeholders' Perspectives from Greece

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Abstract: The present study examined how the agri-food enterprises in Greece affect the socio-economic life of rural areas and contribute to ensuring food security. It sought the extent of their contribution to the revitalization of the local community and residents' quality of life. Furthermore, it focused on the policy measures needed to ensure that their operation protects the environment and reduces their environmental footprint. Additionally, this research explored agri-food enterprises' impact in addressing the problems of rural societies in the context of their social responsibility. Qualitative research was conducted through semi-structured interviews with twelve central government and local self-administrative executives who formulate policies that shape or influence the agri-food sector and agri-food enterprises The study revealed that agri-food businesses play a major role in the rural economy. At the same time, they are a key factor in linking sustainable development to the well-being of citizens. It was also highlighted that agri-food enterprises in Greece continue to leave a large negative environmental footprint and therefore a change in the framework of existing policies is needed to make the latter effective. In this regard, measures are needed to support agri-food enterprises with certain financial instruments in order to enhance the reduction of their environmental footprint. Finally, the research indicated the need for further strengthening of agri-food enterprises' social responsibility toward rural residents. The contribution of this research has both theoretical and empirical value. It responds to the recent calls for greater investigation of agri-food enterprises and their contributions to sustainable development and rural residents' quality of life as well. In this respect, the present primary study adds evidence to the international literature regarding the role of agri-food enterprises in the socio-economic life of rural areas by shedding light on various aspects while the findings can be used by the institutions (European, state, and local authorities) that are responsible for policy-making in the agri-food sector and agri-food enterprises respectively. Moreover, the findings can also be a valuable tool for the business world of agri-food entrepreneurship.

Keywords: agri-food enterprises, sustainable development, rural areas, quality of life

1. Introduction

The contribution of agri-food enterprises to the socio-economic well-being of rural areas and many regions has been significant over time (Lamprinopoulou, Tregear and Ness, 2006). In particular, the establishment of agri-food enterprises in the countryside leads to increased employment, a rise in rural income, and the development of different activities. According to European Commission data, the agricultural sector employs more than 400.000 people, representing 10% of the total workforce for 2020. Moreover, rural areas make up 63% of the Greek territory, while their inhabitants consistently account for 31% of the Greek population (European Commission, 2021). However, rural societies are experiencing a period of ongoing economic, social, and environmental transformation as a result of globalization, economic recession, demographic ageing, climate and environmental change (Apostolopoulos et al, 2023; Moschidis, Karamichalakou and Thanopoulos, 2022; Steiner and Cleary, 2014). All these factors affect the resilience of agri-food enterprises, and their ability to adapt to changing conditions is increasingly important (Steiner and Atterton, 2015). Creating an enabling environment for agri-food enterprises is often the answer to the need for self-organization, mutual support, and institutional support from the state.

Based on the current socio-economic environment, mainly shaped by the crises, this research focuses on the contribution of agri-food enterprises to local development, quality of life of rural residents, and sustainability.

Against a theoretical background, the role of agri-food enterprises in the cohesion and well-being of the local community and the promotion of sustainability is described with reference to the international literature. Then,

in order to approach the views and experiences of policymakers for agri-food enterprises in rural Greece, the methodology used was the purposive sampling technique. The data analysis was conducted in the native language of the survey participants and was structured under the two interacting dimensions: local development and residents' quality of life and sustainability. This is followed by the discussion, which includes recent and previous literature compatible with our own research. The paper concludes with the importance of establishing agri-food enterprises in the countryside, the main obstacles identified in the midst of crises, and support policies to further strengthen the development environment of agri-food enterprises towards sustainability. Finally, research questions to be addressed by future empirical studies are raised.

2. Literature Review

2.1 Agri-food enterprises and social sustainability

Rural agri-food enterprises are vital for the future of food systems and rural prosperity (Hwalla et al, 2016; Woodhill et al, 2022). Even in times of crisis, decentralized networks have been shown to work best, as was the case during the Covid-19 pandemic (Apostolopoulos et al, 2021). There is evidence that agribusinesses contribute to enhancing local resources, cultural heritage, quality of life (MacDonald and Jolliffe, 2003; Tregear, 2005; Sá, Casais and Silva, 2018), and local economies (Steiner and Atterton, 2014). Rural villages are currently emerging as complex ecosystems (Sgroi, 2022), in which agriculture, processing, distribution and consumption are integrated to enhance the environmental, economic, social and food context of a particular region (Manikas, Malindretos and Moschouris, 2019). Strengthening existing or developing new relationships between all food system stakeholders (Manikas, Malindretos and Moschouris, 2019) develops community resilience, an important indicator of social sustainability (Blay-Palmer et al., 2020; Magis, 2010). Building community resilience requires the development of social capital and interpersonal ties (McManus et al., 2012; McMorran, Scott and Price, 2014; Taylor et al., 2014). In terms of social capital, it is developed by creating new networks in local communities (Fiseha and Oyelana, 2015). These are directly linked to the revitalization-well-being of rural areas (Wiskerke, 2009? Ammirato et al, 2021), job creation, small-scale agriculture (Fiseha and Oyelana, 2015), promoting local food production (Brown and Miller, 2008), making quality products available at affordable prices to consumers (Flaccavento, 2011) and attracting non-family actors (Barbieri and Mahoney, 2009) to establish new farms (Vogt and Kaiser, 2008). Moreover, Abdollahzadeh and Sharifzadeh (2014) showed that the establishment of tourism businesses in the countryside seems to increase the demand for local agricultural products.

2.2 Agri-food enterprises and environmental sustainability

The agri-food sector is the sector of the economy that has the greatest impact on the environment. A necessary goal of sustainable development, as defined by the United Nations in the 2030 Agenda (United Nations, 2020), is to maintain healthy agricultural ecosystems (Sgroi, 2022). Research by Fiseha and Oyelana (2015) shows that sustainable agricultural practices can have a positive impact on community wellbeing, that is, the quality of the living environment, the health of residents and even the harmonious coexistence of farmers and residents. Agribusinesses are now moving from the traditional linear model of the food system "production-processing-consumption-waste" to the circular model (Soldi and Cavallini, 2020). The role of the institutional framework and government support is crucial for agri-food enterprises to remain viable (Apostolopoulos et al., 2021) however further research is needed (Karwacka et al., 2020).

3. Methodology

The main purpose of this study was to trace the views and experiences mostly of the officials responsible for the design and development of agri-food policies that contribute to sustainable development and the quality of life of the inhabitants. To achieve this, we conducted qualitative research as it’s well suited to elicit opinions and experiences (Fossey et al., 2002). Qualitative research allows understanding of the entrepreneurial phenomenon within its own context (Van Burg et al, 2020; Krauss, 2005;) while it clarifies and explains the complexity of entrepreneurial actions (Drakopoulou-Dodd et al, 2014; Al-Busaidi, 2008).

Purposive sampling technique was adopted in order to approach certain stakeholders (Kenny, & Duckett, 2003) relevant to the subject. The sample size was such that it did not distort individual characteristics and was based on the principles of relevance and adequacy (Polit and Hungler, 1999; Morse and Field, 1996). Additionally, we used semi-structured interviews to collect qualitative data (DeJonckheere and Vaughn, 2019; Creswell and Poth,

2016; Lincoln and Guba, 1985) on twelve executives from state, regional, and local authorities. The interviews were conducted in February 2023. They lasted approximately forty-five minutes and were conducted in Greek, the native language of the survey participants. The interviews were conducted by telephone and online, as data collection via telephone or internet is as reliable as face-to-face interviews (Saarijärvi and Bratt, 2021; Apostolopoulos et al, 2021; Lacono et al, 2016). Prior to the interview, the managers who would participate in the survey were thoroughly informed about the objectives of the research. Moreover, they were assured that their anonymity was guaranteed and agreed to participate in the research.

Table 1: Characteristics of participants in the semi-structured interviews

	Property	Geographical Area
R1	Executive of the Hellenic Agricultural Organisation	Region of Attica
R2	Executive of the Hellenic Agricultural Insurance Organisation	Region of Attica
R3	Executive of the Hellenic Agricultural Organisation	Region of Attica
R4	Executive of the Regional Government of Peloponnese	Region of Peloponnese
R5	Chamber Executive	Region of Peloponnese
R6	Member of the Directorate of Agricultural Economy and Veterinary Medicine	Region of Peloponnese
R7	Executive of the Decentralized Administration of Peloponnese-Western Greece and Ionian Islands	Region of Western Greece
R8	Executive of the Decentralized Administration of Peloponnese-Western Greece and Ionian Islands	Region of Western Greece
R9	Municipal Executive	Municipality from the Peloponnese Region
R10	Municipal Executive	Municipality from the Peloponnese Region
R11	Executive of Development Company	Region of Peloponnese
R12	Municipal Executive	Municipality from the Peloponnese Region

The content of the interviews was classified into two sections. The first one concerned the contribution of agri-food businesses to local development and residents' quality of life. The second one addressed the contribution of agri-food businesses to sustainability by examining the framework of necessary measures to protect the environment and reduce the environmental carbon footprint and whether this framework of measures is implemented in practice by agri-food businesses.

4. Data Analysis

Data analysis was conducted in the native language of the survey participants to avoid ambiguity or misinterpretation (Maneesriwongul and Dixon, 2004; Temple and Young, 2004); only the references were translated into English (Van Nes et al, 2010). First, the interviews were examined individually on an inductive approach (Thomas, 2006; Creswell, 2005) before being compared with each other. The emerging themes and subthemes were recorded (Gioia et al, 2013) and captured in Table 2. Then, the creation of categories was specified in detail, and coding was independent and exclusive (Krippendorf, 2018; Smith, 2001). It should be noted that combining the results extracted from the interviews with previous research from the international literature added value, reliability, and validity to the research findings (Flick et al, 2004).

Table 2: Emerged themes and sub-themes

Emerged issues	Subjects	Summary
Contribution of agri-food businesses to local development and residents' quality of life	The contribution of agri-food businesses to the socio-economic life of a region The development conditions of businesses with different scopes than agri-food businesses, with the ultimate result of the region's overall development	• They create jobs. • They keep the population in the countryside. • They contribute to socio-economic life. • They create wealth and quality of life • They gather other businesses next to them.

Emerged issues	Subjects	Summary
	The contribution of agri-food businesses to addressing the problems of local communities in the context of their social responsibility	• More input is needed from them to address local problems
Contribution of agri-food businesses to sustainability	Measures in the operation of agri-food businesses to protect the environment Measures taken by agri-food businesses to reduce their carbon footprint	• Significant steps have been taken to acquire pro-on environmental characteristics • Further institutional measures accompanied by financial instruments are needed • Continued rigorous controls are needed

5. Findings

The findings were structured based on the two emerging themes: i) the contribution of agri-food enterprises to local development and residents' quality of life, and ii) the contribution of agri-food enterprises to sustainability.

- *Contribution of agri-food businesses to local development and residents' quality of life.*

It was detected by the survey participants that agri-food enterprises contribute to the socio-economic life of the rural areas in which they operate. They create jobs and keep the population in the countryside. They contribute to the local economy, create wealth and through this create quality of life for the inhabitants.

"The establishment of agri-food businesses contributes not only to a reduction in unemployment, new jobs, increased income and economic growth but also to the retention of the local population in the area, the upgrading of human resources and the strengthening of entrepreneurship. This sector is also directly linked to the cultural heritage of each region." (R12)

"Agri-food businesses are central to the economy, the socio-economic development of a region and the well-being of its citizens. They underpin all the activities of economic and social life. It is agri-food businesses that further boost GDP, employment, exports and contribute with their technologies to the modernisation of production. " (R7)

Survey participants consider that the establishment and operation of agri-businesses in the countryside attract other businesses directly or indirectly linked to agri-businesses and businesses in other sectors.

"In the industrial zone of Tripoli, when businesses began to operate, refrigerators for the distribution of products, a paper mill was automatically established which produced cartons. In many areas, there are organized industrial zones which among themselves develop synergies and effects with the aim of reducing costs in the production of products." (R2)

"With the completion and establishment of agri-food enterprises in the countryside, external enterprises are needed to repair, maintain and transport the products to consumers. Of course, all the professions and services that support a prosperous society are being developed and upgraded, such as catering, entertainment, sport, supplementary education, etc. The end result of all these activities leads to the overall development of the place". (R4)

"Businesses of different disciplines can exist as satellites in a subsidiary capacity, supporting agri-food businesses and cooperating with them where necessary. These can be transport companies, companies that supply the agri-food enterprise with various packaging materials and machinery. But also companies which provide services, such as telecommunications support, software and so on, which are directly dependent on and need to work with the agri-food business." (R5)

Reflection with different approaches by the participants developed on the extent to which agribusinesses contribute to addressing the problems of local communities in the context of their social responsibility. The contribution was not questioned but reservations were expressed by four participants about the size and effectiveness of the contribution.

"It is necessary to solve the waste disposal issues because social problems are created. Through the circular economy, a solution will be found. Therefore, rural entrepreneurship contributes to many social measures when there is a larger scale that defines its sustainability." (R3)

"Local businesses contribute to issues of collective interest, such as the development of cultural actions, social solidarity actions, and actions of vulnerable social groups. I believe that healthy businesses established in the region contribute greatly to increasing employment, increasing income, and increasing purchasing power. Every healthy business creatively helps society and therefore its social responsibility is fulfilled either through sponsorships or through the legislation in force that protects the environment." (R2)

- *Contribution of agri-food businesses to sustainability*

Survey participants consider that significant steps have been taken in recent years to make agri-food businesses environmentally friendly in their operations. However, it was pointed out that additional institutional measures with financial support tools and strict controls are needed to enhance environmental protection.

"In recent years there has been an improvement in the institutional framework and it requires all businesses to respect the environment. There are also difficult cases in management such as special waste but the situation is constantly improving. In any case, however, we cannot claim that we are at 100% of good environmental practice." (R11)

"There have been serious steps forward towards sustainable agricultural production and sustainable agri-food businesses, but we are far from reaching the goal of sustainability. More measures are needed to support agri-food businesses with specific financial instruments to enhance environmental protection." (R7)

In recent years, as a result of the strict European and national framework and the development of competition, agri-food businesses have been taking more and more environmental protection measures, drastically reducing their environmental footprint.

"*In the last 10 years and with the energy crisis, all businesses, especially agri-food businesses, are moving towards the use of renewable energy sources, such as photovoltaics, biomass and contribute to reducing their carbon footprint."* (R10)

"Several companies are taking measures because they cannot export products without the required carbon footprint reduction label. The development of competition between companies is an additional incentive for compliance in this direction that I mentioned earlier". (R1)

6. Discussion

Greek agri-food businesses have been experiencing a continuous state of crisis since 2009 (Sdrolias et al, 2022; Apostolopoulos et al, 2022; Giannakis & Bruggeman, 2017). The 2009 financial crisis has lasted more than ten years in Greece, as the country's credit rating was downgraded and it was forced to join stability programmes and certain surveillance mechanisms (Maris, Sklias and Maravegias, 2022; Walter et al, 2018; Vasilopoulou, Halikiopoulou, and Exadaktylos, 2014; Karamichas, 2009). The financial crisis was followed by the health crisis and then the current energy crisis emerged, with significant consequences for agribusinesses (Apostolopoulos et al, 2023; Moschidis, Karamichalakou and Thanopoulos, 2022; Apostolopoulos et al, 2021). The present research was conducted in this uncertain environment of ongoing crises. By examining in depth the contribution of agri-food enterprises to local development and citizens' quality of life, it emerged that agri-food enterprises have a positive impact on the socio-economic conditions of rural Greece, create jobs and keep local populations in rural spaces.

They directly and indirectly support rural enterprises and the socio-economic life of the area (Sá, Casais and Silva, 2018; Fiseha & Oyelana, 2015; Tregear, 2005; MacDonald & Jolliffe, 2003). At the same time, research has shown that despite moments of crisis, rural enterprises have shown adaptability and resilience (Steiner & Atterton, 2015; Steiner & Markantoni, 2014; Morrison, Wilson and Bell, 2012), even utilizing the tool of diversification (Lang et al, 2022; Steiner & Atterton, 2014). Furthermore, the research of Behl et al. (2021) highlighted the causal relationships between social capital, motivation and various other factors in terms of entrepreneurs' diversification efforts in the new supply chain environment. Evidence consistent with the findings of the present research on agri-food enterprises in rural Greece. Moreover, the finding that differentiates agri-food enterprises in rural Greece from other research findings is the critical evidence of reduced social responsibility activity towards local communities and addressing social issues. Of course, there is no doubt about their overall contribution to society. Additionally, the research by Giannarakis & Theotokas (2011) showed that firms during crises increase their performance by enhancing corporate social responsibility to regain lost trust. However, the same research showed increased corporate social responsibility performance during the financial crisis, with the exception of only 2009-2010.

Regarding the pro-environmental role of the agricultural sector and agri-food firms, research shows that these activities leave a strongly negative environmental footprint (Amin-Chaudhry, Young and Afshari, 2022; Bajan & Mrówczyńska-Kamińska, 2020). The present study showed that agri-food enterprises in rural Greece are quite sensitive to pro-environmental issues. The European and national environmental protection framework enshrines the protection of the environment, however, in this study issues for additional institutional measures and control mechanisms were raised. Furthermore, according to Fiseha & Oyelana (2015), sustainable practices in the agri-food sector have a positive impact on the well-being and rural residents' quality of life. The orientation of these enterprises from the traditional linear to the circular agri-food model is a critical path leading to the new sustainable model of production and consumption (Soldi & Cavallini, 2020; Toop et. al., 2017). The fact that agri-food enterprises are becoming increasingly environmentally conscious has also been highlighted in the research of Steiner and Atterton (2015). Finally, through regional and local policies, the government should create a positive development environment for the agricultural sector and agri-food enterprises (Manikas, Malindretos and Moschuris, 2019; Mangla et al, 2018).

7. Conclusion

Agri-food enterprises, even in an environment of long-term crisis, offer economic and social benefits to society and contribute to the improvement of food security. They also contribute to sustainable development and provide income and jobs while keeping the rural population from migrating to urban centres. They contribute to the enhancement of local resources and the inhabitants' quality of life. They regenerate the countryside and support agricultural production, and the food supply chain, even in difficult times of crisis. At the same time, they create a dynamic business environment in rural areas. They have shown adaptability and resilience to crises. However, new support policies are also needed from government and local self-administrative authorities to further strengthen their development environment towards sustainability. In addition, agri-food enterprises are continuously improving their environmental footprint while contributing to sustainable development goals.

The research contribution has theoretical and empirical implications. It responds to the call for greater research interest in agri-food firms in the context of extended crisis by adding important findings to the international literature. At the same time, the findings of this paper appear to be a useful tool for policymakers regarding planning for the agricultural sector and agri-food enterprises. This primary study could also be a valuable tool for entrepreneurs who are active or intend to become active in the agri-food sector.

8. Limitations and future research

The present research was conducted during a continuous crisis period for agri-food enterprises. The crisis is still ongoing; therefore, these enterprises' resilience and adaptability to shocks have yet to be definitively assessed. In addition, this research focused on the views of the policymakers regarding agri-food enterprises. Future research should also focus on agri-food entrepreneurs and rural residents in order to achieve a holistic approach.

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Co-creation Methodology to Promote 21st Century Skills in the Classroom Context

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Abstract: Research studies on learning processes provide strong empirical evidence that active-learning methodologies promote students' engagement which has a positive impact on students' learning outcomes, skills, and performance. Against this background, active teaching-learning environments have seen increasing popularity over the past few decades. Several studies suggest that the implementation of new methodologies based on "ask more, instead of telling" approaches lead to an increase of students' performance. The purpose of this study is to explore the impact of an active learning unit based on innovation co-creation methodologies on students' perceptions of their learning outcomes and on the so-called 21st century skills, such as critical thinking, creativity, collaboration, and communication, in the context of a Portuguese higher education institution - the Polytechnic Institute of Coimbra (IPC). Founded in 1979, the IPC is a public higher education institution, oriented towards the pursuit of the objectives of polytechnic education, with an intrinsic vocation for applied research and the transfer of knowledge to the society. The empirical study is carried out based on data derived from a questionnaire survey applied to a class of students. Preliminary results reveal that the implementation of innovation co-creation methodologies in the classroom context is perceived by students as having a positive effect not only on the development of soft skills but also on their learning outcomes. Additionally, results give evidence that students improve their performance and therefore their final grade is higher. Results also reveal that students would like to see this active-learning methodology applied to other courses.

Keywords*:* Co-creation, Active learning, Innovation, Students' perceptions, 21st century skills.

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1. Introduction

Since the founding of the first universities in Europe during the Middle Ages, teaching methodologies have been mainly based on lecturing (Brockliss, 1996). Conventional lecture-based classes or courses are centred on the teacher, who decides what really matters to be learnt (Michael, 2006). This traditional model often described as passive learning (Fidalgo-Blanco et al., 2017) doesn't allow the development of students' own way of thinking. Nonetheless, current empirical evidence suggests that the implementation of new teaching-learning methodologies based on "ask more, instead of telling" approaches lead to an increase of students' performance (Henderson et al., 2011). For example, in STEM (science, technology, engineering and mathematics) undergraduate courses, the average failure rates in traditional courses tend to be 1.5 times higher than the failure average rates observed in courses where active learning approaches are implemented, as shown by Freeman et al. (2014). These authors also give evidence that students who achieve the 50th percentile of a class based on traditional lecturing would reach the 68th percentile under active learning classes. In these student-centred learning environments, the pace of learning is customized to the student's needs, goals, and abilities (Michael, 2006).

Based on the above evidence, it is fundamental to adopt teaching methodologies that imply a greater involvement of students in the learning process, that focus on problem solving rather than only memorization, leading to a more long lasting and meaningful learning (Michael, 2006). This construct is the cornerstone of active learning approaches, which can be defined as a process where students are forced to reflect upon ideas and how to use them (Collins and O'Brien, 2003). By this process, students should be mentally and/or physically active in their learning by collecting information and solving problems and should often assess their skills, namely the so-called 4 C's of 21st century learning skills: critical thinking, creativity, collaboration, and communication. According to Pocol et al. (2022), in this active learning contexts students participate with greater motivation in their educational process, which leads to better results.

Among several examples of student-centred learning approaches summarized by Michael and Modell (2003) are problem-based or case-based learning and cooperative/collaborative learning/group work. As stated by Bovill (2020), co-creation methodology fits into the paradigm of active learning, since by enhancing greater interaction between students and teachers and among students themselves, the latter tend to adopt a more active role, developing several types of activities to gather information to solve problems and reflect upon the current state of the art and future trends (see also Michael, 2006; Freeman et al, 2014; Dollinger et al., 2018; Bovill et al., 2016). In addition, co-creation contributes to enhancing students' satisfaction and performance, bringing competitive advantages to educational institutions (Hofstatter, 2010). This statement is reinforced by Araújo et al. (2021), which stands out that co-creation methodologies improve students' engagement and learning outcomes. Furthermore, Gärdebo and Wiggberg (2012) demonstrate that students are an important and valuable resource, although underused in higher education, and that the collaborative work brings significant benefits, namely engagement, motivation, and relationship. Concerning learning outcomes, Michael (2006) states that students are likely to learn more when they study and work with other students than alone. In the same line, Crouch and Mazur (2001) show that the gains resulting from teamwork are significant and that students show an increase in conceptual reasoning and problem-solving competences.

As summarized by Bovill (2020), there are several types of co-creation approaches: *i)* students co-researching university-wide projects; *ii)* students collaboration with staff in research and scholarship projects; *iii)* students representatives working together with staff on committees; *iv)* students participating in course design review committees, being involved in redefining courses and their curricula; *v)* students as consultants, assessing teachers and providing teaching feedback; *vi)* students proposing their own final projects of masters' thesis topic. During the process, and whatever is the type of co-creation, three main dimensions can be identified: co-production, experience, and relations (Dziewanowska, 2018). These dimensions are characterized by several components, as illustrated in Figure 1. The co-production dimension refers to the participation itself of students, i.e., what students really do in the co-creation process. The experience dimension reflects on how deep the participation of the student during the process is. Finally, the last dimension is related to collaboration skills during the process. Additionally, according to Prahalad and Ramaswamy (2004), co-creation processes are characterized by some intrinsic features, such as dialogue, clear risk-benefit assessment, equal access, and transparency, based on cooperation systems, aiming to apply science, technology and innovation policies in personal, educational and business contexts.

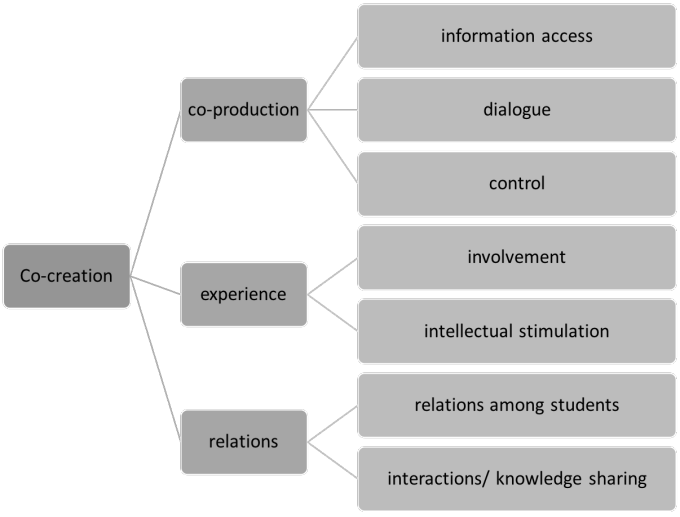

Figure 1. Dimensions and subdimensions of co-creation processes (adapted from Dziewanowska, 2018)

Considering that the co-creation methodologies are based on a joint initiative, in which providers and beneficiaries create value together, the aim of this study is to examine the impact that the implementation of this method brings to the quality of Portuguese higher education. Specifically, this paper explores the impact of an active learning unit based on innovation co-creation methodologies on students' perceptions of their learning outcomes and on the 21st century skills, such as critical thinking, creativity, collaboration, and communication, in the context of a Portuguese higher education institution - the Polytechnic Institute of Coimbra (IPC).

The remainder of the present paper is organized as follows. Section 2 describes the methodology used to carry out the empirical analysis. Section 3 presents and discusses the main findings. Section 4 sets out the main conclusions and policy recommendations.

2. Research design

The present study is based on the implementation in the classroom context of the innovation co-creation model developed by Demola Global (2022) and applied in several higher education institutions around the world. The methodology has been applied in the course Journalistic Writing Workshop of the 1st cycle degree in Social Communication, which is taught at the Higher Education School of the Polytechnic Institute of Coimbra. This course represents the students' first contact with the techniques of collection, selection, hierarchy and writing of information. It is intended that students master the main techniques of journalistic production, being able to identify sources, collect and process information, write texts for journalistic publications, in printed or digital support, understand infographics and articulate their content with the text, title and subtitle. The syllabus focuses on the main techniques of research, selection, collection, and processing of information with a view to their application to the production of journalistic texts, providing students with skills in the management of information sources and in informative writing.

In the academic year 2021/2022, applied to this course and chose a continuous assessment regime 31 students. It is observed that, in terms of gender distribution, the student's population is dominated by females who constitute about 65% of the collected data, while males represent around 35%. All sample students are aged between 18 and 22 years.

The weekly workload of the course is 4 hours and has a total duration of 13 weeks. For the implementation of the innovation co-creation process, which lasts for 8 weeks, the class was divided into teams of 6 students and each team worked on a specific challenge. Although the students have roughly the same background, the professor (who assumes the role of facilitator of the learning process) tried to ensure that there was some heterogeneity in the teams to enhance the creative process. The co-creation process follows the double diamond model, as firstly proposed by Banathy (1996). This process comprises two distinct phases: Discovery and Creation, as illustrated in Figure 2.

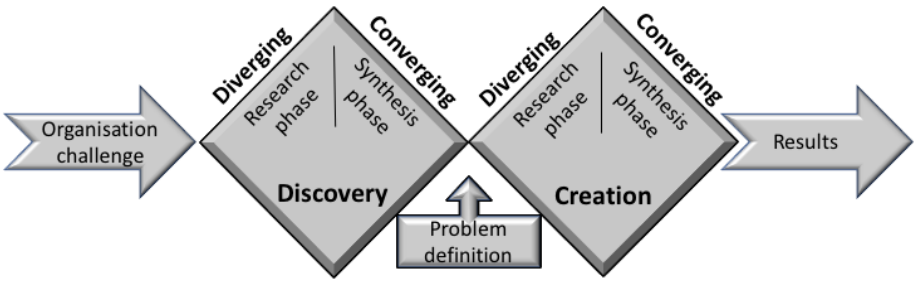

Figure 2: Double diamond model applied to innovation co-creation process (adapted from Banathy, 1996)

The first stage of the process (Discovery stage) consists of collecting and examine several information to understand the challenge in all its dimensions (week 1). Through the following weeks, students develop several tasks which can be divided in a Research phase and a Synthesis phase. Firstly (weeks 2 and 3), students make a list of all the stakeholders that directly or indirectly can impact or be influenced by the problem under analysis, and then group them by interests, influence, etc. This list allows identifying potential experts to be interviewed whose knowledge will allow completing the documentary information already collected. All the information is compiled in collaborative and visual tools, which facilitate the tasks of the next phase. In the Synthesis phase (weeks 4 and 5), students are invited to elaborate empathy maps, where each target group is described based on what it says, does, feels or thinks, and perform a PESTLE analysis, by looking at the political, economic, socio-cultural, and technological factors affecting the phenomenon under study. Once the previous tasks have been completed, students are able to prepare their midway report. During this first stage, the professor acts as a facilitator, providing guidance and works on the team's motivation. The facilitator also proposes tools for collaborative work, helps to identify relevant sources of information, and moderates weekly team meetings.

The second stage of the innovation co-creation process is the Creation phase (see Figure 2), in which the team carry out speculative work anticipating future trends and solutions to the challenge under study (weeks 6 and

7). This phase starts producing lots of ideas and prototyping different solutions and is carried out with the help of several tools, namely:

i) Weak signals. There are several definitions in the literature for weak signals. The co-creation model follows the definition resulting from the compilation carried out by Van Veen and Ortt (2021) who refer: "a perception of strategic phenomena detected in the environment or created during interpretation that are distant to the perceiver's frame of reference".

ii) "What if…" and "How might we…." questions. This type of questions allows a speculative view, in which students should be bold and provocative and not be limited to factual situations. These questions are part of a creative thinking methodology, whose application makes it possible to frame complex problems, discover needs still unknown and propose more appropriate solutions (Lahiri et al., 2021).

iii) Future scenarios. Based on the weak signals and the speculative questions, the team build future scenarios, specifying the main vectors of change.

The Creative stage ends with the elaboration of a final report (week 8), which brings together all the information compiled in the midway report as well as all the speculative work carried out in this second stage, given special emphasis to the future scenarios, which are the main outcomes of the innovation co-creation process.

Table 1 summarizes the stages and main tasks proposed to the teams during the innovation co-creation process.

Table 1: Stages and tasks of the innovation co-creation process

Stage	Week	Tasks
Discovery Stage	Week 1	Collecting and examine several information to understand the challenge in all its dimensions
	Week 2	List of all the stakeholders and identification of potential experts to be interviewed
	Week 3	Conducting interviews/questionnaires and collecting information
	Week 4	Empathy maps, PESTLE analysis
	Week 5	Midway report, personal interpretation
Creation Stage	Week 6	Signals, "What if…" and "How might we…." questions
	Week 7	Speculative questions, future scenarios
	Week 8	Final report (assessment)

Once the innovation co-creation process was completed, all the students were invited to participate in questionnaire survey, designed to evaluate both their degree of satisfaction with the methodology and their perception of the skills developed. The questionnaire comprises a set of questions about the students' perception of the skills improved with the application of the co-creation process and another set of questions referred to the students' perception of the methodology impact in the classroom context, aiming to evaluate and understand the degree of satisfaction with the process and its impact on students' performance. The questions in the questionnaire were applied on a multi-item scale from 1 to 7 (Likert type scale). In this scale, 1 represents "completely dissatisfied" or "completely disagrees", while 7 indicates "completely satisfied" or "I totally agree".

3. Results

This section presents and discusses the main outcomes of this research with the purpose of assessing the effect of implementing an active learning unit based on innovation co-creation methodologies on students' perceptions of their achievement of the learning outcomes, satisfaction, skills improvement, motivation, and engagement with their studies.

The results give evidence that students, when inquired about their degree of satisfaction with the application of the innovation co-creation methodology in a classroom context, reveal to be satisfied, with levels of agreement

of 90%, as illustrated in Figure 3. Results also show that about 50% of the students are mostly satisfied with their participation in the innovation co-creation process.

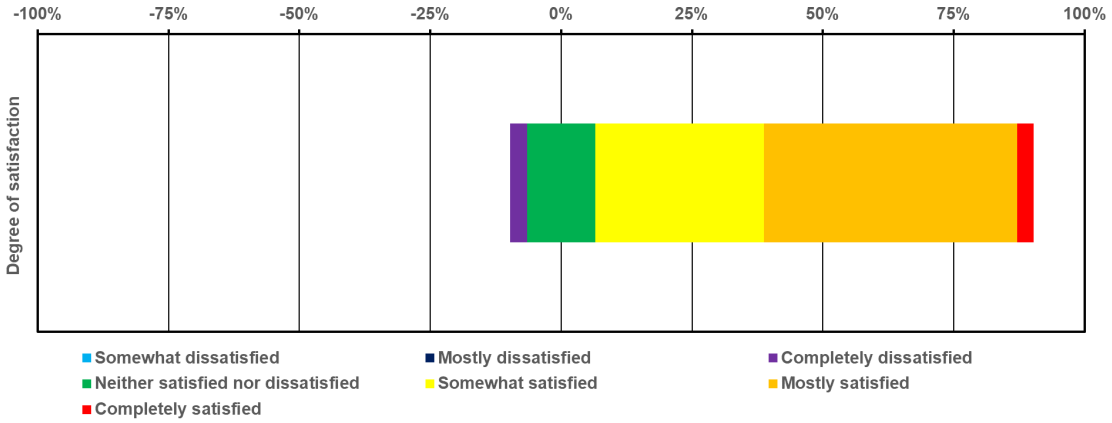

Figure 3: Students' degree of satisfaction

As can be observed in Figure 4, when asked about the positive impact of the co-creation methodology on the classroom dynamics and productivity, most students reveal a high level of agreement. They also consider that the implementation of this active learning methodology has a positive impact on the final grade, with a level of agreement of around 90%. These results allow us to validate the acceptance of the co-creation methodology by the students, who become an active part of the teaching-learning process, with positive impacts on their level of motivation and, therefore, an increase in performance and achieved outcomes. Similar results were presented in other studies that also focus on co-creation methodologies in the classroom context, namely Araujo et al. (2021, p.226), who reported that: "it is noted that the student, in general, does not seek a passive role but an active one in the teaching processes, and this view should prevail in the relations of value co-creation". From the teachers' perspective, students present themselves within the classroom with a greater openness and motivation to actively participate in the application of the syllabus of the curricular unit. On the other hand, participation, sharing, and focus become consistent and last until the end of the course, essentially because they feel part of the process and not just as information receivers.

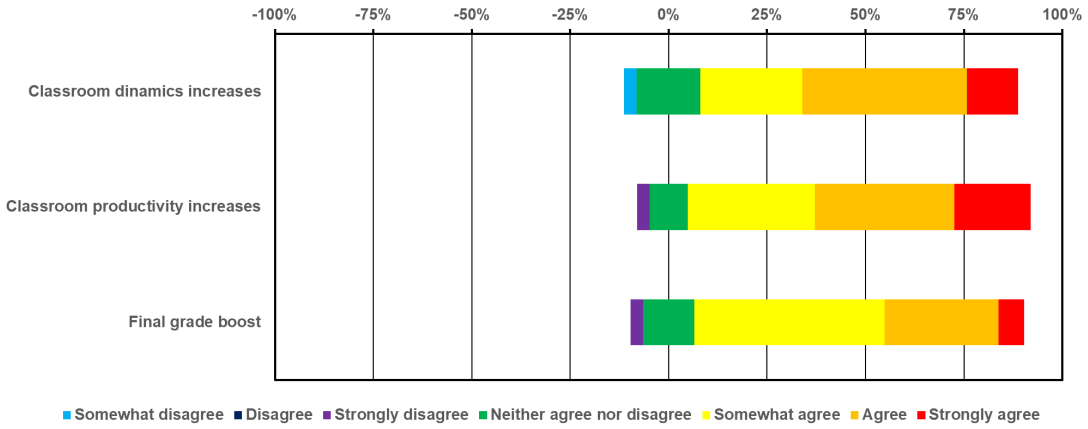

Figure 4: Students' perception of the impact in the classroom and performance

Results also show that most students consider that the participation in the innovation co-creation process contributed to an improvement of the so-called 21st century skills (WEF, 2016), namely critical thinking, creativity, collaboration, and communication (Figure 5), with a level of agreement greater than 90%. It should be noted that these four skills are essential today and will be essential in the future as well for students to succeed in school and in the workplace. These findings are corroborated by previous research conducted by Costa et al. (2021) that concludes that the implementation of co-creation methodologies generates high levels of satisfaction among students and are perceived as having very positive impact in skills' development.

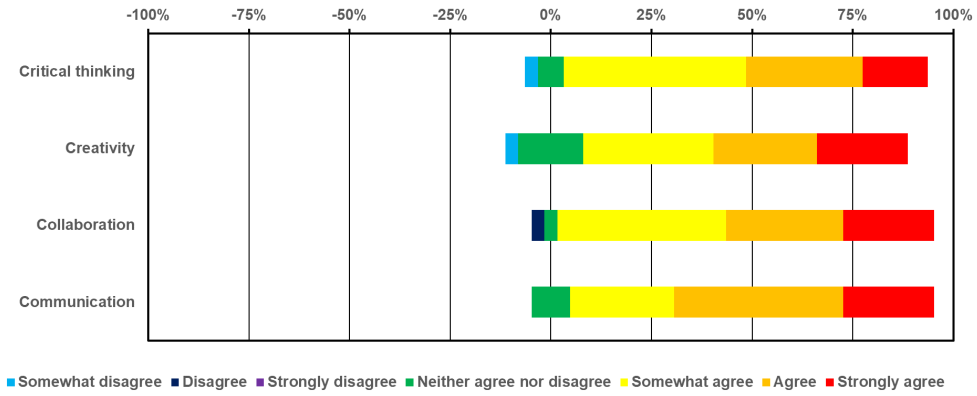

Figure 5: Students' perception of 4 C's 21st century skills improvement

When questioned about the implementation of this innovation co-creation methodology in other courses, the students demonstrated a high level of agreement (> 80%), as illustrated in Figure 6. This finding reinforces the importance of disseminating the application of the innovation co-creation process as an active teaching-learning methodology in the classroom context, as stated by Freeman et al. (2014). Active learning approaches as regular teaching practice in classrooms should be preferred over traditional lecturing. The implementation of these active strategies promotes both students and teacher's engagement and tend to maximise students learning outcomes. Furthermore, these approaches can contribute to the social integration of students, who in more conventional lectures would probably go unnoticed (Gregory, 2013).

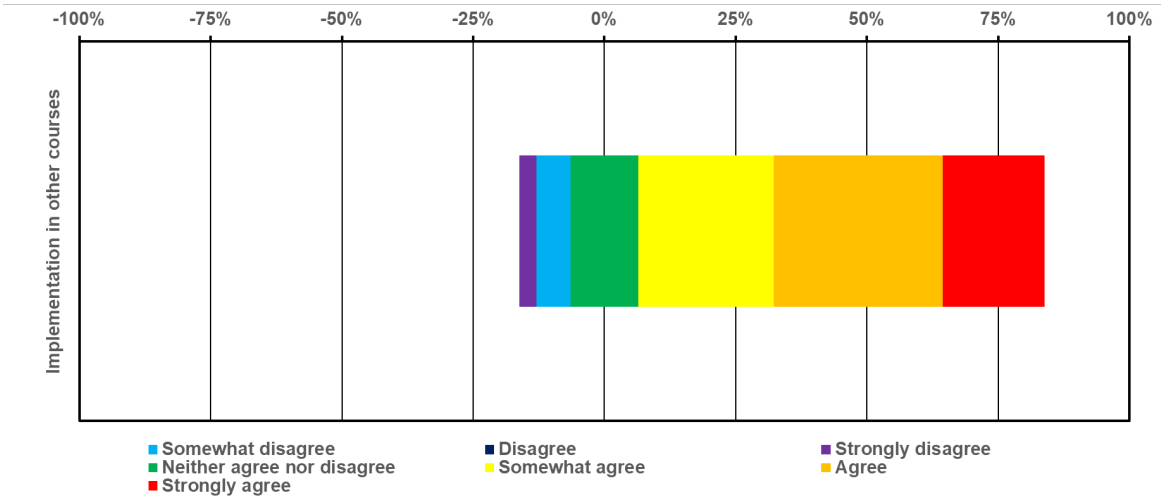

Figure 6: Students' perception of the application of the methodology in other courses

4. Conclusions

The main purpose of this paper is to examine the impact of an active learning unit based on innovation co-creation methodologies on students' perceptions of their learning outcomes and the so-called 21st century skills, namely critical thinking, creativity, collaboration, and communication, in the context of the Polytechnic Institute of Coimbra (IPC), as a Portuguese public higher education institution oriented towards the pursuit of the purposes of polytechnic education, with an intrinsic vocation for applied research and knowledge transfer.

The results corroborate previous findings that active teaching-learning methodologies, by implying that students become engaged in their learning process by thinking, discussing, investigating, and creating, have a positive impact on students' learning outcomes and enhances the development of competencies considered essential for career success in the 21st century. The empirical findings also provide evidence that this type of cognitively activating learning environment enhances the classroom dynamics and productivity with positive impacts on students' final grade. Furthermore, results reveal that students would like to see this active-learning methodology applied to other courses. The degree of students' satisfaction with the application of this

innovation co-creation methodology in a classroom context compared to more traditional approaches is nearby 90%, which allows concluding about the importance to extend its implementation.

This study reinforces the need for a paradigm shift in current teaching and learning models towards more active learning approaches that engage and develop problem solving, communication, and collaboration skills. Efforts should be made by the decision makers to support this paradigm shift to meet the expectations of new generations of students as well as the needs of the labour market in the 21st century.

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Towards carbon neutrality through innovation: Empirical insights in European countries

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Abstract: In the current era where innovation and sustainability are at the forefront, businesses need to becomeincreasingly active in implementing environmentally sustainable projects. The aim of this paper is to set initiative-taking activities for small and medium sized enterprises (SMEs) which would increase their level of engagement in innovative and environmentally responsible projects. Achieving environmental goals has never been easy given the fact that SMEs are the biggest polluters of the environment. Therefore, there is an urgent need for the leaders of these businesses to start implementing eco-innovation solutions to respond to these challenges. Our research consists of examining the current situation of the European Union's member states and responding to the objectives which have been set for them, by proposing strategic solutions for SMEs. Research also compares data between Human Development Index and Innovation Index to identify areas where there is room for improvement. These objectives concern the green development of countries, and the achievement of carbon neutrality by 2055. The results of the work points to increased attention for countries with low levels of development capability and refers to the adoption of measures taken by SMEs to help achieve the goals set. Final recommendations will describe how SMEs could implement initiatives in their businesses and where to look for sustainable and green change in their environment. Marked changes need to be made immediately in order for SMEs to adapt to these changes in order to fulfil objectives set by the European Union in a widely discussed program, Fit For 55.

Keywords: sustainability, green projects, innovation, development, SMEs

1. Introduction

The challenge of meeting environmental targets and reducing our carbon footprint is more urgent than ever before. It is therefore necessary for small and medium-sized enterprises (SMEs) to become increasingly focused on this issue. Innovative solutions and the implementation of green projects within their organizational portfolio are ways in which SMEs could be inspired and should implement such solutions to meet environmental targets and thus support the European Union's efforts to achieve carbon neutrality by 2055. Corporate reporting is as essential and important for the long-term sustainability of a business as expanding the project portfolio to include green and sustainable projects.

In this paper we will discuss the issue of innovation and innovative solutions that have an impact on the issue athand with respect to meeting the environmental challenges of today. This paper follows a study (Margarida, etal., 2023), which aims to approach how SMEs should implement green innovation projects and activities in the management of their business.

The study focuses on the development of sustainable and renewable projects to assist SMEs to build a stronger position in the market while meeting the environmental objectives of the European Union. Many other articles focus on the development of innovation in organizations, but very few focus on development linked to the achievement of the European Union's objectives. Our findings are interpreted in the context of the general outlook and the current situation in EU Member States related to the involvement of SMEs in the transformation of sustainable environments.

The following section, literature, overview describes how different business functions define innovation and why is it important to the future scale of companies. It also provides us with an overview of why the activities of SMEs are a crucial factor in the challenge of reaching carbon neutrality by 2055. In the methodology section we describe how we approached our study and what data and resources were used in our analysis. The final two sections discuss the conclusions we have reached, and the gaps identified between EU countries. Lastly, the conclusion section provides an overview of how to implement and suggestions SMEs what to do with their environment to achieve previously set goals from EU by 2055.

2. Literature overview

Innovation in this era is extremely important not only for people as individuals, but also for individual companies whose task it is to advance the development of sustainable environments for society as a whole. (Jeck, 2012). There are many opinions on how to properly define the word "innovation". The definitions that we are familiar

with stem from different industries and therefore it is difficult to define in one sentence what the word "innovation" truly means. When attempting to define it we ask different questions, such as why must something be seen as entirely new to the world to be considered an innovation? For whom does the innovation add value? For the customer or for the company that brought the innovation to market. This is why a clear definition of innovation is exceedingly difficult to process. (Nieminen, 2020) Innovations are found in all industries around us and create value for both people, and various companies. (Pace, 2019)

SMEs have become an integral part of business and national economies. (Belás, et al., 2014) Therefore, it is essential to introduce innovations in the organizational environment that positively affect their prosperity and efficiency. Innovation can help organizations to reduce costs and keep them at a minimum level. (Chris, 2018) Organizational innovation refers to the implementation and use of new work practices and methods in the daily processes of a given firm. (Zgodavova, et al., 2017). In practice, from an environmental perspective, organizational innovation means introducing an environmental audit into the company to examine the areas ofthe company's packaging management, waste management, air protection, and what cost-saving measures the company is implementing to improve the environment. (Alharbi, et al., 2019) The aim of an environmental audit is to analyze the company and propose solutions to achieve a more environmentally friendly operation and reduce its adverse impact on the environment. (RÚZ, 2020) With the introduction of organizational innovation, strategic planning is equally associated. It is a process that uses available information to accurately map the direction of a given enterprise. It is used to set priorities, allocate resources efficiently, and to align stakeholders and all interested parties with the strategic goals of the organization. (Combe, 2014) The strategic goals of an organization have their origin in its mission and outlines the objectives the organization has set out to achieve. (OECD, 2009) The goal must be measurable, and thus its results must be in the form of quantifiable results that can be compared with each other and then evaluated. (De Bruin, 2019).

Organizational innovation can provide insights into how companies in the analyzed countries are embracing sustainability practices, what challenges are they facing during their green transition, and precisely what types of new green innovations they are employing. Knowledge within organizational innovation and the understanding of what types of barriers and drivers, researchers or policymakers are facing can help in the development of new strategies towards carbon neutrality through innovation. Alongside organizational innovation, environmental audit plays an important role in achieving carbon neutrality. Environmental audit is a tool that measures the effectiveness of an organization sustainability activities. The use of external auditors can help businesses identify the areas for improvement available to them. From these results they can decide on new sustainability goals. By combining these two practices within the context of this study, they can provide guidance on how to develop more effective policies, best practices, or how different segments can contribute to each other when achieving successful transition towards carbon neutrality in Europe.

Strategy and strategic objectives are the basis of any organization that aims to achieve predetermined goals within a certain time horizon. (Štefánik et al., 2003) One of the strategic objectives of the European Union is decarbonization, or climate neutrality, by 2050. The European Union has approached this goal by adopting several measures that have been allocated specific time milestones of 2020, 2030 and 2050. Currently, the European Union's main strategic objective for decarbonization is to achieve zero greenhouse gas emissions and thus to achieve climate neutrality in general by 2050. By 2020, the European Union is committed to reducing emissions by 20% compared to 1990 levels, and to increase energy efficiency by at least 20%. The target for 2030 is to reduce these emissions by more than 50% compared to 1990, and to increase the share ofrenewable energy to 32% (European Union, 2020).

The European Union is currently leading the world in the fight against the energy and climate crisis and aims to remain at the forefront of the entire ecological transformation. This whole idea is enshrined in the Fit for 55 legislative documents.

3. Methodology

The main objective of the study is to highlight the importance of innovative projects for organizations to help meet environmental objectives. We examined publicly available data on the EU environment, the share of sustainable projects within EU territory, and the historical development of EU Member States. We conducted our study on 27 EU member states for which this data is publicly available. Based on the datasets selected for our study, individual observations were analyzed and later evaluated. The main purpose of selected datasets was to show how important are innovative projects in EU countries, and what are the drivers in green transition or sustainable development. The data origin is from publicly available statistical data banks such as:

Statista.com, Eurostat, GlobalEconomy.com, DataCube.sk. These statistical data banks provided appropriate datasets for our study including historical records that could help us closely examine the development and progress of each European member state. The study population was focused on Europe, and we picked sample countries that are an adequate member state of European Union. The main purpose of this statistical evaluation was to highlight differences between countries in HDI and the Innovation Index and then compare them against the share of sustainable projects within these countries. We then evaluated the share of renewable energy projects comparing the European Union average to Slovakia alongside the variations in greenhouse gas emissions over time and stating if the increase of renewables had an impact on the decrease of greenhouse gas emissions. This dataset covers a range of ten consecutive years with an annual reporting average from each monitored sample.

The data used in this study pertains to sustainable projects, greenhouse gas emissions, gross domestic product, index of living standards of the population, and the innovation index of the countries where we used Pearson´s correlation coefficient as a main point focus to determine dependencies between chosen datasets. To determine the correlation, corresponding hypotheses are formed. The hypotheses are repeated in the comparative analysis to highlight the correlation in detail. Hypotheses H0 and H1 are represented here.

H0: Question X and question Y are not dependent on each other

H1: Question X and question Y are dependent on each other

The basic formula to calculate Pearson´s correlation coefficient is:

$$r = (\Sigma((X_i - \bar{X})(Y_i - \bar{Y}))) / (\sqrt{(\Sigma((X_i - \bar{X})^2) * \Sigma((Y_i - \bar{Y})^2)})$$

The range in Pearson´s correlation coefficient states that:

- -1 indicates a perfect negative correlation (inverse relationship)
- +1 indicates a perfect positive correlation (direct relationship)
- 0 indicates no correlation between the variables.

For our results in this study to achieve Pearson´s correlation coefficient calculation, we have used Data Analysis software within Microsoft Excel, that helped us calculate these results in more efficient way. This study was conducted in the second quarter of year 2023.

In summary, we looked at twenty-seven member countries of the European Union, and then compared this data between specified countries. For sustainable projects and greenhouse gas emissions, we analyzed data for 2012-2021, and for all other metrics, we analyzed the most recent data available for all countries for one year, 2021. We used a descriptive method to evaluate the statistical data, and all results are recorded and thoroughlyexplained in the study.

4. Results and discussion

Between 2012 and 2021, the share of renewables in the EU increased by 35.63% year-on-year. The curve of the graph in percentages shows a continuous increase in the share of renewables in the EU Member States up until 2020.

The average share of renewables in the European Union is at 18.7% for the period 2012 to 2021. The year-on-year growth rate shows us that almost all countries have managed to maintain the growth in the share of renewables in energy production during the period under review, except Hungary which has seen a decline at -9.11% in the share of renewables. However, its average for the period under review was 14.2%.

When comparing the graphs of the European Union and the Slovak Republic, we can see that the Slovak Republic has not been as consistent over the period under review as the European Union average. Large investments and development of renewable energy sources in the Slovak Republic started to prevail in 2018-2019, where we see a high percentage increase in the share of renewable energy sources. Specifically, it is a jump of 5% between the two years. However, after this high jump from 12% to 17%, the Slovak Republic started to stagnate. This is reflected in the last years 2020, 2021 and, according to current data, we can expect continued stagnation in 2022 as well.

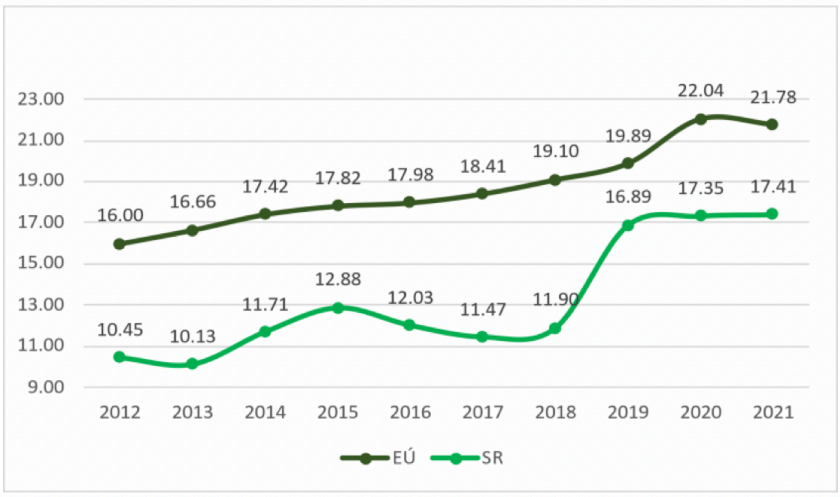

Figure 1: Share of Renewables

Source: Authors

Emissions have plagued the planet for centuries and are an undesirable byproduct that every country must address. The European Union has a target of reducing emissions by at least 55% by 2030. Its plans to achieve this transformation include, increasing the tax burden on energy, making use of the existing emissions trading system, increasing energy efficiency, increasing the production of energy from renewable energy sources, and improving the infrastructure within the European Union for alternative fuels, along with many others. Of these, the most important is the development of renewable energy sources, which are considered key to reducing greenhouse gas emissions.

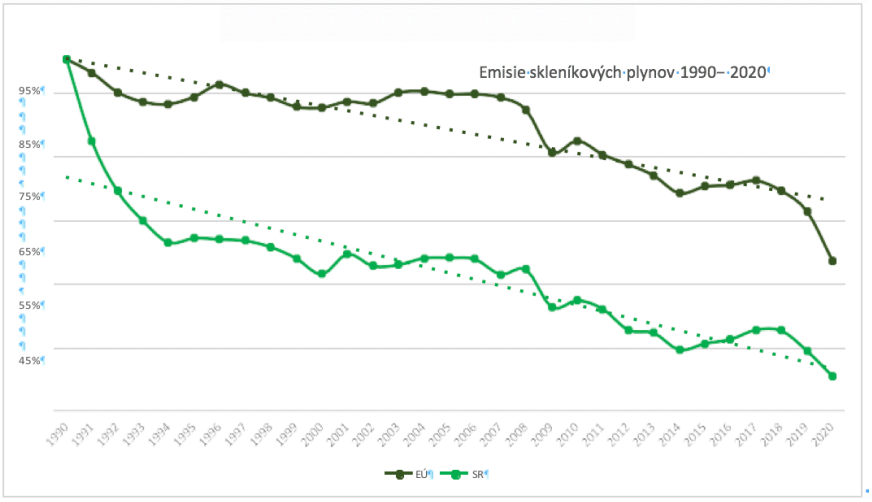

Figure 2: Greenhouse emissions - EU and SK

Source: Authors

From the data for the period 2000-2020 and 2011-2020, we observe a continuous decline in emissions showing that both the European Union and the Slovak Republic are constantly striving to meet the targets set. In 2020, the level of emissions in Slovakia was approximately 37 104 kilotons of CO2. Compared to 1990, this is a decrease of almost 50% in total anthropogenic greenhouse gas emissions. The European Union is following the same trend as the Slovak Republic, and greenhouse gas emissions are gradually decreasing.

The below map of the European Union shows us in color variations how each Member State has performed in terms of emissions. We can clearly see that Germany was the highest emitter of greenhouse gases in 2020, at 742 491kt of CO2.



Figure 3: Map of EU - Emission production

Source: Authors

The development and prosperity of innovative technologies and the implementation of innovative projects depend on a variety of variables centered on the overall quality of the environment. The environment is characterized by a country's capacity to produce and invest in development activities. Factors that influence such developments are, for example, a country's GDP (Gross Domestic Product), HDI (Human Development Index) and EIS (European Innovation Index). According to the values obtained, it is possible to identify which countries are thriving and making progress in innovation-related activities, but conversely, we can identify which countries are falling behind and where more determined measures need to be taken to develop the country further.

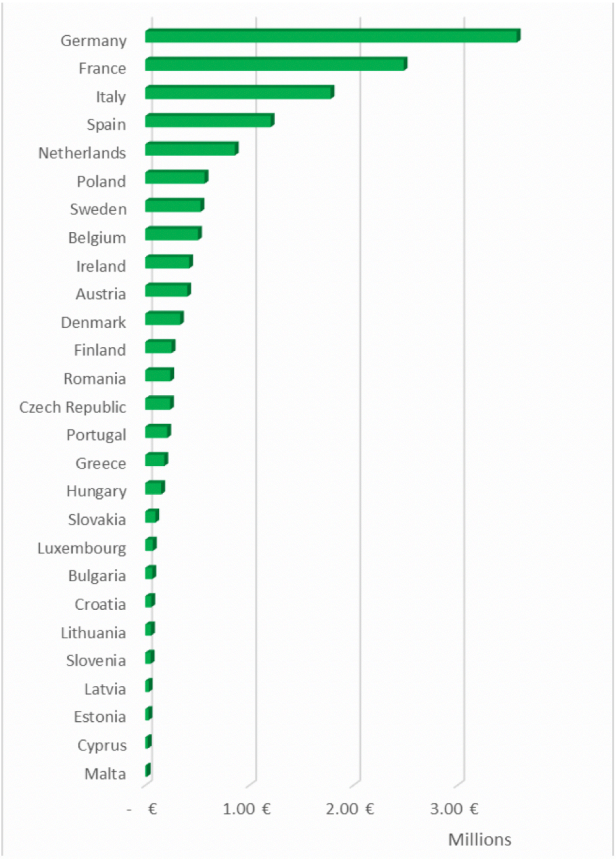

Figure 4: HDI 2021

Source: Authors

The GDP of the EU Member States monitored was €14.45 trillion in 2021. The German economy ranked first and was sovereignly the largest of allEU countries. This high GDP indicates the quality of the country's economic situation and its potential growth in future periods. It also indicates a higher standard of living for the population, higher investment in education, science, and research, but also in health and other areas. Countries with higher GDP onaverage have better quality healthcare andelevated levels of education, which contribute tothe long-term sustainability and quality of life of their population. Quality of life is addressed by the HDI, which represents the standard of living of the population (Baru, 1998).

As part of tracking the information available on national productivity and living standards in the form of a human development index, the study also focused on the innovation index. The innovation index is used to compare the technological and innovative capability of countries in diverse types of sectors and regions.It compares countries' investment intentions andreflects qualitative and quantitative assessmentsin the field of science and research. Based on theinnovation index, a country or sector can respondappropriately and conduct the necessary activities to support the development ofinnovation projects and thus strengthen its position. According to the latest data, the study was dedicated to comparing the innovation indexin the following countries for the year 2022.

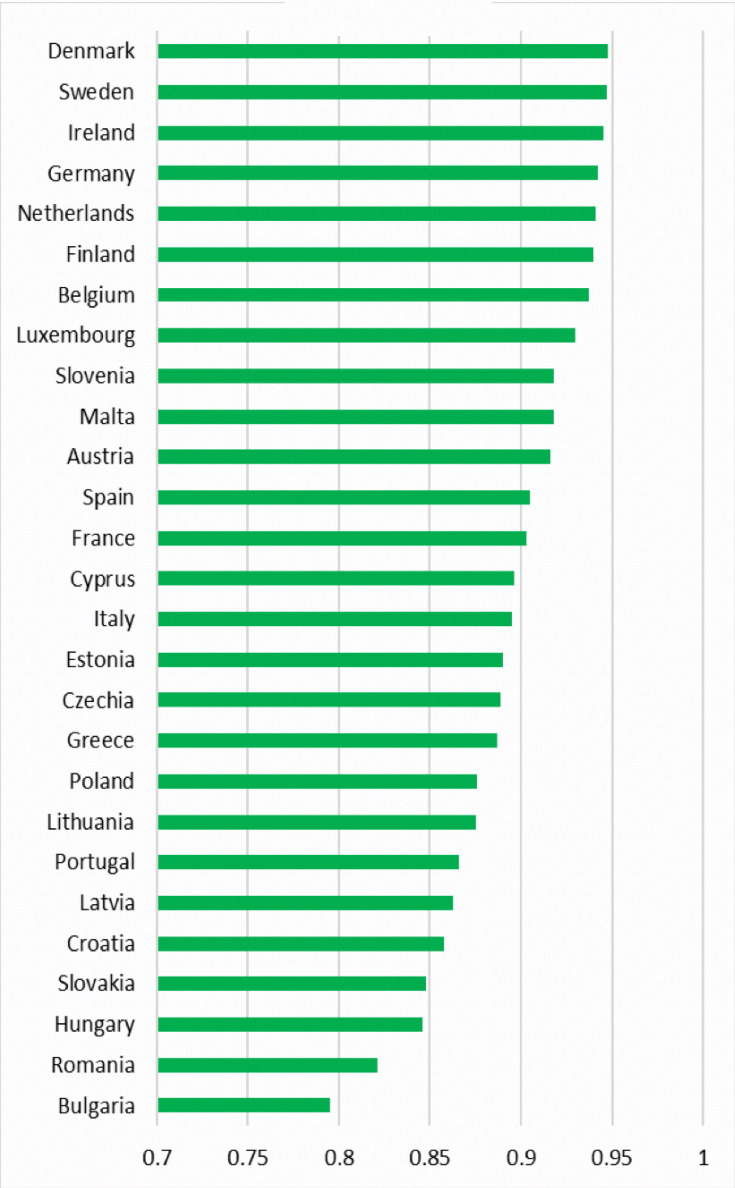

Figure 5: HDI 2021

Source: Authors

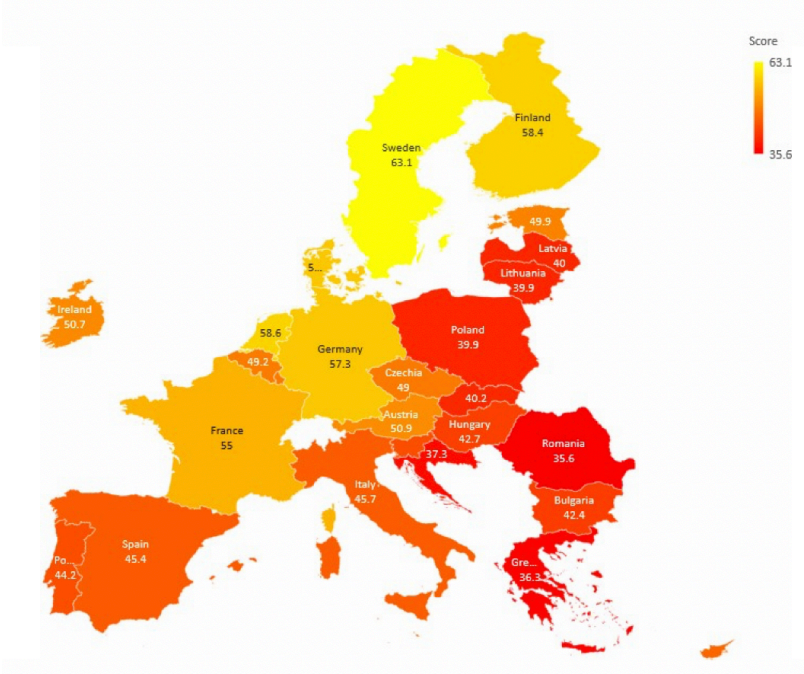

Figure 6: Map of Innovation Index 2021

Source: Authors

The average value of the innovation index of the countries studied was 47.3. The highest value was achieved by Sweden, which reached a value of 63.1 in 2022, and the lowest value was attributed to Romania at 35.6. In general, the Eastern European member countries achieved the lowest values according to the innovation index. This indicates these countries are not prioritizing the development and research of innovation and technological capabilities.

By combining the GDP, HDI and EIS indicators and their values, it is possible to identify which countries have the greatest opportunities to prosper in the field of environmental and renewable innovation, and to improve the general standard of living and development. North-Western Europe is making progress in these areas, while actively contributing to the environmental objectives identified by the EU for the FitFor55 program.

Table 1 compares HDI towards Innovation index, where H0 and H1 are assumed as follows:

H0: There is NO dependency between the HDI and Innovation index by countries

H1: There IS a significant dependency between the HDI and Innovation index by countries

Table 1: Correlation coefficient

	HDI	Innovation index
HDI	1	
Innovation index	0.779342	1

Source: Authors

When examining Pearson correlation coefficient and it´s dependency, we discovered that HDI and Innovation Index have moderately strong dependency among the examined datasets. The value of correlation coefficient is0,77. This number suggests that countries with higher HDI, tend to have also higher Innovation Index and vice versa.

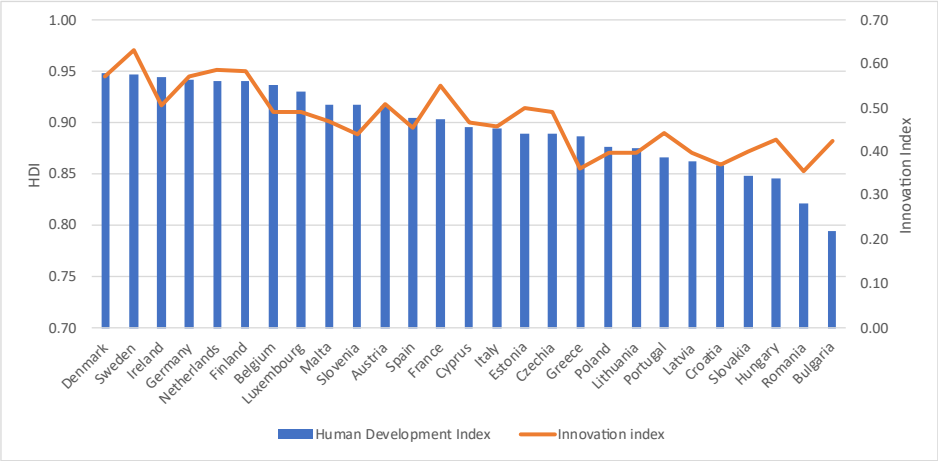

Figure 7: Comparison of HDI and Innovation Index

Source: Authors

In the chart above, the correlation coefficient between the examined datasets shows that countries tend to have higher Innovation index due to higher HDI. The average of the Innovation index is 0.47, and the average of HDI is 0.90. Higher education, and higher living standards, as well as many more factors are responsible for the capability of a country to generate more ideas, use higher and newer technologies, and processes to promote economic growth and its competitiveness.

Returning to the first chart visualizing the Share of Renewables in European union countries, we concluded that in more than 70% of cases, lower HDI and Innovation Index leads countries to use and implement less of renewable energy solutions than those countries with higher evaluations.

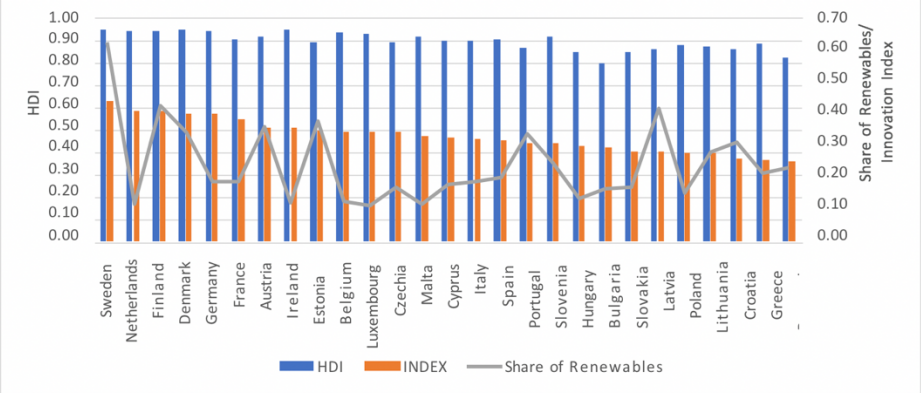

Figure 8: Share of Renewables against HDI & Innovation Index

Source: Authors

From our research perspective, we can confidently say that based on the obtained results, increasing renewable energy sources, and driving general country innovation index upwards has an enormous impact on reducing greenhouse gas emissions. Renewable energy plays a pivotal role in achieving carbon neutrality. Thus, this growth indicates a positive trend towards the adoption of renewable energy sources in the EU member states as they are a key instrument in achieving set of goals by EU. A strong positive correlation between HDI and the Innovation index suggests that countries with higher HDI tend to have higher innovation capabilities and vice versa. This finding is aligned with the observation that countries with higher evaluations in HDI and the Innovation Index tend to implement more renewable energy solutions. Conversely, countries with lower HDI and Innovation Index scores exhibit lower adoption rates of renewable energy. This also supports findings indicating that these countries tend to contribute more toward long-term sustainability and competitiveness. Supporting this evidence is that these indexes and findings are therefore a result of SMEs being highly initiative taking in this environment. They are the drivers that make the country competitive and highlights their interest in sustainability. This evidence indicates that countries separately should support small businesses and make

the processes and activities associated with green development more approachable and easier to implement. Without them a country on its own cannot compete and achieve the specified goals.

Analysis of statistical data shows the need for change in sectors at the organizational and national level, in relation to GHG production or emissions generation. The strategic objectives adopted by the Member States ofthe European Union have committed themselves to achieving these targets in different time horizons. The European Union aims to achieve carbon neutrality by 2050. However, in order to achieve this a change in legislation is needed in the Slovak Republic to better support the development of innovative projects at both national and organizational level. The current situation indicates a poor legislative and procedural environment that needs to be changed to embrace the development of innovative projects in the field of green energy. At the organizational level, it is necessary to make changes or adapt the company's strategy and values according to the draft strategic recommendations that have been developed, which describe how organizations should proceed if they want to continue to integrate environmental projects in their environment.

5. Conclusion

Innovative green energy projects are now crucial for organizations if they want to continue to thrive and add value. In addition to helping individual organizations and increasing their prosperity, innovative projects are important in meeting sustainability goals and protecting the environment. They provide the prerequisites for achieving carbon neutrality, but without their implementation by organizations, this goal is exceedingly difficult to achieve. Projects at the organizational level are unsuccessful due to poorly aligned organizational strategy and values. Unless the core values of the organization are communicated to all stakeholders who influence the growth and management of the organization, it is unlikely that these types of projects will be integrated into the organization’s project portfolio. Environmental projects are becoming more prevalent and desirable by the investment entities that fund today's organizations. They impose various conditions for obtaining funding, including the pursuit of carbon neutrality.

Based on the study, the following points are suggested as they provide useful strategies on how to become greener and more sustainable for the future in the EU region.

The first recommendation is the implementation of ISO standards (Ka et al. 2023) that can provide practical solutions for their businesses and strengthen the market position or create competitive advantage amongst other competitors, with norms such as ISO 14001, ISO 45001, ISO 20400, or ISO 50001.

The second recommendation would be to plan out an action plan that would consist of results from internal and external environmental evaluation. Businesses would then use these data to formulate their strategy and plans (Cote, 2020). It would bring them closer to the formulation of internal company values and what they want to achieve.

The third recommendation is to monitor implement and monitor their KPIs, so the business is more likely to achieve their intended goals within set timeframes. They should be created based on their strategy and planning. The implementation of KPIs in projects should then defined by its importance to business and importance to stakeholders, which could then look like this:

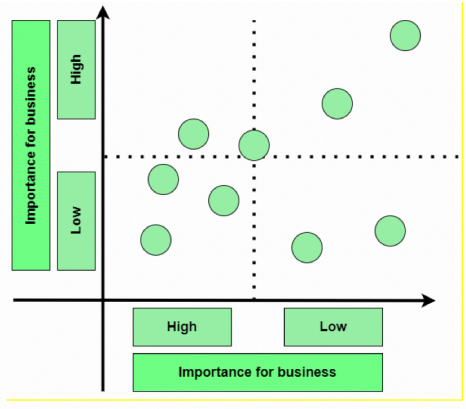

Figure 9: Importance diagram

Source: Authors

The fourth practical recommendation would be for SMEs to lower their consumption of fossil fuels and use sustainable green energy produced from green energy sources. This can be achieved by using local green energy source, or partially depend on their own sustainable green energy source if possible. This would drastically help the environment by reducing dependency on fossil fuels and simultaneously lower the local CO2 emissions. Overall, if majority of SMEs would consider this path, they could globally lower greenhouse gas emissions. On the other hand, businesses would then be able to access so called green financing (Červeňáková, 2023), because they would be considered as a suitable partner for financial institutions to invest in their business. After setting up a proper direction for business, these recommendations would increase relevance of all projects conducted and would help their future growth.

This study brings together valuable information about how the SMEs can influence globally debated question about sustainability and green development. SMEs are the biggest factor that can change the direction of accomplishing EU goals for 2055. However, other researchers may conduct more precise and comprehensive research in this field. For example, data for Slovak republic weren´t that precise and complete in matter of detailed information. In the future, more precise and conducted surveys with larger data samples can be useful to continue this study in more detailed way. In the future, we recommend researchers to split datasets from all countries, and compare results on country level rather than globally. Researchers may focus on different variables than Country Innovation Index which indicates a level of innovation, for example on financial incentives and support mechanisms, regulatory and policy frameworks, environmental and social impacts or on industry collaborations and networks.

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Toward Universal Creativity Assessment by Untrained Judges

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Abstract: The purpose of a creativity session being first to generate many ideas, how to fast and reliably assess each one's creativity, even with non-creativity experts? Creative people appearing not only to be good at generating ideas but also at implicitly evaluating them, improving people's assessment would further improve their own creativity. This paper investigates canonical components of originality to identify universal creative performance subscales assessable by untrained judges. Three originality criteria emerged from theoretical research: (1) Feelings, emotions; (2) Imagination, fantasy; (3) Logical complexity. One criterion was used to assess appropriateness: (4) Consistency as defined by four rules. A corpus of 100 ideas were distributed for assessments by untrained judges (n=41). All ideas were assessed by 4 expert judges on a single criterion: creativity. Surprisingly the criterion (4), which had four clear rules to define it, showed insufficient reliability and had to be disregarded for the analysis. The three other criteria proved consistent with one another and were hence reduced to an assessment of originality. They showed poor consistency with expert judges' ratings. These results are discussed and call for further research to better understand creativity.

Keywords: idea, scale, evaluation, originality, appropriateness, novice

1. Improving creativity knowledge

Lack of innovation is a potential failure factor for businesses. New products are almost half of a company's income, but 35 to 45% of new product releases would fail (O'Quin & Besemer, 2006). Creativity is key to innovation and is a potentially significant predictor of purchase intentions and customer satisfaction (Horn & Salvendy, 2009), but most people misunderstand creativity (O'Quin & Besemer, 2006). Creativity can qualify either a *potential* or a *performance*. Creative *potentials* lead to creative outcomes (persons, influences from the environment, and processes). Creative *performances* are the outcomes themselves (ideas, processes, physical objects, communicating an idea). Creativity is commonly defined as producing a *performance*, or having the *potential* to produce a *performance*, which is both original and appropriate, i.e. which is unusual and responds to a need for its audience. Originality and appropriateness are subjective and context-dependent (e.g., Beghetto & Corazza, 2019; Tang & Gruszka, 2017). Ideas are implicitly favored when they are socially beneficial and immediately effective, and they can hardly be judged as both original and appropriate even by domain experts (Beghetto & Corazza, 2019; Ceh et al., 2022). Highly original ideas' expected usage and benefits would be harder to communicate and understand, increasing the uncertainty relative to ideas' effectiveness and workability, while possibly triggering defensive reactions (O'Quin & Besemer, 2011, 2006; Mastria et al., 2019; Cropley, 2023). To rightly assess creative ideas and thus be creative, one must understand *what* is creative avoiding implicit rules appearing behind the term "original" (Ceh et al., 2022; Forthmann et al., 2017; Runco et al., 2005). Rater's cognitive workload increases with ideas and scales complexity, leading to misjudgments (Forthmann et al., 2017). Simple and absolute subscales assessable by anyone would ease creative understanding, rating, and generation, relieving cognitive load and sharing the evaluation task. They would allow non-creativity experts to faster understand what is creative *performance*, what ability to train to increase their *potential*, and what to discuss and tweak in concepts to achieve high creativity. Besides, creativity science needs to identify a *universal aesthetic* to quantify creativity kinds (Cropley and Kaufman, 2013), a common language and definitions (Amabile, 1982) shared by different artifacts (e.g., knowledge, products, processes, art), and by different audiences (e.g., consumers, entrepreneurs). It would facilitate communication across domains (O'Quin & Besemer, 2011) and possibly remove assessment's contextualization needs. Otherwise, (1) neither cross-field *performances* nor performers can be compared, hindering interdisciplinary collaboration and *potentials* comparison; and (2) performances should be randomly assessed by experts (Amabile, 1982), decreasing fluidity in creativity sessions where ideas are constantly generated, combined, and discussed. These drawbacks could be overcome by identifying common creativity scales, which could be used as material to consider generated concepts' interesting sides, full discussions about their values and (pre-)sorting them fast. Besides, quality scoring may have a different meaning for assessing potential and performance (Reiter-Palmon et al., 2019). Identifying universal criteria would fuel both this debate and the one about whether creativity is general or domain-specific (Baer, 2012).

2. Performance assessment

Several product creativity scales are experimentally supported. Besemer and colleagues developed the Creative Product Analysis Model (CPAM), then refined it to the Creative Product Semantic Scale (CPSS, O'Quin & Besemer, 2006). Cropley and colleagues refined the CPAM to a Creative Solution Diagnosis Scale (CSDS) and then to a reduced Revised CSDS (RCSDS). These scales use 24 (RCSDS) to 125 (CPAM) subscales (Brown, 2014; Cropley, 2023). The CPAM considers three dimensions: *novelty* (any element in the product that is original, incentive or enables new perspectives), *resolution* (the product meets a need, is feasible and understandable), and *synthesis and elaboration* (how the solution is implemented and displayed) (Tang & Gruszka, 2017; O'Quin & Besemer, 2011; Cropley, 2023). The *CPSS* renames *Elaboration and synthesis* to *Style* (novelty perception enhancement) (O'Quin & Besemer, 2011, 2006). The *CSDS* rates five dimensions: *Problematization* (definition of the problem) and *Propulsion* (new perspectives given to the problem, combined as *Novelty* in the RSCDS; *Relevance & Effectiveness*; *Elegance* (external, i.e. product's looking, or internal, i.e. how the solution is implemented)*;* and *Genesis* (or *Generalizability;* workability for other needs, perspectives extension) (Cropley & Kaufman, 2013; Brown, 2014; Cropley, 2023). Only the CPSS and CSDS enable ratings close to experts' (Cropley, 2023), outside of technologically-oriented domains. CSDS' *Elegance* and *Genesis* could not be assessed even by quasi-experts (Cropley & Kaufman, 2013).

These scales are mostly concerned with functional relations (Reiter-Palmon et al., 2019) and knowledge-oriented, being relative to the knowledge brought to the user and seemingly loosely considering experience, feelings. *"Pleasingness"*, *gracefulness,* and "*harmoniousness"* are some of the *External elegance*'s subscales, but more hedonic scales could miss. Indeed, creativity is sometimes defined by the responses elicited by the product in an observer or user, like surprise (Han et al., 2021). Besides, to study the link between product creativity and purchasers' evaluations, Horn and Salvendy (2009) tested a model with seven dimensions, mostly based on the CPAM and notably adding *Emotion*, *Centrality* (interest in the product), *Importance* (how suitable and crucial the product is for the customer), and *Desire*.

Getzels and Csikszentmihalyi (1969) proposed three criteria targeting fine art: *originality*/*imaginativeness*, *overall aesthetic value*, and *craftsmanship*/*technical skill* (O'Quin & Besemer, 2011). Nevertheless, I argue technical aspects might be avoided. Indeed, *technicity* could be different from creativity (Amabile, 1982) and users appear sometimes to produce more original and valuable ideas than professionals (Kristensson et al., 2004). Moreover, Lewis (2005) argues to pursue "more subjective and elusive goals" to promote creative insight, and including technical aspects in criteria would hinder reaching criteria generalizable to all domains.

3. Potential assessment

Performances cannot arise without creative thinking, a *potential* composed of two main thinking: divergent (DT; generating many ideas) and convergent (CT; evaluating the ideas). DT can be measured through *fluency* (number of ideas), *originality* (rarity of ideas), *flexibility* (semantic variety of ideas), and *elaboration* (level of detail) (Reiter-Palmon et al., 2019; Runco et al, 2005). Their operationalization lacks agreement. They all require subjective decisions (e.g., what aspects are similar?) and are relative to a sample (Silvia et al., 2008; Reiter-Palmon et al., 2019). *Fluency* is generally preferred over other criteria because it is objective and fast computed, whereas it "is not directly tied to the creativity definition" (Forthmann et al., 2017; see also Reiter-Palmon et al., 2019). *Originality* is generally rated as one criterion but is sometimes measured by three subscales: *uncommonness* (infrequency), *remoteness* (far link from existing artifacts), and *cleverness* (smart nature, encompassing "imaginativeness, ingenuity, funniness, and cunning aptness" (Reiter-Palmon et al., 2019)). Not all ideas' facets are *remoteness*-assessed (e.g., either features overlap or part-whole relations) and high *cleverness* can compensate for the others (Reiter-Palmon et al., 2019; Silvia et al., 2008). Creativity's *appropriateness* is rarely assessed. It is the amount to which an idea is feasible and solves the problem at hand without being viewable as inappropriate by others (Runco et al., 2005).

4. Toward universal creativity scales

To ease the identification of universal creativity scales efficient among untrained judges, appropriateness is excluded, being defined by four specific rules imposed during the creativity task (see 7.1). Moreover, reliability of assessing one's own ideas and others' ideas being different (Mastria et al., 2019), this paper focuses on assessing exogenous/extrapersonal ideas. Besides, the scales are expected to be usable at any stage of the design process. Therefore, I suggest subscales relative to the presentation/communication (e.g., *Style*) of ideas should not be criteria. They should be later tweaked, when all ideas are gathered into concepts. At least, they

should be mediators of the assessments. Indeed the clearer the novelty, the more reliable the creativity assessment is. In the same way, level of detail should not matter.

From an evolutionary viewpoint, the brain is triune. Two of them are the limbic system, primarily responsible for emotional responses, and the neocortex, primarily responsible for logical reasoning. Both have major roles in creativity (Carson, 2010). Therefore, emotions and logic seem two major components constituting creative performances. In the continuity of Getzels and Csikszentmihalyi's (1967) conclusions that "creative achievement […] depends upon a union of the intuitive and the rational, of the imaginative and the analytic, of fantasy and control", I suggest at least two dimensions of universal creativity exist: *feelings/emotions* and *logic*.

Feelings/emotions might be an indirect estimator of any idea's originality and value. Indeed, highly novel ideas are accompanied by a surprise effect (see 2). With repeated exposures to a stimulus, whether it is positive (e.g., food) or negative (e.g., a shock), the central nervous system gets *habituated*; the elicited responses, both cognitive and behavioral, decrease (Thompson, 2009). Therefore, I suggest the feeling subscale would be rated higher for original ideas. Moreover, according to the Conservation of Resources Theory (COR), people value their resources (objects, conditions, personal characteristics, and energies) (see Hobfoll & Shirom, 2019), and would naturally feel emotions to conserve them (Park et al., 2014). Consequently, ideas would be valuable when they are perceived to prevent losses of resources, or to enable gains, generating *feelings* (e.g., a loss prevention can relieve, a gain anticipation can elicit joy). Meaningfulness of an idea could increase the elicited feelings, making *feelings* an indirect estimator of any idea's value.

To assess opportunities given by an idea, the observer must be conscious enough of the problem and imagine the idea's impacts (Cropley & Cropley, 2010). Otherwise, *feelings/emotions* would not be elicited. However, the idea might be viewed as too complex or absurd, as highly imaginative, fanciful. Therefore, I suggest *fantasy/imagination* and *logical complexity* would be two dimensions constituting creativity.

That is, *feelings/emotions* are the emotions reflected by the idea, or the feelings it elicits. *Logical complexity* is the amount of involved systems interacting with each other, referring then to the depth and sophistication of the idea. *Fantasy/imagination* is the amount of push-backed limits of reality and appeal to the imagination, defying conventional expectations and proposing concepts that don't exist in reality. By combining these three criteria, an original idea or creation would be emotionally powerful, intellectually stimulating and capable of inspiring the imagination. These criteria are assumed to be absolute because when an idea does not meet any criterion enough, the related component must simply be added (e.g., if it idea does not reflect emotions enough, emotional components must simply be added). These criteria might seem too subjective to reach a reliable consensus among raters. Nevertheless, Amabile (1982) argued judgments about creativity, even with subscales, "can ultimately only be subjective." Moreover, the CPSS' *Style* rose the same concern, but studies finally showed great consistency among raters (O'Quin & Besemer, 2011).

5. Hypothesis

Originality of ideas will be assessed through three subscales: (1) feelings, emotions, (2) imagination, fantasy, and (3) logical complexity (see 4). Appropriateness through one item defined by four rules (see 7.1). Suggesting the criteria would rate the degree of creativity of ideas, I hypothesized:

H1: Assessment by untrained judges of creativity, based on the abovementioned criteria, will be consistent with the assessment of creativity by expert judges.

6. Participants

Participants were 45 French engineering students from the same promotion and engaged in an innovation project. They were aged 20-27 years (M = 22.28; SD = 1.45). Three were women. All were divided into groups (n=6) and evaluated 20 ideas generated by another group. Four expert judges from a research team in Innovation were recruited to score each idea's overall creativity.

7. Material

7.1 Experimental ideas sample

Ideas assessed by participants were generated the day before during a creativity task inspired by the causality effect (Michotte, 1963) and by three types of typical tasks: instantiation, consequence, and bridge-the-gap

(Silvia, 2011). The task requests explaining a hidden part in a 5-second animation made of geometrical shapes seemingly interacting. Ending frames were partially hidden so that the result of the interaction could be seen, but not the interaction itself, giving participants the opportunity to imagine as many possible interaction(s) as possible that occurred between the allegorical shapes (see Figures 1 and 2). Each participant individually completed idea sheets with a drawing and a textual description (see Figure 3), because Torrance's figural and verbal tasks appeared to measure almost orthogonal creative abilities (Baer, 2012). Ideas had to follow four rules:

1. When they are invisible (in a black area), the existing elements can be anywhere (visible or invisible area). Specify their location in the drawing/description.
2. You can add one or more new elements anywhere, but not delete existing ones.
3. Size and time are flexible (smaller/larger existing elements, slower/faster animation sections).
4. The whole animation must remain coherent.

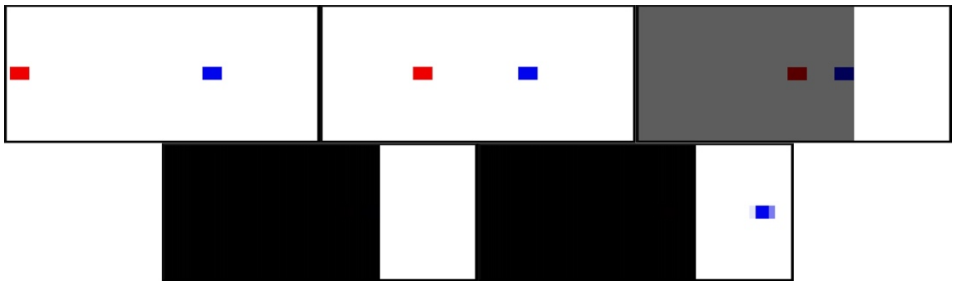

Figure 1: First task's animation

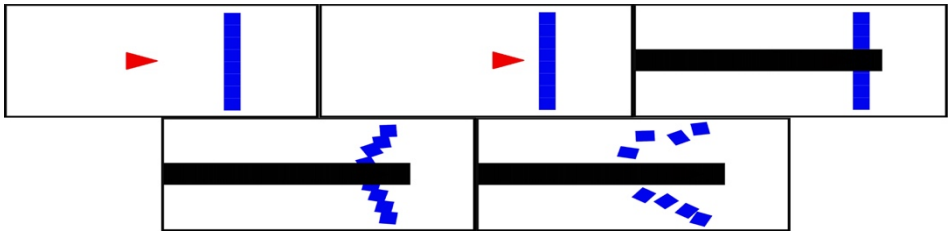

Figure 2: Second task's animation



Figure 3: Idea sheet presented as example

From 374 generated ideas, ideas sheets were randomly selected (n=120) for this study. Duplicates were replaced. Each group assessed 20 ideas, ten addressing the first animation and ten the second one.

7.2 Expert judges' warm-up sample

For the expert judges to appropriate the new creativity task, they trained on ideas generated with the same task through a pilot study (n=95), and by participants from the same engineering school's promotion.

7.3 Measures

Each participant completed a numerical form. Each page displayed the idea number and the four items to be assessed on a 7-point Likert-type scale. Each item was followed by an example illustrating its meaning. Expert judges assessed each idea by a single creativity score.

8. Procedure

8.1 Expert judges' assessment

Expert judges appropriated the task rating the *warm-up sample*, before rating all the ideas (n=374) including those examined by the participant (n=120). The task lasted three hours with a 15-min break. Judges were reminded of the two creativity dimensions - originality and appropriateness -, and were given the four used appropriateness rules (see 7.1). Judges first watched three times the first animation then scored the related ideas, then watched three times the second animation and scored the related ideas. Idea sheets were sequentially displayed on a screen. For each idea, the title and description were collectively read, before individually scoring it. Judges remained neutral to minimize social influence.

8.2 Participants' assessment

All participants performed the task in the same room, each group around a table. The experimenter presented the items to be scored through examples illustrating each one and reminded the four rules of appropriateness. These rules remained displayed to all throughout the task. On each group table, the stack of idea sheets was upside down, to hide the next idea. The experimenter showed the first animation three times and all groups simultaneously assessed the ten first ideas. In each group, one participant took the first sheet, read aloud its title and description, then showed the idea to everyone. The idea sheet could be circulated among the group. Participants could speak to understand the descriptions and the drawings. When all groups had assessed the ten first ideas, the experimenter showed the second animation three times, and the same process was followed for the ten next ideas.

9. Results

9.1 Validation of the expert judges task appropriation

To validate the expert judges appropriated the new creativity task, we analyzed with Cronbach's alpha the inter-rater agreements for the warming-up sample and the experimental one, for each animation. With the first animation, inter-rater agreement was low with the *warm-up sample* (α=.550; n=44) and high with the first ideas from the experimental one (α=.811; n=44). With the second animation, inter-rater agreement was high both with the *warm-up sample* (α=.707; n=51) and the first ideas from the experimental one (α=.796; n=51). Merging assessments of both animations, agreement was moderated with the *warm-up sample* (α=.653; n=95) and high with the ideas the experimental sample comes from (α=.752; n=373). The reached inter-rater agreements suggest the experts satisfactorily appropriated the task.

9.2 Creativity criteria validation

Inter-rater agreement for each of the four assessment criteria was computed. Each group but the fourth ($\alpha \in$ [.579; .678]), which had the lower number of judges (n=4), had an acceptable inter-rater agreement for each criterion ($\alpha \in$ [.664; .930]) (cf. Table 1). We removed group 4 from further analysis. Appropriateness appeared to lead to lowest agreements.

Table 1: Inter-rater agreements per criterion

Assessing group	1	2	3	4	5	6
n	8	8	6	4	9	10
α (feelings, emotions)	.786	.805	.708	.678	.924	.825
α (imagination, fantasy)	.816	.738	.767	.579	.926	.904
α (logical complexity)	.764	.764	.678	.631	.930	.881
α (appropriateness)	.664	.810	.718	.589	.849	.762

Inter-criteria reliability proved high (α=.839). The highest agreement decrease was by removing *logical complexity* (α=.747). The highest agreement increase was by removing *appropriateness* (α=.899) (see Table 3). *Appropriateness* ratings were removed from further analysis.

Table 2: Inter-criteria agreements

Criterion	Cronbach's alpha removing the criterion
Feelings, emotions	.766
Imagination, fantasy	.755
Logical complexity	.747
Appropriateness	.899

We computed the consistency of the assessments between participants and expert judges. Consistency was low (α=.511), which invalidates H1.

10. Discussion

The purpose of this study was to validate universal creativity criteria intended to untrained judges, by comparing *untrained* judges' assessments of ideas with *expert* judges' assessments of ideas. Untrained judges' inter-rater-reliability was good with groups of more than 5 individuals, consistent with Ceh et al.'s (2022) results. Experts inter-judge agreement increased with the study sample relatively to the warm-up one and was high, suggesting they reliably assessed the ideas. They may have got a better grasp either of what original ideas are for this task and participants population, and/or of what appropriateness is through implicit rules underlying ideas (Forthmann et al., 2017). Besides because of the long assessment session, intuitive feelings may have gradually overcome appropriateness checking by the trained judges, feelings elicited by originality gaining then more importance than defined rules.

10.1 Appropriateness seems harder to agree upon

Ideas' *appropriateness*, defined as maintaining consistency of animations by following four rules, was assumed to be a more objective-oriented measure than other subscales. Therefore we could expect *appropriateness* to reach more agreement of *untrained judges* than other subscales. Surprisingly, results invalidated this assumption, *appropriateness* being the criterion that achieved the less satisfactory inter-rater agreement. This suggests that: (1) although the rules were simple, some participants may instead have used their own implicit understanding to assess the consistency of animations (Forthmann et al., 2017), leading to a defined appropriateness not as objective as it seems. (2) Appropriateness is hard to assess probably because it requires to well understand the end-user needs and constraints, and creativity renders existing solutions to problems obsolete (Cropley, 2023). Change brought by an idea's reflected originality might then have sometimes overcome rater's conception of appropriateness, at different degrees among raters. (3) Assessing consistency of animation requires envisioning what the whole animation would look like with the idea inserted inside. This capability may have been owned to different degrees by participants. (4) Non-verbal cues may have influenced appropriateness ratings. Indeed, non-verbal cues influence judgments occurring in groups (Milliken et al., 2003)

and participants could speak to understand what was written as description of the ideas, but they were not required to remain neutral. To improve the appropriateness criterion, maintaining raters' neutrality and both the COR and Schwartz's notion of values (Taylor & Kaufman, 2021) might be good leads.

10.2 The suggested creativity criteria are not sufficient to assess creativity

I suggested creativity assessment by *untrained* judges through the four criteria would correlate with a single-scale creativity assessment by *expert* judges. The *appropriateness* criterion rated by untrained judges did not meet sufficient reliability and overall results invalidated H1. Nevertheless, this may not be the only reason for the invalidation. Indeed, (1) because of the feelings elicited by originality, the *experts* might have implicitly placed more weight on it (Diedrich et al., 2015), theoretically reducing the impact of the appropriateness removal; (2) if the appropriateness criterion did not reach agreement among untrained judges, we can suspect it was also less reliable among trained judges. That is, if the expert judges' warm-up improved their rater agreement, it may be through an increase in originality rating agreement instead of appropriateness rating; (3) originality and appropriateness are not necessarily related (Runco et al., 2005) and an inappropriate but original idea would still be viewed as creative (Runco & Charles, 1993). As a result, a few criteria might be missing for a universal originality assessment by untrained judges. They might be related to germinal aspect (e.g., the extent to which an idea inspires thoughts), to the COR (arousal, relaxation), to the *remoteness* criterion (see 3; omitted because DT enables flexibility measurement), or the third triune brain layer, the reptilian (e.g., movements or energies). Furthermore, novices' assessments should probably include an understandability criterion similar to CPSS' *Style*, to weight their ratings: if they estimate the idea was unclear, their ratings should be less considered. In the same way, raters' emotional states would influence their assessments (Mastria et al., 2019); this could be due to a conflict with the emotion the performance rises, perhaps assessable by the *feelings/emotions* criterion. Therefore, understandability and the studied criteria could be not creative *dimensions*, but creative *perceptions,* that is, mediators of creativity assessment. Finally, the criteria might not be enough because they intend to be universal. Indeed if creativity is domain-specific, according to Baer and Kaufman's Amusement Park Theory, the proposed criteria would fit only between the first and the second level (respectively initial requirements such as motivation, and domain into which creativity is applied) (Baer, 2012; see also Taylor & Kaufman, 2021), leaving the next levels unrated by the untrained judges.

10.3 Limits

This study constitutes only a first step toward the development of a creativity assessment tool. Firstly, to further challenge our creativity criteria, it would be necessary to test them in creative contexts varying in purpose and approach, covering a broad spectrum from e.g., technical creativity responding to a functional brief, to artistic creativity relying more on an introspective process. Different tasks may lead to differential matching with each creativity criterion: for example, ideas in the current task did not have to meet functional requirements or achieve any performance, which may partly explain why appropriateness was particularly difficult to assess. Secondly, our experimental population holds several limitations: it was quite a homogeneous sample (same school, same study level, mostly males) and they may have been influenced to different degrees by the instructions like performers do (Runco et al., 2005), questioning the generalizability of our findings. Finally, regarding the study protocol, experts rated all ideas in one session and could then endure cognitive workload undermining their ratings (Forthmann et al., 2017).

11. Conclusion

Four subscales for universal creativity assessment by untrained judges were tested. Surprisingly *appropriateness*, the criteria expected to be the more objective because it was defined by four rules the ideas had to follow, reached lower inter-rater agreement than the others. The reasons could be that assessing appropriateness requires envisioning capabilities and leads to implicit subjective rules, which could be mediated by the perception of originality. Furthermore, non-verbal cues could have wrongly influenced appropriateness ratings whereas they would have been effective for the other criteria. These other criteria were aggregated but they did not match *experts*' ratings. It is argued the mismatch was not due to the removed appropriateness, therefore a few subscales might be missing. Some proposals to identify them were given. Furthermore, the studied criteria could be not creative *dimensions*, but creative *perceptions*, that is, mediators of creativity assessment. The criteria deserve to be completed, to work for any field at least as fast pre-assessment, and to nurture the debates about creativity's nature. Identifying them all and which ones lead to easier consensus would help to orient debate when discussing creative concepts across domains, enabling cross-communication

between experts. Further studies are required to identify all canonical creativity dimensions/perceptions, for untrained judges to discover creativity and assess it more affordably and engagingly than with existing thorough scales.

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Innovation Adoption Research in Healthcare: Understanding Context and Embracing Complexity

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Abstract: This paper presents a literature review on innovation adoption in healthcare. Healthcare is one of the world's largest and fastest-growing industries, driven by demands such as ageing populations, increasing co-morbidity, and improving technologies. Innovation continues to be a key driver in balancing cost containment and improving quality for health systems. However, healthcare has been slow to adopt and utilize the numerous innovations available to improve patient outcomes and efficiency. Stakeholders in healthcare innovation need to understand the influences on innovation adoption to increase the success rate of implementing innovation into practice. This literature review was conducted via searches of publication databases using selected keywords regarding innovation and adoption in general, and in healthcare specifically. Publications from academic journals and grey literature were assessed based on relevance to the topic, quality, influence, and citations. Key papers, theories, findings, and conclusions in the field are discussed in this review. The review revealed that innovation adoption has been extensively studied in multiple disciplines over decades. However, most empirical research and theory development has taken place in the context of information technologies (IT) and their adoption in various industries and sectors. Research has mainly focused on individual acceptance and adoption of technology, which is less appropriate in healthcare due to its complex organizational structures, processes, and highly skilled workforce with significant social influence. Research into organizational adoption of innovation has been conducted, but these models have generally been utilized less in research and practice, both in general and specifically in healthcare. Within healthcare literature, innovation adoption has been recognized as a complex and challenging issue with multiple factors influencing success. However, research and theory development have generally been more limited in this setting. The review concludes with suggestions to bring learning from disciplines with stronger theory development to the healthcare setting. A novel conceptual model specific to healthcare is posited, accounting for the complexity of the system and understanding the process through a holistic approach. This model should be useful to and useable by any healthcare innovation stakeholder, from clinicians, to industry, to policy makers, as well as by researchers in this field.

Keywords: Innovation, Adoption, Healthcare, Technology, Acceptance

1. Introduction

Healthcare is one of the world's largest and fastest-growing industries, fuelled by demands including an ageing population, co-morbidities and improved detection technology while encompassing multiple business and service sectors. Innovation is increasingly used to reduce spiralling costs while improving healthcare quality (Omachonu and Einspruch, 2010). In healthcare, an innovation in professional practice may be described as a novel idea, product, service, or care pathway that has clear benefits when compared to what is currently undertaken (improved efficacy, safety, quality etc).

In the practice of healthcare, the process of innovation refers to the entire process from the conception of the idea to its adoption and widespread use in clinical practice. The process is often conceptualised as linear, from basic research through applied research, targeted development, manufacturing and marketing, adoption and finally its wider use. However, the process is rarely that straightforward, being more dynamic and iterative in practice (Gelijns & Rosenberg, 1994). For this review, the latter stages of the cycle are of greatest interest: the 'adoption' and 'use' of innovations, where there is less modification to the innovation, the scope and specification of the technological innovation is known, and professionals can (and are permitted to) apply the technology in practice.

This is known as 'technology adoption' or the 'diffusion of innovations' and has been recognised and studied as via various approaches across numerous settings, sectors, and academic disciplines. Decades of theory development have resulted in several models being produced (Greenhalgh et al 2004; Oliveira & Martins, 2011; Alomary & Woollard, 2015; Taherdoost, 2018).

Specific to the healthcare sector myriad innovations remain unadopted even though evidence suggest they could improve outcomes for patients and/or efficiency for health systems. This is especially true for the UK's National Health Service (NHS), which has historically led the world in inventing and testing new innovations but has struggled with adoption and diffusion of innovations (Kelly and Young 2017). Understanding and influencing innovation adoption to improve the likelihood of success is therefore highly important for healthcare stakeholders to consider.

This literature review was conducted to review the research in the field of innovation adoption, both in the healthcare setting specifically, and across broader settings. By broadening the scope, the hope is to identify potential opportunities for cross-disciplinary learning and the application of research approaches and practice from other areas to healthcare.

2. Methodology

The following research questions guided the approach to this literature review: How is innovation adoption researched, conceptualized, and understood in healthcare, and; what knowledge from innovation adoption research in other settings, such as theories and models, could be utilized and applied to healthcare innovation adoption research and practice?

A combination of systematic and targeted search was undertaken between 2018 and 2022, searching online databases, including Google Scholar, PubMed, Scopus, and Web of Science. Keywords included variations of 'technology adoption', 'innovation adoption', 'diffusion of innovation'. For the healthcare specific searches, this also included modifiers 'health', 'care' or 'healthcare'. Articles needed to focus on innovation adoption as the major topic of the study. Snowballing and citation searches were used to expand the search. Document types included journal articles or reviews written in English, and grey literature was included where relevant.

A review of the most relevant literature was then undertaken to identify key theories, concepts and other findings, influential studies (assessed by number of citations and journal metrics) and seminal works, and type of research undertaken (e.g., empirical vs non-empirical, qualitative vs quantitative). This paper contains the pertinent findings from this review, i.e., the most useful knowledge for healthcare innovation stakeholders to apply in research and practice.

3. Findings and discussion of literature review on the adoption of innovation in healthcare

3.1 Key Findings in Healthcare Innovation Adoption Literature

Medical innovation often occurs differently to other industries due to emotional factors attached to the concept of health and illness, and the political commitment to offer people the latest advancements in medicine (Roberts, 1981). Furthermore, novel biomedical technologies usually share two major features: present the promise of longer and/or higher quality of life, while also being associated with the prohibitive cost of care and services. In the context of limited resources and attempts to reduce expenditure, health policy- and decision-makers must prioritise and therefore some technologies may 'diffuse', while others do not (Petkova et al. 2010). This prioritization is (or should be) based on a combination of evidence of benefit, and cost-effectiveness. However, there is a perceived gap between the 'best evidence' and 'evidence-based practice'. Technology with reported clinical efficacy and safety in clinical trials often fails to subsequently integrate into medical use, thus preventing patients from benefitting from the best scientific advances (Lang et al., 2007). This raises questions of why clinical evidence alone appears to be insufficient to push forward innovation, and what other factors are having an influence on an innovation's adoption.

Healthcare systems are complex and diverse groups play a role in decision-making around introducing innovation, with the medical profession being particularly influential. Fitzgerald et al., (2002) studied eight different healthcare innovations in the UK and found several influences that can facilitate or inhibit diffusion, including inter-professional alliances, change networks and collaboration; ambiguity and contention around new scientific knowledge; 'active adopters' serving as role models; 'go to see' sites where the innovation can be observed in practice. Examples in the study showed that strong clinical evidence (or lack thereof) and cost-effectiveness are often not the deciding factors in an innovation's adoption, multiple different context-specific factors and social influences all playing a role (Fitzgerald et al, 2002).

Gelijns & Rosenberg's 1994 health economics study explored the impact of technological innovations on rising healthcare spending. This showed that the rate of innovation is sensitive to changes in the financing and delivery

of healthcare services. Other key factors influencing adoption included the extent of competition over price and operating costs of technology; competition between health and care specialties, and the influence of key opinion leaders (KOLs). Leadership from KOLs is mentioned in multiple studies (Gelijns and Rosenberg, 1994; Rogers, 1995; Fitzgerald et al., 2002), demonstrating a mechanism for role modelling, so that the spread of ideas among individuals occurs by imitation of these important leaders in their specific field (Greenhalgh, et al., 2004; Petkova, et al., 2010). Any attempt to influence diffusion would arguably need to address the attitudes of these individuals (Rogers, 1995; Fitzgerald et al., 2002; Greenhalgh et al., 2004; Petkova et al., 2010). This may be achieved through mass media and persuasion, or what emerges as a more effective approach: through strong interpersonal ties, e.g., via exchanges about the innovation with peers. These are thought to be more trusted channels to deal with resistance or apathy to an innovation, and to influence strongly held attitudes (Rogers, 1995; Petkova, et al., 2010;)

Other social forces and contingencies can influence adoption, even in cases where robust evidence confirms or rejects the need for innovation, such as in the case of the inconsistent availability of the breast cancer drug Trastuzumab to early-stage patients in the UK NHS. The case attracted negative media attention, and due to sustained pressure by cancer charities, clinicians, patient groups, politicians and the public, the National institute for Health & Care Excellence (NICE) changed its guidance to allow access (Nahta & Esteva, 2007). This suggests diffusion is affected by macrocontextual factors, such as stakeholders' interests, the political climate (temporal), and public expectations. Further empirical studies have shown that innovations with suitable clinical evidence, technical attributes and cost-effectiveness can fail to reach widespread implementation (e.g., Meyer and Goes, 1988; Champagne et al., 1991; Hughes et al., 2002).

This suggests that few medical innovations accomplish their originally intended use. Petkova et al (2010) suggested that others 'drift' into other applications or rapidly become legacies where workarounds are introduced, justifying a need for new theoretical frameworks.

A highly influential review of the diffusion of innovation in UK healthcare, conducted by Greenhalgh et al., (2004) resulted in an extensive list of influences on the diffusion of innovation in service organisations. The authors of this review noted that few studies acknowledged, let alone empirically researched, the complexities of spreading and sustaining innovation in healthcare. Most studies concentrated on relatively few components and fail to account for interactions between components or their contextual and contingent features (Greenhalgh et al., 2004). This is also evidenced in the studies from the healthcare innovation literature mentioned previously in this section.

This gap in the body of knowledge is in part due to the difficulty of identifying and scientifically controlling for 'confounding variables' to improve the objectivity of any research. Hypothesis-driven, positivistic empirical approaches that attempt to achieve objectivity cannot account for the complexity and dynamism of innovation adoption in a healthcare system, and the context and confounders are inextricably linked. Previously published research showed that influences are likely to interact in numerous and often unpredictable ways in different settings and contexts, and this should be a part of the research process, and not controlled for.

Greenhalgh et al., (2004) recommended that research in this area should be theory-driven; process rather than 'package' oriented; explore the effect of setting; standardized; collaborative and coordinated; multidisciplinary and multimethod; detailed; and engage stakeholders.

In summary, the seminal studies of pragmatic innovation adoption practice show significant variance and conflict in terms of process and how influencing factors (and combinations of factors) explain adoption or failure to adopt. Furthermore, there is a lack of theory-driven research that takes a holistic approach to capture all significant context-specific details as well as embrace the complexity of healthcare as a system, and the adoption of innovation within it.

3.2 Innovation Adoption Theories, Models, and Frameworks

The previous section 3.1 highlighted the relative lack of theory-driven research in the healthcare setting, therefore this review also looked more broadly at adoption research across disciplines, to review theory built up in other areas, which will be discussed in this section.

3.2.1 Technology Acceptance and Adoption at the Level of the Individual

Technology acceptance is a component of adoption and defines the process by which users come to accept and use a technology. It is usually considered the first stage of adoption, followed by the integration and wider

spread and use of technology. By proportion, most of the research and theory development in innovation adoption has focused specifically on the acceptance of technology by individuals and has been conducted in the context of information technology (IT).

Amongst the many models developed to explore and understand technology acceptance (see Taherdoost 2018 for comprehensive review), the technology acceptance model (TAM) developed by Davis (1989) from the theory of reasoned action (TRA), remains one of the most utilized likely as it is easier to use and less research intensive to apply than other models, and it has received substantial empirical support. Figure 1 shows the model and its components, which explain the motivation of users via three main factors: perceived usefulness, perceived ease of use, and attitude. Sometimes other factors (external variables) are included.

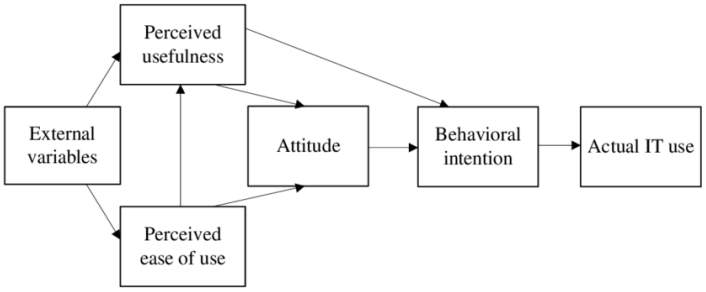

Figure 1: The Technology Acceptance Model (Davis, 1989).

Other models, such as the theory of planned behaviour (TPB) (Ajzen, 1985), or the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), include additional or different components, but the common theme is a combination factors that influence an acceptance of a technology by individuals, focused on characteristics of that technology and the individual adopters (AlQudah et al., 2021). Most studies using these models approach research via positivist, quantitative survey-based design.

While these approaches provide a suitable mechanism for explaining the acceptance of technology by individuals, they are limited in scope and reductionist. As previously discussed, when aiming to understand adoption in a complex setting, with complex organisations and multiple influences outside of characteristics of a technology, a TAM (or similar model) based approach is unable to account for all relevant details, nuance, and provide a holistic view of the system.

3.2.2 Organisation-level adoption

Innovation adoption can occur at various levels: from individuals to larger groups, to entire organisations and even whole systems or industries. While the findings of individual level research can be generalized to larger groups/populations, the influences on the adoption of innovation by larger units differ, and there is a significant body of research and a few theories developed to explain and understand adoption by organisations (Oliveira and Martins, 2011).

Two prominent organisation-level models will be discussed here, the Diffusion of Innovation (DOI) theory (Rogers, 1995), and the Technology, Organisation, Environment (TOE) framework (Tornatzky, Fleischer, and Chakrabarti, 1990).

Rogers' work on DOI theory has been a reference point for many adoption studies, including some previously referenced in this review (including Meyer & Goes, 1988, Fitzgerald et al., 2002; Greenhalgh et al., 2004). There are a few different aspects of DOI theory, covering the mechanisms, the reasons, and the rate that innovation spreads through members of a social system, and can operate at the individual or the organisation level (Rogers, 1995). At the organisation level, the innovation process is more complex, generally involving several individuals, including both supporters and opponents of the innovation, that play a role in the innovation decision. Figure 2 depicts DOI theory at organisation level, showing that organisation innovativeness (i.e., propensity to adopt innovation) is related to the variables 'individual (leader) characteristics', 'internal characteristics of organizational structure' and 'external characteristics of the organization'. Since the early applications of DOI to innovation adoption research, the theory has been applied and adapted in various ways. (Oliveira and Martins, 2011).

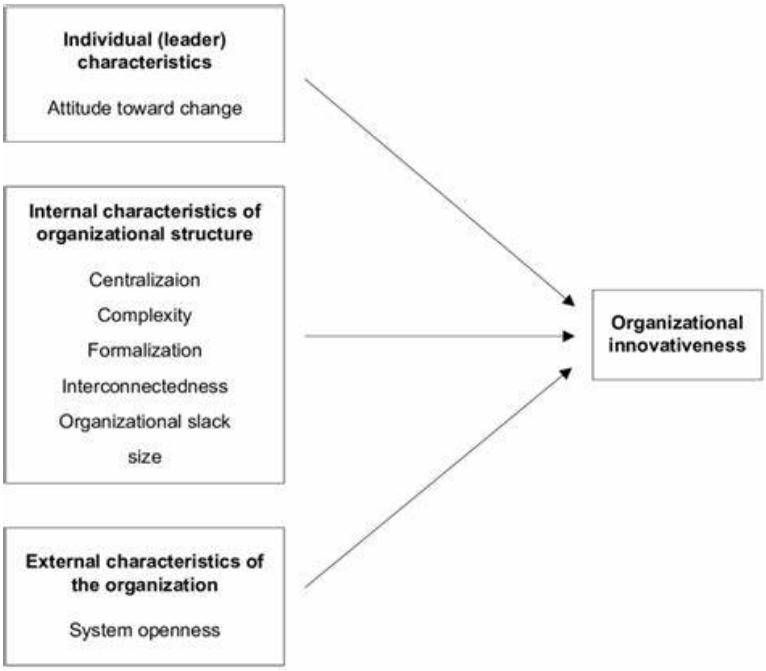

Figure 2: Roger's Diffusion of Innovations (Rogers, 1995)

The second prominent organisation-level adoption model, the TOE framework, has been widely utilized in the fields of management research, engineering, manufacturing, and information systems. It identifies three contexts relevant to an organisation that influence the process by which it adopts and implements innovation, shown below in Figure 3.

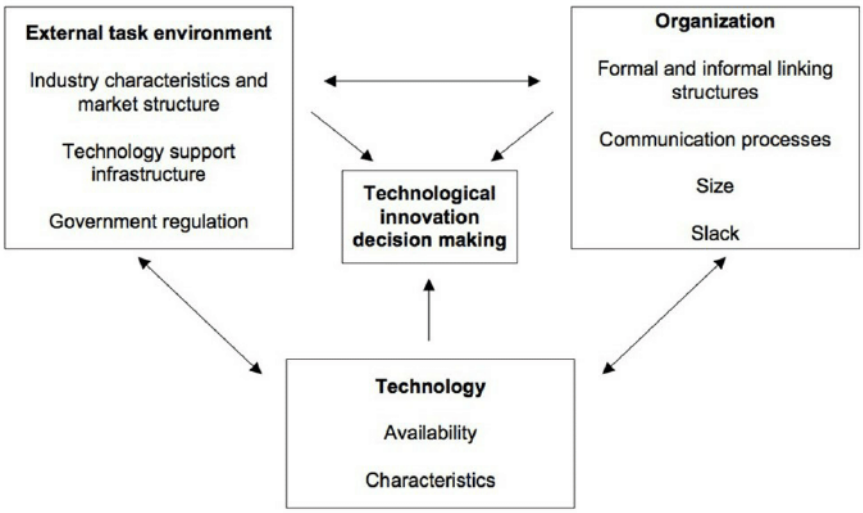

Figure 3: The Technology-Organization-Environment Framework (Tornatzky, Fleischer, and Chakrabarti, 1990).

The Technological context is defined in terms of both internal and external technologies relevant to the firm, and their availability. The Organizational context is defined in terms of descriptive measures about the organisation such as scope, size, and managerial structure, and acknowledges informal linkages between employees within the organisation. The Environmental context is the 'arena' in which an organisation conducts its operations, for example its industry, competitors, and governmental interaction (Tornatzky et al., 1990).

Even though the available technology to an organisation could be considered as part of its 'arena', or environment, Tornatzky et al. (1990) intentionally separated the Technological context from the rest of the Environment context to focus attention on how the features of the technologies themselves can influence both the adoption process and implementation.

The TOE framework has strong theoretical underpinnings (see Tornatzky et al., 1990) and has seen consistent use in empirical studies of organisation level adoption (e.g., Meyer & Goes, 1988; Grover, 1993; Chau & Tam, 1997; Lee & Shim, 2007; Ramdani et al., 2009; Nguyen et al 2022). Most research again has focused on IT adoption, and the factors under the three contexts are often varied between studies.

The TOE framework and DOI theory are consistent, as the components of DOI are covered by the Technological and Organizational context of TOE (Ngongo et al, 2019). TOE goes beyond DOI with the important addition of the Environment context, which can present both barriers and opportunities for technological innovation and adoption. Groups such as industry members, knowledge producers, regulators, customers, and suppliers can be beneficial by providing information, financial or human resources, or detrimental by constraining innovation through policy and regulation, capital availability, restrictions on innovation flow (Tornatzky et al., 1990). TOE acknowledges that the three contexts are linked to and influence each other, for example organisations can set up 'boundary spanning mechanisms' to communicate with their external environment (Tornatzky et al., 1990).

The features of TOE make it a suitable candidate for studying innovation adoption in the setting of healthcare, due to the unit of analysis being the organisation, and the three interlinked contexts and associated factors allowing a more comprehensive view of the influences on innovation adoption, compared with other technology acceptance and adoption models.

However, there is still only a smaller weight given to social influences (contained within Organization context) which have been noted to be highly influential in healthcare (Gelijns & Rosenberg, 1994; Fitzgerald et al. 2002; Greenhalgh et al., 2004; Nahta and Esteva, 2007).

3.3 Sociotechnical systems theory and healthcare

The sociotechnical systems (STS) theory originates from the field of organizational change and development, and has seen considerable use in research in this field and others (Appelbaum, 1997). It is based on the premise that an organisation or a work unit is a combination of social and technical parts, and that it is open to its environment (Figure 4). The theory posits that the design and performance of any organizational system can only be understood and improved if the approach brings together and aims for joint optimization between all aspects of that system (Trist and Bamforth, 1951).

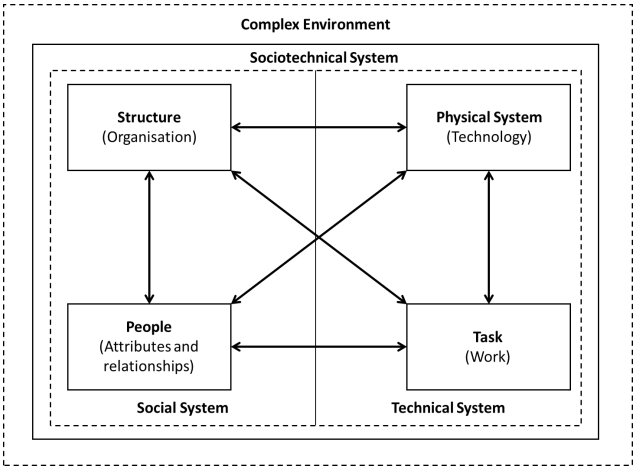

Figure 4: The Sociotechnical Systems Theory (Trist and Bamforth, 1951)

The social subsystem of the organisation is comprised of the attributes of and relationships between people, and the reward systems and authority structures. The technical subsystem is concerned with the technology utilized, and processes and tasks carried out in the organisation.

STS is a suitable construct to apply to healthcare as it is a setting comprised of organizational units and systems of increasing size and complexity, from individual clinics to the NHS. While it does not originate in innovation or technology adoption research, it does acknowledge and cover implementation of technology as a type of change to an organisation, that will affect and be influenced by the social system of that organization – which is important in healthcare, as mentioned.

While not common, there have been instances of STS use in innovation adoption literature. For example, Geels (2004) found that for complex network of organisations like healthcare, an STS approach incorporating user side

into analysis allowed greater focus on diffusion and use of technology; and an analytical distinction between systems, the actors involved in them, and the institutions which guide actor's perceptions and activities.

Ulucanlar et al., (2013) used STS to study adoption of medical devices in the NHS. They found that: organisational adoption decisions are influenced within a dynamic 'adoption space' transcending organisational and geographic boundaries; technologies acquire socially constructed 'identities' in the adoption space (influenced by industry, healthcare organisations and practice, health technology assessment and policy) which relate to novelty, effectiveness, utility, risks, and requirements; and technologies' identities shape their desirability, acceptability, and adoptability.

3.4 Comparing TOE and STS

TOE & STS cover much of the same ground, while also having a few key differences. TOE is explicitly an adoption model, while STS was not intended as such. STS has been utilized with high frequency in other fields but has had much less empirical support in adoption focused studies. A related point can be made of TOE regarding healthcare, as most of its empirical support comes from IT adoption studies, with relatively fewer studies in the healthcare setting, whereas STS has seen broader use in this setting.

The theories themselves have potentially significant overlap. Components of STS can be grouped under the three contexts of TOE: technology from technical subsystem (STS) can be grouped into the Technological context. People, relationships, and structure (from the social subsystem), processes, and tasks (from technical subsystem) could be grouped under the Organizational context. Finally, the external environment subsystem is directly comparable to the Environmental context. In the same way, aspects of TOE can be split between the components of STS.

While neither theory explicitly weighs its components, their arrangement sheds light on what is viewed as important. In TOE, technology has its own context, separated intentionally from the others due to its considered importance (Tornatzky et al., 1990), whereas it is only one component of a technical subsystem in STS. Conversely, social factors are a significant part of STS, whereas in TOE there is only the factor 'formal and informal linking structures' under Organizational context, suggesting STS places higher weight on these influences.

Naturally, some of the differences between the two are due to their different conceptualizations and intended use. STS conceptualizes an organisation as a sociotechnical system, hence why organisation-related factors are split between the different subsystems, whereas in TOE they are grouped under one context, due to TOEs arrangement as key contexts of influence in innovation adoption.

3.5 Conceptual Model for innovation adoption in healthcare

Due to the significant compatibility of the TOE framework and STS theories, there is potential to combine them to create a conceptual model for explaining and understanding innovation adoption. Supported by healthcare innovation and adoption literature already discussed, a model is proposed below in Figure 5.

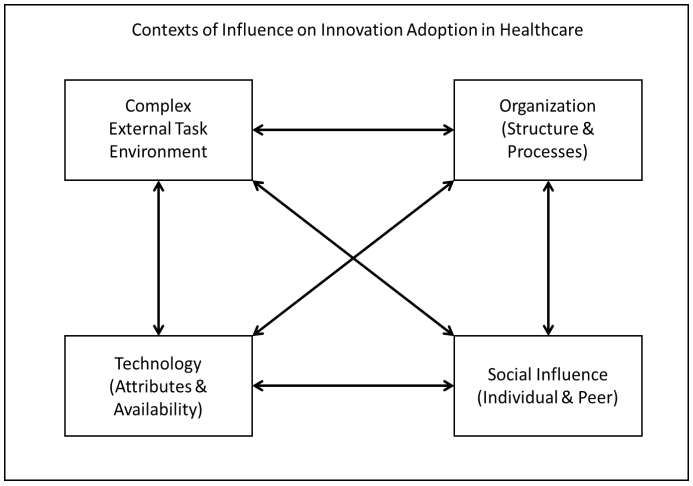

Figure 5: Contexts of influence on innovation adoption in healthcare model.

This model is designed for adoption research in healthcare, following a similar approach to TOE, STS, and other models. It builds upon TOE by introducing a fourth context, "Social Influence," which recognizes the significant impact of social factors on healthcare innovation adoption, as highlighted by STS's social subsystem.

Within this model, social aspects previously considered under TOE's Organization context are now categorized within the Social context, similar to how TOE separates technological factors from the environmental factors due to their distinct importance and influence. While the four contexts are presented as separate, it is acknowledged that they are interconnected and mutually influence each other.

Specific factors under each context are not provided in this model, as they are likely to differ from TOE and STS. Empirical research is needed to identify and validate these factors. It is anticipated that many factors identified in previous STS, TOE, and other adoption model research will apply to healthcare. Additionally, it is expected that unique factors with greater influence on adoption in healthcare will be discovered.

4. Conclusions

The healthcare innovation literature shows how complex healthcare is as an industry and practice setting, and how challenging it is to innovate and support adoption within its processes of decision-making and its multiple actors. Numerous influences on healthcare innovation adoption have been identified and investigated, with social influences being consistently mentioned, in a variety of organisations, and various approaches to research have been explored.

Much of this research has either focused on the individual, utilized fewer factors, not utilized established adoption theory or conceptual models, and by design is not able to account for all contextual influences and complexity of healthcare systems.

The TOE framework is a well-established approach used to study adoption in healthcare organizations. It has a solid theoretical foundation, empirical support, and focuses on organizational-level analysis. However, its application has been mainly limited to IT adoption within healthcare, and it lacks a strong consideration of social influence on adoption.

On the other hand, the STS theory offers a valuable perspective for understanding healthcare organizations. It has been empirically applied in innovation adoption research and recognizes social influence as a crucial factor in organizational change, including the adoption of innovations.

This paper presents a novel conceptual adoption model, supported by healthcare innovation adoption literature, which posits four contexts of influence on innovation adoption in healthcare, the Social, Organizational, Technological, and Environmental.

The model represents an opportunity for valuable insights into the factors that influence technology acceptance and adoption. The model can inform the design and implementation of interventions via advance the understanding of technology acceptance in healthcare and evidence-based strategies for successful technology implementation- leading to improved patient care and outcomes.

Future research should be undertaken to validate the model, using similar methodology to TOE research, while also being detailed and nuanced to capture all relevant factors of influence, understand context, and embrace complexity.

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Entrepreneurship Education in Engineering Courses: Critical Success Factors

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Abstract: The teaching of entrepreneurship in engineering study programs is an understudied area of research.. In an ever-changing economy where continuous innovation (much of it originating from engineering) is a prerequisite for a country's competitiveness and business growth, a purely technical education for engineers appears insufficient to provide organizations with a comprehensive contribution. The growing recognition of this contribution has led higher education institutions (HEIs) offering engineering study programs, which did not previously include entrepreneurship modules in their curricula, to introduce curricular units (CU) to fill this gap and encourage their students to explore the commercial potential of their research/technologies. This study reflects on various aspects related to the introduction of CU about entrepreneurship in the curricula of engineering courses through a literature review supplemented by observations resulting from participation in processes leading to the incorporation of CU entrepreneurship in engineering courses. We identified several factors that can contribute to the success of entrepreneurship in these study programs: (i) the emphasis on innovation and entrepreneurship policies in society; (ii) the involvement of the institution and its leaders in the curricula change; (iii) the presence of teaching staff with a profile suitable for teaching entrepreneurship; (iv) students' favorable attitude towards entrepreneurship. Additionally, our reflection suggests that defining the objectives of the curricular unit should consider the specificities of engineering courses. Furthermore, the selection of content should take into account the students' need to develop the essential skills required for creating a business. The study concludes that adopting a more practical approach oriented towards creating new enterprises, involving entrepreneurs in teaching, and providing facilitating conditions for the development of business ideas within the institution are essential. By identifying various factors that can contribute to the success of introducing entrepreneurship subjects in engineering courses, the paper offers valuable insights for educational institutions to understand and address potential obstacles during the implementation process. The paper also contributes to the debate and sharing of best practices among educators and researchers.

Keywords: Entrepreneurship; Entrepreneurship Education; Engineering Education

1. Introduction

In an ever-changing economy where continuous innovation (much of it originating from engineering) is a prerequisite for a country's competitiveness and business growth, a purely technical education for engineers appears insufficient to provide organizations with a comprehensive contribution. Sheppard et al (2008) argue that engineers nowadays require more than just "technical expertise"; they need additional skills that make them capable of leading teams and understanding the context of market and business pressures. Engineers who receive some entrepreneurship education are better prepared to grasp fundamental business aspects within organizations, integrate interdisciplinary teams, excel in communication, take on managerial roles, develop critical thinking, and motivate their colleagues to embrace an innovative mindset (National Academy of Engineering, 2004). Some literature has confirmed the effectiveness of entrepreneurship education on the entrepreneurial intention of science and engineering students (Maresch et al 2016).

While entrepreneurship education is important for performing roles within established companies, it holds even greater relevance for engineering students who aspire to start their own ventures upon graduation. This trend has been growing over the past two decades due to a combination of factors. These factors include the increasing difficulty for young graduates to find employment, the opportunities presented by the internet economy (where setting up a business often requires just a website), shifts in mentalities, simplified bureaucratic processes for business creation, and financial support available for self-employment or launching new government programs to stimulate entrepreneurship.

Teaching entrepreneurship in engineering courses equips students with essential knowledge and tools while fostering attitudes necessary to (i) identify and create new business opportunities; (ii) practically exploit those opportunities; and (iii) compete with others for a share of the market.

Interest in entrepreneurship within engineering education has been amplified both by policymakers recognizing entrepreneurship's role in driving innovation, reviving economic growth, and reducing unemployment, and by

media portraying various tech entrepreneurs as successful leaders of global companies. Higher education institutions offering engineering courses, which previously did not include entrepreneurship in their curricula, have started introducing entrepreneurship curricular units and encouraging their graduates to explore the potential of their research and technologies.

Based on a literature review complemented by observations from participating in the introduction of entrepreneurship in engineering courses at polytechnic higher education institutions in Portugal (two master's and one bachelor's degree programs), this study reflects on several critical aspects of the process of incorporating entrepreneurship into engineering education. Our paper resulted from a fruitful interaction between theory and practice and is organized around three key questions: (1) obstacles and facilitators in introducing entrepreneurship education in engineering courses; (2) pedagogical objectives, content, and teaching models for entrepreneurship in engineering courses; (3) institutional support in developing business ideas. Lastly, we present the conclusions and recommendations derived from our reflections.

2. Critical Aspects of Introducing Entrepreneurship in Engineering Courses

The literature identifies several aspects, both external and internal to higher education institutions that can critically contribute to the success of introducing entrepreneurship content in engineering courses. Below, we identify the most relevant ones.

2.1 National Environment

The dissemination of innovation and entrepreneurship values and the appreciation of research and development policies in society provide a stimulating environment for Higher Education Institutions offering engineering courses to incorporate entrepreneurship into their strategy. The presence of multiple and diversified organizations within a country that can support entrepreneurial initiatives and the availability of funding for innovative activities are also factors that foster the integration of entrepreneurship into engineering curricula (CE, 2008).

The education system of a country can also play a crucial role. HEIs find greater receptivity to integrating entrepreneurship-related content into non-business study plans when there are already high schools subjects covering basic entrepreneurship concepts. As a result, students have already developed a set of values, attitudes, and behaviors, including the encouragement and appreciation of initiative and creativity, communication and interaction skills, openness to change and new ideas, and the ability to deal with uncertainty and risk management (Godinho and Simões, 2015).

2.2 Involvement of the Higher Education Institution

Success in integrating entrepreneurship curricular units into engineering courses requires some change in traditional engineering teaching methods and a certain level of willingness from the Higher Education Institution to support, or at the very least not reject, the changes in the curriculum. The presence of a bureaucratic culture or conflicting positions regarding the need to introduce entrepreneurship education in engineering courses can lead to inertia and delay in curricular changes. The process can also become deadlocked when there is a lack of awareness or motivation at the level of the HEI and its decision-makers regarding the benefits of incorporating entrepreneurship into the study cycle. The successful implementation of the curriculum adjustment may face delays if HEI decision-makers lack motivation and fail to provide the necessary human and financial resources promptly. To ensure success, the HEI and its decision-makers must be aware of the need for change, actively participate in the process, allocate the required resources, and support those responsible for its implementation. This transition becomes smoother when there is an entrepreneurial culture within the institution, acknowledging entrepreneurial initiatives taken by students and teaching staff, and when entrepreneurship education is deemed a strategic objective.

Including entrepreneurship content in engineering courses can result from a decision made by the coordinator of the study cycle or, as often happens in Portugal, it may stem from an external recommendation from the national authority responsible for evaluation and accreditation. In processes we have participated, some obstacles arose when the HEI was divided into schools and their respective departments worked with significant independence. The lack of cooperation between schools or departments can be a compromising obstacle for the entire process. When the change is driven by an external recommendation, the team responsible for modifying the curricula may not all be equally committed since the introduction of the new curricular unit often

requires the suppression/merging of core curricular units within the program. Regarding the size of the team responsible for this process, Byers et al. (2013) found that small teams led successful experiences in engineering courses.

2.3 Involvement and Profile of Teaching Staff

Any changes to the syllabus structure need to take into account the composition of the HEI's teaching staff. Particularly crucial for the successful introduction of entrepreneurship into the study plan is having faculty members with the appropriate profile for teaching entrepreneurship. It is known that the majority of HEIs, especially those exclusively focused on engineering education, do not have entrepreneurship experts on their faculty, and for economic reasons, they may try to address the situation internally with faculty who are not specialists in the field. If the teaching staff at the HEI predominantly holds a conservative view that engineering students should only acquire technical knowledge, the collaboration of such teaching staff can potentially doom the curricular change to failure from the outset. The process is more facilitated when the HEI houses both engineering and business courses, as there can be a sharing of faculty members.

One of the prerequisites for achieving a higher level of entrepreneurship education in engineering courses is to ensure that the faculty members teaching the entrepreneurship course are familiar with the business world. Entrepreneurship courses taught by faculty who have never had any contact with the realities of the business world are unlikely to spark students' interest.

2.4 Students' Attitudes Towards Entrepreneurship

Another aspect that can facilitate or hinder the curricular restructuring to incorporate entrepreneurship content is the attitude of engineering students towards entrepreneurship (Barba-Sánchez and Atienza-Sahuquillo, 2018). Perceived attitudes and values associated with entrepreneurship among engineering students have been studied in Portugal. Vieira and Rodrigues (2014) concluded that engineering students are aware that entrepreneurship content can broaden their career perspectives and choices, while also recognizing that entrepreneurs have a positive image in society. However, they have doubts about what is best for them: becoming an entrepreneur or being an employee in a large company. Perceived abilities and competencies of the students suggest high adaptability, confidence, technical expertise, and result-oriented orientation. Octício (2012) studied entrepreneurial intentions among students at a prestigious engineering university in Portugal and found that about 3/4 of students did not intend to start a company, with greater receptivity among chemical engineering and biological engineering students. This author also observed a general trend of increasing interest in entrepreneurship among first and final-year students.

3. Pedagogical Objectives, Contents, and Teaching Models

The increasing integration of entrepreneurship curricular units in higher education has resulted in a diversity of pedagogical objectives, contents, and approaches across various courses. Hills (1988) proposes two main objectives for entrepreneurship education: (i) raising students' awareness that entrepreneurship can be a career option, and (ii) enhancing their understanding of the process of starting a new business. Garavan and O'Cinneide (1994) add that this education should challenge the aversion to risk associated with analytical techniques and foster a positive attitude towards change. Wadhwa and Freeman (2010), while agreeing with the mentioned generic objectives, believe that (i) the core education obtained in engineering courses generates opportunities for starting businesses in more innovative industries, and (ii) engineering students are even more inclined to start a business than students from other scientific fields. Therefore, for these students, entrepreneurship education should be an opportunity to develop the skills necessary to create a business related to their technical expertise. This specificity should be considered when defining the objectives of an entrepreneurship curricular unit in an engineering course.

Mäkimurto-Koivumaa and Belt (2016) recommend that entrepreneurship education elements should be distributed throughout different years of the engineering course. A study conducted in the USA highlights a lack of clarity regarding how course contents are defined (Besterfield-Sacre et al, 2016). In the Portuguese context, Redford (2006) found that the majority of entrepreneurship courses include topics such as "identifying and evaluating business opportunities," "market analysis," "business plan," "interpersonal relations," "entrepreneurial attitudes" "legal aspects of company creation," "marketing," "intellectual property" "support for company creation," and "financing." There does not seem to be a significant difference in content regardless of whether the courses are integrated into engineering programs or not. Some HEIs, in order to optimize

resources, offer the same entrepreneurship curricular unit to all study programs. This approach might not be the most appropriate, as contents designed for engineering students should take into account that, despite their solid technical background, they might have limited knowledge of business-related topics and may need basic understanding of economics, management, and marketing. Adopting a more practical approach, with examples from their specific engineering field, focusing on topics like "intellectual property," "commercialization process," "marketing," and "venture capital," seems more relevant in these study cycles.

Various approaches to deliver the knowledge and experiences lead engineering students to become innovative and entrepreneurial. Fernandes et al. (2017) delineated various fundamental aspects concerning the promotion and perception of entrepreneurship education among engineering students. Notably, their work underscores the significance of teamwork, active participation in projects, and a profound comprehension of the market. These elements are emphasized as pivotal for fostering and advancing entrepreneurial skills. Neck and Greene (2011) consider an approach based on methods that value iteration and creativity to be more effective. In engineering courses, a more practical and assertive approach focused on establishing new businesses (entrepreneurship education) might be more effective than alternative approaches identified by Hannon (2005): a more traditional and theoretical perspective on the subject (education in entrepreneurship) and a second one, where entrepreneurial practice is applied to everyday life (education through entrepreneurship). Besterfield-Sacre et al. (2016) consider that entrepreneurship courses should focus on teaching entrepreneurship skills and on developing entrepreneurial values and attitudes among students. Duval-Couetil et al. (2016), examining the role of entrepreneurship program models and experiential activities on engineering student outcomes, report those students' higher perceptions of entrepreneurial knowledge were associated with involvement in experiential learning activities. Berglund and Wennberg (2006) analyze creativity by comparing engineering and business students involved in an entrepreneurship program. Both groups demonstrate a high creative potential. While business students use a more speculative approach and have a greater focus on the market, engineering students, apply creative behaviors in a very pragmatic way. Duval-Couetil et al. (2021) recommend replacing traditional lecture-based courses by teaching/learning models based on experiential pedagogical approaches centered on real-life project development or problem-solving situations. Fayolle et al (2021) after reviewing the literature in this domain, consider that there is an emphasis on the importance of learning by doing, teamwork, interdisciplinary and involvement in projects.

Furthermore, it is important to enrich entrepreneurship education in engineering by involving local successful entrepreneurs or alumni, inviting them to share their experiences with students. In the cases we have participated, the HEI was located far from regions with a stronger entrepreneurial ecosystem, which could limit the possibility of such collaboration. Another potential limitation could be related to biases some prominent entrepreneurs may hold towards less prestigious HEIs or certain education subsystems, leading them to underestimate the contribution of these institutions to economic development. The emergence of distance learning resources can be particularly useful for teleconferences and delivering digital content inside and outside the classroom.

4. Support Students in Business Idea Development

Qureshi and Mian (2021) focused on the question of the incentives that universities use to motivate researchers to commercialize their discoveries in products, services and processes. In the authors' opinion, the main obstacle to such activities is the gap between education in scientific areas and the knowledge and tools needed to prepare students for entrepreneurship.Entrepreneurship curricular units in engineering study programs increase the likelihood of some students working on the feasibility study and development of innovative products, services, or processes. It is essential, therefore, for the institution to welcome and encourage these students to continue evaluating the potential of their research/technologies even after completing the entrepreneurship curricular units. To achieve this, some HEIs in Portugal have created internal regulations on intellectual property, entrepreneurship support offices, or knowledge transfer centers. HEIs can also become partners in technology-based entrepreneurship programs or idea competitions.

An example of collaboration among higher education institutions occurs in Portugal, where the 15 Portuguese polytechnic institutes jointly created "Poliempreende," a competition for entrepreneurial ideas and projects aimed at fostering and stimulating entrepreneurship and providing professional opportunities through self-employment. In “Poliempreende”, students have the opportunity to submit their business ideas for evaluation by a jury. In the initial stage, there is a regional competition developed through actions promoted by each polytechnic institute to select the best project. The winning projects from each polytechnic are then submitted for evaluation by a national jury, which selects the top three projects.

If the idea proves successful and a company is established, students should be able to continue with the support of the HEI's incubator, where the company is housed, takes its initial steps, and receives assistance in integrating into innovation and distribution networks, obtaining venture capital, and exploring strategic partnerships with other technology companies.

5. Conclusions and Recommendations

This study reflects on various aspects related to the integration of entrepreneurship curricular units into engineering study programs. Several critical factors have been identified that can contribute to the success of this process in higher education institutions. An environment where the values of entrepreneurship are widespread and policies on research, development, innovation, and entrepreneurship are valued serves as a significant stimulus for HEIs to incorporate entrepreneurship into their teaching strategies. For the process to be successful, it is also crucial that the institution and its decision-makers are aware of the need for change, actively engage in it, allocate the necessary resources, and encourage those responsible for its implementation. Another prerequisite for achieving a high level of entrepreneurship education is ensuring that faculty members teaching the entrepreneurship curricular units have an appropriate profile and are familiar with the business world. Equally important is a favorable attitude towards entrepreneurship among engineering students.

Regarding pedagogical objectives, content, and teaching models for entrepreneurship in engineering courses, our reflection points towards considering the specificities of engineering programs when defining course objectives and selecting content that enables students to develop the necessary skills to create a business. Teaching approaches that are more practical, based on student participation, and enriched with contributions from alumni and entrepreneurs should be favored. It is also relevant for HEIs to have internal regulations on intellectual property, business idea competitions, entrepreneurship support offices, knowledge transfer centers, and incubators where students can continue evaluating (and realizing) their business ideas and ventures.

Lastly, as a recommendation, it is important for HEIs to evaluate the impact of introducing entrepreneurship into engineering courses and promote debates and sharing of best practices among faculty members and researchers interested in entrepreneurship education, aiming to enhance teaching staff skills and improve the quality and impact of entrepreneurship education.

We would like to suggest some avenues for further investigation, namely an in-depth analysis of the critical success factors identified by investigating whether in other courses or areas, for example AI education, these factors would remain the same or would be substantially different.

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Concept and Impact of an Integrated Approach to Entrepreneurship in Higher Education

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Abstract: Studies show that the intention of students at Swiss universities to become an entrepreneur has been showing a positive trend since 2013 resulting in a 18,8 percent rate in 2021.

The first part of this paper documents the analysis of how the business faculties of the nine Universities of Applied Sciences belonging to the Swiss universities Association take up the topic of entrepreneurship in their Bachelor- and Master-degree programs. This part is based on an analysis of publicly accessible module descriptions of the business administration curricula. The results show that three patterns can be recognized. Firstly, a group of universities that explicitly take up entrepreneurship as a focus subject in their curricula. Secondly, a group that deals with the topic in conjunction with the topic of "innovation". And thirdly, a group of universities that do not address the topic at all in their curricula.

The second part presents the case study of the "Entrepreneurship Pyramid" which is an Integrated Concept implemented at the School of Business of the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) which belongs to the first group of universities mentioned above. The concept divides the entrepreneurship education into four levels. At the lowest level, there are compulsory courses for all students in the bachelor's degree programs. The next two levels are optional specializations in bachelor's and master's courses, the latter of which can already lead to founding a company. On the fourth level, there are other, mostly post-graduate offers. For this purpose, the School of Business of FHNW has built up a network within a regional ecosystem, which supports graduates in their entrepreneurial activities even after completing their studies. Start-up competitions, financing and coaching are offered in cooperation with state institutions, associations, and private companies. This part includes the results of a study which analysed how large the number of startups founded by graduates from the School of Business of FHNW is.

Keywords: Entrepreneurship, Education, Universities of Applied Sciences, Startups, Business Ecosystems

1. Introduction

Recent studies show that 18.8 percent of all students in Switzerland want to work as entrepreneurs 5 years after graduation (Sieger et al 2021b, p. 4). This includes the options of starting their own business or becoming a successor in an existing business. In a global comparison, the entrepreneurial intentions of students in Switzerland are relatively weak, as the global average value of the options mentioned is 34.8 percent (Sieger et al 2021b, p. 4). However, they are typical for highly developed industrial nations because the intention to become entrepreneurial is usually stronger in emerging and developing countries (Wennekers et al, 2005; Sieger et al, 2021b). Nevertheless, there has been a positive trend overall in the last 10 years (Sieger, Baldegger & Fueglistaller, 2019; Sieger et al, 2021a) and there is room for improvement, especially in the area of education and training at universities.

This latter statement is based on the fact, that still over 70 percent of graduates from Swiss universities have not attended a course explicitly dedicated to entrepreneurship (Sieger, Baldegger & Fueglistaller, 2021a, p. 13). In addition, it can be assumed that universities play a central role in imparting knowledge and methods for managerial tasks and that the prerequisites for successful entrepreneurial activity are already created during the course of study. This can be done in particular by raising students' awareness of this topic, teaching them the basics and systematically promoting skills and competences that are important for an entrepreneurial career. Furthermore, universities are important platforms for arranging contacts and building networks. An important basic prerequisite for student entrepreneurship is therefore that students attend appropriate events and courses. And this is where Switzerland has some catching up to do. Whereas in the U.S., for example, entrepreneurship education had already emerged as an independent teaching discipline by the early 1960s (Weihe et al 1991), systematic promotion of entrepreneurship at Swiss universities has only been discernible in Switzerland since the 1990s. A typical example is the Swiss Federal Institute of Technology Zurich, which has been supporting the creation of spin-off companies since the mid-1990s in specially created programs. Between 1995 and 2022, 518 companies were founded out of the university. Based on research from 2018, these companies are estimated to have created around 5500 new jobs to date (Hofer et al, 2018).

In addition to universities such as ETH Zurich, various universities of applied sciences in Switzerland also offer events in the field of entrepreneurship. To date, however, there is a lack of an overview of these programs on the one hand, and in-depth findings on the economic effects in terms of company start-ups and job creation on the other. This is particularly true for programs in the field of business administration/management which is remarkable because students of business administration express the strongest entrepreneurial intentions alongside those of the arts and computer sciences (Sieger, Baldegger & Fueglistaller, 2021a, p. 19).

In the School of Business of the University of Applied Sciences Northwestern Switzerland (FHNW), the topic of entrepreneurship is addressed through events at a wide variety of levels. Two questions therefore arise: First, the question of how these activities differ from those of the business faculties of other Swiss universities of applied sciences. And second, what effect these activities at the School of Business of FHNW have regarding the students' later entrepreneurial activities. Therefore, a first descriptive analysis examines how the business faculties and universities of applied sciences in Switzerland address the topic of entrepreneurship in their Bachelor's and Master's degree programs, as well as in the further education courses offered as part of the Master of Business Administration (MBA) programs and a second descriptive analysis of Startups from graduates of the School of Business of FHNW is being done.

2. Methods

The first part of the paper documents the analysis of how the business faculties of universities of applied sciences take up the topic of entrepreneurship in their Bachelor- and Master-degree programs. The study covers the accredited universities of applied sciences which have a business faculty and at the same time are members of the Association of Swissuniversities. This is the Rectors' Conference of the Swiss universities and represents the interests of Swiss universities at national and international level. It is responsible for the development and implementation of national strategies in the field of higher education and co-operates closely with its affiliated universities and other stakeholders in the education sector to improve the quality of higher education in Switzerland and strengthen the international competitiveness of Swiss universities (Swissuniversities, 2023). The universities, the universities of education and the other institutions in the higher education sector, which are members of Swissuniversities but are not directly comparable with the profile of the universities of applied sciences, were not included in the study. After the above delimitations, the following 9 universities of applied sciences with corresponding faculties or universities of applied sciences in the field of business remain and were examined in detail:

- Bern University of Applied Sciences BFH
- University of Applied Sciences Grisons FHGR
- University of Applied Sciences Northwestern Switzerland FHNW
- University of Applied Sciences Western Switzerland HES-SO
- Lucerne University of Applied Sciences and Arts HSLU
- Kalaidos Universities of Applied Sciences
- OST - University of Applied Sciences of Eastern
- University of Applied Sciences and Arts of Southern Switzerland SUPSI
- Zurich University of Applied Sciences ZHAW

The focus of the study is in the area of education with Bachelor degrees (180 ECTS) and Master degrees (90 ECTS). In the context of further education, the degree of Master of Business Administration (MBA, 90 ECTS) is included. Continuing further education programs with less than 90 ECTS such as EMBA, CAS, DAS, specialised courses, seminars, etc. are not included in the analysis. The courses in the degree programs in business administration and international management within the above-defined initial and continuing education degrees are included. To ensure comparability, study programs on the periphery of business administration or study programs that are designed in an interdisciplinary manner such as "Business Law", "Business Information Systems" or "Business Artificial Intelligence" etc. are excluded from this study. The study focused exclusively on publicly published information on the websites of the relevant degree programs (see references) and on downloadable documentations. A systematic search was carried out for references to courses and other events, such as competitions and advisory services, which can also be used explicitly by students in the area of "entrepreneurship", "entrepreneur", "startup" and "innovation". The websites were examined between January and April 2023. The identified courses are divided into the categories "compulsory modules", "compulsory elective modules (specialisation)" and "other compulsory elective modules". The "compulsory modules" can basically take place in the assessment level and/or in the main study period. These courses are characterised by the fact that all students must attend these courses. In the case of courses in the compulsory elective area

"compulsory elective modules (specialisation)" and "other compulsory elective modules" (e.g. context), students basically have a choice between various alternatives, which means that not the entire cohort of students must attend the module. Compulsory elective modules usually take place in the main study period and vary in terms of the number of ECTS. The allocation into "compulsory elective modules (specialisation)" and into "other compulsory elective modules" follows the information provided by the university without a comparison of the number of ECTS, whereby the wording "specialisation" and "thematic focus" are equated. If it is not possible to clearly assign the courses to a specialisation or thematic focus, they are assigned to the category "other compulsory elective modules". The teaching offers examined can have different formats. They are therefore uniformly referred as "events".

The second part presents the case study of the "Entrepreneurship Pyramid" which is an integrated concept implemented at the School of Business of FHNW. It places the activities of the School of Business of FHNW in the previously developed classification scheme and makes an initial analysis of the effectiveness of these activities by surveying the number and fields of activity of the startups founded by graduates of the School of Business of FHNW. As no respective tracking had been made in the past this information was compiled from lists of graduates from the last 10 years and based on the information on their LinkedIn profiles. This research was done by members of the School of Business' Institute of Entrepreneurship. Based on this, the authors of the present study classified the business activities.

3. Results

3.1 Entrepreneurial education at Swiss Universities

3.1.1 Bachelor's programs

From the entrepreneurship activities of the universities analysed three groups can be identified among the Bachelor's degree programs:

Group 1: There is a group of universities of applied sciences that include the topic of entrepreneurship in the compulsory part of their Bachelor's degree programs. It is noticeable here that in "compulsory modules" the topic of entrepreneurship is always taken up in connection with "innovation" or other related topics. In the category "compulsory elective modules (specialisation)", the topic of entrepreneurship is explicitly found as an independent topic, sometimes in combination with other topics. The category "other compulsory elective modules" is not relevant except for the study programs of the FHNW (see Table 1)

Table 1: Universities including the topic of entrepreneurship in the compulsory part of their Bachelor's degree programs

Group 1		
University of Applied Sciences	**School of / Department of**	**Modules in the Bachelor's degree programmes BSc in Business Administration / International Management**
Bern University of Applied Sciences BFH	Business	Compulsory modules: • Innovation, Entrepreneurship and Marketing Compulsory elective modules (specialisation): • Entrepreneurship and Innovation Other compulsory elective modules: • No details
University of Applied Sciences Grisons FHGR	Business and Servies	Compulsory modules: • Innovation Management and Design Thinking Compulsory elective modules (specialisation): • Entrepreneurship and Corporate Responsibility Other compulsory elective modules: • No details
University of Applied Sciences Northwestern Switzerland FHNW	Business	Compulsory modules: • Entrepreneurship and Innovation Compulsory elective modules (specialisation): • Entrepreneurship • International Entrepreneurship Other compulsory elective modules: • Innosuisse Modules • Winter- and Summerschool Entrepreneurship

Group 2: A further group of universities takes up the topic of entrepreneurship in the corresponding degree programs exclusively in connection with the topic of "innovation" in the category "elective modules (specialisation)", but there are no clear references to the topic of entrepreneurship in the compulsory part of the degree program (see Table 2).

Table 2: Universities taking up the topic of entrepreneurship in the corresponding Bachelor's degree programs exclusively in connection with the topic of "innovation" in "elective modules "

Group 2		
University of Applied Sciences	**School of / Department of**	**Modules in the Bachelor's degree programmes BSc in Business Administration / International Management**
University of Applied Sciences Western Switzerland HES-SO	Business and Services	Compulsory modules: • No details Compulsory elective modules (specialisation): • PME & Entrepreneur/Innovation Other compulsory elective modules: • No details
Kalaidos Universities of Applied Sciences	Business	Compulsory modules: • No details Compulsory elective modules (specialisation): • Entrepreneurship and Start-Ups Other compulsory elective modules: • No details

Group 3: The third group of universities do not provide any information on the relevance of the topic of entrepreneurship in the relevant degree programs (see Table 3).

Table 3: Universities not providing any information on the relevance of the topic of entrepreneurship in the respective Bachelor's degree programs

Group 3		
University of Applied Sciences	**School of / Department of**	**Modules in the Bachelor's degree programmes BSc in Business Administration / International Management**
Lucerne University of Applied Sciences and Arts HSLU	Business	Compulsory modules: • No details Compulsory elective modules (specialisation): • No details Other compulsory elective modules: • No details
University of Applied Sciences of Eastern Switzerland OST	Business	Compulsory modules: • No details Compulsory elective modules (specialisation): • No details Other compulsory elective modules: • No details
University of Applied Sciences and Arts of Southern Switzerland SUPSI	Business Economics, Health and Social Care	Compulsory modules: • No details Compulsory elective modules (specialisation): • No details Other compulsory elective modules: • No details
Zurich University of Applied Sciences ZHAW	Management and Law	Compulsory modules: • No details Compulsory elective modules (specialisation): • No details Other compulsory elective modules: • No details

At 5 out of 9 universities of applied sciences, the topic of entrepreneurship is explicitly visible as a topic in the respective Bachelor's degree programs in business administration, either independently or in combination with other related topics (group 1 and group 2). This means that entrepreneurship is established as a topic in the universities landscape and is visible as a central educational goal by more than half of the universities. In addition, various combinations of specialisations are offered, which is another indication of the relevance of the topic.

3.1.2 Master's and MBA programs

The results for the Master's and MBA programs can be summarised in three groups too. It should be noted that the FHGR is not part of the evaluation because it offers neither a Master in Business Administration nor an MBA. Therefore, 8 universities are analysed.

Group 1: The first group of universities explicitly offers entrepreneurship as a topic in the analysed categories without combining it with other related topics, such as innovation or growth management. International entrepreneurship was equated with the term entrepreneurship, as it is not a related topic but a specialisation within entrepreneurship (see Table 4).

Table 4: Universities explicitly offering entrepreneurship as a topic without any combination with other topics.

Group 1		
University of Applied Sciences	**School of / Department of**	**Modules in the Master's programmes MSc in Business Administration / International Management and Master of Business Administration MBA**
University of Applied Sciences Northwestern Switzerland FHNW	Business	Compulsory modules: • No details Compulsory elective modules (specialisation): • Innovation and VentureLab • Consulting and Entrepreneurship Other compulsory elective modules: • Innovation Academy • Design Innovation for Organisation and Business • International Entrepreneurship • Innovation and Entrepreneurship/Intrapreneurship
University of Applied Sciences Western Switzerland HES-SO	Business and Services	Compulsory modules: • No details Compulsory elective modules (specialisation): • Entrepreneurship Other compulsory elective modules: • No details
Kalaidos Universities of Applied Sciences	Business	Compulsory modules: • No details Compulsory elective modules (specialisation): • Entrepreneurship Other compulsory elective modules: • No details

Group 2: The second group of universities give an explicit reference to the subject area of entrepreneurship but combines it with various related subjects such as innovation, idea creation, growth management etc (see Table 5).

Table 5: Universities with explicit reference to the subject area of entrepreneurship in combination with related subjects.

Group 2		
University of Applied Sciences	**School of / Department of**	**Modules in the Master's programmes MSc in Business Administration / International Management and Master of Business Administration MBA**
Lucerne University of Applied Sciences and Arts HSLU	Business	Compulsory modules: • No details Compulsory elective modules (specialisation): • Business Innovation and Entrepreneurship Other compulsory elective modules: • No details
University of Applied Sciences of Eastern Switzerland OST	Business	Compulsory modules: • Start-up and Growth Management Compulsory elective modules (specialisation): • Corporate/Business Development with moduls in Start-up and Growth / Entrepreneur and Business Creation Other compulsory elective modules: • No details
Zurich University of Applied Sciences ZHAW	Management and Law	Compulsory modules: • No details Compulsory elective modules (specialisation): • Innovation and Entrepreneurship Other compulsory elective modules: • No details

Group 3: In the third group, there are no explicit references to the term entrepreneurship. However, it is noticeable that these universities also deal with related topics such as innovation in their respective degree programs (see Table 6).

Table 6: Universities with no reference to the subject area of entrepreneurship.

Group 3		
University of Applied Sciences	**School of / Department of**	**Modules in the Master's programmes MSc in Business Administration / International Management and Master of Business Administration MBA**
Bern University of Applied Sciences BFH	Business	Compulsory modules: • No details Compulsory elective modules (specialisation): • Strategy, Innovation and Marketing Other compulsory elective modules: • No details
University of Applied Sciences and Arts of Southern Switzerland SUPSI	Business Economics, Health and Social Care	Compulsory modules: • No details Compulsory elective modules (specialisation): • Innovation Management Other compulsory elective modules: • No details

In the case of Master's and MBA programs, 6 out of 8 universities offer courses related to entrepreneurship (group 1 and group 2). This is also evidence that the topic of entrepreneurship is established at a higher educational level.

3.1.3 Other events which are clearly open to students

For the other events, such as competitions or advisory services two groups of universities can basically be formed. A distinction can be made between universities that offer an explicit additional offer for students (see Table 7) and those where nothing was explicitly found. It should be noted, however, that other universities also offer other events. But it was not clear from the available information whether these offers were also accessible to students and thus to be considered an integral part of education or further education, or whether they had to be assigned to the research or services mandate.

Table 7: Entrepreneurship opportunities accessible to students, such as competitions and advisory services.

University of Applied Sciences	School of / Department of	Events in the field of entrepreneurship such as competitions, advisory services, etc., which are clearly open to students.
Bern University of Applied Sciences BFH	Business	Competitions: • No details Advisory Services • Entrepreneurship Office BFH
University of Applied Sciences Northwestern Switzerland FHNW	Business	Competitions: • Swiss Startup Challenge • Swiss Innovation Challenge • Swiss Sustainability Challenge Advisory Services • ImpactLab FHNW • 1:1 Support Business Plan • 1:1 Support Entrepreneur Check • 1:1 Cases and Toolbox

At 2 out of 9 universities, other events that are clearly also available to students were found. This low number of events can be explained by the fact that only those offers were taken into account for which there was an explicit indication that students could benefit from them. It cannot be ruled out that events for which there is no explicit indication are not nevertheless open for use by students.

3.2 Case Study "Entrepreneurship Pyramid" at the School of Business of FHNW FHNW

The School of Business of FHNW is one of nine schools of the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) which are active in teaching, research, continuing education and service in various fields such as engineering, business, social work, art and design, music and education. It runs five Bachelor of Science and two Master of Science degree programs and six institutes. In 2022, a total of 2580 students studied at Bachelor level and 388 students at Master level at the School of Business. In the same year, 549 students graduated with a Bachelor's degree and 147 students with a Master's degree (University of Applied Sciences Northwestern Switzerland, 2023b; see Table 8).

Table 8: Number of students and graduations at the School of Business of FHNW.

		# of students graduated			# of students immatriculated		
Program	**Study Level**	**Total 2022**	**Total 2021**	**Total 2020**	**Total 2022**	**Total 2021**	**Total 2020**
Business Administration	Bachelor degree	417	445	507	1875	1978	1971
International Business Management	Bachelor degree	28	32	26	120	122	127
Business Information Technology	Bachelor degree	104	84	72	585	597	548
Business Information Systems	Master degree	94	87	64	278	278	256
International Management	Master degree	53	55	59	110	119	130

In recent years, the School of Business of FHNW has developed an integrated concept to promote entrepreneurship among students (see Figure 1).

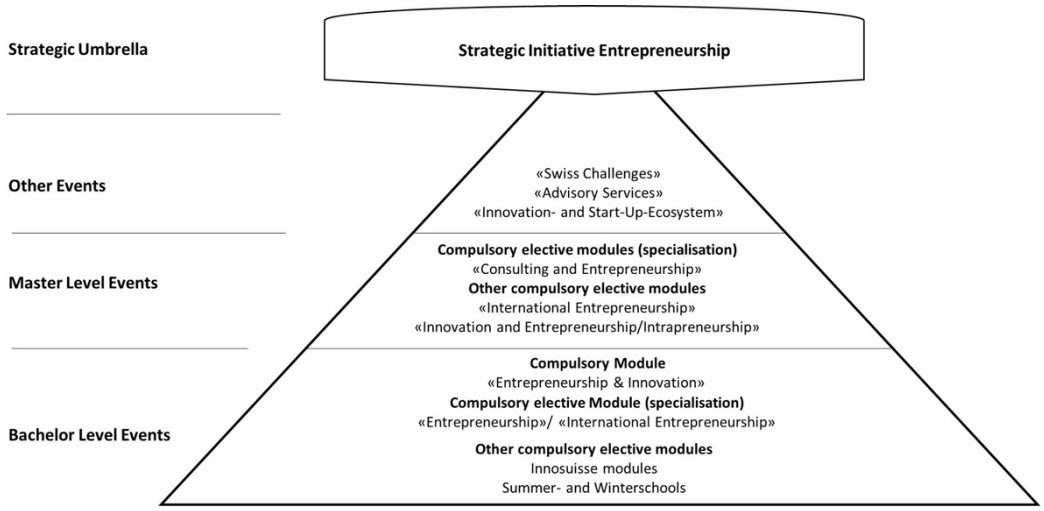

Figure 1: "Entrepreneurship pyramid" of the School of Business at FHNW.

It includes not only elements in the education at Bachelor's and Master's level but also elements that are intended to support the entrepreneurial activities of students even after graduation from the university and thus form an actual regional business ecosystem. In the following sections, key variables of the elements of this *Entrepreneurship Pyramid* are described in more detail.

3.2.1 The Strategic Initiative "Entrepreneurship"

An important design element in terms of a strategic umbrella of all entrepreneurial activities at the School of Business of FHNW is the Strategic Initiative "Entrepreneurship" of the FHNW. The FHNW regularly carries out interdisciplinary strategic initiatives to tackle the most important challenges facing the society. In the period between 2015 and 2017, one of these initiatives was the Strategic Initiative " Entrepreneurship". Its aim was to promote entrepreneurial thinking and action. The relevant target groups of the project were, on the one hand, the students, and employees of all disciplines at the FHNW, but also, beyond that, the stakeholders in the economy and society of Northwestern Switzerland. The projects of the Strategic Initiative "Entrepreneurship" were designed in such a way that the work done could be integrated into the day-to-day business of the participating faculties after completion of the three-year term. The School of Business of FHNW was closely involved in this initiative and various results were incorporated into the design of events on several levels.

3.2.2 Bachelor Level Events

The results of the strategic initiative Entrepreneurship are reflected in the introduction of the compulsory module "Entrepreneurship and Innovation" in the study programs "Business Administration". It consists of 6 half-days of entrepreneurship training and 6 half-days of innovation training and includes 6 ECTS points. Every year, between 400 and 450 students are thus familiarised with the basics of entrepreneurship, which corresponds to around three quarters of all Bachelor students at the School of Business.

In the same programs entrepreneurship education is deepened and implemented in the compulsory elective module "Entrepreneurship" or "International Entrepreneurship". It extends over 2 semesters and comprises 12 ECTS points. In this event, students develop their own business ideas and, if possible, put them into practice. Every year, between 45 and 70 students opt for this module. Furthermore, the School of Business of FHNW offers the Innosuisse semester course "Business Concept - Get the start-up toolbox". Innosuisse is the Swiss Agency for Innovation Promotion. The course is part of the Innosuisse start-up training series. Participants with an innovative idea who intend to startup a business will expand their entrepreneurial thinking and prepare themselves theoretically as well as practically for founding and managing a company. The event is aimed at students but also at PhD students, postdocs, and people with experience in product development. It is free of charge and takes place over 14 evenings with 4 lessons each. Every year between 30 and 50 people participate this course.

Similar objectives to those of the Innosuisse course are pursued with the summer and winter Schools "Entrepreneurship" and "International Entrepreneurship", which are also offered by the School of Business of FHNW. Here as well, participants with an innovative business idea who intend to startup a knowledge- or technology-oriented company train their entrepreneurial thinking and prepare themselves for founding and managing a company. The events are free of charge, and they last 1 week. They are aimed at students, who are credited with 2 ECTS points for this, as well as at people with experience in product development. The development of the number of participants over the years proves that this offer meets a great need. While 28 people from 7 universities took part in 2019, a total of 105 people from 14 universities took part in 2022.

3.2.3 Master Level Events

At Master's level, the School of Business of the FHNW does not offer compulsory modules related to entrepreneurship but a series of entrepreneurship-related events such as Innovation and VentureLab, Consulting and Entrepreneurship, Innovation Academy, Design Innovation for Organisation and Business, International Entrepreneurship, Innovation and Entrepreneurship/Intrapreneurship in its Master's programs as well as in its MBA electives. These can be both specialisations and other compulsory elective modules.

3.2.4 Other Events

3.2.4.1 Swiss Challenges

One key element of the events launched as part of the Strategic Initiative “Entrepreneurship” are the business competitions held under the umbrella brand "Swiss Challenge". The "Swiss Challenge" comprises 5 competition categories that promote different areas of entrepreneurship. In developing them, the experts at the FHNW in general and at the School of Business of FHNW in particular were concerned with a practice-oriented approach. With a focus on entrepreneurship, the "Swiss Startup Challenge", the "Swiss Innovation Challenge" and the "Swiss Sustainability Challenge" are of relevance.

The *Swiss Startup Challenge* supports startup initiatives by students and employees in developing and implementing their business idea. The challenge promotes them within the framework of special events on the topic of entrepreneurship and awards the 5 best projects with a total prize money of CHF 8,000 every year. In addition, the selected projects are supported by coaches in the further development of their project. The basic prerequisite for participation in the Swiss Startup Challenge is attendance at an event on the topic of entrepreneurship at Bachelor or Master level. Within the framework of these events, a pre-selection for the Swiss Startup Challenge is made. In 2022, a total of 242 students were invited to participate in this challenge. The selected projects can benefit from coaching and have the chance to win the prize money.

The *Swiss Innovation Challenge* supports innovations in their development and implementation with practical knowledge. Business model innovations, product innovations, organisational and management innovations as well as process and service innovations are promoted. The Swiss Innovation Challenge is aimed at start-ups and innovative small and medium-sized enterprises. The total prize money is CHF 40,000, which is covered by sponsors. There are 3 selection rounds, which are carried out within six months. In each case, 100 teams are admitted for the 1st pitch, 50 teams for the 2nd pitch and 20 teams for the final pitch. In addition to the opportunity to win prize money, more added value is created for the participating teams by offering seminars, mentoring, and coaching to expand the necessary skills and by creating media attention. A regional bank, a regional chamber of commerce and a foundation act as partners and sponsors.

The *Swiss Sustainability* Challenge is a competition which aims to make a measurable contribution to sustainable development. The call for participation is aimed at individuals or teams who promote social and environmental sustainability with a project, regardless of whether it is a start-up or a non-profit venture and whether the projects are still at the very beginning or have already taken the first steps towards implementation. While the focus used to be primarily on students as the Swiss Student Sustainability Challenge, it is open to all young people and their ideas. Prize money of CHF 20,000 will be distributed, which is sponsored by a national insurance company. Additionally, the participants benefit from the support of experienced coaches in individual consulting sessions, as well as free seminars and workshops.

3.2.4.2 Advisory Services

Various services are available to students who have a business idea. The ImpactLAB FHNW arranges contacts, the 1:1 support includes tools for the development of business plans, personality tests to clarify the suitability as an entrepreneur, and cases and other tools.

3.2.4.3 Innovation and Startup-Ecosystem

Finally, the School of Business of FHNW has established an extensive network in the innovation and start-up ecosystem in Northwestern Switzerland and beyond. It maintains active cooperation with around 15 organisations that offer office space and coaching in the startup sector, financing, feasibility studies or services around research and development.

3.2.5 Impact analysis: Start-ups by graduates of the School of Business of FHNW

The analysis of the activities of graduates of the respective events of the School of Business of FHNW over the last 10 years shows that they have founded a total of 99 companies (Verkuil 2023, p 43ff.). To get a more precise picture of their economic activities, they were assigned to different sectors within the framework of the present study based on the information available. The Swiss standard for the general classification of economic activities is defined as the NOGA code. This nomenclature consists of five stages differentiating between 794 fields of activity (Swiss Federal Statistical Office, 2008). However, this nomenclature is not suitable for depicting their activities in a suitable manner. For this study, a separate nomenclature was therefore chosen to classify the companies. The sectors shown in the were used for this purpose (see Figure 2):

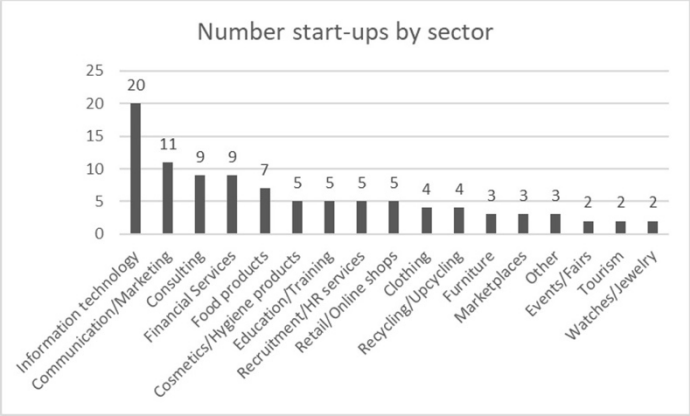

Figure 2: Number of Startups founded by graduates of the School of Business of FHNW.

4. Discussion

4.1 Conclusions

In summary, it can be concluded that the School of Business of FHNW offers an above-average intensity of activities in the field of entrepreneurship at all levels compared to the other universities of applied sciences in Switzerland. This can be an explanation for the results of the study by Sieger et al (2021a), according to which the graduates of the School of Business of FHNW rate the entrepreneurial climate at the school as above average in a cross-comparison with the other analysed universities. The Strategic Initiative “Entrepreneurship” obviously positioned the School of Business of FHNW as a faculty that promotes entrepreneurial-innovative thinking and action among its students and staff in all areas. The study also shows that these activities have an effect regarding the graduates' start-up activities. However, a comparison with the above-mentioned study by Sieger et al (2021a) also shows that studies on the *entrepreneurial intentions* of graduates cannot be used to draw *reliable conclusions regarding the number of start-ups that are founded*. If all the School of Business of FHNW graduates surveyed in the respective study who expressed entrepreneurial intentions in the sense of founding their own business had put them into practice, the number of start-ups would have to be much higher than 99.

4.2 Limitations

The methodology used allows conclusions to be drawn about the visibility of the topic of entrepreneurship on the websites of the respective universities. However, the visibility is only an indication of the anchoring of the examined topic. The present study is a snapshot without any indication of the development of the topic of entrepreneurship. It is also not possible to draw any conclusions about the intensity and scope of the courses offered, since no complete analysis of the number of ECTS for the entrepreneurship part was possible. In this context, no conclusions can be drawn about the weighting of the respective topics in combined offerings such

as "Entrepreneurship and Innovation", as no systematic investigation of the module descriptions could be carried out. It is also not possible to assess the anchoring among students, since the public information does not allow any conclusions to be drawn about the number of students who attend the respective modules. This also means that the present study is not a ranking of the universities in terms of their orientation to the topic of entrepreneurship. Furthermore, the analysis of the companies founded by graduates of the School of Business of the FHNW does not provide any indication of the jobs created and thus the economic benefit of the corresponding events.

4.3 Directions for future research

There is therefore a wide field for further analyses and research. In essence, the aim is to present time series on the development of the topic of entrepreneurship. There is also a need for more in-depth studies on the number of jobs created.

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The Fairy Tale of Unicorns

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Abstract: Unicorns have become symbols of entrepreneurial success and innovation-friendly' countries. Therefore, understanding the process of diffusion of these highly valued startups has important implications for business, investors and policymakers. However, the existing literature lacks a description of the diffusion and forecast of these types of ventures. We address this gap by analyzing the diffusion process of unicorns in 8 countries (USA, China, India, UK, Germany, France, Netherlands, and Sweden) and 3 industries (Fintech, Health, and Transportation) using both 3-parameters and 4-parameters Gompertz and Logistic models. Our diffusion analyses reveal that the Gompertz model is suited for analyzing unicorn diffusion in China, whereas the Logistic model is appropriate for analyzing unicorn diffusion in the rest of the countries studied. We also find that India has the highest estimated speed of diffusion (97%) while the USA has the highest saturation level of unicorns (6241). Our forecasting analyses indicate that all the countries selected in our study, except the USA, will achieve their saturation level of unicorn diffusion in five to seven years. Further, results regarding unicorn diffusion by sectors show that the Logistic model is suited for analyzing unicorn diffusion in all the sectors studied. Results of forecasting analyses indicate that the Fintech sector needs twice the period required for the Transportation and Health sectors to achieve the maximum level of unicorn diffusion. These findings are useful for planning, regulation, policy formulation, and portfolio decision.

Keywords: Startup, Unicorn, Diffusion, Forecasting, Logistic Model, Gompertz Model

1. Introduction

Over the last decade, the term " unicorn startup" which is one particular type of entrepreneurial phenomenon has captured significant popularity. Broadly defined, unicorns are privately held startups with a market capitalization of more than $1 billion. The term "unicorn" refers to the rarity of start-ups that achieve this status among the population of startups. Just ten years ago, when they were first coined by venture capitalist Aileen Lee, only 38 unicorns existed. As of the beginning of 2023, there are over 2600 unicorns around the world (Dealroom. co). Despite their rising number, unicorns remain still quite rare. For example, in Europe, only 1 in 100 companies raising a seed round would reach the $1 billion valuation (Atomico et al., 2020). Only a small number of startups become unicorns since they are dedicated to offering creative solutions and new business models, among other things, without any synergy with existing markets. This type of company provides products and services that have accomplished incredibly fast diffusion rates and business growth. Generally, in most cases, they are disrupting entire industries by replacing a process**,** or a product that is already well-established, giving rise to a new way to operate (Stadler, 2016).

In the last two years, the growth of unicorns has been phenomenal. Assisted by the growing internet penetration and enabled by digital technologies, it seems that innovation not only positively moderates the negative effect of the pandemic but accelerated the adoption of start-ups. In 2021, the number of unicorns around the world jumped from 315 one year before to 787 (Dealroom.co), which means that on average two unicorns are created every day. It is this spectacular diffusion in a period of general recession that gives the history of unicorns this characteristic of a "fairy tale". Performing through the crisis seems sometimes impossible, but some unicorns have proven that this idea is just a myth. In general, achieving unicorn status takes several years (requires an average of at least five years) but some startups have achieved unicorn status so fast that it almost seems impossible. Some American (ClickHouse, Pacasso, Avant…), Chinese (iCarbonX….), or European (NuCom Group, Gorillas….) startups achieved unicorn status in just a few months, less than one year.

Schumpeter (1943) predicted well the role of innovation in economic growth via the process of creative destruction, however this exponential growth, in an embryonic phase, in terms of number or in terms of passage from startup position to unicorn position was not predicted. With the increasing number of unicorn startups, several studies have been conducted on the risks of unicorns (Fan, 2016; Govindarajan, 2016; Wu Jin, 2018), and their valuation (Gornall & Strebulaev, 2020; Jacobus, 2016); public and private initial public offering IPO investments into unicorns (Brown & Wiles, 2015; Kengelbach et al., 2018) performance and financial state

(Demartini, 2018; Gao et al., 2019; Laitinen, 2017); characteristics and growth environment of unicorns (Guo & Zhang, 2021); governmental decisions affecting unicorns (McNeill, 2016). To the best of our knowledge, the existing literature lacks a description of the diffusion and the forecast of these types of ventures. We address this gap by analyzing the diffusion process of unicorns in 8 countries (USA, China, India, UK, Germany, France, Netherlands, and Sweden) and 3 industries (Fintech, Health, and Transportation), using Logistic and Gompertz models both with three and four parameters.

While it has been claimed that focusing on unicorns could conduce to a biased picture of entrepreneurship (Kuckertz et al.2023), several studies show that startup companies and especially unicorns have become the basic drivers of innovation and can contribute significantly to both job and wealth creation (e.g., Guo and Zhang, 2021; Testa et al., 2022). For that reason, economic development policy should support unicorn emergence and growth. From this economic viewpoint, an appropriate prediction of the unicorn diffusion can enable the policymakers "to act at the right time" to make suitable decisions. The derived knowledge can be used by policy makers and regulators for the development strategy of unicorn growth. Besides, investing in such new businesses (with high growth potential) seems rational. Many venture capitalists only consider investing in startups that have the potential to become unicorns. Accordingly, long run forecasts of unicorn diffusion should also guide investors in their portfolio decisions.

The contribution of this study lies in its analysis of the process of diffusion of unicorns using growth diffusion models. The scant existing literature looking at this question suggests that the diffusion process of this type of venture can't be supported by growth models of diffusion due to the incredibly high speed at which they diffuse into the market (Urbinati et al., 2018; Trabucchi, Talenti, and Buganza, 2019). For example, Urbinati et al. (2018) argue that the diffusion process of unicorns should rather be explained by their business model design, using the historical data of 50 unicorns. However, it's well known that the most disruptive innovations are the car and television. Meade and Islam (2015) reported: "Our preliminary literature search found that studies focusing on hardware (television, cellular phones, computer and network equipment) predominated. Hence, contrary to previous studies on unicorn diffusion, we show that growth models of diffusion work well and could be considered as highly performing tools, to describe and forecast the evolution of unicorns.

The paper is organized as follows. The next section provides a theoretical overview of the growth models of diffusion that were used to empirically explore the research questions. The third section describes methodology and data. In section four, we summarize and discuss the results obtained from our analyses. Finally, section five concludes pointing out the practical implications arising from our study and giving some avenues for future research.

2. Growth models of diffusion

Many mathematical representations of the sigmoid shape are used in the literature on diffusion models. But, the Gompertz and Logistic models are the most frequently used sigmoid models fitted to growth data. Both curves of these models share the interesting property that their "S-shaped" feature is suitable to describe processes that began with a slow rate in the first stage of adoption, followed by a stage of rapid adoption which then tails off as the adopting population becomes saturated. Recently, it has been found that the results of these growth models with four parameters are more consistent than those provided by the Gompertz and Logistic models with three parameters (Akin et al., 2020; Satoh, 2021). Thus, we consider the growth models with four parameters in addition to these classical models. The accuracy of the goodness of fit of the estimation model is evaluated by Root Mean Square Error (RMSE) and adjusted R2. The accuracy of forecasting is evaluated by the aggregate error - Mean absolute percentage error- MAPE and- mean absolute error- MAE. As Jha & Saha (2020) and Akin et al. (2020), we use the following representation for each model.

2.1 Logistic model

The logistic curve is symmetric with respect to its inflection point. The Logistic model with three parameters (LM3P) is :

$$U(t) = \frac{M}{1+e^{-\alpha(t-\beta)}} \qquad (1)$$

M, β, and α are all positive parameters.

M is the market potential or the maximum number of possible unicorns, *α* is the growth rate or pace of adoption of the unicorns and *β* is the inflection point indicating the point in time at which the growth of the adoption of unicorns reaches its peak and starts decreasing. This is produced when the diffusion of unicorns achieved half of its maximum level ($\frac{M}{2}$). The Logistic model with four parameters (LM4P) is :

$$U(t) = A + \frac{B}{1+e^{-\alpha(t-\beta)}} \qquad (2)$$

Where *A* is a location parameter and acts as the lower asymptote, *B* is the asymptotic amount of growth of unicorns that occurs as *t* increases, and A+*B*=*M*.

2.2 Gompertz model

The Gompertz curve has the property of being asymmetrical about the inflection point. The Gompertz model with three parameters (GM3P) is :

$$U(t) = Me^{-e-\alpha(t-\beta)} \qquad (3)$$

M is the market potential or the maximum number of possible unicorns, *α* is the growth rate or pace of adoption of the unicorns and *β* is the inflection point indicating the point in time at which the growth of the adoption of unicorns reaches its peak and starts decreasing. This is produced when the diffusion of unicorns achieved the share 1/e ≈ 36.8% of its maximum level ($\frac{M}{e}$). The Gompertz model with four parameters (GM4P) is:

$$U(t) = C + De^{-e-\alpha(t-\beta)} \qquad (4)$$

Where *C is* a location parameter and acts as the lower asymptote, *D* is the asymptotic amount of growth of unicorns that occurs as *t* increases and *C+D=M*.

3. Methodology and data

3.1 Methodology

Our research methodology consists of two main stages. In the first stage, we estimate the diffusion model parameters specified in equations (1), (2), (3) and (4) for each country and each industry of our sample, using a nonlinear least squares (NLS) regression. We then choose the model with the maximum adjusted R^2 and the least RMSE as the best-fit model for the given historical data. In the second stage, we forecast the diffusion of unicorns by country and industry during the years 2023-2033. The forecasting performance of each model is tested using two main indicators, namely the Mean Absolute Deviation (MAD) and the Mean Absolute Percentage Error (MAPE). We choose the model that gives the smallest MAPE and MAE.

3.2 Data

We use time series data on cumulative unicorns from the Dealroom database and more specifically the so-called "Unicorn Club". Several previous studies are based on this database such as Burstrom et al. (2023) and Testa et al. (2022). The Unicorn Club is particularly well-adapted for research as it is updated on a daily basis and is structured in an accessible way (Retterath and Braun, 2020). It provides detailed data on the number of new and cumulative unicorns by continents, countries, and industries since 2000. According to this database (Dealroom. co), there are currently 2615 unicorn companies worldwide, 90% of them predominantly located in just 15 countries. Among these countries, the USA and China alone account for 54% and 12.42% of the total number of unicorns, respectively. The most represented industries are fintech with 517 companies in this category, health with 433 unicorns, and transportation with 234 unicorns. The dataset used for this paper was downloaded in December 2022. It covers the period 2000-2022 and contains information on the number of cumulative unicorns in 8 countries (USA, China, India, UK, Germany, Sweden, France, and the Netherlands) and 3 industries (Fintech, Health, and Transportation). Our database represents 80% of the worldwide unicorns.

4. Results and discussions

We use the NLS regression and STATA 15 software to estimate the parameters in (1), (2), (3), and (4), after providing suitably chosen starting values, as the two curves are non-linear in the parameters of interest. The estimated parameters are then used to obtain forecasts of the variable *U*. The quality of the fit to the data is excellent for each model. All models indicate high accuracy with the Adjusted determination coefficient (Adj_R^2) of more than 95%. All the parameters of the models are almost statistically significant at the 1% level. In the following sections, we detail our results by country and by sector.

4.1 Unicorn diffusion and forecasting by countries

The results of the analysis, for the eight countries, are summarized in Table 1. The models obtained for all countries in the study are statistically significant and all the parameters of the models are statistically significant at a 1% level, except for the saturation point parameter in the case of the USA, UK, and Germany (Table 1). We can infer from Table 1 that the Logistic model is suited for analyzing unicorn diffusion in the USA, India, Germany, the UK, France, Netherlands, and Sweden. This model yields a lower RMSE and higher adjusted R^2 than the Gompertz model. Whereas, in the case of China, the Gompertz model is more suitable to describe unicorn diffusion. Our results of the Logistic model for the unicorn diffusion in the USA indicate a maximum level of 6241.574. The speed of convergence to the saturation level is 0.322 and half of its maximum level will be achieved in 2026. Using the logistic model with four parameters, we find almost the same results as those reported above. The results of the Gompertz model indicate an overestimation of the potential maximum number of unicorns and a very low speed of diffusion (0.017). Values of adjusted R^2, RMSE, MAE, and MAPE indicate that the Logistic model with three parameters is the best in describing and forecasting the unicorn diffusion in the USA. Our forecasting analysis shows that the saturation of unicorn diffusion in the USA, generated by the Logistic model, is predicted to be achieved in 2052. The results of the Logistic model for the diffusion of unicorns in China indicate a maximum level of 335.796 and the speed of convergence to the saturation level is 0.694. Unicorn diffusion has achieved half of its maximum level in 2018. The results of the Gompertz model indicate a maximum diffusion level of 380.713, the speed of diffusion is 0.378, and 36.8% of its maximum level is achieved in 2017. Based on the values of adjusted R^2, RMSE, MAE, and MAPE, we find that the Gompertz model with three parameters has the best performance both in describing and forecasting the unicorn diffusion in China. Our forecasting analysis shows that the saturation of unicorn diffusion in China, generated by the Gompertz model, is predicted to be achieved in 2032.

As for the UK, our results of the Logistic model with three parameters for the unicorn diffusion reveal a maximum level of 545.113 (but not statistically significant). The speed of convergence to the saturation level is 24.5% (significant at 1%) and half of its maximum level will be achieved in 2027. Using the Gompertz model, we find similar results as in the case of the USA. The potential maximum number of unicorns is also overestimated, while the speed of diffusion is underestimated. Values of adjusted R^2, RMSE, MAE, and MAPE indicate that the Logistic model is the best in describing and forecasting the unicorn diffusion in the UK. Our forecasting analysis shows that the saturation of unicorn diffusion in the UK, generated by the Logistic model, is predicted to be achieved after 2032. With regard to India, the results of the Logistic model with four parameters for the diffusion of unicorns indicate a maximum level of 139.889, and the speed of convergence to the saturation level is 97%. Unicorn diffusion has achieved half of its maximum level in 2021. The results of the Gompertz model indicate a maximum diffusion level of 313.211 (but not statistically significant), the speed of diffusion is 0.298, and 36.8% of its maximum level is achieved in 2022. We can infer from Table 1 that the Logistic model with four parameters provides more accurate results in describing and forecasting the unicorn diffusion in India, as reflected in its high adjusted R^2, low RMSE, MAE, and MAPE. Our forecasting analysis shows that the saturation of unicorn diffusion in India, generated by the Logistic model, is predicted to be achieved in 2030.

The results of the Logistic model, with four parameters, for the diffusion of unicorns in France show a maximum level of 91.9, and the speed of convergence to the saturation level is 0.496. Unicorn diffusion has achieved half of its maximum level in 2023. The Gompertz model highly overestimates the ultimate potential number of unicorns and underestimates the speed of diffusion. The Logistic model, with four parameters, is found appropriate to describe the process of unicorn diffusion in France, whereas the Gompertz model is the best to predict the diffusion of unicorns. However, considering that the forecasting performance of the Logistic and Gompertz models do not differ significantly, and since the ultimate market potential estimate of the Logistic model is more realistic (91.9), we choose the Logistic model over the Gompertz model to forecast the unicorn diffusion in France. According to our forecasting results, generated by the Logistic model, the saturation of

unicorn diffusion in France will be achieved in 2032. The Logistic model, with four parameters, also performs well in describing and forecasting the diffusion process in Sweden and Netherlands. In Sweden, the maximum potential number of unicorns is 48, and half of this number is attained in 2021. However, it took a year later for the Netherlands to achieve half of its ultimate potential number of unicorns which is 57. Our results also show that unicorns in Sweden are diffusing at 2.4 times the speed of unicorn diffusion in the Netherlands. Regarding our forecasting results, we find that while Sweden will achieve its saturation point of unicorn diffusion in 2027, the Netherlands needs five years more to achieve its maximum potential number of unicorns.

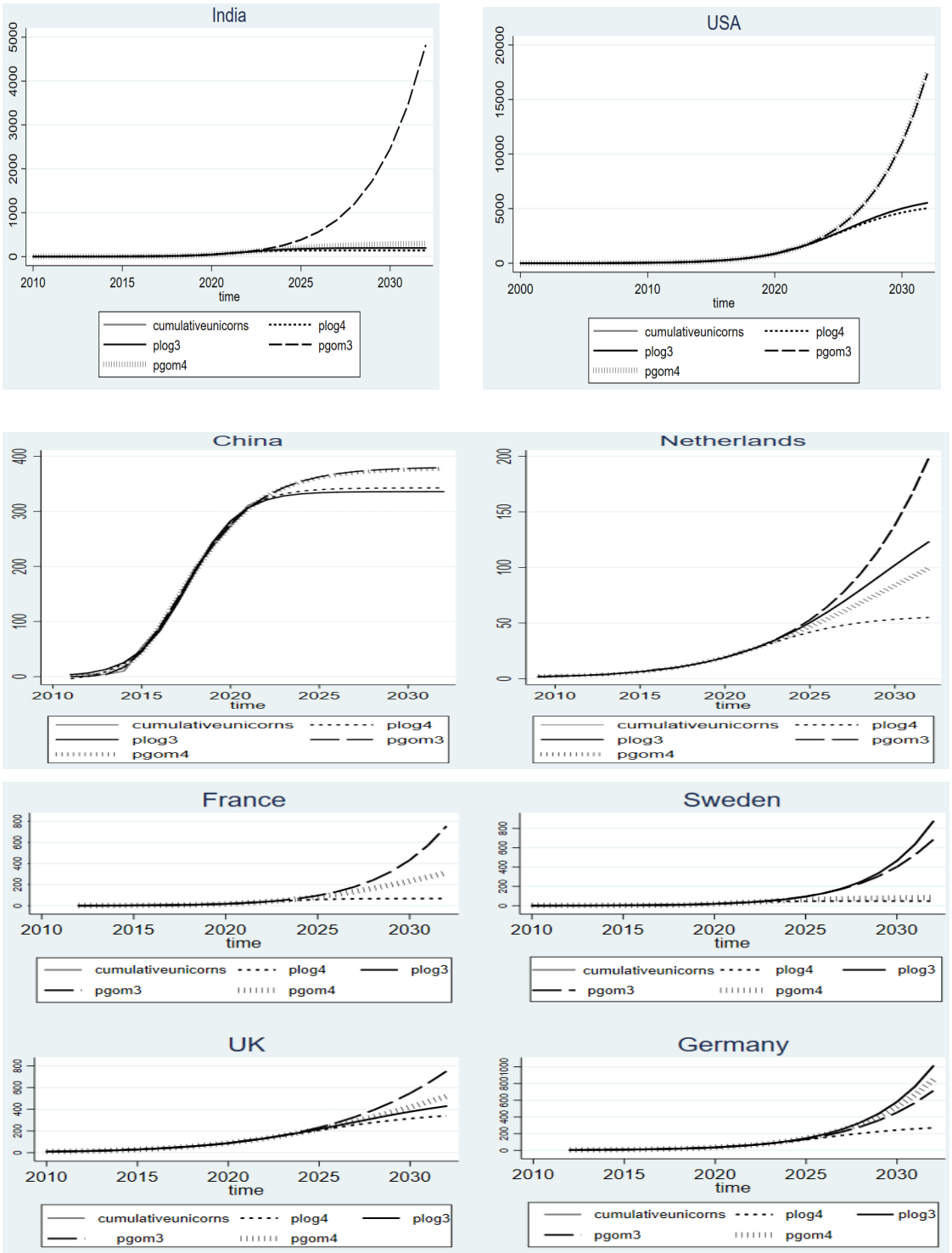

Figure 1: Diffusion and forecasting of unicorns by countries; plog4= forecasting by LM4P, plog3 = forecasting by LM3P, pgom3= forecasting by GM3P, pgom4 = forecasting by GM4P.

Table 1: Estimated parameters of the unicorn diffusion models by countries

*Significance level: *, p < 1%; **, p < 5%; ***, p < 10%. Some values are not reported since the modeling failed to achieve the convergence criteria even after thousands of iterations.*

	USA (n=23)		China (n=12)		UK (n=13)		India (n=13)	
Parameters	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**
M_3P	6241.574	8.94e+09	335.796 *	380.713*	545.113	452195.2	196.359*	6.94e+08
M_4P	5 545,489	-	342,582*	378,268*	381.833	2 358,319	139.889*	313.211
α_3P	0.322 *	0.017*	0.694*	0.378*	0.245*	0.024	0.678*	0.028*
α_4P	0.331*	-	0.637*	0.385*	0.276**	0.066	0.97*	0.298**
β_3P	2025.629*	2182.154*	2017.603*	2016.996 *	2026.676*	2109.214*	2021.719*	2121.446*
β_4P	2025.065*	-	2017.574*	2017.007*	2024.435*	2038.416*	2020.835*	2022.305*
In-sample								
Adj R^2_3P	0.995	0.995	0.998	0.999	0.997	0.996	0.987	0.985
Adj R^2_4P	0.993	-	0.996	0.998	0.991	0.991	0.988	0.983
RMSE_3P	34.047	34.978	8.122	5.119	3.683	3.727	4.532	4.849
RMSE_4P	34.825	-	7.583	5.304	3.853	3.841	3.685	4.386
Out-of-sample								
MAE_3P	15.412	16.437	5.898	3.791	2.252	2.339	3.227	3.309
MAE_4P	15.685	-	5.194	3.6	2.181	2.151	2.37	2.745
MAPE_3P	0.132	0.135	0.415	0.238	0.063	0.068	0.465	0.373
MAPE_4P	0.417	-	0.467	0.19	0.055	0.052	0.451	0.483

	Germany (n=13)		France (n=13)		Sweden (n=13)		Netherlands (n=14)	
Parameters	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**
M_3P	2648.196	3.59e+08	15139.13	4.64e+08	81455.96	1.82e+08	186.937	1.26e+08
M_4P	301,384	1.08e+08	91.9**	1.11e+08	48,308*	88,65***	56,765**	236,871
α_3P	0.285*	0.017*	0.355*	0.021*	0.319*	0.021*	0.236*	0.013*
α_4P	0.349	0.020*	0.496*	0.024*	0.834*	0.295**	0.347*	0.091***
β_3P	2035.042*	2182.009 *	2039.03*	2157.377*	2046.163	2153.066*	2029.22	2224.1 *
β_4P	2025.927 *	2154.355 *	2022.98*	2132.8*	2020.632*	2021.679*	2022.154*	2030.601*
In sample								
Adj R^2_3P	0.982	0.984	0.991	0.991	0.983	0.985	0.995	0.996
Adj R^2_4P	0.955	0.960	0.991	0.990	0.990	0.985	0.992	0.991
RMSE_3P	3.557	3.408	1.117	1.124	1.982	1.865	0.837	0.82
RMSE_4P	4.138	3.888	0.950	0.980	1.131	1.39	0.776	0.794
Out of sample								
MAE_3P	2.48	2.461	0.817	0.894	1.456	1.488	0.603	0.618
MAE_4P	2.59	2.594	0.546	0.572	0729	0.937	0.523	0.541
MAPE_3P	0.4	0.344	0.338	0.399	0.246	0.306	0.108	0.112
MAPE_4P	0.235	0.226	0.143	0.123	0.260	0.301	0.084	0.086

For the case of Germany, performance analysis of non-linear growth models based on adjusted R^2 and RMSE shows that the Gompertz model with three parameters is more suited to describe and forecast the diffusion of Deutschland unicorns. However, the saturation value is highly overestimated while the growth rate is underestimated, and these values do not seem plausible with the data of Germany. This problem of estimation was also detected by several prior researchers such as Gamboa & Otero (2009) and Jha & Shah (2020) in the telecommunication industries. Further, we note that the NLS estimation procedure needs more than two thousand iterations to achieve the convergence criteria, while the Logistic model requires just a few iterations. Since the maximum potential number of unicorns estimated with the Logistic model is more realistic, we choose the Logistic model over the Gompertz model to describe and forecast the diffusion processes of unicorns in Germany. To choose between a Logistic model with three or four parameters, we refer to Figure 1. We find that the Logistic model with four parameters fits the real adoption curve the most closely. Therefore, we consider this model as the best one suited for describing and forecasting the Deutschland unicorn diffusion. The results show that the growth rate is 34.9%, the saturation level is 301.384, and half of this saturation level will be reached in 2026. According to our forecasting analysis results, generated by the Logistic model with four parameters, unicorn diffusion in Germany will achieve 128 in 2025.

4.2 Unicorn diffusion and forecasting by sectors

The models obtained for all sectors in the study are statistically significant and almost all the parameters of the models are statistically significant at 1% level. We can infer from Table 2 that the Logistic model is suited for analyzing unicorn diffusion in all three sectors as it yields a lower RMSE and a higher adjusted R^2 than the Gompertz model.

Our results of the Logistic model for the unicorn diffusion in the Fintech sector indicate a maximum level of 1630.231. The speed of convergence to the saturation level is 0.431 and half of its maximum level will be achieved in 2024. Using the logistic model with four parameters, we find almost the same results as those reported above. The results of the Gompertz model indicate an overestimation of the potential maximum number of unicorns and a very low speed of diffusion (0.022). Values of adjusted R^2 and RMSE indicate that the Logistic model with 3 parameters is found appropriate to describe the process of the unicorn diffusion in the Fintech sector, whereas the Gompertz model is the best to predict the diffusion of unicorns. However, considering that the forecasting performance of the Logistic and Gompertz models do not differ significantly, and, since the ultimate market potential estimate of the Logistic model is more realistic (1630.231), we choose the Logistic model with three parameters over the Gompertz model to forecast the unicorn diffusion in the Fintech sector. Our forecasting analysis shows that the saturation of unicorn diffusion in the Fintech sector, generated by the Logistic model with three parameters, is predicted to be achieved in 2040.

The results of the Logistic model with three parameters for the diffusion of unicorns in the health sector indicate a maximum level of 619.390 and the speed of convergence to the saturation level is 50.8%. Unicorn diffusion achieved half of its maximum level in 2020. The results of the Gompertz model indicate a maximum diffusion level of 1440.596, the speed of diffusion is 15.9% and 36,8% of its maximum level is achieved in 2023. Based on the values of adjusted R^2, RMSE, MAE, and MAPE, we find that the Logistic model with three parameters has the best performance both in describing and forecasting the unicorn diffusion in the health sector. Our forecasting analysis shows that the saturation of unicorn diffusion in the health sector, generated by the Logistic model, is predicted to be achieved in 2030.

With regard to the Transportation sector, the results of the Logistic model with three parameters for the diffusion of unicorns indicate a maximum level of 318.955, and the speed of convergence to the saturation level is 50.4 %. Unicorn diffusion achieved half of its maximum level in 2020. The results of the Gompertz model indicate a maximum diffusion level of 615.22, the speed of diffusion is 17.6% and 36,8% of its maximum level is achieved in 2022. We can infer from Table 2 that the Logistic model with three parameters provides more accurate results in describing and forecasting the unicorn diffusion in the Transportation sector, as reflected in its high adjusted R^2, low RMSE, MAE, and MAPE. Our forecasting analysis shows that the saturation of unicorn diffusion in the Transportation sector, generated by the Logistic model, is predicted to be achieved in 2030.

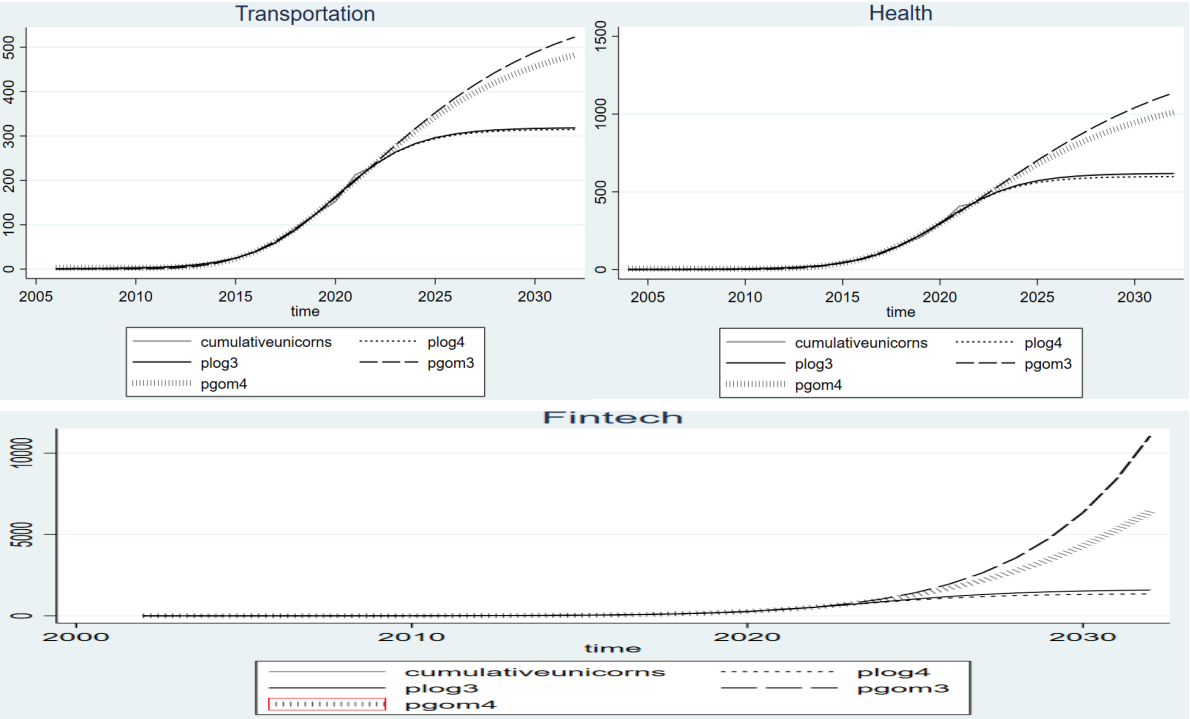

Figure 2: Diffusion and forecasting of unicorns by sectors

plog4= forecasting by LM4P, plog3 = forecasting by LM3P, pgom3= forecasting by GM3P, pgom4 = forecasting by GM4P.

Table 2: Estimated parameters of the unicorn diffusion models by sectors

*Significance level: *, p < 1%; **, p < 5%; ***, p < 10%*

	Fintech (n=21)		Health (n=19)		Transportation (n=17)	
Parameters	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**	**Logistic**	**Gompertz**
M_3P	1630.231***	3.11e+09	619.390*	1440.596**	318.955*	615.22*
M_4P	1 373,545**	239 642,95	599,396*	1 179,559**	315,394*	541,338*
α_3P	0.431*	0.022*	0.508*	0.159*	0.504*	0.176*
α_4P	0.459*	0.052	0.532*	0.184*	0.512*	0.196*
β_3P	2023.707*	2148.927*	2020.128*	2022.922 *	2019.911*	2021.68 *
β_4P	2023.045 *	2056.553*	2020.007*	2021.828 *	2019.87*	2021.032*
In sample						
Adj R^2_3P	0.992	0.992	0.996	0.994	0.998	0.997
Adj R^2_4P	0.989	0.988	0.995	0.993	0.996	0.996
RMSE_3P	14.75	15.026	9.925	12.301	4.598	5.098
RMSE_4P	14.967	15.639	9.986	12.062	4.750	4.905
Out of sample						
MAE_3P	6.961	6.538	5.457	7.447	2.674	3.210
MAE_4P	6.678	6.732	5.191	6.814	2.5	2.501
MAPE_3P	0.334	0.295	0.302	0.492	0.249	0.392
MAPE_4P	0.474	0 .415	0.402	0.768	0.154	0.219

5. Conclusion

In this paper, we use two different growth models, namely the Logistic and Gompertz models with three and four parameters to describe the diffusion of unicorns in eight countries and three sectors. The main objective was to determine the best-fitted and the best-suited model for forecasting the future adoption of unicorns for the selected countries and sectors. Through our analyses, we find that the Logistic model with three parameters is the best at fitting and forecasting the spreading of unicorns in the USA and UK. For the case of Germany, France, Sweden, Netherlands, and India, the best model for explaining and forecasting the diffusion of unicorns is the Logistic model with four parameters. However, the Gompertz model with three parameters fits best with the actual data of cumulative unicorns in China. Unicorn diffusion in transportation, healthcare, and fintech sectors is also well described by the Logistic model with three parameters. The forecasting analysis shows that unicorns are not mythical anymore, their number will surpass 6800 in seven years.

In terms of practical implications, the variables such as the speed of diffusion, time to saturation level and the ultimate market potential, for each country and industry can help policy makers to act at the right time. As almost all the studied countries are expected to achieve their maximum level of unicorn diffusion between five and seven years, our results underline the need for policy makers to promptly establish development strategies targeted at facilitating unicorn growth. Such strategies could include an appropriate infrastructure, a properly defined regulatory framework, availability of risk capital and innovation ecosystems enabling the improvement of the business environment. As far as sectors are concerned, development strategies of unicorn growth should be focused on the three studied sectors and especially the fintech industry to promote financial inclusion and sustainability.

Considering that this paper is the first study on the diffusion of unicorns in the world, the analysis points to useful avenues for future research. Firstly, we think that the growth models have an important capacity to describe and forecast the processes of diffusion. Such models could be enhanced for getting the best model choice. We could, for example, investigate the Logistic and Gompertz models with five and more parameters. Secondly, to enable a much richer analysis, it would be useful to break up the unicorns by their year of achieving such status and undertake a longitudinal analysis of their behavior. Finally, it will be interesting to study the factors that influence the diffusion of unicorns by country and by sector.

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Social Entrepreneurship and Innovation in Low-Density Territories: The i3Social Project

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Abstract: The last decade has seen a significant increase in economic and social inequalities, especially in Portugal's inland territories. As a consequence, the increase in social needs is increasingly evident in low-density territories. In this sense, social entrepreneurs have an important role in society, to the extent that, by having more direct contact with their surroundings, they are also more alert to identify needs, which until then have not had the necessary response from public policies. Thus, social entrepreneurship, allied with innovation, can serve as a "tool" to meet social needs, as well as help combat depopulation. Thus, this work shows the social entrepreneurship activities developed within the i3Social project, which aims to clarify the aspects and dynamics of social entrepreneurship to create social businesses. In this sense, this work also seeks to give an overview of what social entrepreneurship involves, i.e., in practical terms, to show that there is a path that should and must be followed for the business idea to become effective and successful in the social intervention market.

Keywords: Social entrepreneurship, Social Innovation, Social Sustainability, I3Social.

1. Introduction

Social entrepreneurship and social innovation are concepts that have received increasing attention in recent decades, as a result of the significant increase in economic and social inequalities, especially in the interior regions of Portugal, which suffer from a sharp population decline. In this context, social entrepreneurs have been assuming an important role in the fight against these inequalities, by identifying more closely the needs not met by public policies, assuming themselves as agents of change. Thus, social entrepreneurship, combined with innovation, can serve as a “tool” to respond to social needs, as well as helping to combat depopulation.

Given the increasing depopulation of the country's interior, as confirmed by the 2021 Census, and the growing social needs in low-density territories, public policy responses are required to support social workers and social entrepreneurs who, due to their essential role in these territories, enable an adequate social intervention to meet the multiple needs diagnosed. Thus, the goal of this work is to present the i3Social project, a social innovation project that aims to promote the empowerment of the Beiras e Serra da Estrela (BSE) territory by strengthening resources, skills, and collaborative culture of local agents as a way to promote social entrepreneurship and thus respond to complex social challenges, throughout the intervention territory Beiras and Serra da Estrela[1]. And also to reflect on the importance of social innovation, particularly at the level of social entrepreneurship, which can serve as a "tool" to meet social needs and help combat depopulation. In turn, the i3Social project is part of the public policies that are being developed to increase territorial cohesion, which would like to mitigate regional asymmetries and, thus, positively discriminate the interior regions of Portugal, which are the least developed.

[1] i3Social website - https://www.i3social.pt/

The structure of this work includes four parts: a first part concerning the conceptualization of social entrepreneurship, social innovation, social responsibility, and social sustainability; a second part about low-density territories, economic-social inequalities, and social enterprises; the presentation of the i3Social Project and their results is the third part; and the last part is the conclusion and future research lines.

2. Social Entrepreneurship and Social Innovation

Social entrepreneurship and social innovation are concepts that have received increasing attention in recent decades, as a result of the significant increase in economic and social inequalities as a result of the inefficiency and ineffectiveness of public policies. Social entrepreneurship targets the community, the increase of the organization's sustainability, the development of social capital, and activities that prioritize community empowerment and social and human growth.

Social innovation have been on the rise in recent years as the world has increasingly changed, and new social needs are emerging (Adnan, Yusoff, & Ghazali, 2018). Social innovation is associated with the emergence of a new idea and a different way of thinking and acting that changes existing paradigms. OECD (2023) indicates that social innovation refers to the design and implementation of new solutions that imply conceptual, process, product, or organizational change, which ultimately aim to improve the welfare and well-being of individuals and communities. To fully tap the potential of social innovation, an enabling policy framework is needed to support public, non-profit, and private actors to co-construct and implement socially innovative solutions and thereby contribute to addressing socio-economic issues, build stronger territorial resilience, and better respond to future shocks. According to Cajaiba-Santana (2014), social innovations are new social practices created from collective, intentional, and goal-oriented actions that aim to bring social changes by reconfiguring how social goals are achieved. Regardless of the source of social innovation, the concepts of social action and social change are fundamental to the process. Social innovations are a type of social change that has an impact on the social and economic development of a region. Westley and Antadze (2010, p. 2), characterize social innovation as a complex process of introducing new products, processes, or programs that profoundly change the basic routines, resource and authority flows, or beliefs of the social system in which the innovation occurs. Such successful social innovations have durability and broad impact. In practice, measuring this impact may not be easy, but for Bagnoli and Megali (2011) it can be summarized in three categories: (a) economic-financial performance, associated with overall performance such as profits, value-added, and analytical results; (b) social effectiveness, to measure the quantity and quality of the work done and identify its impact on the intended recipients and the public; and (c) institutional legitimacy, verifying compliance with the law and mission statement.

Concerning social responsibility, social entrepreneurs have a strong sense of responsibility and commitment to making a positive difference in society. They are driven by a mission to create social value, and their actions are oriented towards the well-being of individuals and communities rather than purely financial gains (Tracey, Phillips and Haugh, 2005).

According to Santos and Roberts, (2013) and Kamaludin, Xavier and Amin (2021), social sustainability is understood as the process of developing sustainable solutions for social, economic, or environmental problems that are not being addressed by the market. On the other hand, social entrepreneurship seeks to create lasting and sustainable social impact. This involves implementing initiatives and projects that can continue to benefit society over the long term, rather than providing short-term solutions to social issues. Kamaludin, Xavier, & Amin (2021) argue that social entrepreneurship is closely related to sustainability, hence it has been gaining strength in the business world, where technology and innovation dominate the sector. Notably, the rise of social entrepreneurship is due to the long-term benefits it can generate for society and the environment in solving social problems, including unemployment, poverty, and education (Adnan, Yusoff, & Ghazali, 2018).

An analysis of the development of social entrepreneurship in the most advanced European countries shows that the high activity of this sector is due to the legislative consolidation of its role in the economy of the countries, the support from local authorities, the appropriate regulation of the development of social entrepreneurship and also the subvention activities. On the other hand, in the advanced countries of America, its development is due to social stimulation by the government, which creates favorable conditions to support the development of this sector. As an integral part of European Union (EU) policy and to overcome the social isolation of people in situations of fragility, social entrepreneurship has been promoted to achieve social goals within the framework of sustainable growth (Halunko, Ivanyshchuk, & Ppovych, 2018). However, according to these authors, social entrepreneurship differs from region to region, considering its characteristics. In fact, it is inequalities and the attempt to correct them that allow the development of social entrepreneurship.

Social entrepreneurs are change-makers who leverage entrepreneurship and business skills to tackle social challenges, foster social inclusion, and improve the quality of life for different groups of people. They play a crucial role in addressing complex social problems that may not be adequately addressed by traditional for-profit businesses or government initiatives alone. By combining business opportunities with a social mission, social entrepreneurs aim to create a positive and lasting impact on society.

3. Low-Density Territories and Economic-Social Inequalities

One of the EU's concerns has long focused on counteracting the decline in its population and the increase in social inequalities, as shown in published studies (EU, 2008; EU, 2013) and more recently (EU, 2023): "Demography tells the story of our lives. It is about how old we are likely to become, how many children we can expect to have, and where and how we are likely to spend our lives. Demographic change also has a powerful impact on our economies, on our welfare and health systems as well as on housing and infrastructure needs in the European regions..."[2]

During the last decades, Portugal has witnessed a progressive decrease in its population, particularly throughout its interior, causing a deep devitalization that led to the abandonment of land, the almost complete depopulation of small settlements, and deep aging. The dynamics of the Portuguese population over the last almost 70 years have translated on the one hand into a strengthening of the demographic structure of the entire Portuguese Atlantic corridor, the so-called littoralization, and on the other hand into a representative urbanization of the growth of urban areas, particularly those forming part of metropolitan areas. In this context, there has been a clear emptying of low-density territories, particularly in inland regions (Natário et al., 2017). However, in addition to this phenomenon, we should also consider the cross-border migration flows, which are largely composed of young people and adults of working age. If we analyze the statistics of the resident population by age group at the date of the last two Census (2011 and 2021) - Table 1, we can see that the reality is the same both in the Continent and in the Center, as well as in the NUT III Beiras and Serra da Estrela, the region where the i3Social project is focused, which covers 15 municipalities: Almeida, Belmonte, Celorico da Beira, Covilhã, Figueira de Castelo Rodrigo, Fornos de Algodres, Fundão, Gouveia, Guarda, Manteigas, Mêda, Pinhel; Sabugal, Seia, and Trancoso (Figure 1).

Table 1: Resident Population in Portugal Mainland, Central and Beiras and Serra da Estrela (Years 2011 and 2021)

Portugal (Mainland – NUT I) - 2011	Centre (NUT II) – 2011	Beiras and Serra da Estrela (NUT III) - 2011	Portugal (Mainland – NUT I) – 2021	Centre (NUT II) – 2021	Beiras and Serra da Estrela (NUT III) - 2021
10 047 621	2 327 755	236 023	9 855 909	2 227 239	210 602

Source: Portugal National Institute of Statistics (INE).

In addition to depopulation, economic and social changes are taking place, leading to a deregulatory trajectory of these communities, compromising the development of strategies to enhance and promote these territories (Braga et al. 2013).

[2]UE (2023). In: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/new-push-european-democracy/impact-demographic-change-europe_en



Figure 1: i3Social Project Territory.

Table 2 shows some indicators that prove this reality, regarding Continental Portugal (NUT[3] I), NUTS II (North, Center, Lisbon Metropolitan Area, Alentejo, and Algarve), and NUTS III of the Central Region.

Table 2: Social/Economic Indicators in Portugal (NUT I, II, and III) – 2021

Region/Economic Indicator	Doctors per 1,000 inhabitants (No.)	Illiteracy rate (%)	Number of Companies	Aging Index
Portugal (Mainland)	5,7	3,0	1 283 412	183,7
North	5,7	3,0	456 034	185,0
Lisbon Metropolitan Area	6,8	2,0	390 857	149,8
Alentejo	3,2	5,4	86 696	214,1
Algarve	4,2	3,1	76 680	173,8
Center:	5,4	3,7	273 145	226,9
Beiras and Serra da Estrela	4,2	5,4	25 345	335,0
West	2,3	3,2	47 944	183,0
Aveiro Region	3,8	2,5	44 968	184,4
Coimbra Region	13,5	3,4	54 871	243,2
Leiria Region	3,0	3,6	37 373	201,8
Viseu Dão Lafões	4,9	4,2	29 221	245,9
Beira Baixa	3,9	6,0	9 027	325,4
Médio Tejo	2,5	3,8	24 396	251,3

Source: Portugal National Institute of Statistics (INE).

The analysis of the table shows that the Centre region has the highest aging index, compared to the other regions, and within the region, the NUT III Beiras and Serra da Estrela have the most worrying value. Regarding the other variables, the inequality between regions is confirmed.

The demographic, social, and economic analysis of the low-density regions, in this case, the NUTS Beiras and Serra da Estrela is fundamental, since it represents the verifying element of many of the problems that arise when it comes to taking advantage of the potentialities and the economic and social revitalization of the regions. The lack of public policies that promote the qualification and competitiveness of the regions will result in the total disarticulation and non-financing of the territories, hence the importance of social enterprises in these territories.

[3] Acronym for Nomenclature of Territorial Units for Statistics

4. The Social Enterprise

A social enterprise is defined as an organization or entity that provides services according to its social goals aimed at solving a specific social issue while operating in a self-sustaining and entrepreneurial manner (Kamaludin, Xavier, & Amin, 2021). A social enterprise has a strong social mission first and foremost, but it must also have the goal of profit if it is to sustain its operations.

Osberg & Martin (2015), further argue that social enterprises must learn to be financially sustainable by avoiding the practice of receiving subsidies from government institutions. These identified methods of indefinite revenue flow will not allow social enterprises to be sustainable. To achieve sustainability, operating expenses in managing social enterprises will be reduced as the number of beneficiaries increases.

4.1 Social Business Areas

There are several areas of activity of social enterprises. Each area has its own particularities that begin with the target audience for which the social response is intended, through the type/types of response that the company will create. This means that all areas have the same purpose although each one responds to different problems. The "Children and Youth" area covers the following sub-areas: Children and youth in danger; Children and youth with disabilities; Children and youth. The area of "Adult and Elderly Population" includes the following sub-areas: Elderly people; Adults with disabilities; People in a situation of dependency. The area of "Adult Population" considers the sub-areas: People with mental or psychiatric illness; Homeless people; People with HIV/AIDS; People with substance abuse and People who are victims of domestic violence (Copeto et al, 2023).

Although social enterprises originate in the third sector, nowadays they cross traditional and legal boundaries (Cardoso, 2018). There are therefore several ways to create a social enterprise.

4.2 Legal Forms of Social Enterprises

There are several ways to create a social enterprise. In addition to its social mission, it must also have the goal of profit if it wants to survive. In this sense, these companies can have as their main legal forms those contemplated in the Código das Sociedades Comerciais (CSC). There are, however, other ways to create a social enterprise, such as social franchising. This method allows all organizations that fall under the umbrella of the social economy to try to maximize their social impact. It requires the presence of a social franchisor and one or more franchisees. The franchisor develops the business concept, the sustainability foundations and plans, and how to operate the business. The franchisor authorizes the franchisee to use the brand that he or she has created as well as all the methodologies and systems that guide the business. The franchisee is the entrepreneur who negotiates with the franchisor to replicate his business, being entitled to implement it according to a detailed manual provided by the franchisor and being entitled to use its brand and receive support and training. The social franchisor is required to have a specific social business, i.e. a social purpose (Copeto et al, 2023).

Another way to create a social enterprise is through Foundations, Mutual Associations, Charities, Cooperatives, Associations, and Private Social Solidarity Institutions (IPSS).

According to the Portuguese Foundations Centre (CPF) [4], the representative institution of the foundation sector in Portugal, a Foundation may be set up through a public deed, between living persons, or by will. In the first case, the founders prepare the respective statutes and in the second case these are prepared by the executors, except if they are already foreseen in the will. The act of institution occurs with the signing of the will, under the legally required terms.

The purpose of the Foundation, and the assets allocated to it, must be indicated in the act of establishment. When the initial endowment of a Foundation is made exclusively in cash, the minimum amount legally required is currently set at 250 000 euros. However, in the case of a Foundation established for a fixed term, the value of the initial endowment of assets required is established on a case-by-case basis, always taking into consideration its suitability to the object and purpose of the Foundation.

[4] Information obtained from cpf.org.pt

In cases where the initial endowment of a Foundation is made up of a patrimonial patrimony, this must, mandatory, also include a cash portion, which cannot be less than 100 000€.

Mutual Associations are legislated through Decree-Law no. 59/2018 - August 2nd, the Charities and IPSS through Decree-Law no. 172-A/2014 - November 14th, making the fifth amendment to Decree-Law no. 119/83 - February 25th, which approves the Statute of Private Social Solidarity Institutions. Cooperatives are legislated through Law no. 119/2015 - August 31st, and the Associations through Decree-Law no. 391/2007 - December 13th.

4.3 Financing of Social Enterprises

There are several ways to obtain financing for social enterprises. Everything will depend, among other factors, on the objectives of the company, on the capital required for its constitution, and, also, on the stage at which they are. Examples of financing possibilities are: (i) Crowdfunding, Crowdequity, and Donations - This type of financing should be considered when the company is being set up, i.e. when the idea comes up, or when it exists, but the receipts do not yet cover the payments, i.e. at an early stage when the number of customers is insufficient. The legal regime of collaborative financing in Portugal was approved in 2015 by Law 102/2015 - August 24th. Article 2º defines collaborative financing as "the type of financing of entities, or their activities and projects, through their registration on electronic platforms accessible via the Internet, from which they raise investment tranches from one or more individual investors". The law also clarifies the duties of collaborative financing platforms, who can be the owner of a platform, who can be a beneficiary, and how to join, among other aspects. The main difference between traditional Crowdfunding and Crowdequity (equity crowdfunding) is that, in Crowdequity, the investor receives, in return, a stake in the supported company. Donations are one of the ways of Crowdfunding. In Portugal and as an example of a Crowdfunding platform we can cite PPL Crowdfunding Portugal[5]; (ii) Family, Friends, and Fools (FFF) - This type of funding is justified when an idea for a social enterprise arises and the proposers have no income of any kind. Therefore, family, friends, or "crazy people" who believe in the project will be the main funders; (iii) Business Angels - They are individual investors with considerable monetary power who support entrepreneurs who want to make a difference and those who believe in more ethical, healthy, and fairer consumption for all and a better society. Besides being investors, they also support their investors with technical knowledge in the different phases of the project. See the Portuguese Business Angels Association[6] or the National Federation of Business Angels[7]; (iv) Public Financing - They should essentially be considered in the initial phases, the start-up phase, and the development of the activity phase, mainly at a local level, through municipal incentives as is the case of CIMBSE, which participates in this project with 30% funding for future entrepreneurs who want to create their social business; (v) Venture Capital - Venture capital are common investment funds that manage the money of investors looking for private equity in start-up companies and SMEs with strong growth potential. As the name implies this will be venture capital and is justified in a growth phase, with the main goal of the company to grow even more. These investors always seek to obtain a return on their investment; (vi) Bank Loans - The company can use this capital at any stage of development, however, it is more justified to use it in more advanced stages such as growth or maturity; (vii) European Funds -

European funds are resources that must be used by companies implementing social entrepreneurship and innovation initiatives.

5. i3Social Project

The i3Social project was created to combat the social problem of depopulation in the territory of NUT III Beiras and Serra da Estrela through social entrepreneurship. The project is based on a multidisciplinary action strategy, working with promoters of social initiatives, local agents, municipalities, stakeholders, and entities of the scientific and technological system.

[5] https://ppl.com.pt/pt

[6] http://www.apba.pt/mission/?lang=pt-pt-

[7] http://www.fnaba.org

This project has a unique feature that has not yet been carried out at a national level, the existing business incubators work in a traditional way, that is to say, they incubate a project and help it to be developed, while i3Social does not incubate the projects by itself. A structure that allows this support/incubation to continue even after the project is over, "how?" through trained technicians and the mutual help network they comprise.

5.1 Project description

i3Social is an itinerant incubator of social innovation that aims to recreate in the territory of intervention (BSE) conditions conducive to the generation and development of concrete social responses to the problems emerging there. All this through inter-institutional and inter-territorial cooperation, through the training of governance agents and entities that support local development, and by stimulating innovation and social entrepreneurship in each of the communities in the target territory.

The i3Social project is based on 3 major axes of intervention (Incubation, Networking, and Empowerment/training) and was developed over 4 phases (Figure 2).

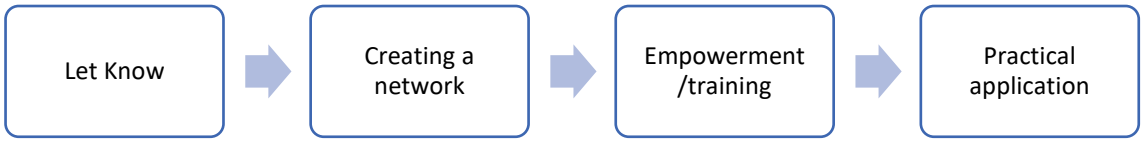

Figure 2: i3Social Project phases.

In the different phases, several activities were carried out in order to make the best out of each phase, such as:

The first phase (Let Know) was to make the municipalities aware of the project and try to get them to appoint people to work on the project. In this phase were done several meetings online and presential with mayors to evolve the municipalities into the project.

The second phase (Creating a network) was to create a network/team among all the technicians assigned so that they can come to help each other and work as a whole. A facilitation and integration program was created for technicians, consisting of monthly meetings and activities to streamline and stimulate group work.

The third phase (Empowerment/training) was to train technicians so that they could provide support to entrepreneurs from the ideation to the implementation of their social business in the field. An intensive program of 39 certified hours was carried out, by professors and trainers from the partner institutions of the project consortium.

The i3Social project contemplates the measurement of the impact, an aspect that became, a great challenge, and to this end, a matrix was developed in which the various dimensions, measured by different indicators, were analyzed in terms of qualitative and quantitative aspects.

Subsequently, a network began to develop through actions (Introduction to Facilitation of Participatory and Collaborative Processes) with the goal of common thinking. Once the network and the commitment were created, a training course with 10 modules was developed (Table 3):

Table 3: Training course modules.

Module	Contents
Module 1: Social Economy and Social Entrepreneurship	Concepts, importance, can I be a social entrepreneur?; Social entrepreneurship, a different way of entrepreneurship.
Module 2: Problem and stakeholders	How to detect problems and identify *stakeholders?*; Stakeholder analysis, when and why?
Module 3: The social business model	How to make the transition from problem to solution, using the technique of *design thinking;* Development of the Canvas social business model.
Module 4: The team, structure, and organization	Create the work team and its functions; Define the structure and legal form of the organization.

Module	Contents
Module 5: Viability/Sustainability of the project	Test the social business plan and verify its viability in the implementation territory.
Module 6: Impact indicators	Structuring of the impact matrix, dimensions, main indicators, and forms of measurement.
Module 7: Social Marketing and Communication in Social Entrepreneurship	Definition of the communication strategy: purpose, target audience, objectives, and channels to use.
Module 8: Pilot Project	How to develop a prototype of a social project, to support future projects.
Module 9: Financing	Present the various sources of funding available for project development.
Module 10: Welcoming entrepreneurs	Reception of entrepreneurs by the municipalities; Development of social business ideas; Creation of social enterprises (i3social.pt).

These modules aimed to clarify the technicians how to accompany entrepreneurs during the several phases they have to go through, from ideation (when the ideas occur) to implementation (when the project stabilizes on the ground). After this training, the technicians were put in contact with entrepreneurs through boot camps, which allowed them to put the whole process into practice.

In the last phase, phase four (Practical application), where it was verified if the result was as expected. Trained technicians/agents were placed in contact with the entrepreneurs to help and captivate them to develop their social ideas, stimulating their entrepreneurial spirit, clarifying their doubts, and minimizing their fears. Bootcamps, events such as workshops, laboratories, and other activities were held to stimulate the development of social ideas.

5.2 Project Results

The i3Social project was fully implemented and the results exceeded expectations even though it was developed, in part, during the COVID-19 pandemic period with the resulting limitations.

As result, we highlight the mobilization of 15 municipalities and the training of 31 technicians from different municipalities. These technicians participated in 25 events for a total of 70 hours of training, of which 39 were certified by a training center.

A platform[8] was developed where social business ideas can be developed with the support of trained technicians from the municipalities (Figure 3).

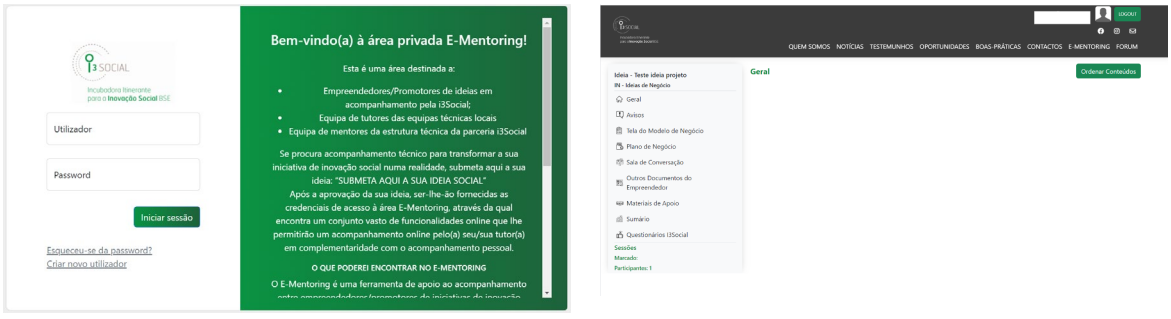

Figure 3: i3Social entrepreneurship platform.

[8] https://i3social.pt/loginpage.aspx

A total of 16 videos were developed for project promotion and, for promotion of project events (Figure 4).

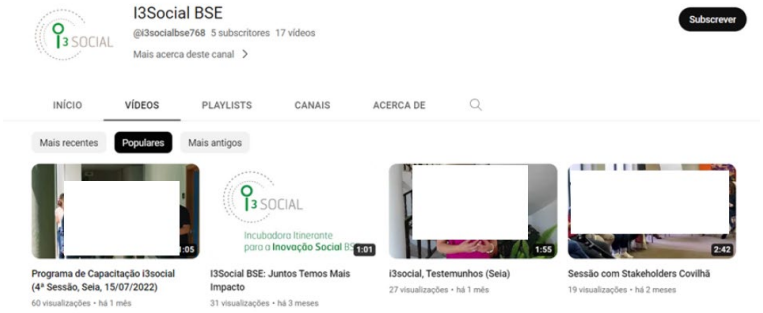

Figure 4: i3Social Youtube channel.

13 newsletters were developed that look at the activities carried out by the i3Social project and also the opinion of different project stakeholders, partners, and other personalities (Figure 5).



Figure 5: Newsletter cover.

Different manuals were developed to support technical entrepreneurs and also a manual with the compilation of the contents presented in the training session modules (Figure 6).



Figure 6: Training manuals.

The i3Social project helped to develop 31 ideas of which 25 were incubated (Figure 6). These 25 projects were incubated under the Sustainable Development Goals (SDG) (UNDP, 2023). Nine projects were incubated under SDG 3 - Good Health and Well-Being; four projects under SDG 4 - Quality Education; ten projects under SDG 11 - Sustainable Cities and Communities; one project under SDG 12 - Responsible Consumption and Production; and one project under SDG 13 - Climate Action (Figure 6). Four incubation spaces have also been identified.

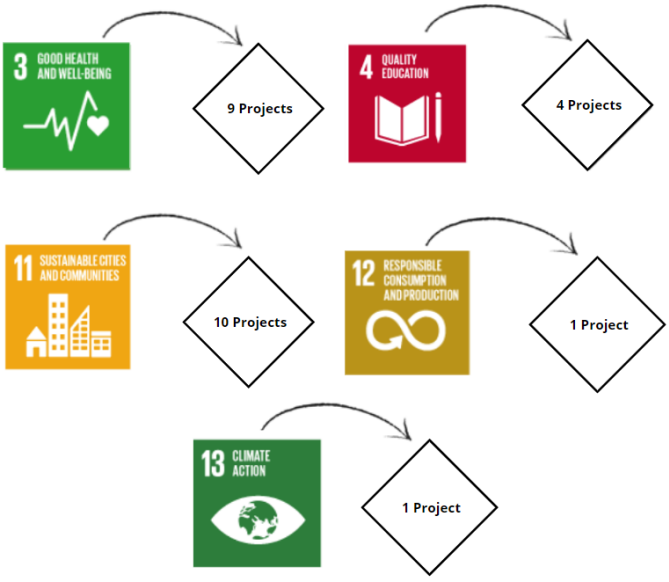

Figure 7: Projects incubated and SDG.

6. Conclusion and Future Research Lines

Social business and social innovation have been on the rise in recent years as the world has increasingly changed, and new social needs are emerging.

The i3Social project was developed based on the growing inequalities of the territories, the decrease in the population, and the increase of social problems. In fact, with the rising cost of living in Portugal, all these projects that are being followed by i3Social have particularities that make them unique and innovative in the social field. We found that at the level of entrepreneurs, each one has its focus, knowing very well where they want to get to, and most projects are related to the third sector. On the other hand, the projects monitored are divided into two types, those that already operated in the territory and those that are being developed. Regarding the former, the biggest difficulties are related to the financial and bureaucratic aspects. In Portugal, social projects

are very dependent on public funding, creating a dependency on these, not seeking other forms of funding or trying to make the business sustainable as already mentioned in other situations.

In conclusion, the results of the i3Social project are positive because it has stimulated the creation of several social businesses.

As a future line of research, it is proposed to deepen the study on social impact and its measurement since it is still a subject on which there is no consensus, and in practice, it is important to be able to measure the social impact of what is happening in the territories.

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Metaverse and Social Virtual Reality for Online Collaboration

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Abstract: "We're at the beginning of the next chapter for the internet", said Mark Zuckerberg in 2021 in his letter about the name change from Facebook to Meta. Social virtual reality (VR) platforms are part of the metaverse: Users immerse themselves in the metaverse using VR headsets and can interact with other users as avatars in a virtual world. During a digital conversation, non-verbal communication can suddenly be experienced in three dimensions. This raises the question of the extent to which the metaverse and social VR platforms can be used for online collaboration. Previous research has investigated how other media, such as the telephone or videoconferencing, can influence teamwork. Theories of media choice attempt to justify the extent to which communication media are chosen for particular interactions. However, there is still a research gap when it comes to including, comparing, and classifying the metaverse in these studies. In an experiment, 24 participants were divided into groups of four and given a creativity task and a decision task to solve together. The experiment tests the use of the metaverse as an alternative to videoconferencing. A standardised questionnaire was used to measure differences in use between the metaverse and videoconferencing, and variables from input-process-output models of teamwork were used as comparison characteristics. The results show that the metaverse can improve the process compared to videoconferencing. In particular, it is shown that social presence increases in the metaverse compared to videoconferencing. The quality of communication can also be improved in the metaverse compared to videoconferencing. With further development of the technology, the metaverse has the potential to replace videoconferencing in the mainstream in a few years.

Keywords: Virtual Reality, Metaverse, Online Collaboration, Spatial, Digital Innovation

1. Teamwork in the context of the metaverse

Online communication is about to enter a new era, if Meta CEO Mark Zuckerberg has his way. After the Corona pandemic, online meetings have become increasingly important. However, many companies recognise that video conferencing cannot fully replace face-to-face meetings. The lack of social presence and proximity to colleagues seems to be the key issue for many. In communication, this is primarily conveyed through spatial proximity or proxemics (Poggendorf, 2009). Since humans interpret all actions of a communication as a message (Watzlawick et al., 2016), the spatial constellation of the communication participants is also interpreted. While this dimension is missing in videoconferencing, the metaverse and social virtual reality can create an illusion of spatial proximity. Due to this feature, communication on this platform can convey different information compared to videoconferencing.

A universal definition of the metaverse does not yet exist, so the term is often generalised as a "catch-all" for various new developments on the Internet (Floridi, 2022). To narrow down the term, Floridi (2022) describes the metaverse as a three-dimensional, virtual space that can be entered through specific hardware. Meta founder Mark Zuckerberg (2021), on the other hand, emphasises the social component of the metaverse, where social presence can be felt. For the purposes of this paper, the metaverse is therefore defined as a three-dimensional virtual space in which multiple users can simultaneously feel part of the space and interact proxemically through immersive technologies.

The metaverse behaves similarly to the two-dimensional web (Floridi, 2022), which is why social virtual reality (VR) platforms can be seen as counterparts to websites or social media platforms. There can also be confusion about the similarity to the 3D web. For example, 360-degree websites, 3D massively multiplayer online games (MMOGs) or communication platforms with 3D features are not part of the metaverse if they don't have social features or VR compatibility. Figure 1 shows the different platforms and dimensions of the Internet.

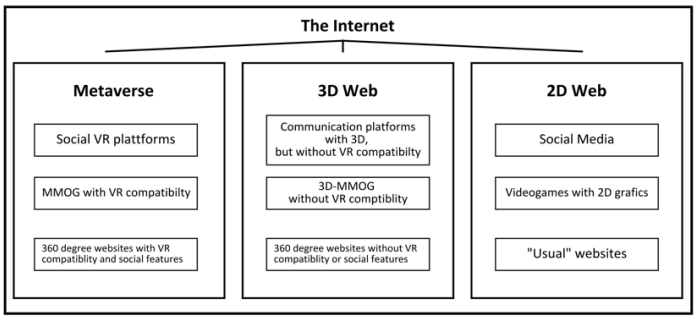

Figure 1: Dimensions of *Internet*

As a synchronous communication medium, the metaverse can be used for collaborations, which are understood as synchronised processes of constructive knowledge generation by two or more people (Bornemann, 2012). A particular aspect of online collaboration is that communication is limited by technology (Schmidt, 2019). In the input-process-output (IPO) model of telecooperation, it is evident that media act as an input factor on the process and outcome of teamwork (Hertel & Konradt, 2007). However, in addition to media, there are four other categories of factors that influence teamwork, namely *tasks, group structure, personal characteristics* and *resources* (ibid.). The processes and results of teamwork are subsequently divided into *a task-related* and a *social level* in the IPO model (ibid.). The psychology of interpersonal communication provides explanations as to why the information content differs in face-to-face meetings, videoconferences and meetings in the metaverse.

Several theories have been proposed to explain how teams choose a communication medium for their collaboration. These can be divided into rational choice approaches and social influence approaches (Johannsen, 2002). In the social presence theory according to Short et al. (1976), the degree of social presence is the decisive factor in the choice. If the social presence is indeed higher in the metaverse, the medium would thus be more attractive than videoconferencing. However, according to Daft and Lengel's (1984) theory of media appropriateness, it is necessary to consider how rich the information of the medium needs to be for the purpose.

While communication media such as the telephone or videoconferencing are already classified in Daft and Lengel's (1984) theory of media appropriateness, there is still no classification for the metaverse or social VR. This paper therefore investigates whether communication participants can really perceive a higher social presence in the metaverse and whether communication is improved at the same time. With richer communication via the metaverse, the medium could thus be an alternative to videoconferencing. This leads to the research question:

RQ: To what extent can the metaverse be used as an alternative to videoconferencing for teamwork?

To answer this question, the characteristics, and functions of the metaverse and social VR platforms are considered, and Hertel & Konradt's IPO model is used to illustrate which variables influence teamwork. Furthermore, interpersonal communication is considered to explain the influence of the communication medium. An experiment was conducted to observe the expression of the variables in the metaverse. Subjects were then asked to rate teamwork in the metaverse compared to videoconferencing using a standardised questionnaire.

2. Theoretical Background

2.1 The Metaverse and Social Virtual Reality

As with the different conferencing platforms in videoconferencing, social VR platforms in the metaverse have different functions. However, the basic features and functions are the same. Using the hardware VR controllers, users can move around in virtual space. They can move naturally by walking or by teleportation jumps. The latter prevents motion sickness because there is no or less discrepancy in the brain's perception of movement (Dobie, 2019). On some platforms it is also possible to fly through space.

The communication characteristics are strongly influenced by the hardware, such as the microphone, the audio output and tracking systems. For example, finger tracking is required for the detailed transmission of gestures. VR glasses with face tracking are required to map facial expressions in the metaverse (Bastian, 2022). As few models support face tracking, some social VR platforms use alternative methods to bring avatar faces to life. For

example, the *Rec Room* platform uses an algorithm to play out facial expressions such as laughter when the user laughs into the microphone (Hayden, 2016).

For professional teamwork, there are social VR platforms in the metaverse that are designed for this purpose. You can use a remote desktop, to integrate platforms from Microsoft or Google or take notes on a whiteboard. Unlike real meeting rooms, the virtual meeting room in the metaverse can be designed without great expense and without physical or geographical feasibility.

Avatars allow users to represent themselves in the metaverse and interact with their environment and other users (Beil & Rauscher, 2018). Avatars can vary widely in the metaverse and usually follow their own style depending on the platform. While avatars on the *Rec Room* platform are cartoonish and simplified, on the *Spatial* platform used for the experiment, an avatar can be created by scanning a photo of the user. However, due to the limitations of the graphical representation on *Spatial*, the avatars do not come close to the actual appearance of the user.

2.2 IPO model for telecooperation according to Hertel & Konradt

To take a closer look at teamwork via telecooperation, the IPO model of Hertel & Konradt (2007) is used here (see Figure 2). The two authors describe teamwork using variables at the input, process and output levels. The model can be seen as a further development of the IPO model of Tannenbaum et al. (1992).

On the input side, factors are grouped into five categories: *Tasks, media, group structure, personal characteristics and resources* (Hertel & Konradt, 2007). Teamwork is therefore influenced by these factors, although no statement is made about the extent of the influence. The communication medium is therefore only one of many variables that influence teamwork.

The process level is divided into *task-related* and *social interaction processes* (Hertel & Konradt, 2007). *Task-related interaction processes* are understood as more factual processes such *as execution, coordination, control and optimisation* (ibid.). Aspects such as *social presence, trust, expectations, appropriation processes, values and norms* are referred to as social interaction processes (Hertel & Konradt, 2007). In the IPO model according to Tannenbaum et al. (1992), the important variables of *communication* and *decision-making* are still mentioned at the process level.

At the output level, the results are further differentiated into task-related and socio-emotional variables (Hertel & Konradt, 2007). *Effectivity*, *efficiency*, *and task conflicts* are the end results of the task (ibid.). In the team, cooperation leaves behind *satisfaction, cohesion* or even *social conflicts* (ibid.). In Tannenbaum et al. (1992) the results also include *changes in the team*, in the *inner attitude* and in the *abilities of the individuals*.

As a communication medium, the metaverse can only have a limited impact on teamwork, as other variables are also highly significant. However, through direct or indirect influences, the medium has an impact on both the process and the outcome.

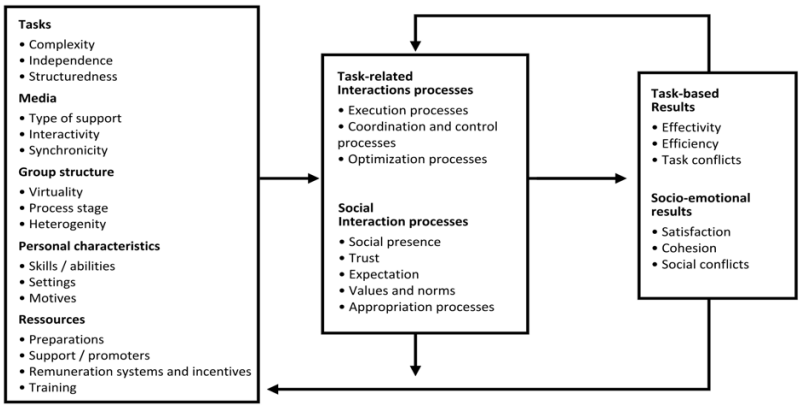

Figure 2: IPO model for telecooperation according to Hertel & Konradt (2007)

The variables of Hertel & Konradt's (2007) IPO model are the basis for the variables in the standardised questionnaire of our experiment. The IPO model of Tannenbaum et al. (1992) is also considered.

2.3 Interpersonal communication

The components of interpersonal communication show why the spatial dimension is important for communication. Verbal communication depends on features such as *volume, intonation, pitch, speed* and *rhythm*, which can be affected by the medium of communication (Argyle et al., 1981). The intelligibility of the message can become unclear due to interference (Lazarus et al, 2007). However, spatial hearing makes it possible to locate the interference from a particular direction.

Non-verbal communication is even more dependent on three-dimensionality. Haptic signals can at least be perceived visually through the VR glasses. Body language is also given more weight because gestures can be experienced in three dimensions. It is also possible to tell from the other person's body whether he or she is facing the conversation. For example, the alignment of the feet, body, head and eyes is important (Poggendorf, 2009). Eye contact can be partially or, with face tracking, completely represented in the metaverse. This takes on important functions in communication, such as signaling a change of speaker (Schönherr (1997)). Emotions such as trust or aggression can also be conveyed through eye contact (ibid). Facial expressions are limited when using VR glasses without face tracking. Facial expressions are primarily responsible for conveying emotions (Röhner & Schütz, 2016). Posture can also be interpreted in a spatial context, for example when people try to stand higher than others (ibid).

Proxemics describes the "spatial behaviour, i.e. the spatial constellation of the communication or interaction partners in a certain situation" (Poggendorf, 2009). Distance or posture in space is interpreted through this factor. The virtual space in the metaverse can, for example, create situational features via walls, doors or chairs with which the communication participants interact (Argyle et al., 1981).

3. Methodology and Hypotheses Development

To answer the research question and thus to observe the expression of the variables in the metaverse, an experiment was conducted with 24 students. They were asked to solve a simple task within 30 minutes in groups of four using appropriate VR hardware in the metaverse via a social VR platform in the metaverse. The students formed their groups independently. Later, the groups of four were invited to a university facility where they were given a brief introduction to the use of the VR glasses and the social VR platforms. The group members were then separated into different rooms in the same building, where they could not hear or see each other. Three pairs of HTC Vive glasses, which require several cables, and one pair of Meta Quest 2 glasses, which are used without cables, were provided for the work. The teamwork took place on the free social VR platform *Spatial*. Participants created avatars by scanning an image of themselves. All groups were then given the task of finding a motto for a party in their class, being as creative as possible and agreeing on only one. After completing this task, the students were asked to complete a standardised online questionnaire. In the questionnaire they had to rate the variables of teamwork in the metaverse and compare them with the hypothetical execution of the task via videoconference. They were also asked about personal characteristics and opinions about virtual reality.

The comparison of the variables was measured using Likert scales. Students could rate teamwork in the metaverse as better (5), rather better (4), the same (3), rather worse (2) or worse (1) compared to videoconferencing. They were also asked to give a self-assessment of their VR skills, creativity and affinity with the technology, as well as how important social presence was to them in teamwork.

Prior to the experiment, it was suspected that the metaverse as a communication medium might improve teamwork compared to videoconferencing. Since the IPO model is used to describe teamwork, this would imply an improvement in the process and outcome variables. Therefore, the primary hypothesis H1 reads:

H: *The metaverse as a communication medium for online collaborations has a positive impact on the process and outcome of teamwork compared to videoconferencing.*

To test this hypothesis in more detail, the hypothesis was split into two parts and further hypotheses were formulated. In the sub-hypotheses, individual significant variables from the process and outcome levels are addressed separately. Table 1 lists all the hypotheses that are addressed in this paper.

Table 1: Research hypotheses

	Hypotheses
H1.1	The metaverse as a communication medium for online collaborations has a positive impact on the *process of teamwork* compared to videoconferencing.
H1.2	The metaverse as a communication medium for online collaborations has a positive impact on the *outcome of teamwork* compared to videoconferencing.
H2	Through the metaverse as a communication medium for online collaborations, the *social presence* is conveyed more strongly than in comparison to videoconferences.
H3	The metaverse as a communication medium for online collaborations has a positive impact on *team cohesion* compared to videoconferencing.
H4	The metaverse as a communication medium for online collaborations has a positive impact on the *quality of communication* compared to videoconferencing.
H5	The *personal characteristics* influence the effect of the metaverse as a communication medium for online collaborations.

4. Research results

To evaluate the hypotheses, the subjects were asked to compare the collaboration in the metaverse based on the process and outcome variables with the hypothetical completion of the task via a videoconference. The samples were then tested for normality using the Kolmogorov-Smirnov test. The t-test and the Wilcoxon test were then used as significance tests, where the t-test is only significant for normally distributed variables. The Wilcoxon effect size can be used to compare the influence of the metaverse on the variables. Only for hypothesis H5 the Spearman correlation coefficient was used to test for a dependence of the effect on the personal characteristics of the respondents.

Table 2 below shows the results of the survey for the process-level variables. The variable *communication* was evaluated by the students both holistically and differentiated according to several sub-variables.

In the questionnaire, 96% of the students indicated that they were between 18 and 30 years old, while one of the 24 subjects was between 41 and 50 years old. The gender ratio was 50:50. Three of the 24 participants experienced mild motion sickness, but none had to abandon the experiment. The female subject, aged between 41 and 50, was the only participant who coped badly or rather badly with the VR glasses and the social VR platform. On average, students tend to rate themselves as creative and tech-savvy. While they show a high level of interest in VR, they consider their skills in this area to be mediocre. The six groups represent different constellations of the gender ratio. While some teams have worked together before, the members of other groups hardly know each other or do not know each other at all.

On average, the students rated all process variables as significantly better than with videoconferencing. In particular, the students felt that *communication* had improved the most (Wilcoxon effect size r=0.788, mean x=4.13). There was also a strong effect for the other process-level factors such as *coordination* (r=0.755), *execution* (r=0.686), *opinion* (r=0.731) and *decision-making* (r=0.670). For the sub-variables of *communication*, there was also a significant improvement of the variables in the metaverse. Accordingly, *social presence* was perceived to be the most significantly improved (Wilcoxon effect size r=0.798, mean x=4.17). Aspects of *communication* such as the perception of *emotions* (r=0.802), *trust* (r=0.745), *opinions* (r=0.731) and *personality* (r=0.725) of the other test persons also benefited strongly from the performance in the metaverse. Charisma was also perceived better than in the videoconference, although the effect was not as strong as for the other variables (r=0.639).

Table 2: Results of the process variables

Process variables		p-value (K-S-test)	p-value (t-test)	p-value (Wilcoxon -test)	z-value (Wilcoxon -test)	r-test (effect size)	Mean value
Coordination of task		0,023	0,000*	0,000	-3,70	0,755	3,92
Discussion		0,085	0,000	0,000	-3,58	0,731	3,92
Execution of task		0,002	0,000*	0,001	-3,36	0,686	3,92
Decision process		0,111	0,000	0,001	-3,28	0,670	3,82
	Communication	0,011	0,000*	0,000	-3,86	0,788	4,13
	Social Presence	0,076	0,000	0,000	-3,91	0,798	4,17
	Trust	0,006	0,000*	0,000	-3,93	0,802	4,00
	Emotions	0,041	0,000*	0,000	-3,65	0,745	4,04
	Opinions	0,085	0,000	0,000	-3,58	0,731	3,92
	Personality	0,081	0,002	0,002	-3,55	0,725	4,00
	Charisma	0,028	0,000*	0,000	-3,13	0,639	3,88

*= Not meaningful, as not normally distributed

Based on the results, hypothesis H1.1 is supported. According to this hypothesis, the process of teamwork can be improved via the metaverse compared to videoconferencing.

The effect can be found for all sub-variables of the process level, which also confirms hypotheses H2 and H4. The results allow us to conclude that *social presence* is indeed higher in the metaverse, which enriches communication in teamwork in many aspects. The better rating of the other elements of the process level could be due to the improved communication. The relatively small effect on charisma could be related to the lack of facial expressions and the appearance of the avatars.

The effect of the metaverse on several variables was shown to correlate with the personal characteristics of the respondents by Spearman's correlation coefficient. Table 3 shows only those variables with a particularly strong correlation. According to this, the VR skills of the participants had the strongest correlation with the evaluation of *communication* (ρ=0.77), *exchange of opinions* (ρ=0.74) and *decision-making process* (ρ=0.54). Thus, participants who were already good at using technology were more likely to perceive the positive effect of the metaverse. An important personal characteristic was also the perceived *importance of social presence* for teamwork. This variable was particularly related to the effect on *confidence* (ρ=0.63), *opinion* (ρ=0.61), *social presence* (ρ=0.53) and perception of *personality* (ρ=0.53). The positive effect of the metaverse on *task performance* (ρ=0.56) and perception of others' *emotions* (ρ=0.51) also depended on *creativity*.

Table 3: Results on the correlation of personal characteristics

	Spearman-Correlations-coeffizient (ρ)	T according to Spearman correlation	p-value according to Spearman correlation
VR-skills x Communication	0,77	5,65	0,000
VR-skills x Discussion	0,74	5,12	0,000
Importance of social presence x Trust	0,63	3,83	0,001
Importance of social presence x Opinions	0,61	3,63	0,001
Creativity x Execution of task	0,56	3,18	0,004
VR-skills x Decision process	0,54	3,01	0,006
Interest in VR x Social Presence	0,54	3,02	0,006
Importance of social presence x Social Presence	0,53	2,91	0,008
Importance of social presence x Personality	0,53	2,91	0,008
Interest in VR x Execution of task	0,52	2,82	0,01
Creativity x Emotions	0,51	2,78	0,011

The results of the experiment confirm hypothesis H5 for numerous personal characteristics and correlations. According to this, the personal characteristics of the team members are important for the successful use of the metaverse as a communication medium. At the same time, the strong influence of personal characteristics on teamwork, as described by Hertel & Konradt (2007) and Tannenbaum et al. (1992) in their IPO models, is confirmed. Consequently, to use the metaverse, it is necessary to be able to use the communication medium well. People for whom social presence is particularly important in teamwork rate the effect of the metaverse higher. This can be attributed to the already proven higher *social presence* in the metaverse. The importance of creativity for a successful application could be explained by the more abstract, virtual representation of the task and emotions, which creative people may be better able to process.

No significant improvement or significant deterioration of the outcome variables was found for the study compared to videoconferencing. As shown in Table 4, all p-values for the outcome variables quality, time spent, own satisfaction, team satisfaction, team cohesion and avoidance of misunderstandings are significantly above p=0.05. Hypotheses H1.2 and H3 can therefore be rejected. The additional comparison of the teamwork in the metaverse with a hypothetical processing of the task in a face-to-face meeting also showed no improvement or deterioration.

Table 4: Results of the outcome variables

	p-value (K-S test)	p-value (Wilcoxon test)	Mean value
Quality	0,306	0,518	2,88
Time required	0,325	0,479	2,83
Own satisfaction	0,104	0,152	3,33
Team satisfaction	0,245	0,268	3,25
Team cohesion	0,451	0,253	3,25
Avoidance of misunderstandings	0,087	0,308	3,21

5. Limitations and Future Work

The result of the experiment can be interpreted or explained in different ways. Since the difficulty of the task was not high, working via videoconference would also be manageable without complications. The final product of the teamwork would therefore probably be similar for videoconferencing, metaverse and face-to-face meetings and therefore actually neither significantly better nor worse. Another explanation is the lack of long-term studies. An improvement in outcomes due to the improved processes may only become apparent after regular, long-term use. *Team cohesion* in particular is a product of long-term collaboration and is unlikely to be noticeably improved or worsened in a single day.

However, the same aspects apply to the classification of the results for the process variables. Long-term use of the communication medium and more complex tasks could lead to a different assessment of the variables. This points to the need for further research.

It should be noted that the sample was small (24 people) and therefore not representative. As the subjects were students of approximately the same age and with a high level of interest and openness to the topic of VR, different results can be expected for a more heterogeneous group. The sample's affinity with technology allowed them to complete the task with little difficulty, which cannot be assumed for less technologically savvy people. At the same time, further training and familiarity with the technology could increase the positive effects of use.

The VR glasses used in the experiment are not state of the art. In particular, the three HTC Vive models were uncomfortable to use because of the extensive wiring. Face tracking was not available with any of the VR glasses, so facial expressions could not be transmitted. However, these are an important part of non-verbal communication. The free version of *Spatial* was used as the social VR platform. There might be better paid-for platforms on the market.

Future research should investigate the long-term implementation of metaverse meetings with several groups in real everyday work. For this purpose, companies could be supported in the introduction of this communication medium in their teamwork. Alternatively, a semester project by groups of students using the metaverse would be conceivable. It should be noted that all participants will be trained in the use of the VR glasses and the social VR platforms. Ideally, participants will use modern VR hardware with face and finger tracking.

6. Practical Implications and Conclusion

The experiment provides the first insights into the use of the metaverse as a communication medium. By confirming the higher *social presence* and the general improvement of *communication*, the metaverse has a higher media richness than videoconferencing in the media appropriateness theory of Daft and Lengel (1984). The metaverse could therefore certainly be used as an alternative to videoconferencing. However, the study also showed that the use of VR glasses and the social VR platform needs to be learned or trained to take full advantage of the metaverse. Companies that want to test metaverse meetings should staff the working group with creative and tech-savvy people. It is also recommended to use wireless VR glasses with face and finger tracking. These allow for more comfortable use and the transmission of facial expressions. Task types such as creative tasks, task planning and decision-making tasks are particularly suitable for implementation in the metaverse.

The results show that the three-dimensional representation in the metaverse increases the perceived *social presence*, which improves *communication* in other aspects as well. The richer communication can also enrich processes such as *coordination, exchange of opinions, execution* and *decision-making*. An improvement in outcomes could not be demonstrated, which may require long-term research. Further studies should accompany long-term projects to observe changes in teamwork.

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Impact of an Entrepreneurial camp on Students' Psychological Capital

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Abstract: Psychological capital is a positive quality that describes person's attitudes towards work and life in general. It includes four dimensions: self-efficacy, optimism, hope and resilience. There are plenty of research of positive impact of psychological capital on individuals' working life, and research show that short interventions impact positively into the psychological capital dimensions. Here the interest was to see if the intensive 3-weeks innovation and entrepreneurial camp impacts on the students' psychological capital. 95 participants did answer on the questionnaire during the last week of the camp. Results indicated that impact of the camp was positive in all the psychological capital dimensions. The dimension Hope increased mostly, indicating that camp impacted positively on attitudes for target setting and finding the different paths to gain those. The dimension Resilience did not increase so much, which may be because the students were quite tired at the end phase of the camp. Interestingly those students who had intentions to start own business, had more increase of psychological capital than those who were unsure about their intentions of becoming entrepreneur. Also, students from US reported more increase in their psychological capital than European students.

Keywords: Entrepreneurship, Innovativeness, Psychological Capital, Study camp

1. Introduction

Entrepreneurship has typically been connected with characteristics like risk-taking, innovativeness and competitiveness. There is plenty of research indicating that risk-taking attitudes and behaviours are distinguishing characteristics of entrepreneurship (e.g. Das and Teng, 1997; Douglas and Shepherd, 2002; Stewart et al, 1998).

Psychological capital (PsyCap) illustrates individuals' positive capacity in terms of the components of optimism, resilience, self-efficacy, and hope (Luthans et al., 2006). It has been found to have several positive impacts on individuals' life at organizations and work-related matters (Avey et al., 2011; Luthans et al., 2005; Luthans et al., 2008; Peterson et al., 2011). Some studies have been focused also in psychological capital and entrepreneurship (e.g., Akmaliah and Pihie, 2009; Saeid et al., 2011). It has huge impact on individuals' working life. It is not permanent trait, but it can be increased with interventions. For example, 1-4 hours micro-interventions have been noted to have positive impact on the psychological capital (Lupsa et al., 2019). Interestingly, leaders' have impact on their team members' psychological capital (Brandt, 2022).

Here the study focus, if the 3-weeks intensive entrepreneurial student camp acts as an intervention method improving students' psychological capital. Also interest is to compare USA and European students and also students with entrepreneurial intentions to those without.

1.1 Entrepreneurial intentions

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is one of the models in the study of entrepreneurial intent in different countries (Autio et al., 2001; González-Serrano et al., 2016; Krueger et al., 2000; Liñán and Fayolle, 2015; Moriano et al., 2012). Ajzen (1991) postulates that behaviour is a function of beliefs that influence a certain behaviour. These beliefs are considered important premises that determine personal attitude, intention and perceived behaviour control. The more favourable the subjective norms and attitudes towards behaviour, the greater the perceived degree of control of the individual, leading to a stronger intention to perform a certain behaviour (Ajzen, 1991). Previous studies have used TPB to predict certain variables that are related to entrepreneurship. These variables include entrepreneurial intentions, entrepreneurial behaviour and entrepreneurial skills and attitudes. Entrepreneurial intention is the "self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future" (Thompson, 2009, p. 676). Entrepreneurial intention is the first step towards taking entrepreneurial action such as contemplating a start-up. The second variable of interest is entrepreneurial behaviour. Based on the TPB, intentions are correlated with behaviour and linked to behavioural control. Intention plays a central role in TPB by connecting norms, attitudes and behavioural control with enacted behaviours.

1.2 Entrepreneurial qualities

Entrepreneurial qualities have been typically been related to ability to take risks (Frishamme and Andersson, 2009) and multiple research indicates this (e.g. Begley and Boyd, 1987; Carland et al, 1995; Karabey 2012; Pekkala et al, 2019; Zhang et al, 2015). Other authors have shown that highly risk-minded entrepreneurs are generally willing to take on high-risk ventures for the chance of high returns (Covin and Slevin, 1989; Lumpkin and Dess, 1996). Some research indicates that with risk-taking ability the need for autonomy in decision making is also needed. The stronger the risk-taking tolerance of the individual has, and the stronger is their preference for decision-making autonomy, the stronger is their intention to be self-employed (Douglas and Shepherd, 2002). The intervention study indicated that people can learn to take risks (Kyrö and Tapani, 2008).

Competitiveness drives efforts which improve performance (Krishnan et al., 2002) and it is associated with the adaptation of deep learning strategies (King et al., 2012) and related to learning effort as well as general self-efficacy (Wang and Netemeyr, 2002). Many studies have focused on entrepreneurial orientations and the relationship of aggressive competitive orientation to firm performance and business success (Covin and Covin, 1990; Matchaba-Hove et al, 2013). *Innovativeness* is important in order to create something new and succeed in changing situations. In relation to competitiveness, it has noted that aggressive competitive orientation is related to firm performance and business success (Covin and Covin, 1990; Matchaba-Hove et al, 2013).

Other factors like age, gender and personality have been studied in relation to entrepreneurship. Age impacts so, that older people are significantly less likely to engage in entrepreneurial activity than younger individuals (Curran and Blanckburn, 2001; Hart et al, 2004), but on the other hand survival rates of businesses established by older entrepreneurs are higher than those of younger entrepreneurs (e.g., Cressy and Storey, 1995; Rotefoss and Kolvereid, 2005). In case of personality, some preferences have more tendencies towards entrepreneurship than others. For example, intuitive and thinking personality preferences have been noted to be acting more as entrepreneurs than their opposite preferences sensing and judging (e.g. Brandt & Helander, 2020; Carland and Carland, 1992).

Researchers studying students used a variety of measures for entrepreneurial attitudes that included a mixture of attitude and trait measures, often including items referencing risk-taking and innovativeness (Domke-Damonte et al., 2008; Langkamp-Bolton & Lane, 2011; Levenburg & Schwarz, 2008; Macko & Tyszka, 2009; Zampetakis et al., 2009) as well as proactivity (Langkamp-Bolton & Lane, 2011; Zampetakis et al., 2009).

1.3 Psychological capital and entrepreneurial tendencies

A comprehensive definition of PsyCap is “an individual’s positive psychological state of development that is characterized by: (1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resilience) to attain success” (Luthans, Youssef, & Avolio, 2007, p. 3).

In working life, it has been noted that psychological capital has a huge impact on the individuals’ experiences and success. There are multiple studies of its positive impacts on individuals’ life at organizations and work-related matters (Avey et al, 2010; Avey et al, 2011; Bergheim et al, 2015; Luthans et al, 2008; Peterson et al, 2011). For example, Karatepe and Karadas (2015) found that employees scoring high on psychological capital are more satisfied with their jobs, careers, and lives. It has also been associated with positive career mobility (Järlström and Brandt, 2017) and objective career success measured in wages and hierarchical career progression (Järlström et al, 2020). At the organizational level, it is connected to organizational performance (Hmieleski and Carr, 2008), business excellence (Hsu et al., 2014) and competitive advantage (Youssef and Luthans, 2010).

In relationship with entrepreneurship, psychological capital seems to have also positive connection. According to the study of Contreras et al. (2017) with the sample of 100 persons, the results indicate that entrepreneurial intention is related to psychological capital with dimensions of self-efficacy and resilience and as an integrated construct as a whole. A study by Ebhrem et al (2019) highlighted the importance of psychological capital in explaining why some students are more willing to start-up business than others. Indeed, the higher the student’s psychological capital, the higher the intention to start-up a business. Further, according to study of Brandt (2022) with 457 persons, the PsyCap correlated with Entrepreneurial tendencies as well as Growth orientation. The Entrepreneurial tendencies correlated all dimensions but Hope and Growth correlated with all dimensions. Both

were correlated with whole construct of PsyCap. Concerning psychological capital dimensions, the relation between self-efficacy and entrepreneurial behaviour has been widely established (Akmaliah and Pihie, 2009; Chandler & Jansen, 1997; Chen et al, 1998; Saeid et al., 2011). Also, optimism (Laguna, 2006; Lingfei and Li, 2011; Robledo et al, 2015) and hope (Laguna, 2006) are predictors of entrepreneurial intention and hope indicates entrepreneurs' satisfaction with business ownership according to Jensen and Luthans (2002). According to these studies it seems like persistence is the only dimension which has not been studied as a relationship with entrepreneurship.

2. Methodology

2.1 Sample

Totally, 95 students responded to the questionnaire of psychological capital. Altogether the camp includes about 300 students. 53% of respondents were women and coming from Europe (62%). Representatives from USA were 38%. Most of the respondents (72%) were between 21 years – 30 years old. 59% of respondents were students, and 30,5% were students having the job or own company. 80% of respondents were university students, 10,5% at applied sciences, and 4,2% were having doctor degree.

2.2 European Innovation Academy (EIA)

The European Innovation Academy (EIA) (https://www.inacademy.eu/portugal/) is the 3 weeks study camp fostering innovativeness and entrepreneurship with students. Students will form the enterprise with international teams during camp. They will get help from mentors with the business background. The best ones will get rewarded after the final pitch day.

2.3 Measuring impact on psychological capital

Students rated the list of psychological capital items from -3 to +3 indicating if the camp decrease or increase this psychological capital item. Factor analyses (Varimax) produced seven dimensions of PsyCap: 1) Self-Efficacy, 2) Successful, 3) Resilience 4) Optimistic 5) Positive future 6) Goal orientation 7) Finding way.

Self-efficacy was measured with 5 items, such as "I am able to resolve most of the problems if I try enough". Cronbach's alpha was 0.876. *Successful* was measured with three items, such as "I regard myself as quite successful". Cronbach's alpha was 0.762. *Resilience* was measured with 5 items, for example: "I recover and get over disappointments fast". Cronbach's alpha was 0.8359. *Optimistic* was measured with 4 items, such as "I think most of the people that I meet are very nice". Cronbach's alpha was 0.723 *Positive future* was measured with 3 items, such as "At the ucertain situations I trust that things will turn out right". Cronbach's alpha was 0.788. *Goal orientation* was measured with 3 items, for example: "I am thinking often how to reach my goals". Cronbach's alpha was 0.866. *Finding way* was measured with 4 items, such as: "If I don't reach the goals the way I planned, I will find the other way". Cronbach's alpha was 0.779.

Originally PsyCap includes only four dimensions (i.e. Hope, Resilience, Optimism, Self-Efficacy), but here the results are more specific. Self-Efficacy and Successful can be described as Self-Efficacy, Optimistic and Positive as Optimism and lastly, Goal orientation and Finding way can be described as Hope.

2.4 Measuring Innovativeness and Proactiveness

Students were asked to rate their innovative and proactive behaviour at the Likert scale 1-7. Factor analyses (Varimax) divided as planned two dimensions. Innovativeness was measured with 6 items, such as "I consider innovative opportunities". Cronbach's alpha was 0.779. Proactiveness was measured also with 6 items, such as "I make important organizational members enthusiastic for innovative ideas". Cronbach's alpha was 0.779.

3. Results

1) Impact of the camp to the psychological capital

The students evaluated that all the dimensions of the psychological capital were having positive impact due to the camp (see Table 1). Especially dimension Hope (Goal orientation + Finding the way) had positive impact, but also dimensions measuring Optimism, and Self-Efficacy were having positive impact. Least positive impact had Resiliency, even it was also positive.

2) Comparison of those becoming entrepreneurs and those who will not start business

The interest was to see if the students will have the interest to become entrepreneur after the EIA-camp. Results were:

- 1,1% will not definitely start own business at the future
- 7,4% will not probably start own business at the future
- 34,7% did not know if they will start own business at the future
- 34,7% will probably start own business at the future
- 21,2% will definitely start own business at the future

The respondents were divided into two groups comparing 1) those with entrepreneurial intentions, and 2) those without entrepreneurial intentions. Results indicated that all PsyCap means were higher in the group with entrepreneurial intentions (see Table 1.) There were statistically significant differences in the all dimensions but Optimistic and Successful.

3) USA vs. EUROPE, gender

The differences between continents indicated that the EIA-camp impacted more US participants' PsyCap than European ones. The difference was statistically significant in of Resilience and Optimism (see Table 1). In case of gender there were no statistically significant differences.

Table 1: Impact of the EIA camp on the psychological capital

		Comparison:			Comparison:		
	Impact all (N=95)	**YES Entrepren. intentions n=50**	**NO entrepren. intentions n=34**	**t-test two-sided p.**	**USA (n=32)**	**EUROPE (n=50)**	**t-test two-sided p.**
Self-Efficacy	+1,41	+1,62	+1,13	0,008**	+1,66	+1,30	0,076
Successful	+1,53	+1,68	+1,30	0,027*	+1,68	+1,41	0,209
Resilience	+1,00	+1,24	+0,70	0,015*	+1,42	+0,73	0,007**
Optimism	+1,48	+1,58	+1,37	0,115	+1,72	+1,33	0,038*
Positive future	+1,44	+1,73	+1,09	0,002**	+1,53	+1,35	0,425
Goal Orientation	+1,64	+1,90	+1,33	0,003**	+1,85	+1,51	0,117
Finding Way	+1,57	+1,79	+1,28	0,002**	+1,77	+1,45	0,093
PC Total	+1,55	+1,72	+1,31	0,122	+1,78	+1,39	0,141

4) Innovativeness, proactiveness and psychological capital

In the Table 2 can be seen the correlation analyses of innovativeness and proactiveness with PsyCap dimensions. All the dimensions correlated, indicating that positive improvement in PsyCap correlated with innovativeness and proactiveness.

Table 2: Pearson bivariate correlations

	Innovativeness	**Proactiveness**
Self-Efficacy	0,319**	0,478**
Resilience	0,410**	0,460**
Finding Way	0,431**	0,375**
Goals	0,426*'	0,320**
Positive future	0,416**	0,398**
Optimism	0,218*	0,361**

	Innovativeness	Proactiveness
Successful	0432**	0,787**
PC Total	0,412**	0,504**

4. Conclusions

The results showed that all the aspects of the psychological capital were increased. Students thought that especially Hope (Finding Way and Goal Orientation) was increased. Hope means target setting and finding the different paths to gain the target. It may be that the idea of having business target was so clear in every aspect that it impacted how the students think. The goal-setting mindset did increase during the camp.

Resilience was the dimension which did had lowest increase (but still did increase). The lower increase in resilience might be because many students experienced the camp as very demanding, there were long days to build the business and gain the clients, with team members you did not know earlier. It would be interesting to send the questionnaire later, e.g. after one year of the camp, and then see what are the results – maybe camp's impact on resilience would be higher when measuring it later.

When comparing the students with and without entrepreneurial intentions the interesting results were found. The camp was especially useful for those who were thinking to start their own business at the future. The EIA impacted more positively in their Self-Efficacy, Resilience, Positive future, Goal orientation, and Finding Way - dimensions. According to these results, it seems like that those students who were having entrepreneurial intentions, did get the most out of the camp in regard of PsyCap. It should be noted, that camp might have impact on entrepreneurial intentions to one or the other direction.

When comparing US and European students the EIA-camp had more positive impact on US students' PsyCap. Especially Optimism and Resilience improved more than European students. The state of PsyCap was not measured when students arrived at the camp, so it is not known if the US students were having lower levels of PsyCap in advance.

Interestingly, there were correlations between PsyCap dimensions and innovativeness and proactiveness. So it seems that improvement in PsyCap is connected to higher Innovativeness and Proactiveness which are regarded important prerequisities for entrepreneurship. Further analyses would be needed to confirm these results.

According to these results the EIA enhances students' psychological qualities aside of entrepreneurial knowledge. Some of the studies of entrepreneurial education show that education can exert positive effects on entrepreneurial self-esteem (e.g. Jones et al., 2008). These results support these studies, indicating that entrepreneurial camp has impact on the wider construct of persons' attitudes, including self-esteem. Psychological attitudes are important when willing to start own business. EIA camp was highly demanding for some of the most ambitious students, when needing persistence to do long days, solve the set-backs, gain customers, and negotiate with team members from different cultures. When there are clear goals (hope) the working is more systematic and the focus and main purpose do not disappear. Self-esteem gives the strength to defend own idea and negotiation and selling skills. Optimistic mindset is needed to keep the working atmosphere positive. According to earlier studies the persistence has had the lowest correlations with entrepreneurship, these results support this when also the entrepreneurial camp had the lowest intervention impact on persistence-dimension. Most probably those students' who applied and travelled to the EIA, already had their psychological capital at very high level, but interestingly, this experience still did increase that. It would be interesting to study the psychological capital at team level, if the top-ten teams have higher psychological capital than others.

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Impact of Entrepreneurial camp on Students' Entrepreneurial Attitudes

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Abstract: Entrepreneurial career choices are impacted by entrepreneurial mindset, family background and cultural values. Entrepreneurial mindset includes for example innovativeness, proactiveness, and risk-taking capacity, and entrepreneurial education has been found out useful in enhancing these qualities. Here the interest is to see how the intensive 3-weeks innovation and entrepreneurial camp impacts on the students' entrepreneurial attitudes compared to international data sample. The 95 students representing mostly USA and European countries filled in the questionnaire which focused on identifying qualities they would need if they would start own business. This data set was compared with the data over 1000 students from various countries. Several differences were found, indicating that those students, who have learnt profoundly about entrepreneurship emphasize different qualities than those with more general level knowledge.

Keywords: Entrepreneurship, Entrepreneurial Education, Innovativeness, Needed Qualities for Entrepreneurship

1. Introduction

Entrepreneurship is defined as an individual's ability to turn ideas into action (European Commission, 2020). Entrepreneurial career choices are impacted by entrepreneurial mindset, family background and cultural values (e.g. Harris & Gibson 2008; Roberts & Robinson, 2010). Entrepreneurial mindset includes innovativeness, proactiveness and risk-taking capacity.

Studies have contradictory findings about impact of the entrepreneurial education on entrepreneurial intentions, entrepreneurial attitudes, and self-efficacy. Some have positive results, (e.g. Jones et al. 2008; Bae et al. 2014), while some studies have findings of negative impact (e.g., Oosterbeek et al., 2010). Similarly, some of the studies exert positive effects on entrepreneurial self-esteem and propensities (e.g. Jones et al. 2008; Zhang et al., 2014), while others report a negative impact (e.g., Oosterbeek et al., 2010). It has been found that entrepreneurial skills can be learned in the context of entrepreneurial behavior (Mayhew et al., 2012; Kuratko 2005). Jones and Iredale (2010) distinguish between enterprise education with a focus on personal attributes and skills that can be used in a variety of contexts and entrepreneurship education with a focus on starting and running a business.

Bae et al. (2014) meta-analyzed studies examining the relationship between entrepreneurship education and entrepreneurial intentions and found a significant but a small correlation between entrepreneurship education and entrepreneurial intentions. This result was consistent with the findings by Martin et al. (2013), who also found a small but positive relationship between entrepreneurship education and entrepreneurial intentions.

The issue of the impact of entrepreneurship education is still very complex (Henry et al., 2004), and there are plenty of possible reasons for these contradictory results, e.g. culture, gender, self-efficacy, initial level of intentions, or motivation may have a role in the impact of entrepreneurial education on entrepreneurial intentions (Packham et al. 2010; Fayolle & Gailly 2013). It may be also that the impact of entrepreneurship education programs might only become apparent after some time as Fayolle et al. (2006) stated.

Here the interest is to study 1) the students' innovativeness and proactiveness qualities and entrepreneurial intentions, and 2) students' needs for qualities and attitudes for entrepreneurship.

1.1 Innovativeness and Entrepreneurial Mindset

Entrepreneurs are inherently creative and innovative (Schumpeter, 1934). Psychological and personality characteristics have been shown to be the major determinants that predict the individuals' innovativeness. While some believe it is possible for all individuals to be innovative, it appears that due to personality factors, creating new ideas is easier for some than others. It has been noted that a preference for innovation clearly differentiates entrepreneurs from managers (Timmons, 1990). Managers tend to be more adaptive (Buttner & Gryskiewitz, 1993), and to be rewarded for their competence and efficiency (Schein, 1985) rather than for innovation and creative destruction (Schumpeter, 1934).

Entrepreneurial mindset includes innovativeness, risk-taking, proactiveness, autonomy and competitive aggressiveness. Harris and Gibson (2008) found that personal control, innovation, self-esteem and achievement with respect to business involvement were correlated with intentions to become an entrepreneur. Entrepreneurial mindset has positive impact for example on firm performance, profitability, growth and product innovation (Johan & Dean, 2003; Moreno & Casillas, 2008).

Numerous studies have described the attributes of innovators. Innovators are persistent, self-confident, open to experience, original, independent and they have tolerance for ambiguity (e.g. Hurt et al., 1977; Sandberg et al., 2013). Innovators are willing to change (Hurt et al., 1977), eager to try new ideas (Rogers & Shoemaker, 1971), and have tendency to advance problem solving (Scott & Bruce, 1994). Additionally, there are positive correlations with three personality preferences; openness, extraversion, and creativity (Bender et al., 2013; Hughes et al., 2013).

In a business setting, a preference for innovation refers to a willingness and inclination towards experimentation and creativity when developing and introducing new products and services (Lumpkin & Dess, 2001). Innovation alone is not sufficient. There is need for proactive action to progress the ideas further. Proactive individuals scan the environment for opportunities, show initiative, and persevere until they bring about change (Bateman & Crant, 1993).

Florin et al. (2007) have studied student attitudes which promote entrepreneurship and found that innovation, nonconformity, proactive disposition, self-efficacy and achievement motivation are crucial in this regard. Other researchers studying students used a variety of measures for entrepreneurial attitudes that included a mixture of attitude and trait measures, often including items referencing risk-taking and innovativeness (Macko & Tyszka, 2009; Zampetakis et al., 2009; Wanasika et al., 2022) as well as proactivity (Zampetakis et al., 2009).

1.2 Theory of Planned Behaviour and Entrepreneurial Intentions

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is one of the models in the study of entrepreneurial intent in different countries (Liñán & Fayolle, 2015; Moriano et al., 2012). Ajzen (1991) postulates that behaviour is a function of beliefs that influence a certain behaviour. These beliefs are considered important premises that determine personal attitude, intention and perceived behaviour control. The more favourable the subjective norms and attitudes towards behaviour, the greater the perceived degree of control of the individual, leading to a stronger intention to perform a certain behaviour (Ajzen, 1991).

Previous studies have used TPB to predict certain variables that are related to entrepreneurship. These variables include entrepreneurial intentions, entrepreneurial behaviour and entrepreneurial skills and attitudes. Entrepreneurial skills and attitudes are necessary antecedents in the process of effective entrepreneurship. Skills and attitudes are developed through learning, experience and environmental factors. Intention plays a central role in TPB by connecting norms, attitudes and behavioural control with enacted behaviours. Entrepreneurial intention is the "self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future" (Thompson, 2009, p. 676). Entrepreneurial intention is the first step towards taking entrepreneurial action such as contemplating a start-up. The second variable of interest is entrepreneurial behaviour. Based on the TPB, intentions are correlated with behaviour and linked to behavioural control.

The TPB can also be used in evaluating the outcomes of entrepreneurship education. Fayolle et al., (2006) found that the entrepreneurship education programs assessed had a strong measurable impact on the entrepreneurial intentions of the students.

2. Methodology

The European Innovation Academy (EIA) (https://www.inacademy.eu/portugal/) is the 3 weeks study camp fostering innovativeness and entrepreneurship with students. Students will form the enterprise with international teams during camp. They will get help from mentors with the business background. The best ones will get rewarded after the final pitch day. The questionnaire about their experiences were sent to them at the last week of the camp, so they already had knowhow and experience about entrepreneurship. The data was analyses with statistical program SPSS using t-test.

2.1 Sample

Totally, 95 students responded to the questionnaire of psychological capital. Altogether the camp includes about 300 students, so the response rate is quite good. 53% of respondents were women and coming from Europe (62%). Representatives from USA were 38%. Most of the respondents (72%) were between 21 years – 30 years old. 59% of respondents were students, and 30,5% were students having the job or own company. 80% of respondents were university students, 10,5% at applied sciences, and 4,2% were having doctor degree. The interest was to see if the students will have the interest to become entrepreneur after the EIA-camp. Results were:

- 1,1% will not definitely start own business at the future
- 7,4% will not probably start own business at the future
- 34,7% did not know if they will start own business at the future
- 34,7% will probably start own business at the future
- 21,2% will definitely start own business at the future

The respondents were divided into two groups comparing 1) those with entrepreneurial intentions, and 2) those without entrepreneurial intentions

2.2 Questionnaires

Innovativeness and proactiveness questionnaire bases on the global questionnaire (see e.g. Brandt et al., 2022) and here the factor analyses (Varimax) produced two dimensions as it was planned. Alphas were 0,873 for innovativeness and 0,842 for proactiveness.

Qualities needed for entrepreneurship. The question was "What qualities or attitudes you would think you would need if you become as entrepreneur". There were 13 items asked to be rated in Likert-scale 1-7.

3. Results

In the Table 1. the results are presented, in case of innovativeness and proactiveness. When compared to global dataset (Wanasika et al., 2022) it can be seen that in both cases EIA-students have both the innovativeness and proactiveness higher. When looking the statistical analysis, the t-test shows that there were statistically significant differences between the students with entrepreneurial intentions and those without entrepreneurial intentions. Those EIA-students with entrepreneurial intentions had highest means in both Innovativeness and Proactiveness than comparison groups. When looking the means, those without entrepreneurial intentions had still higher means than global dataset.

Table 1: Innovativeness and proactiveness means, comparisons and t-test comparing intention to start the business

	Global dataset (n=1081) Mean	Alldata (n=95) Mean	YES Entrepreneurial intentions (n=53)	NO Entrepreneurial intentions	t-test two-sided p.
Innovativeness	5,05	5,79	6,03	5,47	<,001**
Proactiveness	4,50	5,08	5,41	4,70	<,001**

When looking the list of the qualities (Table 2), the students with entrepreneurial experience had different ranking than the global sample (Brandt et al., 2022). The first quality they thought they needed was Team to build up the business, secondly risk-taking and thirdly Decisiveness. The last quality for them was More knowledge about entrepreneurship. Ranking with the global sample was 1) Good business idea 2) Motivation and 3) Mentor to help me.

Table 2: Qualities needed for entrepreneurship EIA-students vs. Global data

	EIA-students	Global (n=994)	Difference (Global-EIA)
Team to build up the business	5,84 (1)*	5,67 (7)	-0,17

	EIA-students	Global (n=994)	Difference (Global-EIA)
Risk-taking	5,52 (2)*	5,69 (6)	0,17
Decisiveness	5,48 (3)*	5,73 (5)	0,25
Mentor to help me	5,45 (4)	5,21 (3)*	-0,24
Motivation	5,44 (5)	5,93 (2)*	**0,49**
Persistence	5,44 (6)	5,84 (3)	**0,40**
Resilience	5,42 (7)	5,62 (10)	0,20
Courage	5,34 (8)	5,74 (4)	**0,40**
Self-Esteem	5,27 (9)	5,58 (11)	**0,31**
Innovativeness	5,25 (10)	5,63 (8)	**0,38**
Good Business idea	5,20 (11)	6,02 (1)*	**0,82**
Optimism	5,17 (12)	5,30 (12)	0,13
More knowledge about entrepreneurship	5,03(13)	5,63 (9)	**0,60**
Mean of the qualities	5,37	5,66	0,29

4. Conclusions

This study was focused on the students who were experiencing international entrepreneurship camp at summer 2022. The point was to study, if the camp had impact on their entrepreneurial qualities, when comparing their results on the international data set. When the students were filling in the questionnaires at the end of the camp, they already had quite much knowledge about entrepreneurship.

These results confirm earlier results that innovativeness and proactiveness are strongly connected with entrepreneurial intentions. It seems that students who apply on the camp are more innovative and proactive than students overall, when comparing to the global dataset. It may be that the intensive entrepreneurial camp increased those qualities even more. Interestingly, EIA-students with no intention to start own business had still higher innovativeness and proactiveness when compared to global data set.

When looking the qualities and attitudes needed for entrepreneurship, total means of the global data are higher than EIA-students, indicating that entrepreneurial camp might decrease the needs and give important qualities in regard of entrepreneurship. The biggest differences were in Good business idea, Motivation, Persistence, Courage, Self-esteem and Innovativeness. EIA-students regarded most important the Team to build up the business, Risk-taking and Decisiveness, when Global data set emphasized Good Business idea, Motivation and Mentor. It seems that students with EIA-experience think that good team overcomes good business idea. Maybe they did learn at the camp, that if the team does not work, it is very difficult to do business. Also, their responses reflect the environment of the camp, where the target was to make global business, thus risk-taking is necessarily. It may be that students attending to the camp were already having some qualities more than on average and also, they might had gain those at camp. All in all, this study shows that entrepreneurial camps might have huge impact on students' entrepreneurial qualities and attitudes.

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Experiential Marketing for Online Shopping Innovation: A Correlation in the Fashion Industry

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Abstract: The fashion industry is in a moment of change and innovation due to the growth of e-commerce and many companies have to adapt their physical stores to online stores. This is a great opportunity for the growth of female entrepreneurship as it highlights their ability in the sector. The present research work was carried out with the objective of determining the influence of experiential marketing in the online purchase decision in the field of fashion in people between 18 and 35 years of age in Metropolitan Lima. Throughout the study, information about experiential marketing is known, as well as the current situation of e-commerce in Peru and relevant information about the fashion industry in the country. This study was conducted with a quantitative approach and a non-experimental design of correlational scope. The study instrument was applied to a sample of people who met the established criteria. A probabilistic sampling was applied, the sample size was 384 people between the ages of 18 and 35 years, residents of Metropolitan Lima (capital of Peru), men and women, who are online buyers of fashion items; the collection of information was done through the Google Forms platform. The descriptive statistical analysis of the data was performed in the SPSS statistical program, in terms of inferential statistics, Spearman's Rho was applied to determine the relationship between both variables. The results show that the factors most valued by the respondents in relation to the experiential marketing variable are: tangibility, purchase experience and exclusivity of the product; and in terms of the purchase decision, the following stand out: available information, ease of use, trust and ease of exchange or returns. Finally, we conclude on the relationship between both variables knowing that experiential marketing is positively related to the online purchase decision. Thus, this research can contribute to those companies that do not apply experiential marketing by explaining the importance of creating strategies to influence the purchase decision in online sales channels.

Keywords: Experiential marketing, online shopping, shopping experience, e-commerce, consumer behaviour.

1. Introduction

The companies are competing in the market since they offer similar products and services. In fact, Vijay et al. (2019) mention the importance of constantly interacting directly with your customers and continuously examining their needs and intentions because they change or are modified. This leads to planning any strategy around developing a personalized experience for each client (Nazel, 2014; Cordova-Buiza et al., 2022). It can be pointed out that now the buyer demands to acquire a "Total Product" which includes, in addition to the product, the shopping experience (Schmitt, 2010; Lenderman, 2008; Maklan and Klaus, 2011). In general, the experience lived when buying a product is in a physical establishment where the consumer awakens his five senses, generating a shopping experience (Datta, 2017). On the other hand, the fashion industry in Peru has been in constant transformation in the last 10 years, growing together with new markets thanks to the expansion of shopping centres and retail stores (Peru Retail, 2020). There is a record of recent years indicating that the fashion

sector is currently in the first three leading categories of online retail; Likewise, it is predicted that it will continue to grow thanks to the development of the online market (Andina, 2019).

In Lima, Ecommerce News (2021) explains that the study carried out by GRM shows that 34% of the Lima population acquires their products through digital commerce. Information supported by the same author, Ecommerce News (2020) in which he maintains that ecommerce in Peru has been growing 131% since the beginning of 2019. In addition, it is known that garments are the most required items in this channel. A tactic to generate a positive reaction in buyers is to give them a coupon book, this persuades the buyer by making sales. The determining factor, for which the remaining percentage of Lima do not make purchases online, is the insecurity they feel and their concern about suffering from electronic fraud. Therefore, the following general research problem is presented: What is the relationship between experiential marketing and the decision to buy online in the fashion industry among people between 18 and 35 years old in Metropolitan Lima?

1.1 Objectives

The objective of this research work is to determine the relationship between experiential marketing and the decision to purchase online in the field of fashion in people between 18 and 35 years old in Metropolitan Lima.

2. Literature Review

Many authors studied the variables presented, these generally defend the term experiential marketing as a process of attracting consumers, providing them with a deep experience together with the product purchased with a brand (Moon et al., 2017; Cordova-Buiza et al., 2021). In this sense, Nazel (2014) highlights that an experience ranges from the environment, the packaging, to the stimuli caused by well-planned incentives.

Likewise, according to the model designed by Brakus, Schmitt et al. (2015), in order to apply experiential marketing, three important dimensions must be taken into account: sensations, emotions and interaction. The sensations dimension refers to the way to access, either completely or partially, the 5 senses of the human being, awakening them through tactics (Schmitt, 2010). On the other hand, the emotional dimension reaches the client's deepest feelings in order to establish an affectionate relationship that lasts over time. While interaction is based on creating experiences for the brand to relate to the consumer.

Therefore, e-commerce, also known as online commerce or Internet commerce, is the transaction of goods and services over the Internet. In this system, customers search for and purchase products or services using websites or online platforms. Although the order is placed online, the method of delivery and payment may vary, and may be online or otherwise. This process takes place in three stages 1) the customer places his order on an e-commerce platform, 2) the company receives and confirms the order electronically, and 3) finally, the delivery of the purchased goods or services takes place. (Barnett, 2001). Hence, online purchases are the modern sales channel that stores have, so that the entire user experience in physical establishments is transferred to websites (Berthon et al., 2010; Ladhari, 2010). For this variable, Trevinal and Stenger (2014) established a design with four dimensions: physical, ideological, pragmatic and finally the social dimension. When referring to the physical dimension, it encompasses the place, the shopping atmosphere and the time. The ideological dimension emphasizes purchase values, symbolism and rituals. The pragmatic dimension sees from touch and tastes to the appropriation of the environment. Finally, the social dimension evaluates and deepens the socialization that the brand can promote among colleagues, friends, family and sellers.

Many antecedents studied both variables to know if there is a relationship between them; Sádaba and San Miguel (2015) states that there are 4 elements that are key to providing a better online fashion shopping experience, and it consists of providing abundant content apart from just text, but rather a greater number of high-quality photos and videos offering added value. such as outfits, lookbooks, etc. He also adds the importance of incorporating an online chat to have a direct presence with customers to encourage engagement.

Regarding the online fashion shopping experience, Del Olmo and Fondevila (2012) mention how the way of acquiring and buying fashion changed over the years. In both, those users who surf the vast internet do so not merely for the purpose of searching for information and purchasing products, but also to find an emotional fulfilment that fulfils their deepest desires. (Pui et al. 2007). For this reason, clothing brands now focus their attention on building an online shopping experience for their customers (Puro Marketing, 2022). Continuing with this, in a study carried out by Sarmiento Guede (2017) the importance of developing a relationship based on trust, security and transparency with the consumer is mentioned, so that the first online shopping experience is the most perfect possible, managing to convert the customer into a repeat buyer. In addition to this, it is crucial

to have security regarding payments, since this will help provide greater confidence to the client (Emprenderalia Magazine 2022).

Customer behaviour is a state of mind influenced by the environment, and is characterised by changes in its intensity through dynamic and repetitive engagement processes, according to (Brodie et al. 2013). This concept represents a significant advance in customer management, as it transcends the mere act of business transactions, as highlighted by (Verhoef et al. 2010).

Peru Retail (2019) CEO of the Peruvian Chamber of Electronic Commerce, argues in his study how these events justify the 31% growth at the end of 2019, obtaining an activity of approximately 4 billion dollars in the country compared to the year 2009 where 267 million dollars were moved, standing out with a growth of up to 15 times more in the last decade, and thanks to this Peru now has approximately 6 million online buyers. In turn, an investigation carried out by Euromonitor International (2019) supports that Peruvian users are more active, indicating that they access the Internet more than five times a week on average. In this way, the Peruvian population interacts more with online advertising and accesses a variety of information. Thus, the hypothesis of this research is based on determining whether there is a significant relationship between the application of experiential marketing and online purchasing decisions in the fashion sector, aimed at people between 18 and 35 years of age in Metropolitan Lima.

3. Methods

All methodological aspects of the research were carried out under the concepts of Hernández Sampieri (2010). A quantitative approach research design was used since statistics were used, which helps to measure behaviour patterns in a population, with a correlational scope worked based on two variables to determine the relationship between them. By observing an existing situation without altering any variables, this research was based on a non-experimental research design. Having an infinite population (approximately 4 million), the sample was found using the equation formula for said population and probabilistic sampling was used. Therefore, the sample is 384 people between the ages of 18 and 35, residents of Metropolitan Lima, male and female, who are online buyers of some fashion item.

In this study, the anonymity of the people surveyed is respected since their names were not requested to fill out the surveys. The 384 surveys were applied in their entirety, without manipulating any of them, personally sharing the questionnaire link to each person, managing to reach those who met the inclusion criteria and preventing those who did not meet them from continuing with the development of the questionnaire.

4. Data Collection

The technique used was the survey, applying it to 384 people from 18 to 35 years old of both sexes from Metropolitan Lima to determine the relationship of the study variables. The data was collected through a questionnaire. This questionnaire was extracted from the research of Vázquez Del Rio (2019) which obtained a reliability result of 0.831 in the Cronbach's Alpha coefficient, being in an acceptable range. The necessary adjustments were made for the correct application within the context. For this reason, a questionnaire was used which begins with two filter questions in order to respect the established criteria, continuing with 9 closed questions with multiple alternatives. Two Likert scale questions were then added, where 1 is not at all important, 2 is neutral, and 3 is very important. Finally, the questionnaire was completed with 3 closed questions with multiple alternatives.

The procedure to be followed in said information collection was carried out through the Google forms platform, distributing the questions in the appropriate order. Being in a complicated situation, said questionnaire was shared virtually through social networks and direct messaging to various people in Metropolitan Lima to reach 384 people. It took about a week to collect all the questionnaires.

The descriptive statistical analysis of the data was carried out in the statistical program SPSS. In it, the descriptive statistics were found to know the current trend measures such as the mean and mode. In turn, the dispersion was found to know the variance and standard deviation. On the other hand, in terms of inferential statistics, Spearman's Rho was applied to determine the relationship between both variables.

5. Results and Discussion

5.1 Cronbach's alpha

The results obtained from the analyses carried out using the IBM SPSS Software are presented below. The instrument underwent a reliability test using Cronbach's Alpha coefficient, and it is known that this coefficient must be above 0.7. Thus, according to the analysis of the results presented in Table 1, a Cronbach's Alpha coefficient of 0.831 was obtained, determining a good reliability of the instrument used.

Table 1: Reliability statistics

Cronbach's Alpha	No of elements
,830	18

Note: With a result of 0.831 in Cronbach's Alpha, the applied instrument is in an acceptable range.

5.2 Demographics

The survey was carried out on a group of people between 18 and 35 years old, the age range that had the most participation in the questionnaire was 21 to 25 years old, representing 61% of all the respondents. See Figure 1. The female sex had a higher participation in the questionnaire, representing 55%, while the remaining 45% was carried out by men. As for the level of education, 75% of the sample had higher education. The highest percentage of respondents were students and working at the same time. Nine percent received an income greater than S/. 3000 per month, while the majority, that is, 30%, received an income between S/. 500 and S/. 1000 per month.

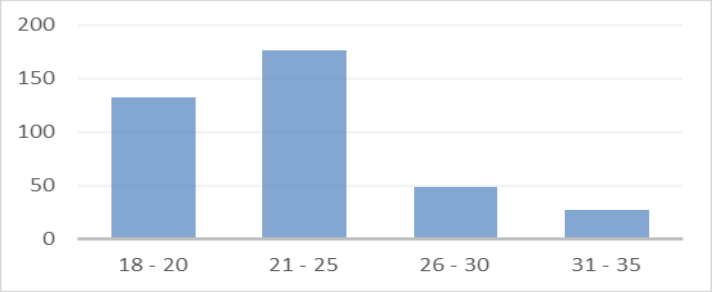

Figure 1: Number of participants by age

5.3 Descriptive análisis

5.3.1 Variable Experimental Marketing

About the Sensations dimension

Within the instrument, the present dimension was studied through some of the questions. As an analysis, the intangibility of the products at the time of purchase can be considered important, since this was the most frequently chosen alternative, representing 81% of the responses. See table 2.

Table 2: Importance of intangibility

		Frequency	Percentage
Valid	Yes	311	81.0
	No	73	19.0
	Total	384	100.0

Note: The intangibility of the products is an important factor to be able to make purchases.

In turn, within this dimension, it was possible to contemplate that the shopping experience lived in the physical premises of a store is considered very important, this being the most selected criterion. See table 3

Table 3: Shopping experience

N	Valid	384
	lost	0
Mode		3

Note: Within the alternatives, option 1 represents the not important criterion, option 2 represents a neutral criterion and option 3 represents the very important criterion.

About the Emotional dimension

A relevant study criterion is the factor of the exclusivity of the product that the brand can offer. As can be seen in figure 2, it is more frequent in the sample to consider this very important, and even more so in respondents aged between 21 and 25 years. In addition to this, the sample studied indicates that they prefer to buy in physical stores (63%) than online (37%).

About the Interaction dimension

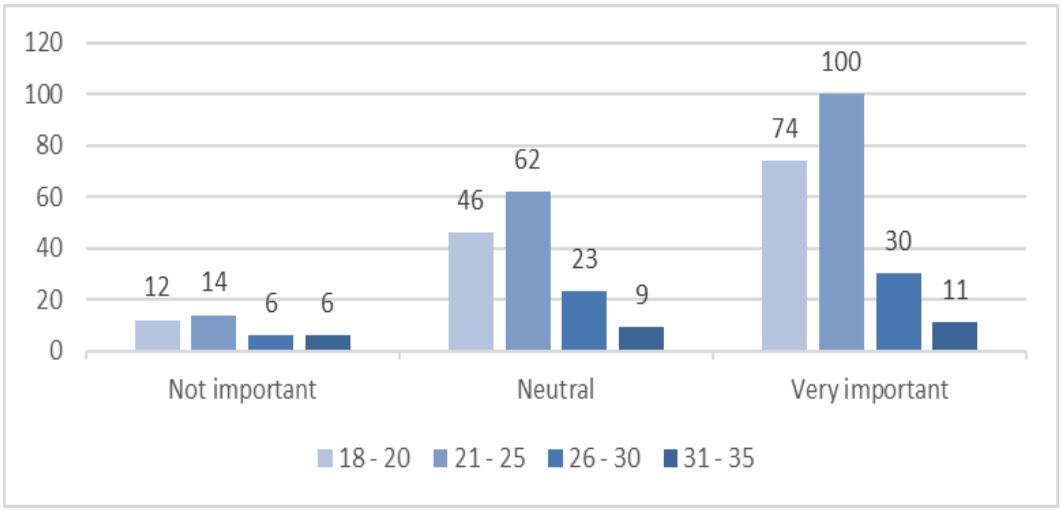

Figure 2: The figure represents the number of people according to the age range in terms of the criterion of importance in obtaining exclusive products different from those on the market.

As can be seen in Table 4, the average sample highly values having physical contact with a product (2.80), in addition to having it at the moment (immediacy = 2.75), followed by the factor of direct attention from a store staff (2.53).

Table 4: Factors valued when buying in a physical establishment

		Immediacy	Being able to have physical contact with the product	Receive attention from store staff
N	Valid	384	384	384
	lost	0	0	0
Mean		2.76	2.80	2.53
Mode		3	3	3

Note: Within the alternatives, option 1 represents the not important criterion, option 2 represents a neutral criterion and option 3 represents the very important criterion.

5.3.2 Variable Purchase Online

About the Usability dimension

The evaluation criteria for the factors of this dimension (convenience, available information and unlimited accessibility) are considered very important for the sample. Within these, the available information that can be found in an ecommerce (2.79) has a higher average, so it is understood that there is greater importance in this factor compared to the others.

Table 5: Usability factors in online shopping

		Convenience	Information available	unlimited accessibility
N	Valid	384	384	384
	ost	0	0	0
Mean		2.66	2.79	2.55
Mode		3	3	3

Note: Within the alternatives, option 1 represents the not important criterion, option 2 represents a neutral criterion and option 3 represents the very important criterion.

About the Design dimension

The design of the website, and additional services such as packaging and delivery, are factors that help to better understand this dimension. In addition, as can be seen in the table, speed is the factor with the highest percentage (61.7) of importance. See table 6.

Table 6: Design factors in online shopping

	Web design		Speed		Additional services	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Nothing important	20	58.3	5	1.3	25	6.5
Neutral	140	36.5	83	21.6	122	31.8
Very important	224	58.3	296	77.1	237	61.7
Total	384	100	384	100	384	100
Mode		3		3		3

Note: Within the alternatives, option 1 represents the not important criterion, option 2 represents a neutral criterion and option 3 represents the very important criterion.

About the Online Behaviour dimension

There are various fashion implements such as clothes, shoes, accessories, bags, etc. In this case, accessories are the most frequently purchased fashion implements within the population studied, representing 52.3%, followed by clothing (51.6%).

On the other hand, there are various reasons that generate an online purchase and within these, the most concurrent are: buying as a result of an advertisement on the internet, organic search, product stock break in physical stores and exclusive promotions on the website. The reasons are diverse, but the most frequent is the organic and direct search of the client (53.9%), followed by exclusive promotions on the web. See table 7.

Table 7: Reason for online purchase

	fi	%
Following an advertisement on the Internet	93	24.2%
Organic search	207	53.9%
Lack of stock in physical store	81	21.1%
Exclusive promotions on the web	189	49.2%
Total	384	100%

Note: The table shows the most frequent reasons for online purchase by consumers of this digital channel.

About the Social dimension

Trust, the possibility of picking up at the store and the ease of exchange or return are factors that help to better understand this dimension. On average, the sample highly values the trust generated by its buyers (2.80), in

addition to the ease of exchange or return that a brand can offer (2.79), followed by the option of picking up the purchase at the physical store (2 ,42). See table 8.

Table 8: Social factors in online shopping

	Confidence	Possibility of pick up in store	Ease of exchange or return
Valid	384	384	384
lost	0	0	0
Mean	2.80	2.42	2.79
Mode	3	3	3

Note: Within the alternatives, option 1 represents the not important criterion, option 2 represents a neutral criterion and option 3 represents the very important criterion.

General Hypothesis Test (RHO SPEARMAN)

H1: Experiential marketing is significantly related to the online shopping decision in the fashion category in people aged 18 to 35 in Metropolitan Lima.

Ho: Experiential marketing is not significantly related to the online shopping decision in the fashion category in people between 18 and 35 years old in Metropolitan Lima.

Table 9: Correlation between Independent Variable and Dependent Variable

			IV	IV
Spearman's rho	IV	Correlation coefficient	1,000	.287**
		Next (2-sided)	.	,000
		N	384	384
	IV	Correlation coefficient	.287**	1,000
		Next (2-sided)	,000	.
		N	384	384

Note: The correlation is significant at the 0.01 level (two-sided).

Specific Hypothesis Test 1

H1: Sensations are significantly related to the online shopping decision in the fashion category in people between 18 and 35 years of age in Metropolitan Lima.

Ho: Sensations are not significantly related to the online shopping decision in the fashion category in people between 18 and 35 years of age in Metropolitan Lima.

Table 10: Correlation between Dependent Variable and the first dimension of the Independent Variable

			IV	IV
Spearman's rho	IV	Correlation coefficient	1,000	.261**
		Next (2-sided)	.	,000
		N	384	384
	D11V	Correlation coefficient	.261**	1,000
		Next (2-sided)	,000	.
		N	384	384

Note: The correlation is significant at the 0.01 level (two-sided).

As Spearman's Rho coefficient is 0.261 and according to Spearman's correlation estimation scale, there is a medium positive correlation. In addition, the level of significance is less than 0.05, this indicates that there is a relationship between the variables. In this way, the null hypothesis is rejected, accepting the alternative hypothesis.

Specific Hypothesis Test 2

H2: Emotions are significantly related to the online shopping decision in the fashion category in people between 18 and 35 years old in Metropolitan Lima.

Ho: Emotions are not significantly related to the online shopping decision in the fashion category in people between 18 and 35 years of age in Metropolitan Lima.

Table 11: Correlation between Dependent Variable and the second dimension of the Independent Variable

			DV	D2IV
Spearman's rho	DV	Correlation coefficient	1,000	.029
		Next (2-sided)	.	.573
		N	384	384
	D2IV	Correlation coefficient	.029	1,000
		Next (2-sided)	.573	.
		N	384	384

Note: The correlation is significant at the 0.01 level (two-sided).

A bilateral significance value of 0.573 was obtained, accepting the null hypothesis, rejecting the alternative. This indicates that there is a negative relationship between the variables. For the same reason that, when obtaining a correlation coefficient of 0.029, it is interpreted that said correlation is weak.

Specific Hypothesis Test 3

H3: The interaction is significantly related to the online shopping decision in the fashion category in people between 18 and 35 years of age in Metropolitan Lima.

Ho: The interaction is not significantly related to the online shopping decision in the fashion category in people between 18 and 35 years of age in Metropolitan Lima.

Table 12: Correlation between the Dependent Variable and the third dimension of the Independent Variable

			IV	D3IV
Spearman's rho	IV	Correlation coefficient	1,000	.270**
		Next (2-sided)	.	,000
		N	384	384
	D3IV	Correlation coefficient	.270**	1,000
		Next (2-sided)	,000	.
		N	384	384

Note: The correlation is significant at the 0.01 level (two-sided).

Spearman's Rho coefficient is 0.270 and according to Spearman's correlation estimation scale, there is a medium positive correlation. In addition, the level of significance is 0.000 (less than 0.05), this indicates that there is a relationship between the variables. This is how the alternative hypothesis is accepted, rejecting the null hypothesis.

5.4 Discussion

In the data obtained with respect to the first dimension, it is known that the sensations that are generated in the buyers are very important to help in the decision of online purchases. Adding to this, a coefficient equal to 1 is found, accepting the alternative hypothesis, which confirms a perfect positive correlation with the online shopping decision. This indicates applying strategies such as developing a shopping experience. Meanwhile, external factors in the environment can have a considerable impact on how consumers perceive the utility and pleasure associated with a product, which influences their propensity to make purchases. Moreover, as consumers become more knowledgeable about product utility, their emotional disposition towards purchase intent becomes more positive, which, in turn, further encourages impulse purchases. (Parboteeah et al. 2009)

Regarding the emotional dimension, it is found that respondents aged 21 to 25 years prefer exclusivity. However, in the correlational analysis, emotions are not related to the online shopping decision due to the result obtained in the significance coefficient (0.29 = negative correlation). This may occur since the sensations that are produced in the client are greater than the emotions generated virtually.

In turn, three factors were evaluated in the interaction dimension: immediacy, physical contact with the product, and staff attention, of which the factor with the highest average in the importance rating was physical contact with the product (mean =2.80). On the other hand, a strong positive correlation coefficient of 1.00 is found, which indicates that it is related to online purchases. This means that the factors already mentioned above help to close this complete circle of experience in an online purchase.

Including all the dimensions, the general alternative hypothesis was evidenced and accepted, thus sustaining that experiential marketing is related in a low positive percentage with the decision to purchase online in the fashion category in people from 18 to 35 years of Metropolitan Lima since a Correlation Coefficient of 0.287 and Bilateral Significance equal to 0.000 were obtained.

Based on the findings found, we compare the results of the general alternative hypothesis with other studies, in which it is argued that experiential marketing is strongly positively related to the decision to purchase online (Correlation Coefficient = 0.287 and Sig. Bilateral = 0.000). This result coincides with multiple international studies (Ladhari, 2010; Married, 2011; Martínez & De Garcillan, 2016; Moon et al. 2017) in which consumer perceptions are studied regarding the attributes of the website and their online shopping intentions, pointing out that experiential marketing is related to the decision to make an online purchase. Thus, customer satisfaction has been recognised as one of the most fundamental concepts in business (McQuitty et al., 2000) and plays a crucial role in building customer trust (Flavian et al., 2006).

On the other hand, regarding the evaluation of the correlation of sensations, the contributions of Katrandjiev and Velinov (2014); Nepomuceno et al. (2014) agree in affirming that a positive correlation is found with the online shopping decision, studies in which the role of technology is exposed to improve the fashion shopping customer experience. While in the study by Vijay et al. (2019) in which the influence of the values of online purchases with the electronic atmosphere is evaluated, disagrees with our results since its bilateral significance yields a value greater than 0.05, maintaining that there is no relationship between sensations such as touch with the decision to make an online purchase. Given the above, it is considered that this may be due to differences in the characteristics of the population.

The emotional dimension is not related to the online shopping decision due to the result obtained in the significance value (09.573 > 0.5), which coincides with the research results of Simó (2003). While in the investigations of Trevinal and Stenger (2014); Sarmiento Guede (2017) where they are studied the experience of the quality of the online service and its satisfaction do not coincide mentioning that a better online shopping experience will lead to an improvement in the emotional state of pleasure and activation. Regarding the analysis of the interaction dimension, a correlation of 0.270 (sig. Bilateral 0.00) is found, accepting the alternative hypothesis. This coincides with various research works (Maklan and Klaus, 2011; Nepomuceno et al., 2014; Moon et al., 2017) confirming a positive correlation regarding the importance of an interaction with the consumer to generate a purchase.

6. Conclusion

According to the quantitative analysis, the general hypothesis is accepted, stating that Experiential Marketing is positively related to the decision to purchase online in the fashion category in people between 18 and 35 years of age in Metropolitan Lima. When the sensations are related to the online purchase decision in this population, tangibility and purchase experience are included. It is inferred that, according to the results of Spearman's correlation, emotions have a low imperfect relationship with the online purchase decision. On the other hand, the interaction is positively related to the online purchase decision. Meaning that the immediacy of the product, direct contact, customer service and post-sale service influence the online purchase decision. The research concludes that the most valued for the respondents in relation to the experiential marketing variable are tangibility, purchase experience and product exclusivity. Regarding the purchase decision, what stands out the most is: available information, ease of use, trust and ease of exchange or returns.

The main limitation was the situation in which this work was carried out, since the government restricted mobilization and the data collection technique could only be applied through digital channels. It also made difficult the lack of face-to-face interaction with the advisors who were slightly involved in the effective development of the study. It is recommended to use the same correlation in the field of fashion, but in the other important cities of Peru to study their progress at the national level.

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Entrepreneurship in Natural Cosmetics Distribution Logistics Channels in Brazil: Analysis of the entrepreneurial profile of Bothânico Hair

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Abstract: Technological, organizational and market integration changes, which have been taking place in the business environment in Brazil, contribute to significant changes in the search for new ways of understanding how to reinvent itself in a country that cannot guarantee economic stability. With all these changes, people seek a redirection in their professional life and new earning options and financial security. With this, entrepreneurship becomes a reality contextualized by individuals inserted in the business scenario. These individuals look for opportunities that allow them financial stability and often fulfill their dreams of opening their own businesses. The entrepreneur is the engine of the economy, he is an agent of change and motivation to overcome the challenges of commercial oscillation. In the area of natural cosmetics distribution logistics channels, the capacity to innovate, to reinvent business, processes and marketing are crucial for the sustainability of the business. It is important to know the profile and potential of entrepreneurs who work in this very competitive business area. An exploratory study was developed, with a descriptive design, using a questionnaire to obtain information about the profile of the entrepreneurs of the company Bothânico Hair in distribution logistics (case study). As participants in this research, we selected about 12 natural cosmetics professionals working as distributors of a brand of natural products. The results obtained allow us to conclude that entrepreneurs are mostly male individuals, with medium training, experience in the area and able to take risks. Also noteworthy is its ability to identify new opportunities, openness to the adoption of new technologies and interest in innovating operational processes. In the same way, entrepreneurs feel the need to invest in knowledge and professional training that allows for strengthening, greater growth and sustainability of the business. The most outstanding characteristics about the qualities of entrepreneurs were: the ability to identify new opportunities, the ability to create or improve technologies and/or processes and take calculated risks. The data obtained allowed to draw a profile of the distributor of natural cosmetics, listing the ten main items that should be valued in a professional cosmetics entrepreneur.

Keywords: Entrepreneurship, Distributor, Natural Cosmetics, Logistics, Case study

1. Introduction

Technological, organizational and market integration changes, which have been taking place in the business environment in Brazil, contribute to significant changes in the search for new ways of understanding how to reinvent itself in a country that cannot guarantee economic stability. With all these changes, people are looking for a redirection in their professional life and new earning options and financial security. With this, entrepreneurship becomes a reality contextualized by individuals inserted in the business scenario (Dornelas, 2011).

These individuals look for opportunities that allow them financial stability and often fulfill their dreams of opening their own businesses. Gerber (2014) points out that the entrepreneur's profile transforms the most insignificant condition into a great opportunity. When analyzing how companies will behave in the market, considering that more important than their opening is their permanence in the market, and the causes of success or failure will depend a lot on the profile of the entrepreneur, on the people who make up the organizational environment (Müller et al., 2023).

The part that belongs to these individuals becomes very important for the economy and business sustainability (Javed et al. (2023), because, as stated by Dolabela (2008), the entrepreneur is the engine of the economy, he is an agent of change and motivation to overcome the challenges of commercial oscillation. The “physical

appearance" sector (cosmetics/beauty) is a business that moves billions of dollars a year worldwide, in which gigantic multinationals and small industries operate, as highlighted by ABIHPEC (2018).

As a result, Brazilian industries are working to explore this market, which has been demonstrating great commercial opportunities for the country. The continuous search for channels that make the undertaking feasible and sustainable, guaranteeing the entrepreneur, in this case the distributor, the expected return and security, so important for the realization of their projects in this business network.

Companies are working with channels for introduction, at points of sale, and the processes to sell their products and reach their target audience are quite varied. According to Kotker (2012), distribution is the most common way for companies to get their products to the right place. This stage is very important, since the entire flow of production will depend on the choice of distribution channel. It is an activity that is directly linked to the company's Marketing, therefore, a well-detailed strategy in the way the company will reach its target audience is of paramount importance.

Undertaking in the distribution sector one of the most important and fundamental pillars of this business constitutes the necessary conditions for opening new fronts to be explored and at the same time guaranteeing loyalty and innovation, in the commercial actions for the customers that the distributor managed to conquer in its commercial coverage network.

The aim of this investigation is to analyze the entrepreneurial profile of the distributor of Natural Cosmetics. Through a case study, it is intended to know the entrepreneurial profile of the distributors of the company Bothânico Hair, and how these characteristics can contribute to the success of the business.

2. Literature Review

In Brazil, the Cosmetics, Perfumes and Hygiene Products sector has shown continuous growth in recent years (BOLETIM FOCUS DO BANCO CENTRAL, 2018; ABIHPEC, 2018), largely due to the greater participation of Brazilian women in the labor market, the constant launch of of new products to respond to market needs, as well as the increase in life expectancy, making it necessary to preserve a more youthful impression.

Calvacanti (2012) considers that societies cannot evolve without entrepreneurs. However, he defends the creation of a technological park and greater government intervention in order to encourage entrepreneurship.

Boava and Macedo (2009) add that society is not the generator of entrepreneurship, as it only creates the conditions for its development. However, the entrepreneur is of paramount importance for the survival of the economy, enabling the generation of wealth, employability, innovation and competitiveness of different sectors (Gjergji et al., 2022; Patzelt et al (2021).

According to Schumpeter (apud Mintzberg et.al; 2000), capital is not necessarily the main item that the entrepreneur must have, but the identification of business opportunities, ideas, resilience and the ability to take considered risks. In this way, Dolabela (2008) considers that the entrepreneur is a being who imagines, develops and realizes the vision, being the product of the society where he lives (entrepreneurial culture)

In the study of entrepreneurship, profile identification is a very important and comprehensive practice. Profiles are generally positively associated with the success of entrepreneurs. According to Pereira and Santos (1995, p.45), "every person is the result of a constant good relationship between the talents and characteristics he inherited and the various environments he frequented during his life". Coexistence at school, with family, friends, work, among others, makes it possible to develop personality traits and talents and at the same time may inhibit or weaken others (Gjergji et al., 2022; Patzelt et al., 2021; Müller et al. . 2023).

This phenomenon occurs throughout life and, generally, entrepreneurial characteristics are related to: needs, knowledge, values, attitudes and skills.

According to Lezana and Tonelli (1998) and Sheedy (1996) the main needs of the entrepreneur can be described as approval, the search for family recognition, a position in society, respect for friends, increasing status, achieving something and having the recognition for that. And with this activity, they intend to control their destiny, be independent and achieve personal fulfillment (Müller et al., 2023; Javed et al. 2023).

However, given the dynamics of markets and technological evolution, knowledge (technical, scientific, of the market) is required, a necessary condition to achieve greater organizational performance (Oliveira, 2003; Gramigna, 2013; Gjergji et al., 2022; Patzelt et al. 2021; Müller et al. 2023; Javed et al. 2023).

In turn, Lezana and Tonelli (1998) highlight the role of values (existential, aesthetic, intellectual, moral and religious) and attitudes of entrepreneurs (Robbins, 2010; Cunha et al, 2005) as determinants in identifying opportunities, management of the business team, in the decision-making process about the business project and/or business (Javed et al. 2023; Müller et al. 2023).

The opening of new distribution channels generates opportunities for the creation of new companies, managing the connection and intermediation between products and consumers (Kotler, 2012), providing the generation of value to the consumer in the acquisition, consumption and disposal of products and services (Pelton, Strutton & Lumpkin, 1997). As an organization, distributors turn to marketing to assert their value proposition and create demand, filling the main gaps in time, place and ownership (Lambin, 2000) that distance goods and services from those who wish to use them. A well-planned distribution logistics and a dynamic and innovative marketing of the distributor, allows a competitive differential in relation to the competitors (Rosenbloom, 2002), in an increasingly competitive and fragmented market. According to the author, the success of the distribution process is basically the interaction of people and the experiences they provide to their customers at the point of sale.

3. Methodology

Based on the research problem (what is the entrepreneurial profile of the cosmetics distributor of the company "Bothânico Hair" in the distribution logistics in the municipalities of Minas Gerais?) the objectives of the study were defined.

The general objective is to analyze the entrepreneurial profile of the distributor of Natural Cosmetics. In specific terms (Cervo & Bervian, 2007) it is intended to: identify the importance of the distributor in the distribution logistics of Natural Cosmetics; identify the Natural Cosmetics distributor profile; identify the entrepreneurial profile of Natural Cosmetics distributors.

As a methodological design, exploratory research was used, with a descriptive design, focusing on a quantitative case study (Gil, 2010), using a questionnaire to collect data.

The questionnaire contained 36 questions, including questions referring to the socio-demographic profile of the participants. The questions were divided into 5 groups with closed questions, using a 5-point Likert-type scale, in which "1" meant "I totally disagree" and "5" "I totally agree".

Twelve natural cosmetics professionals who work as distributors of a brand of natural products "Bothânico Hair", located in the state of Minas Gerais, participated in the study. The participants have a bond with the company, with the representation of the brand through a contract signed between the company and the distributor, on an exclusive basis in the area signed between the parties.

4. Analysis of results

The state of Minas Gerais is the fourth largest state among the 27 that make up the Brazilian federation, ranking 2nd in territorial extension of 586,520.732km² (IBGE, 2018). According to SEBRAE (2018), twelve out of every 100 creative economy businesses in Brazil are located in the state of Minas Gerais. There are 63,000 companies, the vast majority of micro and small companies. The state ranks second in the country in job generation in the sector, with a representative number of more than 457,000 people employed in the various activities of the so-called creative economy.

Bothânico Hair started its activity in 2002 and currently employs 45 people. It presents a mix of more than 100 products, being one of the most developed companies in the hair cosmetics market in Brazil. It is present in more than 18 Brazilian states, through the exclusive distribution process. It is in the state of Minas Gerais that it has a greater number of distributors (13 distributors).

Twelve of the 13 distributors who work in the state of Minas Gerais responded to the questionnaire. It is observed that most professionals are between 25 and 34 years old and between 35 and 44 years old, that is, characterizing a more experienced professional profile. With regard to marital status, it is observed that most are married (58.3%). As for education, it is observed that the majority (41.7%) have Completed or Incomplete Higher Education.

When analyzing the characteristics most related to entrepreneurship, it is observed that most of the distributors already have an occupation in the area, exercising the function of Administrator (33.3%) or Entrepreneur (25%).

These professionals perform this function even with brief experience. Most are in the profession between 1 and 3 years. Only 25.0% of professionals have been in the business for a longer time, with more than 10 years of experience.

Table 1. Natural Cosmetics Distributor Profile

	F	%
Marital status		
Married	7	58,3%
Stable union	3	25,0%
Single	2	16,7%
Profession		
Administrator	4	33,3%
Business Person	3	25,0%
Administrative Assistant	2	16,7%
Commercial Manager	1	8,3%
Trade Representative	1	8,3%
Did not answer	1	8,3%
Age Group		
Up to 24 years	2	16,7%
From 25 to 34 years old	5	41,7%
From 35 to 44 years old	5	41,7%
Education		
Teaching Medium Complete/	2	16,7%
Incomplete Teaching Superior	5	41,7%
Graduate/ Master/ Doctorate	2	16,7%
Did not answer	3	25,0%
Professional Exercise Time		
Between 1 and 3 years	4	33,3%
Between 4 and 5 years	2	16,7%
Between 6 and 10 years	3	25,0%
Over 10 years	3	25,0%

The following table presents the summary statistics of the questionnaire items. The item with the highest evaluation score is: 27 - Conveys integrity and reliability (M=4.5) and the item with the lowest value is 16 - Does not conform to the status quo (M=3.5) and 14 - Able to define concepts and detail ideas (M=3.5).

Table 2 - Descriptive statistics of the evaluated items

	Average	Median	Standard deviation	Minimum	Maximum
1- Proactivity in decision making	3,67 (3,25 - 4,08)	4,00	0,65	3,00	5,00
2 - Tenacity, obstinacy	4,08 (3,76 - 4,41)	4,00	0,51	3,00	5,00
3 - Discipline and Dedication	4,17 (3,71 - 4,62)	4,00	0,72	3,00	5,00
4 - Persistence in solving problems	4,08 (3,58 - 4,59)	4,00	0,79	3,00	5,00
5- Willingness to sacrifice to achieve goals	4,42 (3,99 - 4,84)	4,50	0,67	3,00	5,00
6 - Total immersion in the activities it develops	4,17 (3,71 - 4,62)	4,00	0,72	3,00	5,00
7 - Seeks to have in-depth knowledge of customer needs	4 (3,53 - 4,47)	4,00	0,74	3,00	5,00
8 - Is driven by the market (Market Driven)	3,73 (3,29 - 4,16)	4,00	0,65	3,00	5,00
9 - Obsession with creating value and satisfying customers	4,42 (4,09 - 4,74)	4,00	0,51	4,00	5,00
10 - Takes calculated risks (Analyzes everything before acting)	3,83 (3,38 - 4,29)	4,00	0,72	3,00	5,00
11 - Try to minimize the risks	3,75 (3,2 - 4,3)	4,00	0,87	2,00	5,00
12 - Tolerance of uncertainty and lack of structure	3,67 (3,17 - 4,16)	4,00	0,78	2,00	5,00
13 - Stress and conflict tolerance	3,5 (3,07 - 3,93)	3,00	0,67	3,00	5,00
14 - Skilled at solving problems and integrating solutions	3,92 (3,59 - 4,24)	4,00	0,51	3,00	5,00
15 - Unconventional, open minded, thinker	4 (3,53 - 4,47)	4,00	0,74	3,00	5,00
16 - Does not conform to the status quo	3,5 (2,99 - 4,01)	3,00	0,80	3,00	5,00
17 - Skilled in defining concepts and detailing ideas	3,5 (3,07 - 3,93)	4,00	0,67	2,00	4,00

	Average	Median	Standard deviation	Minimum	Maximum
18 - Don't be afraid to fail	3,58 (2,89 - 4,27)	3,50	1,08	2,00	5,00
19 - Orientation to goals and results	4,08 (3,66 - 4,51)	4,00	0,67	3,00	5,00
20 - Driven by the need to grow and achieve better results	4,25 (3,96 - 4,54)	4,00	0,45	4,00	5,00
21 - Doesn't care about status and power	3,58 (2,89 - 4,27)	3,50	1,08	2,00	5,00
22 – Self confidence	3,92 (3,34 - 4,49)	4,00	0,90	2,00	5,00
23 - Aware of your weaknesses and strengths	4,25 (3,7 - 4,8)	4,00	0,87	2,00	5,00
24 - Has a sense of humor and tries to be cheerful	4,33 (3,92 - 4,75)	4,00	0,65	3,00	5,00
25- Have initiative	4,17 (3,64 - 4,7)	4,00	0,83	2,00	5,00
26 - Power of self control	3,92 (3,34 - 4,49)	4,00	0,90	2,00	5,00
27 - Conveys integrity and reliability	4,5 (4,07 - 4,93)	5,00	0,67	3,00	5,00
28 - Is patient and knows how to listen	4,42 (3,99 - 4,84)	4,50	0,67	3,00	5,00
29 - Knows how to build teams and teamwork	4,25 (3,86 - 4,64)	4,00	0,62	3,00	5,00

To better understand the profile of cosmetics distributors, the top 10 items with the best evaluations were listed. In this way, it will be possible to know the items with the highest scores and importance for professionals (figure 3). For distributors, the most excellent item is “Conveys integrity and reliability”, followed by “obsession in creating value and satisfying customers” and “willingness to sacrifice to achieve goals”. These items reinforce how much natural cosmetics distributors are concerned with ensuring excellence for their customers, sparing no efforts to achieve them.

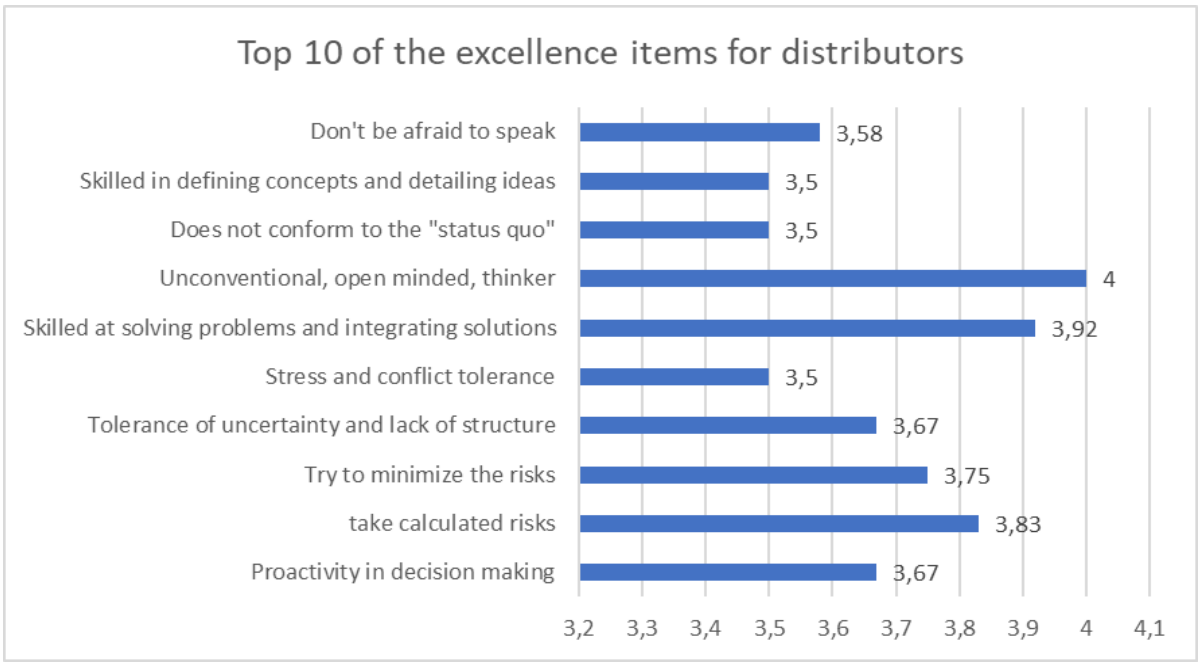

Figure 3. Top 10 positive evaluation items

The entrepreneurial profile of distributors was evaluated based on 5 dimensions. The results show that the Leadership attribute is extremely important for distributors (M=4.25). This is followed by the “Commitment and determination” dimension (M=4.10). On the other hand, creativity, self-confidence and ability to adapt are attributes, although positive, need to be improved (M=3.65).

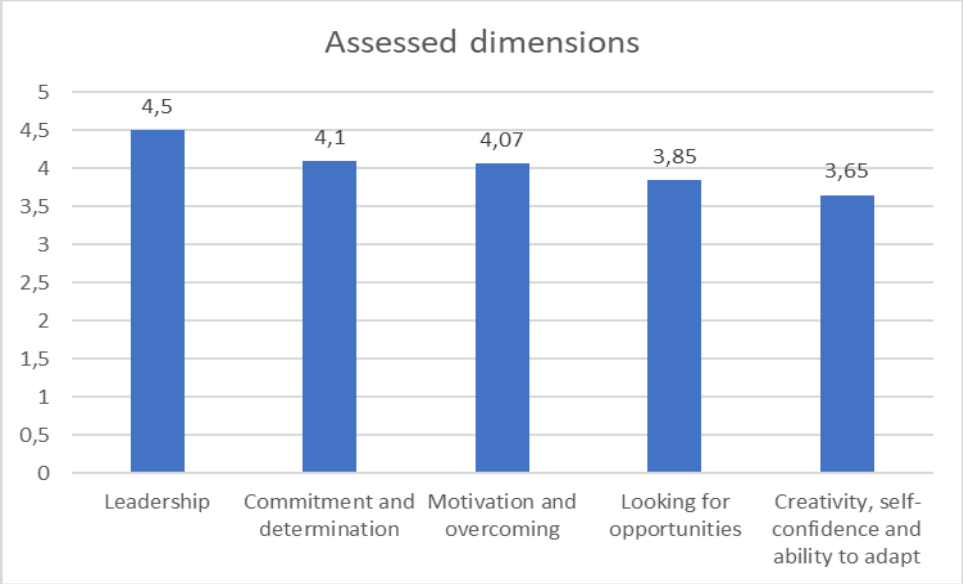

Figure 4. Mean of evaluated dimensions

5. Discussion of Results

With regard to leadership for distributors, it was noticed that those with a longer profession were able to stand out, being crucial to achieving the organization's objectives, as evidenced by Barlach (2012), Guedes (2008) and Javed et al. (2023).

The results on commitment and determination show that distributors who are aged (35 to 44 years) and longer in service (6 and 10 years), tend to be more focused and seek the goals set through the experience gained with the time. Along the same lines, Valdemir (2009) states that commitment involves learning, the importance given to how to learn, that is, the variety and intensity of ways used to do so, as well as the time dedicated to this end.

According to the indices found on motivation and resilience, these were more present in the responses of more experienced distributors, with an age group between (35 and 44 years), with a representativeness of 66.7%, demonstrating that they can motivate themselves and overcome its challenges, as evidenced by Guedes (2008) and Marques (2018).

The vision of being an entrepreneur is linked to the possibility of the individual seeing a good business option, due to this issue, the opportunity variable, brings results that show that education is fundamental for distributors (Vacilotto, 2018; Fagundes, 2016; Javed et al, 2023). This data was representative, emphasizing that the qualification acquired with the postgraduate/master's/doctorate means that the understanding of an opportunity has to be backed up with knowledge.

With regard to creativity, self-confidence and adaptation, it was evident that distributors rely on the career they pursue throughout their lives, and experience allows them to increase confidence and agility in identifying opportunities and adapting to changes (Silva, 2016; Patzelt et al. 2021).

When analyzing the indexes found, a significant relevance was observed in the 10 that stood out the most:

(1) Proactivity in decision-making, as stated by Rocha (2013), assumes the ability of distributors to anticipate and take responsibility for decision-making (Müller, 2023);

(2) Taking calculated risks (analyze everything before acting), reports that the distributor focuses on analyzing the risks inherent in the business, thereby ensuring greater peace of mind when referring to what can affect the success of the enterprise (Zilch, 2016 ;Müller et al.2023);

(3) Distributors demonstrate that they seek to minimize risks, as recommended by the literature (Garcia, 2013; Assi, 2010);

(4) tolerance of uncertainties and lack of structure shows that the distributor has good acceptance in this regard, contributing to face new challenges, as mentioned by Baldaia (2012), Andreasi (2013) and Müller et al. (2023);

(5) The distributor showed in the 3.50% found in the variable tolerance to stress and conflicts, that even in non-occasional issues, the absorption of the impacts in the situation, one must always maintain control, and be able and tolerant for the resolution of the conflicts. This result is in line with the works of Araújo (2008), Cunha and Leitão (2016) and Gjergji et al. (2022);

(6) The distributor demonstrated that he is able to solve problems and integrate solutions, being decisive in entrepreneurial activity (Cristofolini, 2016; Marques, 2017; Müller et al. 2023).

(7) When analyzing the unconventional, open-minded, thinker index, it was observed that there was an expressiveness in the percentage found, as distributors demonstrated that a concern about not being convenient, always seeking to innovate and be open-minded to new ideas, as recommended by Brussel (2014), Bravin (2015), and Gjergji et al. (2022);

(8) The study shows that non-conformity with the status quo describes a distributor that is still stagnant and not very confident in continuous change. For Souza (2012), many people wrongly label entrepreneurs, not conforming to the way things are happening is a very important virtue that can make all the difference in relation to others.

(9) In the variable able to define concepts and detail ideas, a study shows that the distributor is prepared to analyze existing concepts and ideas. Araújo (2010), in this line, describes that having skills capable of understanding concepts within the organization and identifying and filtering ideas are essential entrepreneurial characteristics.

(10) The distributor showed in the variable not afraid to fail that his confidence in this regard is unknown, showing fear for his future and his activity.

6. Conclusion

The study carried out showed that the distribution logistics is an operation that needs the distributor intensely. The data show that the industry produces and the distributor delivers its products, logistics that is in charge of the distributors, so the brand needs intensely a good relationship between the distributor and the market. The notoriety that can be described in relation to how much it is necessary to understand that the distributor is a fundamental part in the cosmetics distribution operation.

In terms of the profile of the distributors, the data show a distributor, mostly male, having completed high school, with regard to decision-making, an individual with experience in the area and able to take risks, from that are calculated. The idea of knowing how to behave when seeing an opportunity was visible when analyzing the indexes, the distributor demonstrated that it is flexible to new technologies and always looking to innovate operational processes. With an overview of the distributor, it is believed that he is a born entrepreneur, innovative and always open to new ideas, but like any other individual, he needs to continuously seek training and guidance for his personal and professional growth and strengthening.

The characteristics of the most prominent entrepreneurs were the intelligence to identify an opportunity, to improve an idea or even to invent something that did not exist. The profile of the entrepreneur of the distributor of Natural cosmetics, is of an individual who has experience in the field, all male, with an ideology that a risk is only worth it if it is calculated, their time in the profession varies between 6 and 10 years, with management carried out by the distributor itself.

Identifying the profile of a company's entrepreneur will allow working on training and qualifying these distributors, working on deficiencies found and improving positive and essential characteristics to achieve success.

Given that the study focused only on one company and in the State of Minas Gerais, it is suggested for future work to extend the study to other organizations in the sector and regions of Brazil.

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Enhancing Customer Engagement on Business Facebook Pages in the Fuel Retail Sector

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Abstract: Social networks change the way how companies conduct their marketing activities. Potential customers become part of companies' marketing activities instead of just being passive participants. The ability to actively involve customers thus becomes a critical factor in the success of marketing activities. The study aims to determine how the posts' different content on the companies' Facebook pages affects the engagement of the message recipients. A retrospective, longitudinal study approach was used. Five hundred fifty-three posts from the four Slovak largest fuel retail sellers' Facebook pages were analyzed. The results revealed the significant difference in the medians of the passive engagement ($\chi 2$ (3, N = 533) = 85.685, p-value = < 0.0001) and active engagement ($\chi 2$ (3, N = 533) = 85.685, p-value = < 0.0001) according to different content types. The paired rank differences suggest that while entertainment messages (EM) significantly encourage both types of engagement (passive and active), informational messages (IM) and social messages (SM) encourage mainly passive engagement. The study extends the research on active and passive customer engagement, and thus, it contributes directly to understanding engagement and customer experience with social media and expands the knowledge about the Facebook content strategy. Finally, it offers recommendations for future research in the examined area.

Keywords: Content, Engagement, Fuel, Retail, Facebook

1. Introduction

Social networks such as Facebook, Instagram, and Twitter affect how today companies deliver their services (Zilber et al., 2019), and conduct their marketing communication activities (Dušek & Sagapova, 2022). The developments in information communication technologies (Obeng, 2021), and the usage of those innovative networks have also accelerated the digitalization of companies (Shu-Hua, 2022) and have increased their e-commerce activities (Hassan & Lee, 2021) and probabilities to survive (Ključnikov et al., 2022). Moreover, the usage of those networks by companies has not only increased their innovativeness but also their competitiveness (Civelek et al., 2020) to weaken their rivals‘ competitive power (Civelek et al., 2021). Those innovative actions have also increased the peroformance of companies (Ključnikov et al., 2021).

Since many people have mobile phones that enable people to access those networks, there is an increasing interest in marketing activities via those networks (Stefko et al., 2022). In particular, marketing activities are increasingly being transferred to social networks because they easily allow reaching right customers, include them to participate in marketing activities (Rehman et al., 2020), and make them more aware about the benefits of companies' products (Dincă et al., 2019; Stefko et al., 2020a). The ability to actively involve customers in marketing activities becomes a critical factor of companies' success (Rozsa et al., 2020; Godany & Mura, 2021), and profitability (Štefko et al., 2020b), mainly because their resources for traditional forms of marketing are limited (Kotaskova et al., 2020). Social media have a positive impact on the entrepreneurship intention of a student to start doing business (Ojewumi, Fagbenro, 2019) and also for raising of the entrepreneurship in many lines of business (e.g. in services (Ferencakova et al., 2020), tourism (Srovnalíková et al., 2020) or transportation (Bertan, 2020).

Facebook, as the most popular social network in the Slovak Republic (Hootsuite, 2019), allows customers to engage with organizational messages through different tools (Like (in various forms), Share, and Comment) (Cho et al., 2014). However, not all tools indicate the same customer engagement. For instance, sharing and commenting requires more appreciable support from customers, and thus it can be considered as a more engaging behavior (Bitiktas et al., 2020; Cooper et al., 2019; Kent et al., 2020; Ngai et al., 2020; Rakoczy et al., 2019; Rajnoha et al., 2016; Mura et al., 2021; Popp et al., 2018) than liking. Consequently, companies should achieve higher levels of the customers' engagement because it positively impacts outcomes such us sales, competitive advantage, profit, and brand evaluation (Gruss et al., 2020; Harrigan et al., 2017; Kim et al., 2020; Rather, 2020; So et al., 2016; Zheng et al., 2016, Zámečník et al., 2015). Nevertheless, the link between the

content and customer engagement in the form of likes, comments, and shares is still under-researched (Ngai et al., 2020).

Because of the above reasons, the study aims to determine how the different content of the posts on the companies' Facebook pages affects customer engagement to address the mentioned research gap. However, unlike already published studies, which in most cases deals with the influence of post type (f. e. link, status, picture, video, (Siyam et al., 2020; Thongmak, 2015; Villamediana-Pedrosa et al., 2019; Wijonarko et al., 2019)), media richness (Banerjee et al., 2019; Moran et al., 2019) or posts' frequency or timing (Fähnrich et al., 2020; Mariani et al., 2018) on customer engagement, this study focuses on posts' text analysis, specifically in terms of used message type (informational, entertainment, remuneration, social).

The paper contains four sections, besides this introduction. Firstly, it presents a brief theoretical background on customer engagement and social media message categorization. Secondly, the methodology section explains the research context, methods of data collection, and analysis. After that, the results are discussed. Afterward, suggestions for further research and the study's limitation are presented in the conclusion.

2. Literature review

Customer engagement marketing is defined as a company's "deliberate effort to motivate, empower, and measure customer contributions to marketing functions"(Harmeling et al., 2016), beyond purchasing (Kim et al., 2020). Customer engagement (CE) in the online environment refers to the motivational state that occurs through the interactive experience with brand content on social networks and is expressed in the form of relevant cognitive, emotional, and behavioral practices such us sharing company's messages, writing reviews, recommending company's products and other similar activities (Abuljadail et al., 2019; Avnet et al., 2018; Brodie, 2011; Dolan et al., 2019; Eigenraam et al., 2018; Hollebeek et al., 2014). Therefore, this study operationalizes CE as customers' liking, commenting, and sharing behaviors on a company's activities on the Facebook Page (Gruss et al., 2020).

Several authors divide individual customer responses on Facebook (or social media in general) into those that require less or more customer involvement (Cooper et al., 2019; Dolan et al., 2019; Malthouse et al., 2013; van Asperen et al., 2018). Van Asperen et al. (2018) recognize two forms of social media engagement. Passive (engagement) which is based primarily on consuming social media content, and active (engagement) which occurs when customers contribute to social media. Similarly, Cooper et al. (2019) consider liking as a static measure that is not good for engagement measurements because of customers' limited interaction. On the other hand, they indicate that commenting is the highest form of engagement, requiring the customers to write and post their thoughts or tag friends and thus provides them with the opportunity to engage in dialogue with brands and their own social networks simultaneously (Cooper et al., 2019). A highly engaged customer might even choose to distribute an independent review of the company's product or reveal promotional offers that the company might prefer not to expose to a wide audience (Malthouse et al., 2013). In accordance with the above-mentioned research works, the study operationalizes passive engagement customer behaviors which manifests itself as liking (i.e. Like, Love, Haha, Wow, Sorry, Anger) of the company content and active engagement as the commenting of the company content. Sharing company content is also considered an active form of engagement, despite the fact that this contradicts with the above findings, mainly due to the fact that by sharing company content, the customers actively identify with the company among their friends. Customer reviews are not classified because they are not the subject of this study.

Based on the Uses and gratifications theory (UGT), which explain how media consumers' social and psychological needs are satisfied by actively choosing media channels and information (Li et al., 2019), social media content can be categorized into four main groups as follows (Dolan et al., 2016): Informational, Entertaining, Remunerative, Relational (social interaction) content. Informational messages contain resourceful and helpful information about the company brand or its products and services. Entertainment messages are a type of messages which contain fun and entertaining information and do not directly encourage the customer to consume the company's products or services such as questions, quiz memes, funny videos. Remuneration company messages include specific monetary and rewards information such as special promotions, trials or other offers. Social messages contain information that usually occurs in personal interaction and may include information such as shared personal experience, sociable events (e.g. Birthdays) or small talk (Dolan et al., 2019; Kujur et al., 2020; Vaičiukynaitė et al., 2018; Seilerová, 2019). In line with the UGT, these four specific types of content result in different expressions of active and passive engagement (Dolan et al., 2019).

3. Methodology

The study aims to determine how the different content of the posts on the companies' Facebook pages affects the engagement of the message recipients. The hypotheses were formulated as follows:

- H1: Diverse post content does not lead to different degrees of passive engagement on the companies' Facebook pages.
- H2: Diverse post content does not lead to different degrees of active engagement on the companies' Facebook pages.

A retrospective, longitudinal study approach was used. The four largest companies engaged in the retail sale of fuels in the Slovak republic were selected as participants in the study. Data (posts) from participants' company Facebook pages were extracted using the Fanpage Karma web application (https://www.fanpagekarma.com/) for 12 months period (from 1st August 2019 to 31st July 2020). A total of 556 posts were collected. Thirty-six of them were excluded because they did not contain text; therefore, 553 posts were used for further analysis (see Table 1).

Table 1: The study participants

Participant	Facebook page ID	Number of Posts	% of Total
Benzinol	1089162457824646	109	20.45%
OMV Filling Stations (SK)	342218085894136	148	27.77%
Shell	304290527049134	128	24.02%
Slovnaft	52904571954	148	27.77%
All		**533**	**100.00%**

Source: own calculations

Deductive coding was used to analyze posts' content (independent variable). Firstly, the flat coding frame was set with codes as follows: informational message (IM), entertainment message (EM), remuneration message (RM), social message (SM). Secondly, three doctoral students were hired to assign codes to posts manually. To eliminate cognitive biases, coders checked one another's coding, and the founded differences were resolved by mutual agreement. Table 2 presents the posts coding final results.

Table 2: Posts coding final results

Participant	EM Count Total % Col% Row%	IM Count Total % Col% Row	RM Count Total % Col% Row	SM Count Total % Col% Row	Total Count Total % Col% Row
Benzinol	27	41	24	17	109
	5.07	7.69	4.5	3.19	20.45
	32.14	22.04	22.43	10.9	
	24.77	37.61	22.02	15.6	
OMV Filling Stations (SK)	26	44	30	48	148
	4.88	8.26	5.63	9.01	27.77
	30.95	23.66	28.04	30.77	
	17.57	29.73	20.27	32.43	
Shell	14	50	30	34	128
	2.63	9.38	5.63	6.38	24.02
	16.67	26.88	28.04	21.79	

Participant	EM Count Total % Col% Row%	IM Count Total % Col% Row	RM Count Total % Col% Row	SM Count Total % Col% Row	Total Count Total % Col% Row
	10.94	39.06	23.44	26.56	
Slovnaft	17	51	23	57	148
	3.19	9.57	4.32	10.69	27.77
	20.24	27.42	21.5	36.54	
	11.49	34.46	15.54	38.51	
Total	**84**	**186**	**107**	**156**	**533**
	15.76	**34.9**	**20.08**	**29.27**	

Source: own calculations

The dependent variables were calculated as follows. The passive engagement was calculated as the sum of all forms post's Likes (i.e., Love, Haha, Wow, Sorry, Anger). The active engagement was calculated as the sum of the post's comments and shares. The above procedure corresponds with studies of Cooper et al., 2019; Dolan et al., 2019; Malthouse et al., 2013; van Asperen et al., 2018.

Before data analysis, ANOVA assumptions were checked. The normal quantile plot and the Anderson–Darling test showed that both Passive (p-value < 0.0001) and Active (p-value < 0.0001) engagement data are from a non-normal distribution. Bartlett test of homogeneity of variances showed that data were not from populations with equal variances (Passive engagement data p-value < 0.0001, Active engagement data p-value < 0.0001). Because the ANOVA's assumptions were severely violated Kruskal-Wallis Test instead of an ANOVA was used. SAS JMP 15 was used for all calculations.

4. Results and discussion

The results of the passive engagement data analysis indicate that there is a significant difference in the medians, $\chi 2$ (3, N = 533) = 46.1106, p-value = < 0.0001 (see Tab. 3), and thus H1 can be rejected. Because the overall test is significant, pairwise comparisons among the four groups should be completed.

Table 3: Kruskal-Wallis Tests (Rank Sums) for passive engagement

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
EM	84	30014.5	22428	357.315	5.856
IM	186	50263.5	49662	270.234	0.355
RM	107	22137.5	28569	206.893	-4.516
SM	156	39895.5	41652	255.74	-1.086
Total	533				

Source: own calculations

The p-values indicates that we should reject the null hypothesis that the paired rank differences in passive engagement are symmetric around zero between SM and RM (p-value = 0.0222), RM and IM (p-value = 0.0002), SM and EM (p-value < 0.0001), IM and EM (p-value < 0.0001), and RM and EM (p-value < 0.0001).

Table 4: Comparisons for each pair using Wilcoxon Method (Passive engagement)

Level	- Level	Score Mean Difference	StdErr Dif	Z	p-Value
SM	RM	21.83	9.54597	2.28683	0.0222

Level	- Level	Score Mean Difference	StdErr Dif	Z	p-Value
SM	IM	-10.1542	10.7329	-0.94608	0.3441
RM	IM	-37.9831	10.27869	-3.69533	0.0002
SM	EM	-41.7582	9.39493	-4.44477	<0.0001
IM	EM	-49,0870	10,26449	-4,78221	<0,0001
RM	EM	-52,3720	8,05785	-6,49950	<0,0001

Source: own calculations

Table 4 also presents the pairwise differences in passive engagement, which can be interpreted as follows: Difference scores above zero mean that the engagement of the message type in the first-row exceeds engagement of the message type in the second-row. Analogically, difference scores below zero mean that the engagement of the message type in the second-row exceeds engagement of the message type in the first-row. Practically speaking, we conclude with 95% certainty that performance (passive engagement) of the social messages (SM) exceeds the performance of the remuneration messages (RM, the median of the difference in performance fall between 1 and 18); that performance of the informational messages (IM) exceeds the performance of the remuneration messages (RM, the median of the difference in performance fall between -22 and -5). Also, we can conclude that the entertainment messages (EM) exceed the performance of the social messages (SM, the median of the difference in performance fall between -77 and -28), informational messages (IM, the median of the difference in performance fall between -76 and -30), and remuneration messages (RM, the median of the difference in performance fall between -99 and -52).

The results of the active engagement data analysis indicate that there is a significant difference in the medians, $\chi 2$ (3, N = 533) = 85.685, p-value = < 0.0001 (see Tab. 5), and thus H2 can be rejected. Because the overall test is significant, pairwise comparisons among the four groups should be completed.

Table 5: Kruskal-Wallis Tests (Rank Sums) for Active engagement

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
EM	84	34147.5	22428	406.518	9.051
IM	186	47911	49662	257.586	-1.033
RM	107	24300	28569	227.103	-2.999
SM	156	35952.5	41652	230.465	-3.525
Total	533				

Source: own calculations

The p-values indicate that we should reject the null hypothesis that the paired rank differences in active engagement are symmetric around zero between RM and EM (p-value < 0.0001), SM and EM (p-value < 0.0001), and IM and EM (p-value < 0.0001).

Table 6: Comparisons for each pair using Wilcoxon Method (Active engagement)

Level	- Level	Score Mean Difference	StdErr Dif	Z	p-Value
SM	RM	-0.1103	9.53748	-0.01156	0.9908
SM	IM	-18.5580	10.72753	-1.72994	0.0836
RM	IM	-19.6688	10.27209	-1.91478	0.0555
RM	EM	-62.4660	8.05336	-7.75652	<0.0001
SM	EM	-75.3938	9.39155	-8.02783	<0.0001
IM	EM	-80.5645	10.26211	-7.85068	<0.0001

Source: own calculations

Table 6 also presents the pairwise differences in active engagement, which can be interpreted as follows: Difference scores below zero mean that the engagement of the message type in the second-row exceeds engagement of the message type in the first-row. Practically speaking, we conclude with 95% certainty that performance (active engagement) of entertainment messages (EM) exceeds the performance of the informational messages (IM, the median of the difference in performance fall between -165 and -69), social messages (SM, the median of the difference in performance fall between -164 and -63), and remuneration messages (RM, the median of the difference in performance fall between -174 and -65).

The previous results also suggest that while entertainment messages (EM) significantly encourage both types of engagement (passive and active), informational messages (IM) and social messages (SM) encourage mainly passive engagement.

The results of this research in line with Dolan et al. (2019) or Svec & Mura (2020) demonstrate that the effectiveness of different types of social media content have varying effects on social media engagement behavior. Contrary to Vaičiukynaitė & Gatautis (2018) and Mura et al. (2018) they show that in the fuel's retail sector social messages do not support active engagement.

5. Conclusions

As part of their social media marketing efforts, many company brands seek to communicate with the customers online. They create Facebook Fan Pages, submitting posts, and try to involve customers in their marketing activities through liking, sharing, and commenting published content. The importance of content is frequently highlighted (Eggers et al., 2017). Especially in the service sector, where the use of social media platforms is the most significant (Bejtkovsky et al., 2018). However, few studies consider the effort and resources the content creation process takes, or what alternative tactics can be employed (Kraus et al., 2019; Mészáros et al., 2019) to create compelling content. Firms in manufacturing industry can be example for this fact since they implement technological developments into their operations more than other firms from various industries (Civelek, & Krajčík, 2022).

The study aimed to determine how the different content of the posts on the companies' Facebook pages affects the engagement of the customers. The results revealed that different content types (Informational, Entertaining, Remunerative, Social) affect differently passive and active engagement. Specifically, entertainment messages (EM) significantly encourage both types of engagement (passive and active), informational messages (IM), and social messages (SM) encourage mainly passive engagement.

These findings show that social media marketers should better select content based on their marketing goals, as well as provide a potential explanation for the success of campaigns, gingerly. For instance, they should be careful with using entertainment messages even if they cause a high degree of engagement, because their significance for achieving other marketing outputs may be questionable.

Although the study extends the research on passive and active customer engagement in relation to the content type, the results should be generalized with consideration of the following limitations. Firstly, the study focused exclusively on one social network channel (Facebook). Secondly, posts on the Facebook pages in the fuel's retail sector were analyzed.

In the future research, it would be useful to address the limitations of this research and other content strategy elements, such as another network channel, and passive and active customer engagement, according to the types of appeals.

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Applicability of Theoretical and Practical Entrepreneurial Training and Development Programs for Start-ups

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Abstract*:* The main aim of the study is to find the gap between expectations and perceptions of entrepreneurial students regarding the service quality of the Entrepreneurial Development Program (EDP) they are enrolled at the idea-GYM, Central University of Technology in the Free State Province, South Africa. Expectations of a customer or a student refer to the beliefs about a service delivered by a company or institution as a standard or reference point against which the performance of the service received afterwards is judged. Knowing what the customer or student expects is a very important departure point in overall service delivery process. Customer perceived value is all about the quality service received and the satisfaction levels around the received service. Satisfaction is generally the broader concept, while service quality is focused specifically on the service delivery dimensions. A stratified random sampling technique was used to collect the data from the EDP students on the program of 2021 and 2022. Students completed the questionnaire on expectations before they started with the EDP program and then after the last session of the program, they completed the perception questionnaire. The results indicated that there were differences between the expectations and perceptions of the students related specifically to empathy and tangible dimensions of service quality. There were some significant differences between the expectations and perceptions of the students towards the service quality of the EDP which in most cases the perceptions were higher than what they expected beforehand from the program. Research limitations: The data was only collected from the current students attending the EDP program in 2021 and 2022. Moreover, the study focused only on the EDP program and the content within the program. The research methodology of this study is based on a pre-evaluation (expectations of the EDP program) and a post-evaluation (perceptions of the EDP program) after they were done with the content of the program.

Keywords: Excellent Service delivery, Expectation standards, Explicit service promises, Fostering Entrepreneurship

1. Introduction

Many students studying at a university are constantly looking for ways to start a new business or innovate their already existing businesses. This innovative thinking of students lets them always explore great new business ideas. Some of the students want to be the next Elon Musk or Jeff Bezos. The EDP program is the perfect study program for a student who wants to be an entrepreneur.

In South Africa, with an unemployment rate of 32,7% in Q4:2022, and an unemployment rate of 61% in the age group 16 to 25 years old, there needs to be some new solutions to starting businesses and creating job opportunities. According to the Quarterly Labour Force Survey (QLFS) for the fourth quarter of 2022, there were about 28 thousand more people who were unemployed than in Q3:2022 (Smit, 2023).

Addressing the world's youth unemployment challenge (including those in South Africa) requires a multipronged, long-term effort involving multiple stakeholders, such as governments, employers, educational institutions and civil society organizations – as well as families, communities and peer groups.

There are five basic strategies that could be pursued globally (Rush, 2015):

1. Boosting job creation and labour demand
2. Better preparing young people for the job market
3. Illuminating pathways to productive work
4. Improving financial well-being, both current and long-term
5. Fostering entrepreneurship

2. Literature review

2.1 Entrepreneurial training

The Entrepreneurial Development Program (EDP) was established at the Innovation Services Unit, Idea Generator / *i*-GYM (referred as *idea*-GYM in this article), CUT (https://www.cut.ac.za/idea-generator) in 2020 as a hybrid program presented online as well as in person. The aim is to help students with an entrepreneurial mindset to turn their dreams into a real business entity. The program is developed with different units related to all major

aspects of business and then the different units: environmental analysis, marketing, management, finance, etc., are in sequence to build up to a fully-fledged business plan for the entrepreneur.

Part of the practical aspects of the program is also that the participating student must apply what was learned in every session to their own business to ensure they have a business plan at the end of the sessions. Students will learn the basics of establishing and running a business, get to know the global environment and the industry marketplace, the necessary equipment and technologies that businesses will be using in the future, and develop a strong management and project management mindset. Entrepreneurial-oriented students can start living out their existing passion for creativity, innovation and business challenges and work on building it into a successful business plan. The EDP is for entrepreneurs to start up their own business or move their existing businesses forward to another level of doing business. And the best part? The entrepreneurs start working on their own business plan and do not make use of consultants for planning and writing a business plan, which means the entrepreneur is hands-on in the whole planning process of the business.

The EDP is a service that Central University of Technology (CUT) is delivering via the *i*(idea)-GYM (gymnasium) / Idea Generator Innovation Services Unit established in 2017 at CUT to entrepreneurial students as well as to other entrepreneurs in communities in and around the market environment of CUT. This study focuses on the expectations of entrepreneurs before they start with the program and their perceptions afterwards when they are done. The whole idea is to determine some gaps in the service delivery aspects of the EDP according to expectations and their perceptions.

2.2 Expectations vs. perceptions

Expectations of a customer or a student are beliefs about a service delivered by a company or institution as a standard or reference point against which the performance of the service received is judged. Knowing what the customer or student expects is a very important departure point in a service delivery process (Yap, et al., 2007).

Among the aspects of expectations that need to be explored and understood for successful marketing are the following: (Pabley, 2023)

- The type of expectation standards the entrepreneur is holding.
- What factors most influence the formation of these expectations?
- What role these factors play in changing expectations?
- How can service delivery meet or exceed the expectations?

In this article more detail will be provided on the expectations of student versus their perceptions after the service delivery to ensure that what is promised will be delivered.

Services are heterogeneous which means performance may vary depending on the person delivering the service. A customer will recognize and be willing to accept a variation in the service delivery process between the desired service and the adequate service, which will be determined by some personal and other aspects as discussed in the theoretical part. This level of expectation is called the Zone of Tolerance (Figure 1) (Zeithaml, et al., 2012).

In the case of the EDP program, the level of expectations can vary widely depending on the reference point the student holds. For example, a student from the Faculty of Management Sciences can have some higher expectations from the EDP program because the student is already more familiar with management, marketing and financial aspects of doing business, than an engineering student that does not have any reference to business-related aspects.

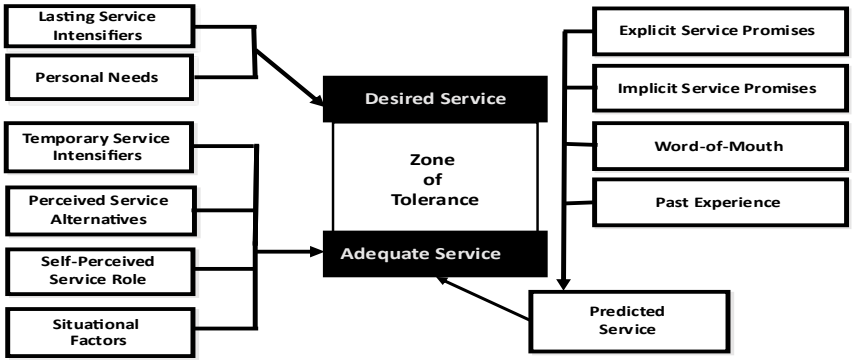

Figure 1: Factors that influence adequate service delivery

Source: (Wilson, et al., 2016)

2.3 What is Customer Perceived Value?

Customer perceived value *is the difference between the prospective customer's evaluation of all the* ***benefits*** *and all the* ***costs*** *of a* ***product / service*** *offering and the* ***perceived alternatives*** *(Zeithaml et al., 1997).* Customer perceived value is all about the quality service received and the satisfaction levels around the received service. Satisfaction is generally the broader concept, while service quality is focused specifically on the service delivery dimensions.

Figure 2 gives an indication of the service quality delivery and satisfaction. The service quality dimension consists of a few aspects, namely reliability, responsiveness, assurance, empathy and tangibles, while customer satisfaction is the customer's evaluation of the delivered service in terms of whether it has met the customer's needs and expectations.

Customer satisfaction is the feeling that a product has met or exceeded the customer's expectations. The question is now: How do consumers judge satisfaction? (Wilson, et al., 2016).

- Expectations: the anticipation or predictions of future service delivery by the chosen institution.
- The way in which the product or services they purchase will fulfill their wants and needs.
- For example, when an entrepreneur wants to attend a new training course like the EDP, the entrepreneur expects to gather some more knowledge around business principles to start or run a business more successfully.
- Satisfaction is thus a judgment of a pleasurable level of consumption related fulfillment.
- Consumers can experience higher or lower satisfaction levels, depending on if the product or service gives greater or lesser pleasure than anticipated.

As shown in Figure 2, multiple factors determine customer satisfaction. For this research study, the only aspects we are going to look at in more detail are the five dimensions of SERVQUAL. The SERVQUAL dimensions are the following: (Mauti, et al., 2013).

- Reliability - Service provider, in this case the *idea*-GYM, has the ability to provide service in the same way, it was advertised and promised. Reliability is a major factor in the program so that the entrepreneurs can have trust in the quality.
- Responsiveness - Provision of service at the exact time of need of the entrepreneurs and the availability of skilled staff to help the customers with answering questions applicable to their own business / business ideas swiftly.
- Assurance - Familiarity of staff with the service (being knowledgeable entrepreneurs with practical experience) so that they are in a position to deliver trust to the enrolled entrepreneurs.
- Empathy - Understanding of the needs of an entrepreneur and individualizing the knowledge to apply it to the entrepreneur's own business ideas while taking an interest and showing personal care.
- Tangibles - All the physical items that can be observed by human senses. In the case of this study, it is the presenters of the course, the PowerPoint presentation slides and the physical environment of the venue of the class.

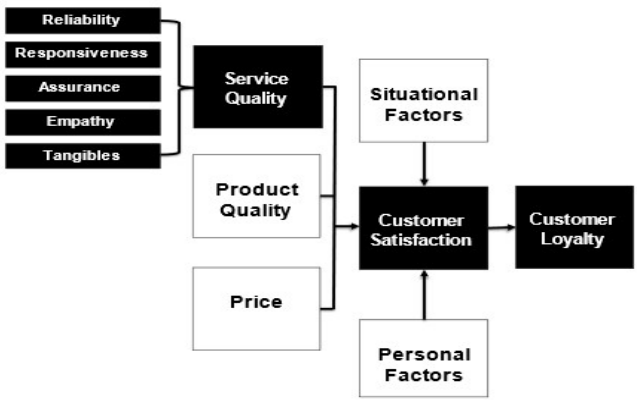

Figure 2: The link between service quality and satisfaction *Source: (Wilson, et al, 2016)*

Some of the factors mentioned in the data presented in Figure 2 are not applicable to EDP. For example, students do not pay to enroll in the program. Factors that are part of SERVQUL but can be highlighted that could possibly have an influence are the quality of the classes and the material they received. Some other factors, like situational factors, can have an influence, but the factors that are controllable by *idea*-GYM, like the venue, the lecturers, the material they receive and the availability of skilled people to help them, are fixed for all sessions (Zeithaml, et al., 2012). There can be some personal aspects that can influence each individual entrepreneur differently, but for this research study, they are not taken into consideration.

Excellence in entrepreneurial service like EDP, is the hallmark of success in service delivery in any industry, also in the teaching and learning environment that require reliable service. But what exactly is excellent service? It is the ability to deliver what you promise. First you must determine what you can promise. Building on many years of research on entrepreneurial service quality, the EDP construct a model that, by balancing an entrepreneur's perceptions of the value of receiving entrepreneurial business skills with the entrepreneur's need for that specific service, provides brilliant theoretical insight into entrepreneurial expectations and service delivery. For example, the EDP promise to save the entrepreneur valuable time and money when using the insight and matrix to do the necessary calculations to determine the feasibility of a business idea. The real perception of this action is realized when the entrepreneur used the matrix and concluded that this idea will not work because of various reasons. Procurement of the correct raw material is not available which will influence the product quality and then the market do not want to buy the product because of inferior quality (Lonita, 2023).

3. Methodology

Self-administered structured questionnaires were used to get the data from the EDP students on the CUT campus attending the sessions. Before the first session started, the EDP students had to complete the first questionnaire on their expectations of the program. The questionnaires include the following information: Section 1 comprises of some demographics of the student, while Section 2 is designed to measure the expectations of students around the impact of the program on some important business principles. The demographic part of the questionnaire was just to monitor if the student completed both questionnaires.

The second questionnaire around the perceptions of students was done just after the last session of the program. The same questions were asked regarding the impact of certain important business principles, but they had to give their perceptions around them. A three- and a four-point Likert scale were used for the different questions to describe the expected and the perceived impact of the program.

For this study, 52 questionnaires were distributed among the different students enrolled in the EDP, of which 46 were usable because they completed both the expectation and perception questionnaires. Six of the 52 questionnaires received were rejected because they were either incomplete or the expectation or perception questionnaire was not completed, leaving 88% of them usable. Cronbach's alpha statistical technique was used to measure the reliability of the overall data and reliability of each dimension of the expectation and perception. Paired sample t-test was used to find out the gap between the expectations and perceptions of the students enrolled in the entrepreneurship development program on offer at CUT Innovation Services.

4. Data analysis and results

According to the service delivery theory, the two main aspects to measure are what the customer expects (within each individual framework) before receiving the service and then their perceptions after receiving the service. For the purpose of this research study, two different questionnaires were used: a pre-questionnaire to get the expectations of the entrepreneurs related to some different business principles that are important to start and run a successful business and a post-questionnaire to get their perceptions on the same business principles. Figures 3a and 3B give the overall expectations and perceptions of different business principles, which are important to start and run a business.

Entrepreneurs have higher expectations of the following two aspects (see figure 3a):

- Entrepreneurial thinking – to let entrepreneurs think differently about doing business (55%).
- Feasibility and viability of their idea – to understand if their idea can really become a successful business (45%).

The entrepreneurs have a higher medium expectation of the following:

- Financial management (55%)

- Operations, Logistics and Purchasing management (54%)
- Project management (54%)

The high and medium expectations of management and marketing were equally distributed among the expectations of entrepreneurs, both lying at 45%.

Entrepreneurs with low expectations of the different aspects mentioned have lower than 20% and, in some cases, like management, marketing, operations and project management, even lower than 10%.

When comparing the expectations with their perceptions (Figure 3b) after the service delivery process, some interesting findings come out. The following are the perceptions of the respondents:

- Entrepreneurial thinking came out high at 82%, meaning that the program helps participants think more entrepreneurially after they are done with the EDP.
- Although the expectation for the financial outcome was not that high (27%), the perception came out at 91%. Meaning that the financial part of the EDP highly exceeded their expectations. Some other aspects that also exceeded their expectations were management, marketing and operations.
- Feasibility and viability are the aspects that came out lower at 37%, versus the expected 45%.
- The project management expectation and the perception of it came out on par, meaning that the entrepreneurs are satisfied with the outcome.

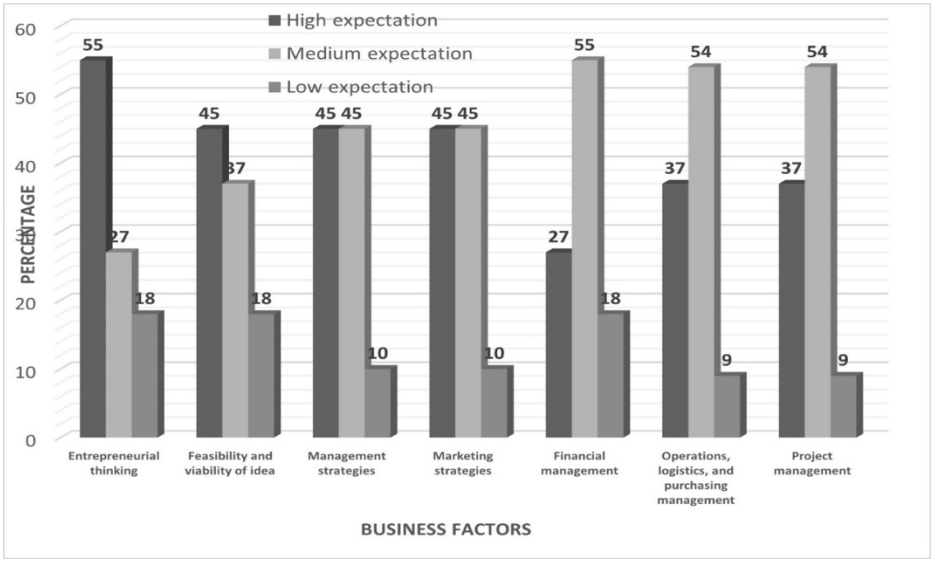

Figure 3a: Expectations of EDP students on different business factors

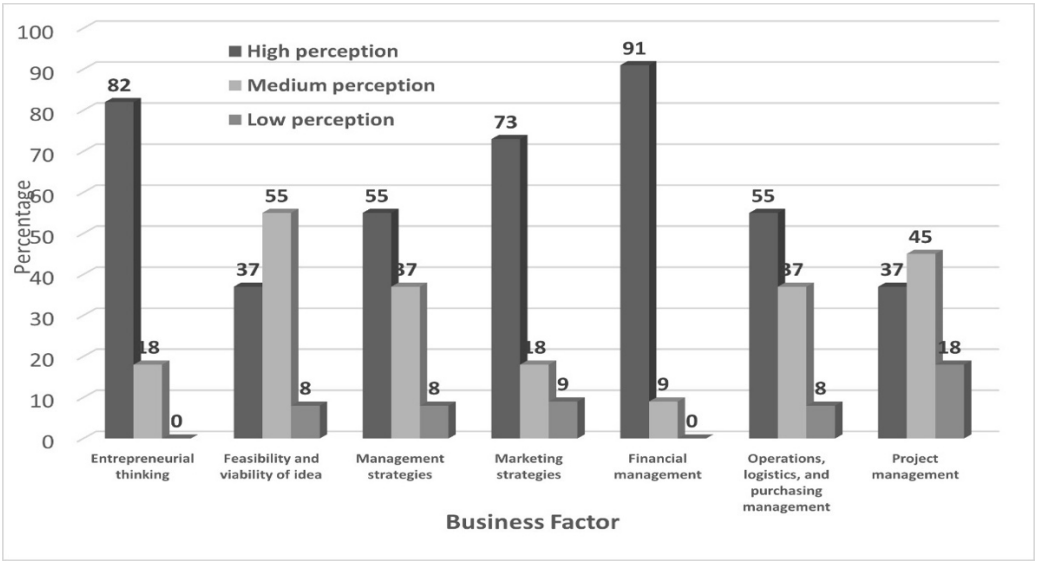

Figure 3b: Perceptions of EDP students on different business factors

Figures 3c and 3d show the more specific impact (high positive impact, positive impact, slight impact and no impact) of the training on the different aspects of starting and running a successful business. The following are comparisons between the impact of the EDP on expectations and perceptions of different business principles:

- According to the entrepreneurial respondents, the impact of entrepreneurial thinking is expected to have both a high positive impact and a positive impact (46%). Only 8% indicated that there would be a slight impact. Their perceptions after the sessions were that 82% responded with a high positive impact and 18% responded with a positive impact.

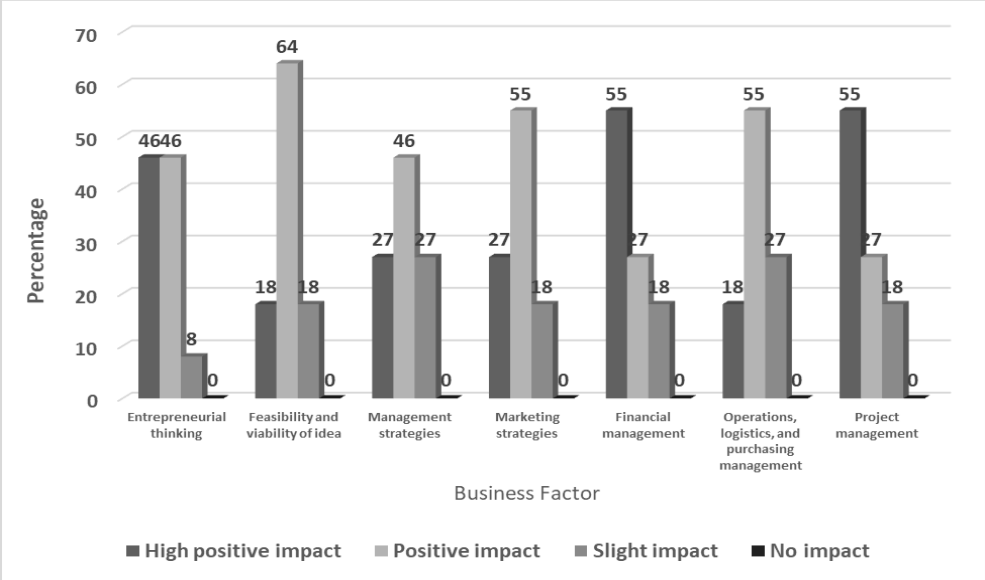

Figure 3c: Expectations of EDP students on the impact of training on the different business factors

- High positive impact on financial management and Project management were both at 55%. The perceptions afterwards for the two aspects were 73% for a high positive impact on financial management but closely on par (54%) for Project management.
- The expected high positive impact on Management, Marketing and Operations was lower than the positive impact. Comparing it with the perceptions, all the impacts on the mentioned three aspects have a high positive impact of more than 60%.
- Feasibility and viability were positive at 64%, but the perceptions afterwards were not so good at just over 50%.

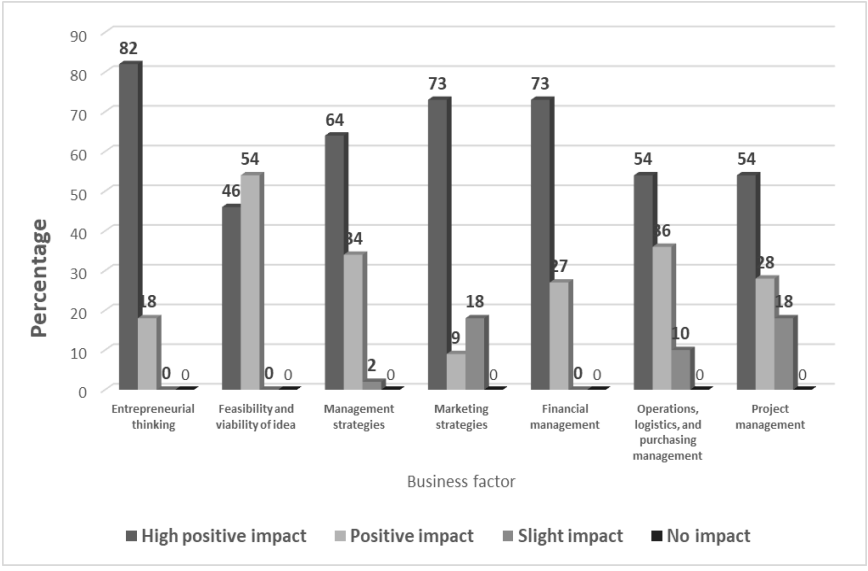

Figure 3d: Perceptions of EDP students on the impact of training on the different business factors

Table 1*:* Standard deviation of each variable

Variable	Expectations			Perceptions		
	Mean	SD	(α)	Mean	SD	(α)
Tangibility	3.80	.91	.745	3.54	.86	.738
Reliability	3.73	.94	.839	3.31	.95	.842
Responsiveness	3.50	.85	.841	3.41	.91	.790
Assurance	3.41	.86	.723	3.39	.94	.811
Empathy	3.29	.91	.802	3.27	.83	.758

The mean standard deviation of each variable and the results of correlation among variables are listed in Table 1. Mean value (3.80) of "Tangibility" dimension of expectation was highest while mean value (3.29) of Empathy dimension was the lowest. The statistics of Cronbach's alpha (α) indicated that the estimated α of tangibility, reliability, responsiveness, assurance and empathy in expectation were .745, .839, .841, .723, .802 and in and in perception were .738, .842, .790, .811 and .758 respectively. The value of (α) was above the threshold value (Ravindran, et al., 2012). Mean value (3.54) of "Tangibility" dimension of perceptions was highest, while mean value (3.27) of Empathy dimension was the lowest.

5. Conclusion, Limitations and Recommendations

This study indicated a difference between the expectations and perceptions of the entrepreneurial students regarding the service quality of the EDP delivered to them by the *idea*-GYM at the CUT campus in Bloemfontein, Free State province. This study indicated some differences between the expectations and perceptions of the entrepreneurial students regarding the service quality of the EDP.

Results of this study showed that overall expectations were, in most cases, lower than the perceived service delivery around the different business aspects they received from the program. Results of this study showed that entrepreneurial students normally do not expect high-level, practical, applicable business and related aspects to help them in their business decisions. In a minor way, the presenters of the EDP need to take corrective action to remove the gap between expectations and perceptions of entrepreneurial students regarding the EDP service.

This research results are conducted only on the 46 entrepreneurial students enrolled in the EDP. This research captures only the students of the 2021 & 2022 programs at the CUT main campus in Bloemfontein. It could be conducted on all the entrepreneurial students also enrolled on the other campus (Welkom), so that the results would be more generalisable. This construct can also be used with other groups of entrepreneurs enrolling for the EDP. Since there are few studies in the literature review, it leaves more room for further research in this domain. The following are some of the main recommendations, according to the data analysis:

- More attention needs to be given in the Feasibility and Viability of a business or business idea. For any entrepreneur, it is important to do some pre-screening on the idea before investing more time, effort and money to draw up a full business plan.
- The tangible dimension of the SERVQUAL is very important because it consists of all the physical items that can be observed by entrepreneurs, which include the presenters of the course, the PowerPoint power point presentation slides, the practical examples in the program and the physical environment of the venue of the class.
- Empathy is the understanding of the needs of the individual entrepreneur on the EDP to ensure that the entrepreneurs on a specific program are more or less on the same level in their business development. A solution is to develop a matrix with some weights for different aspects of the matrix, then put each individual entrepreneur applying for the program through the same criteria in the matrix. Then, select the entrepreneurs with more or less the same percentage at the end of the criteria calculations. This will ensure that the program will consist of entrepreneurs of more or less the same calibre.
- Motivation to complete the program was already include in the 2022 program by including potential funding opportunities for the participant's business. EDP participants who completed assignments and attended the workshops were invited to present to a panel of adjudicators at a hybrid event (online and in person) to showcase their businesses and the top four best businesses or business ideas received prize money to further their businesses.

In conclusion, the EDP is a very good entrepreneurial program because the perceptions of students, compared with their expectations, are mostly positive. The few gaps that exist, as mentioned in some of the few recommendations, will be addressed in the 2023 and 2024 programs. Feasibility and viability workshops need a different approach. Feasibility and viability perceptions afterward completion of the program was lower than initial expectations. The reason for this could be that businesses and business ideas varied among the group of participants and more sector-based feasibility and viability workshops should be offered to the participants.

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Factors influencing the Entrepreneurial Intention of University Business Students: Evidence from Lima-Peru

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Abstract: Entrepreneurial intention has become a question, and in order to investigate its study, this research was based on the Theory of Planned Behaviour, which takes as dimensions the entrepreneurial attitude, the subjective norm and self-efficacy. The purpose of this research is to identify the factors that influence the entrepreneurial will of university business students in Peru. For this purpose, the study method used is mixed, cross-sectional and non-experimental; it comprises a quantitative analysis with a sample of 400 university students, to whom a virtual questionnaire was applied; and it is complemented with a qualitative analysis through videoconference interviews with 11 experts in entrepreneurship in the Peruvian and international context, made up of business career coordinators, university business incubator coordinators and student entrepreneurs. The results highlight as factors in entrepreneurial intention the desire to be independent (65%), the challenge in practice of creativity and innovation (62%), the enjoyment of knowledge about business genesis strategies (55%), also the development of soft skills such as leadership and resilience, as the merit of attributing technological tools within the business, notions highlighted by the qualitative analysis. It is concluded that universities should take these factors into account in the design of competencies in their student curricula, creating programs that generate an entrepreneurial ecosystem, and with it, the formation of companies, new jobs and socioeconomic improvement.

Key words: Subjective Norm, Self-Efficacy, Entrepreneurial Attitude, Companies, Latin America, Employment, Entrepreneurial Spirit.

1. Introduction

The Covid-19 pandemic has set a precedent for Peru and the world in both employment and education, indirectly impacting entrepreneurship, which is considered part of the productive strength of developing economies (Figallo et al., 2020; Torres-Coronas and Vidal-Blasco, 2019). Some 38,000 SMEs were established in Peru in the first quarter of 2020 due to high unemployment. Of these, 20,000 are led by women, 53.7% of the total and 46.3% by men (Instituto Nacional de Estadística e Informática [INEI], 2020).

The city of Lima, the capital of Peru, is divided into 4 distinct areas, one of them is the northern area of Lima also known as Lima Norte, this place has had a significant economic growth in the last 15 years due to the desire for entrepreneurship of its inhabitants, which has led to the installation of major universities.

This research is important because it has not been done before in a Peruvian university and is rare in Latin America. In practice, the characterization of the entrepreneurial intentions of students in North Lima should inform the relevant business departments or structural units of the university to make informed and effective decisions, promote the improvement of entrepreneurial skills and attitudes to form a company. The results obtained methodologically can be used for the implementation of trainings, seminars and forums to better understand students' motivation to start a business.

1.1 Objective

The general objective is “identify the factors that influence the entrepreneurial intentions of university business students”. The hypothesis of the study holds that the factors that influence the entrepreneurial intention of university business students are: Entrepreneurial attitude, subjective norm and entrepreneurial self-efficacy.

2. Literature review

Since the late 1980s, the literature has been concerned with the concept of entrepreneurial intention, this leads to the act of an entrepreneur and the formation of the intention to start a business being considered the entrepreneurial process (Diez and Guevara, 2020). Entrepreneurial intent has a great impact on all organizations. In this sense, understanding the motivations of entrepreneurship has become a very important aspect of understanding the culture of an organization. Entrepreneurial intent has a great impact on all organizations. In this sense, understanding the motivations of entrepreneurship has become a very important aspect of understanding the culture of an organization (Bird, 1988).

In terms of students' entrepreneurial intention, an important factor is hands-on work-based learning or simulated learning (Thobekani, 2021). Soria-Barreto et al. (2016) factor out that an individual`s entrepreneurial purpose is diagnosed whilst he/she determines the concept of making an enterprise and plans to hold it out within the future. On the other hand, De Jorge (2013) found that sociodemographic variables, including age, gender and own circle of family businesses, are crucial for entrepreneurial intentions. According to Ajzen (1991), the theory of planned behaviour was developed to predict and explain human behaviour. Analysing personal beliefs through self-efficacy, subjective norm and entrepreneurial attitude; as causes of intention, which also influence the person's behaviour. On the other hand, the theory of planned behaviour also seeks to know the influence of the environment on people's behaviour that determines the intention to undertake (Montoya et al., 2016; Millán et al., 2017). This theory takes into account situations where an individual may have the intention to perform a behaviour but no access to opportunities or resources (such as lack of money or knowledge); hence, this theory argues that if a person has the opportunities, resources and intention to perform a behaviour he or she should succeed (Galleguillos-Cortés et al., 2019; Krauss et al., 2018).

Bandura (1997) defines self-efficacy as personal judgment in a given situation, so people with high self-efficacy are more self-confident and more likely to pursue goals and objectives, about what people think of their abilities. Similarly, Gorostiaga et al. (2018) Self-efficacy refers to the likelihood of carrying out behaviours predetermined by an individual and affecting activity and persistence in the face of a challenge. In addition, research by Valencia-Arias and Marulanda-Valencia (2019) confirms that self-efficacy is one of the key factors when undertaking a new business. This is because people recognize factors such as performance needs, innovation, creativity and leadership. From another perspective, Salazar-Carvajal (2014) analyses entrepreneurial self-efficacy and sees socioeconomic status as a driver of entrepreneurship.

In Tarapuez et al. (2018) subjective norm related to private or public education and includes entrepreneurial friends. Gálvez et al. (2020) applied the theory of planning behaviour to analyse entrepreneurial intentions and found that the main family factor motivating students to participate is security and the main motivating factor is lack of budget. On this dimension, Guzmán et al. (2014) subjective norm is the inference people make about the behaviour they are performing under social pressure, which are based on two factors: the approval of a significant other and a person's ability to meet people's expectations. Lazo and Vela (2020) and Olavarria-Benavides et al. (2021) point out that entrepreneurship is the ability to start a business, business plan or other livelihood that requires confidence, perseverance and initiative. Oliver et al. (2016) they also say that entrepreneurship is related to six recognized attitudes such as positivity, professionalism, empathy, innovation, autonomy and risk-taking.

Tarapuez-Chamorro et al. (2019) and López-Guzmán et al. (2019) confirmed entrepreneurial attitudes as another determinant of entrepreneurial intentions, reflected in social norms, attitudes, behavioural management and socioeconomic aspects. For Sánchez-Oramas et al. (2020) this attitude is related to business experience, socio-economic and cultural measures, not to character. In the research of Sampedro et al. (2014) stated that entrepreneurial intentions grow positively when associated with entrepreneurial attitudes, highlighting the need for entrepreneurial vision, self-control and resource management.

In this regard, numerous studies have been carried out around the world on this subject, but there is no diagnosis of entrepreneurial intentions in the Peruvian context, especially in the field of business administration, this fact hinders the measurement of intention and complicates the prediction of entrepreneurship (Salazar-Rebaza et al., 2022; Córdova-Buiza et al., 2022a; Gorostiaga et al., 2018). Therefore, the absence reflects little public interest in entrepreneurial projects. In addition to this, it is important to analyse the frameworks developed by early stage companies in order to develop strategies and educational programs that encourage entrepreneurship (Goyanes, 2015; Cordova-Buiza et al., 2022b; Valencia et al., 2016). From this perspective, Vélez et al. (2020) and Friedland &amp Jain (2022) confirmed that entrepreneurship education is related to the development and empowerment of skills, attitudes and values related to entrepreneurship. Hernandez and

Sanchez (2017) identified motivational factors for entrepreneurship and concluded that entrepreneurial education and entrepreneurship are related. A study by Torres-Coronas and Vidal-Blasco (2019) refers to the ability to start and manage a new business and related to entrepreneurial intention factors such as self-efficacy, which university students understand as innovativeness and creativity, focuses on behavioural performance. As a necessary element to address entrepreneurship. In addition, Soni and Misra (2021) consider students' self-efficacy as an important factor in identifying business opportunities.

3. Methodology

A mixed research methodology was used, composed of a main quantitative part and a secondary qualitative part. Descriptive, cross-sectional, and non-experimental design, in which variables are not deliberately manipulated. (Hernández et al., 2014). As for the quantitative research, the sample consisted of 400 students belonging to four Peruvian universities with campuses in northern Lima, considered to be private universities with trajectory in this area of the country. The information corresponds to a universe of 50168 students enrolled in 2021, a probabilistic approach was applied, based on the formula (Sample size = Z2 * (p) * (1-p) / c2) for which a sample of 400 students is taken.

The selection criteria for this study was a private university geographically located in North Lima. Participants are students studying business administration, banking and financial management, marketing, international business, economics, accounting, resource management, human resources, business administration and management. a student of the school. same. For the review of the information, various databases such as Scopus and Scielo were used, as well as statistical studies of the INEI (National Institute of Statistical Information) and university transparency portals. The research instrument is the Entrepreneurial Intentions Evaluation (VIE) questionnaire proposed and validated by Laguía, Moriano, Molero and Gámez (2017), It assesses three factors of entrepreneurial intention: entrepreneurial self-efficacy, subjective norms and entrepreneurial attitudes. The tool consists of 20 open and closed questions ranging from 1 to 7 on a Likert scale.

4. Data collection

Data collection was done through a pre-approved survey, distributed through Google Forms and disseminated through student email, WhatsApp and Facebook and the university's fan page. Professors from the four universities assisted in conducting a survey among their students. Data analysis using pivot tables in Microsoft Excel, a semi-structured interview was used for the qualitative component. the interview sample was confirmed by 5 people by peer review method; this tool consists of 8 open questions for 11 professionals of university entrepreneurship in Peruvian and international contexts, including university leaders of startups and business career coordinators (8), university coordinators of business incubators (2) and one student entrepreneur. The aforementioned tools, which will be operational from September to December 2021, are expected to determine whether students in Lima-Norte have entrepreneurial intentions.

In this study, from an ethical point of view, the intellectual property of the different authors in relation to the theories and research results, their exact citations and references to directory sources are mainly protected. Secondly, regarding the confidentiality of the information, the advice and support of the Universidad Privada del Norte (UPN) was taken into account. In the end, the identities of the 400 students interviewed were kept secret, with the exception of the experts who allowed their identities to be identified due to their importance.

5. Results and Discussion

5.1 Results

5.1.1 Quantitative Research

As a result of the quantitative study, profiles determined by the university student population from grades 1 to 10 were used. The age range goes from 17 to 35 years old, in which the female sex predominates, representing 66% of the respondents. The 400 students participating in this survey belong mainly to the middle socioeconomic level (57%). Of the survey sample, most of the respondents are not related to the labour market (55%). The mean score is 22.19 with a median of 21 and a mode of 20. See Table 1.

Table 1: Demographic data of the surveyed profile

	Amount	%
Age range		
17-23	284	71%
24-29	80	20%
30-35	36	9%
Type of gender		
Women	264	66%
Men	136	34%
Socio Economic level (SEL):		
Middle	228	57%
Middle – high	59	14.7%
Low	3	3.3%
Low – middle	100	25%
Labor Situation:		
Employed person	110	27.5%
Self-employed person:	70	17.5%
Does not work:	220	55%

The factors influencing students' motivation for entrepreneurship were presented in three categories: entrepreneurial attitude, subjective norms, and self-efficacy. The survey sample also indicated that they had not attended any courses or training courses in the field of entrepreneurship (53%), so the rate of lack of knowledge on the subject was very high.

5.1.2 Entrepreneurial Attitude

A survey of students' business intentions shows that their interest is comprehensive. 62% plan to start their own business, 35% plan to pursue a career in the private sector, students plan to work in government, 25% plan to work in a non-profit organization (NGO), 22% and 22%. % Working together. 44% plan to start their own business to address social and/or environmental problems.

Being an entrepreneur for students entails a variety of tasks that must be completed in order to achieve this goal. 61% believe they have the ability to take on new challenges and 51% believe they will create new jobs for others. Taking calculated risks, 66% believe they will become more self-sufficient and their own boss during this time (See Figure 1).

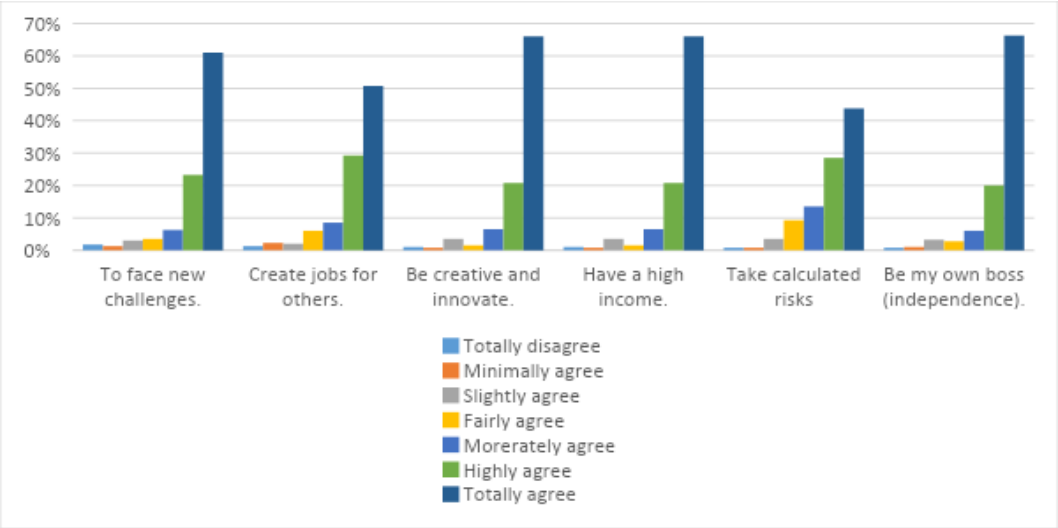

Figure 1: Aspects to consider when becoming an entrepreneur

On the other hand, respondents answered that the main reasons why they decided to become entrepreneurs, 66% responded that the main factor was to take advantage of a business opportunity and 30% responded that there was a lack of better opportunities.

5.1.3 Subjective Norm

In another aspect of the research it was found that the level of support when making the decision to start a business, the students surveyed affirm that they will receive a high level of support from their family, colleagues and closest friends; 66% of the group affirms that they will have the support of their family, 36% strongly agree that they will have the support of their closest friends, and 29% strongly agree that they will have the support of their colleagues (See Figure 2).

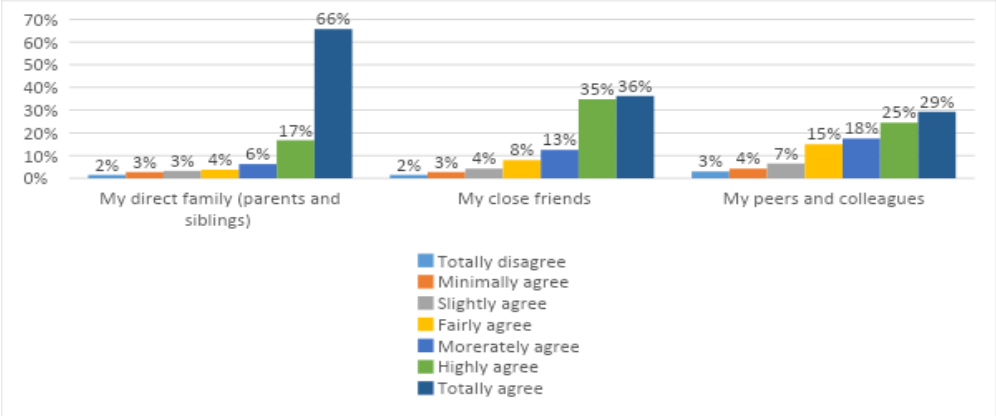

Figure 2: Acceptance of a business by family, friends, and colleagues

In this regard, respondents highly value the approval of those close to them. It is stated that 49% consider the opinion and approval of family to be fundamental, 26% that of a close friend and 20% that of colleagues and friends.

5.1.4 Entrepreneurial Self-Efficacy

In terms of their ability to carry out successful business development activities and manage a successful business, 55% of students agree that this includes defining their business idea and start-up strategy. This includes leading the creative process, 49% manage and maintain relationships with potential investors and banks, 52% discover market opportunities for new products and services, and 56% raise capital, including contacting key people, 55% create and initiate projects. new business.

When it comes to their willingness to be entrepreneurial, most students want to be independent (65%), solve new problems (59%), create jobs for others (46%) and be creative and innovative. be objective, earn high rewards (56%) and take calculated risks (43%). On the other hand, when it comes to determining how much a student intends to become an entrepreneur, there is a lot of concern. 85% strongly agree that they are likely to start a business in the future. 84% agree or strongly agree that they are willing to make the effort to become an entrepreneur. 77% agree or strongly agree that their career goal is to be an entrepreneur (See Figure 3).

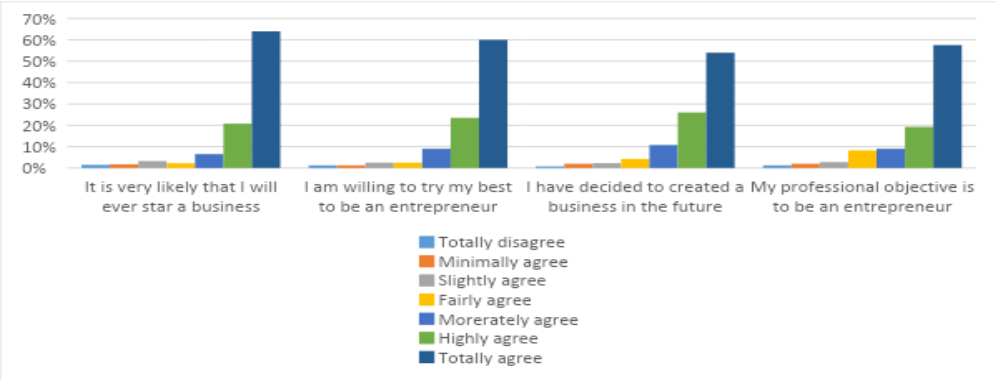

Figure 3: Students' level of intent regarding the decision to start a business

5.1.5 Qualitative Research

Due to restrictions due to the covid 19 pandemic, interviews were conducted by videoconference and telephone. In addition, to comply with the confidentiality obligations set out in the participation agreement, the data of the 11 participants were coded as follows (see Table 2).

Table 2: key informants' data.

Key experts' group	Key informant counts
National Entrepreneurship Experts (Heads of the entrepreneurship area of universities, coordinators of business careers)	8
International Entrepreneurship Experts (Coordinators of business incubators in universities)	2
Student entrepreneur	1

In terms of entrepreneurial attitudes, all respondents agree (100%) that there are several factors that motivate young people to become entrepreneurs, including the desire to generate income and be self-sufficient. The idea that innovative products can solve consumer problems and, finally, the internal competition faced by students. On the other hand, the most common characteristics of entrepreneurs are perseverance, sustainability, productivity, creativity, and innovation.

As for the subjective norm, the respondents agree that family has a great influence when it comes to entrepreneurship, as the experience of running a family business becomes a precedent for their own creativity. With that in mind, they can start their own business with more confidence. In this regard, respondents pointed to innovation, creativity, quick access to information and entrepreneurial foresight as the main advantages of business school students. Their weaknesses include fear of failure, inflexibility, informality, lack of support and immaturity.

About entrepreneurial self-efficacy the experts emphasized the university role in encouraging student entrepreneurship through seminars, competitions, fairs, and courses; they also argued that the university should create a business environment, since students spend most of their day at the university. The majority of experts said that the most useful courses for entrepreneurship would be marketing, accounting, leadership courses, graphic design, ideation, elevator pitch for searching of investors, and entrepreneurship methodology. Finally, the experts emphasized the significance of technological resources in the development of a business. Experts cited mobile phones, laptops, social networks, and software management as extremely useful tools.

5.2 Discussion

The primary goal of this research is to identify the factors that influence students' entrepreneurial intentions. A sample of students from four universities in northern Lima, Peru, as well as another source of business professional, were used for this purpose. Research on entrepreneurial intention of university economics students based on Eisen's (1991) model has revealed there is a high level of agreement on the theory of planned behaviour, which allows us to analyse essential characteristics to see it in the future in its use for business purposes in its application (Orozco et al., 2018; Duran-Aponte and Arias-Gomez, 2016). In the research records, it found a statistical sample with a mean score of 22.19, a median score of 21, and a trend of twenty years in the records we studied to see if these findings are reliable if it affects the intention entrepreneurial. We acknowledge the approach of García-García (2015), who emphasizes that young individuals have strong entrepreneurial intentions. As a result, new generations bring new knowledge that, when combined with information from previous generations, is extremely useful for entrepreneurial endeavours (Arzubiaga, 2018). The findings were classified into three dimensions: entrepreneur attitude, subjective norm, and entrepreneur self-efficacy. Based on the data gathered, it is possible to confirm that young people have an entrepreneurial spirit. This study is very interesting, with a total of 62% saying they intend to start their own company and only 35% said becoming employees of a private company, and 25% for the state. This data compares the most significant aspects associated with seeking greater autonomy, creativity and innovation, family recognition and support, and strengthening communication skills related to entrepreneurship development.

The subjective standard proved to be a factor in fostering entrepreneurship among the students, as they found it profitable and attractive to run their businesses. Moreover, they appreciated that such a decision was

approved by their family members, friends and peers. This is consistent with the study by Mwiya et al. (2017), who assesses this factor in the Zambian context in Africa, as a result, the influence of family in establishing a new business will be determined by the results obtained, and this serves as an indicator of what is likely to occur. This is consistent with Velez et al. (2020), who describe how experiences in family businesses can influence entrepreneurial intentions.

For organizations that support entrepreneurship in Peru, the main institution is a university (Ministry of Education [MINEDU], 2014), which supports the training of entrepreneurs. Therefore, the study speaks of the approval of its work with students, as it promotes seminars, competitions, fairs and courses. Thus, creative ideas are promoted and implemented. For Dal-Soto et al. (2021) Universities in strategic management have a direct impact on business intentions, as they connect academia to promote social action and community involvement in the long term. The outcomes differ from the Galleguillos-Cortés et al. (2019) study when no inputs from entrepreneurship education programs are validated. The entrepreneurial mindset stands out as a key component for launching a new business. Students are drawn to the prospect of earning money and becoming self-sufficient, but they are less inclined to take chances. Similarly, Mora (2011) argues that risk aversion in entrepreneurs is permanent. To comprehend someone's behaviour toward something, perception, belief, and attachment must all be considered (Robbins & Judge, 2011), as a consequence, entrepreneurial profiles are linked to sociocultural factors (Yurrebaso et al., 2020), which biases the score for the business factor. For university students studying business, it would be taking advantage of commercial opportunities. The results of the study are consistent with the results of Gálvez-Albarracín et al. (2020) where the components of entrepreneurial intent are: financial reward, residence and personal security; additionally, to the study of Torres-Coronas and Vidal-Blasco (2019) Listing business opportunities as a means of furthering one's career. In the meantime, the studies varied from those of Wang et al. (2018) who regard family business learning experiences as the most important factor influencing entrepreneurial intention.

However, according to a group of experts consulted, entrepreneurship is an outstanding characteristic of students. Perseverance, productivity and innovation are the engines that drive entrepreneurship. Therefore, we analysed the factors that affect the development of soft skills and the desire to be independent, along with the quantitative results that independence (having your own business) is a driving force. As for subjective criteria, experts point to family work experience as a factor that incentivizes young entrepreneurs. Therefore, we found a strong relationship in the quantitative results that students highly rated family acceptance and support to complete the project. The results differed in terms of self-efficacy, as experts argued that the elements of entrepreneurship are founded on creativity, innovation, instant information availability, and entrepreneurial development in starting a business. In this sense, it is similar to the work of Abedelrahim (2020), who found that self-efficacy in business is not easily trained, as it requires a developmental program in management.

6. Conclusion

The purpose of this study was to identify the entrepreneurial intentions of students in North Lima, Peru, and to explore the empirical evidence on entrepreneurship and entrepreneurial intentions. It turns out that students have an entrepreneurial intention, which is reflected in factors such as self-efficacy, personal level and entrepreneurial attitude. Expressions such as financial income that may influence entrepreneurial intentions among young students were also identified, and the research highlighted factors in the development of independence and personal competencies such as management, flexibility and productivity. However, public and private educational universities must implement strategies to safeguard students' new ventures and increase the visibility of their businesses. When it comes to business technology tools, online activism is becoming increasingly important, so students are demanding more technological advances from training schools and professional programs.

Therefore, access to technology and separation from the traditional experiences of others is expected to further increase, thus providing more opportunities to develop creativity and innovation, which are important determinants of self-efficacy in this study. Considering that family business experience influences entrepreneurial intentions, it is critical to emphasize sociocultural factors in Peru given its high penetration of micro and small businesses in the economy. It inspires many students to do business with a family business and further develop that business or start their own business. Therefore, it is a factor that affects business in our reality.

The research has identified factors that make it difficult to start a new business. Fear of failure, not recognizing how to deal with new challenges, and financial difficulties are some examples. In fact, Peru has national and

private innovation programs that should be more open in terms of funding sources for new projects, such as Startup Peru, 'Fondo de Investigación para el Desarrollo de la Competitividad' (FIDECOM) and Innovate Peru. It should be mentioned previous theories and studies have shown that perceived incentives have a positive impact on the entrepreneurial intentions of university students. For this reason, courses, training, seminars, exhibitions and forums related to entrepreneurship should be more accessible and promoted.

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Transformative Business Models for Decarbonization: The Case of Web Summit Award-Winning Start-ups

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Abstract: The social demand for decarbonization has placed increasing pressure on businesses to climate mitigation. The development of new business models capable of transforming conventional systems of production and consumption and replacing them with more sustainable alternatives is one critical step towards this goal. This study combines several streams of literature including sustainability transitions and business model narratives to investigate the key-elements of the business models that have the potential to transform the supply of goods and services in a way that enables the transition to a low-carbon society. We investigate the organizational arrangements in the business activities of start-ups and relate to the extent to which they avoid, shift, or improve the production and consumption of goods and services in a way that significantly reduces carbon emissions. To do this, we analyzed start-ups that received innovation awards and were on the list of finalist's candidates of the Web of Summit between 2014-2020. The results suggest that start-ups may be in the process of transforming their business models (BM), since a growing trend of transformative projects that adopt integrated business models was identified, e.g., business-to-business-to-commerce (B2B2C), instead of the familiar business-to-business (B2B) and business-to-consumer (B2C) models. The findings also highlighted the role of Industry 4.0, such as artificial intelligence (AI) and machine learning (ML), together with other sustainable elements, as crucial to shortening the gap between design and consumption, leveraging innovative solutions, and transforming the model of business, from start-up. This research emphasizes the importance of transformative business models in the context of decarbonization and contributes to filling a gap in the literature on the elements that drive this transformation. The research is also relevant for policymakers aiming to promote a low-carbon economy by highlighting the levers that can be used to promote transformative pathways through business models.

Keywords: Decarbonization, business model, sustainability transition, transformation, technology, start-up

1. Introduction

The urgency to decarbonize several sectors of the economy to prevent climate risks and achieve the goals of the Paris Agreement (Skea et al., 2022) is pressing, and the business sector plays a crucial role in supporting low-carbon production and consumption. Start-ups are increasingly focusing on technology and innovation to decarbonize production and consumption, but they are also resorting to alternative pathways, such as transformative business model (TBM), to ensure sustainable socio-economic development.

Research on TBM for sustainability is crucial for determining an organization's economic, social, and environmental impacts (Nijhof et al., 2022). The integrated development of business model (BM), technologies improvement and sustainability are increasingly present in the global sustainable development agenda (Sachs et al., 2019). However, there is a lack of consensus on the elements of BM to boost sustainability transitions (Lüdeke-Freund, 2010). This study aims to investigate the key-elements of TBM of start-ups that contribute to a low-carbon society. The limited literature on TBM for sustainability and the increasing number of companies and investors aware of decarbonization targets (Sachs et al., 2019) make this study essential. The article consists of five sections, including conceptual framework, methodology, results, and discussion and conclusions. The conceptual framework section provides key-aspects relating to the literature on theories of transitions to sustainability, narrative on TBM, and supporting mechanisms of Industry 4.0 such as artificial intelligence (AI) with machine learning (ML) and internet of things (IoT). The methodology section details how the study was developed, while the results section presents the study's findings. Finally, the discussion and conclusions section address the most relevant aspects of the investigation, highlights the limitations of the research, and points out recommendations for future studies.

2. Conceptual Framework

2.1 Transformative business model conceptualization

The literature of TBM is at an embryonic stage. Research carried out on this topic "*Transformative business model"* reveals that up to 29/3/2023, few English articles were published: 3 from Web of Science (WoS) and 12 from Scopus. The existing literature on TBM covers the development of innovative and disruptive BM that has the potential to completely revolutionize the operations of those who adopt TBM. Such models must offer unique value propositions to consumers, while allowing the organization to achieve sustainable growth and profitability (Proka et al., 2018).

TBM should emphasize identifying and exploring opportunities for transformative organization changes and implementing processes to mitigate the risks and challenges associated with changes in the organizational management system (Kavadias et al., 2016). Consequently, TBM must enable organizations to generate, deliver and capture new value propositions and conduct transactions that bring about significant changes in market dynamics, resulting in benefits for both organization and the consumer (Kavadias et al., 2016; Proka et al., 2018).

The transformation (Table 1) approaches in the literature in the context of corporate management incorporating up-to-date technologies (such as AI-ML, digitalization, IoT, etc.) is crucial to understand the evolutionary nature of corporate management and its best practices. Industry 4.0 technologies help to understand the development of new management strategies. It also allows knowing the challenges and opportunities in the business environment to adapt to technological changes, thus proving to be an essential component for organizations to thrive in a competitive and rapidly changing business environment (Kavadias et al., 2016; Pratt, 2021).

Table 1: Transformation approaches in the context of corporate management

Transformation Author	Definition	Management	Industry 4.0
(Warner & Wäger, 2019)	"Digital transformation has been defined as the use of new digital technologies, such as mobile, artificial intelligence, cloud, blockchain, and the Internet of things (IoT) technologies, to enable major business improvements to augment customer experience, streamline operations, or create new BMs."		√
(Denicolai et al., 2021)	"Digital transformation is a central driver towards innovation and business renewal, especially for established small and medium sized enterprises (SMEs) in the contemporary economy."		√
(Christensen, 2013)	"…a new technology or BM that disrupts existing markets and creates new ones". Technology is enabling new BMs in the education industry, and how these models are creating new opportunities for learning and growth."		√
(Verhoef et al., 2021)	"...a change in how a firm employs digital technologies, to develop a new digital BM that helps to create and appropriate more value for the firm."		√
(Nijhof et al., 2022)	"...sustainable market transformations can be disentangled through the understanding of the path-dependent nature of socio-technical systems and the nature of the interactions among the actors involved."	√	
(Hoyte & Greenwood, 2007)	"Business transformation is about moving an organisation from an existing condition to a future state, in line with a targeted strategic ideal"	√	
(Roome & Louche, 2016)	Organization transformation occurs "when moved from a focus on products to a higher-level focus on the system of which they were a part. When organizations sought to create new arrangements with other social and economic actors to identify new approaches to business that addressed environmental and social issues"	√	

Briefly, a TBM is a new way to create, deliver and capture value for customers, society and other stakeholders that fundamentally changes the way business is conducted. It is a revolutionary approach that disrupts the existing market and creates a new market altogether. For example, the rise of ride-sharing platforms like Uber and Lyft disrupted the traditional taxi industry by providing a new, more convenient way for people to get around.

2.2 Transformative business model in the sustainable transitions system

Sustainability transition theory (STT) is concerned with explaining the processes by which society moves towards more sustainable forms of development. STT focuses on the processes, pathways and actors that are involved in technological transformation, innovation and sustainable practice in which organizations and other actors play critical roles in sustainability transitions (Köhler et al., 2019).

TBM emerges from a set of different types of BM relationship such as business-to-business (B2B), business-to-commerce (B2C), business-to-government (B2G), business-to-business-to-consumer (B2B2C) direct-to-consumer (D2C), etc. They emerged over time to classify different types of businesses relationship based on the nature of their customers and revenue sources (Iankova et al., 2019). The B2B and B2C models have become widely recognized and are commonly used in business literature and discussions to distinguish between businesses that sell to other businesses and those that sell to individual consumers. It is in the BM elements that form the basis of these types of TBMs that can lead to more sustainable ways of producing, delivering and consuming goods and services.

It is expected that the transformative business can add more significantly in the transition to a low-carbon society and support the goals of sustainable development (Skea et al., 2022). Naturally, there are several forms of support, such as the adoption of production and consumption practices with less environmental impact (Fontes et al., 2021), increased investment in clean technologies and renewable sources (Bento & Fontes, 2015; Sousa & Costa, 2022), creativity to increase energy efficiency, processes for carbon capture, utilization, and storage, adoption of responsible corporate governance practices (Ghisellini et al., 2016), and collaboration between sectors to jointly develop sustainable solutions (Wang & Wells, 2021).

A transformative sustainable business model (TSBM) requires improving and shifting consumption and production patterns and avoiding emissions, as these can reduce the environmental impact, e.g., waste and pollution, and promote resource efficiency, e.g., resource conservation (Skea et al., 2022). Moreover, the elements such as sharing economy (SE), circular economy (CE), sustainable development goals (SDGs) as well as Industry 4.0 with the digital transformation (DT) are key-elements for sustainable transition, as they offer innovative and efficient solutions to the economic, social, and environmental challenges of today.

For example, the SE by sharing underutilized assets, promoting the efficient use of resources, and reducing waste can contribute to a more sustainable economy. CE based on the principles of reuse, repair, refurbishment, and recycling, keep resources in use for as long as possible, it promotes sustainable development and reduces the negative impact on the environment. SDGs cover a wide range of areas, including poverty, health, education, gender equality, clean water and sanitation, sustainable cities and communities, and climate action. SDGs are widely used by governments, businesses, civil society organizations, and individuals around the world. Industry 4.0, characterized by the integration of advanced technologies such as AI-ML, IoT and big data analytics, can contribute to optimizing resource use, reducing waste, and increasing productivity. So, these elements provide a framework for a more sustainable and efficient economic model.

Therefore, TBM is a way to optimize organizational management and resource efficiency, enhancing sustainability and resilience of the systems (Di Vaio et al., 2020), and foster fair and sustainable economic development for all. So, a TBM can advance sustainability objectives in different ways, such as reducing carbon emissions, increasing energy efficiency, changing consumer behavior, and boosting innovation (Costa et al., 2021, 2022).

The TBM narrative in the context of sustainability (Brenner, 2018) – which examines the systemic changes necessary for a society to move towards sustainability – serves as a foundation for the TSBM. A TSBM is a BM that creates positive environmental and societal impact by changing production inputs, influencing the product usage cycle, expanding societal value, and re-localizing and regionalizing the value chains (Kavadias et al., 2016). TSBM should be focused on creating long-term value for both the organization and society at large by considering environmental, social and governance factors in its operations. So, a TSBM, especially when incorporated into Industry 4.0 with sustainable elements in its various dimensions, can provide a series of benefits to start-ups (Sachs et al., 2019).

2.3 Technological and sustainable elements included in the proposed transformation of business models

A sustainable business model (SBM) includes diversity, modularity, openness, scarce resources, and corresponding cycles. These aspects help a company create value for its customers, society, and the environment in a profitable and resilient way. Among the main elements that can make a BM more sustainable are the SE, CE, SDGs, Industry 4.0, and innovations from the integration of technologies such as AI-ML, IoT, etc. By incorporating these elements, a business can create a sustainable business model that benefits not only the organization but also its stakeholders and the wider community (Di Vaio et al., 2020; Geissdoerfer et al., 2018; Ghisellini et al., 2016; Sachs et al., 2019).

AI-ML elements are understood as what transform human decision-making into a mechanical and dynamic process with the support of algorithms and machine learning reveals power to support organizations in the sustainable transition (Sachs et al., 2019). The use of AI-ML combined with other elements in the production process is in full evolution. Recent data reveal that the adoption of AI-ML is more common in experienced and innovative organizations with the objective of prioritizing the creation of new products and services, aiming at reducing costs and new business practices (Pratt, 2021; Sachs et al., 2019).

The application of AI-ML has become a widespread practice in the production sectors due to its ability to reduce costs, increase efficiency and profitability. AI-ML is commonly used in quality control, predictive maintenance, automation, and manufacturing to streamline production and minimize waste. Recent research confirms the advantages of using AI-ML, with technology accounting for more than 5% of earnings in 2019, and revenue for businesses employing AI-ML in their models continuing to increase each year. Business leaders recognize the critical role of AI-ML in enterprise success, with 94% acknowledging its importance in 2022 (Mittal, 2022).

Integrating AI-ML in TSBM production and creation sectors can provide start-ups with several benefits, including improved customer experience, and higher market competitiveness. This technology can also lead to innovative solutions and attract new investments. Moreover, incorporating sustainable elements in TSBM aligned with Industry 4.0 can reduce costs, increase revenue, enhance risk management, and improve brand reputation and innovation. Therefore, by prioritizing sustainability, start-ups can develop a resilient and adaptable business model that can thrive in the long term. (Pratt, 2021; Sachs et al., 2019).

3. Methodology

To identify key-elements of start-up TBMs that ease the shift to sustainability by changing the production and distribution of commodities and services, we analyzed a dataset of 231 Portuguese start-ups, of which 36 were categorized as sustainable. They were nominated as finalist candidates at the Web Summit conferences and received recognition awards in Portugal and abroad between 2014 and 2020. The start-ups were identified through research in the archives of the Web Summit conference and free internet research.

The choice of studying start-ups, rather than companies in general, was motivated by the fact that start-ups are characterized by their innovative proposals that typically incorporate recent technological resources, and new propositions and BM with transformative potential. The Web Summit's choice is because it is widely regarded as one of the largest technology conferences in Europe, with the Portuguese government's support for its annual holding up to 2028. Portugal's choice to host the Web Summit is due to its recognition of start-ups as a potential agent for accelerating innovation, which can serve as a lever for economic development and the transition to a low-carbon society.

In this study, we define a BM as the way an organization creates, delivers, and captures value in various contexts, including economic, social, and cultural (Costa et al., 2022; Lüdeke-Freund, 2010; Wang & Wells, 2021). The transformative of a sustainable BM is interpreted in this study in line with Geissdoerfer et al., (2018: 406) as the ability to transform how businesses work, substantially changing the way value is created and delivered and leading to significant changes in market dynamics and value capture. Therefore, SBMT must fundamentally change the existing BM to low-carbon production and consumption modes, changing habits towards more sustainable consumption, mitigating anthropogenic emissions (Wagner & Svensson, 2014), and radically transforming the way goods and services are produced and consumed, such as sharing platforms, Tesla Motors, Amazon, and Google Ads.

The database used in this study was based on BM characterization, which is a relevant approach as it provides insights into start-up dynamics and decision-making processes. The BM's relationship was categorized into a)

B2C, business-to-consumer, b) B2B, business-to-business, c) B2G, business-to-government or NGO d) B2B2C, business-to-business-to-consumer e) D2C, direct-to-consumer f) B2R, business-to- research or R2B (Iankova et al., 2019)

The categorization of start-ups considers the type of business (kind of business), sector of activity, profile (type of start-up), root (origin of start-up), and evolution (start-up status) as shown in Table 2. This characterization structure was adopted to facilitate the understanding of the innovations implemented by start-ups, their environmental impacts and the fundamentals of the BM adopted.

Table 2: Characterizing attributes of a database approach for sustainable start-ups

Sustainable elements	Business	Sector	Profile	Root	Evolution	Sustainable Transition	Stage
SE CE SDGs	B2C B2B B2G B2B2C D2C B2R	Transport (TP) Building (BL) Consumer goods (CG) Industries (ID) Services (SV) Other (OT)	Limited (LT) Corporation (A.S) Sole proprietorship (SP)	Laboratories (LB) Company (OG) Self-employed (SE)	Active (AC) Sold (SD) Closed (CL)	Improving Shifting	Beginner (BG) Senior (SR)
Digital elements							
AI ML IOT							

The characteristics that signal the shift towards sustainability categorized by four elements: a) Industry 4.0 or digital transformation, which require the adoption technology from the start-up to a more sustainable trajectory; b) SE, which emphasizes individuals' ability or preference to rent or borrow goods rather than buying and owning them, also known as collaborative consumption or peer-to-peer sharing; c) CE, or circularities, which is a production and consumption model that prioritizes renting, reusing, repairing, rehabilitating, and recycling existing materials and products for as long as possible; d) SDGs as mechanisms for aligning business strategies and operations with sustainable development objectives and, at the same time, improving organizational sustainability and competitiveness. These four characterization elements were chosen due to their crucial role in the transition to sustainability. They offer innovative and efficient solutions to decrease waste, boost resource efficiency, and pave the way for a more sustainable future.

The start-ups database was categorized into multiple attributes (Table 2) to allow assessing the type of mitigation and sustainability potential proposed by the start-ups. The framework was further supplemented by analyzing the TBM indicators proposed by Kavadias et al., (2016) to identify the six main attributes of a TBM. The researchers identified three attributes: A closed-loop process, a more collaborative ecosystem, and an agile and adaptive organization.

4. Results

The results indicates that the transformative potential of BMs, powered by Industry 4.0 technologies like AI-ML and sustainable practices that promote decarbonization of production and consumption systems, may be more pronounced in the B2B2C model than on B2B and B2C models. Since, around 3/5 of start-ups using AI-ML with sustainable elements are B2B2C types as an alternative to B2B and B2C models.

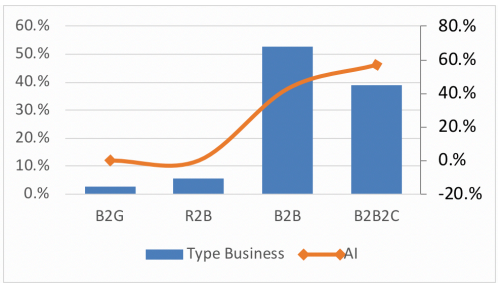

Figure 1: The development of AI-ML implementation in start-up business model

About 4/5 of sustainable start-ups adopt B2B and B2B2C model, of which about 1/5 use AI-ML integrated with one or more sustainable elements that can lead to the transformation of production and consumption such as the SDGs, CE, SE, and Industry 4.0 in their projects (Figure 1).

The findings also suggests that the application of Industry 4.0 such as AI-ML by start-up companies surpasses the exclusive purpose of enhancing the progression of commodities and amenities, as formerly expounded in literature concerning the benefits of digitization in the domains of production and consumption (Pratt, 2021). The analysis suggests that AI-ML is progressively gaining attention in the B2B2C´s model, which requires intricate logic by combining the B2B and B2C models. B2B2C necessitates prompt decisions and responses along with minimized costs to shorten the distance between production and consumption. Hence, the features of Industry 4.0, such as AI-ML has become an essential tool for start-ups, particularly those that have adopted the B2B2C models.

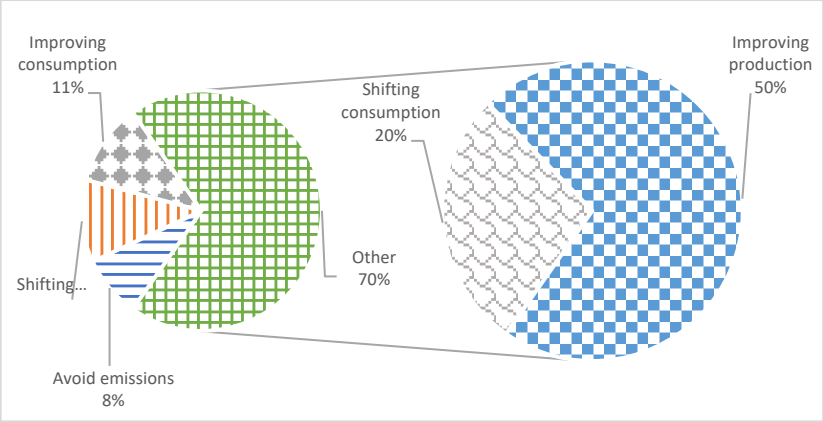

Figure 2: Start-up methods for effectively delivering sustainable transitions

Another important revelation of this study is that around 3/4 of sustainable start-ups are focused on improving or shifting the process of producing goods and services, whereas approximately 1/4 aim to optimize consumption patterns or mitigate carbon emissions, as illustrated in Figure 2. This indicator emphasis the growing pressure provided by sustainable guidelines such as the SDGs, SE, CE that make consumers, investors, governments, and society more aware of sustainable business practices with the reduction of the carbon footprint by the business area.

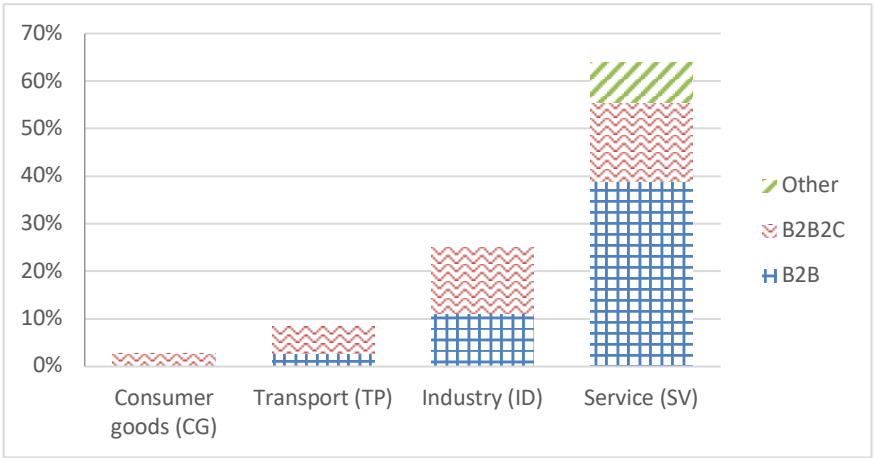

Figure 3: Business model adopted by start-ups by sector

The cross-sectoral analysis of sustainable start-ups, revealing a pronounced preference for service-oriented projects, accounting for 3/4 of all start-up initiatives. The industrial sector ranked second, representing 1/4 of the start-up projects. Notably, around 4/5 of these initiatives employed B2B2C and B2B models, revealing the industry's movement towards retail and services expanding to cover the business and the final consumer sectors (Figure 3). The prevalence of service-oriented start-ups in Portugal can be explained by several factors. Firstly, there is a diverse range of business opportunities available that require relatively low capital investment.

Secondly, the service sector in Portugal is subject to a relatively low level of regulation, which facilitates faster scaling and establishment of businesses. Thirdly, service-oriented start-ups are typically more flexible in responding to changes in the market. Finally, service sector start-ups, which have less complicated physical resources, are advantageously positioned if they have access to AI-ML resources. That's because digital capabilities can be implemented faster and help transform their BM, allowing them to expand into new market segments. In comparison, start-ups in other sectors, such as the industrial sector, are often dependent on numerous connections with huge financial resources and substantial human involvement to connect stakeholders which can limit the start-up ability to pivot their business models. In addition, the strong share of the services sector in the Portuguese economy (around 70% of the gross domestic product) helps to explain the great interest of start-ups in the service sector and AI-ML technologies that facilitate TBM and enable achieving new market segments.

5. Discussion and Conclusion

The novelty of this research was realizing that transformative and sustainable elements in BM, notably the integration of Industry 4.0 such as AI-ML with sustainability-driven elements such as the SDGs, CE, and SE, in their most enriching dimensions can be a driving force capable of reproducing better results in B2B2C models than in conventional models such as B2B and B2C. This shift has the potential to catalyze the transformation of production and consumption towards more sustainable practices.

Start-ups are seen as playing a critical role in adopting Industry 4.0 resources such as AI-ML to diversify their business offerings and reach new markets. By integrating elements focused on sustainability, the optimal environment is established for the rise of SBMT as a catalyst for accelerating the low-carbon transition through the creation, delivery, and capture of sustainable value.

The study highlights that the socio-environmental pressure for the adoption of SBM (e.g., SDGs) can lead to significant changes in organizational processes and practices. Therefore, the use of Industry 4.0 technologies such as AI-ML are essential to shorten the transition from design to commercialization of goods and services and boost TSBM practices. Policies that incentivize and support the adoption of such technologies and sustainable elements are crucial to promoting decarbonization through TSBM.

The use of Industry 4.0 elements, in connection with sustainable elements, are becoming increasingly important for start-ups to maintain their competitive edge. By leveraging AI-ML solutions with other sustainable elements, start-ups can improve efficiency, reduce costs, gain a competitive advantage, and attract investment and funding. The study calls for more empirical research and in-depth case studies to consolidate the characteristics of TBMs and identify new elements that can enrich existing literature.

The study recognizes limitations due to the low number of sustainable start-ups analyzed, as well as the low level of detail of the information provided by the start-ups about their BM. Future research is recommended to broaden the geographic and sectoral scope of start-ups to obtain a more representative sample. Further investigations are also suggested to identify other elements that can guide the transformation of BM, in addition to AI-ML.

This study expands the literature on BM and provides new information to support start-ups in their efforts to decarbonize production and consumption. The research is also relevant for policymakers to encourage the decarbonization of the economy by identifying levers that can be used to drive the transformation of BM. Through TSBM, start-ups can, in a rapidly changing business environment, create, deliver, capture sustainable value for stakeholders and accelerate the low-carbon transition.

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The impact of the COVID-19 pandemic on courier delivery innovation – InPost company case study

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Abstract: The COVID-19 pandemic has changed many markets, including the courier market. This market still has great potential. Thanks to the introduced innovations and due to the growing demand for courier services and the development of e-commerce, it is currently one of the most dynamically developing industries. In the face of the pandemic, courier companies had to adapt to the new operating conditions. The implementation of innovations (i.e. parcel lockers) has become one of the key development trends in the contemporary mechanisms of for creating the competitiveness of enterprises. Parcel lockers introduced by InPost in Poland in 2009 now operate in other countries, there are over 23,000 of them in Europe. They are also located in Asia, both Americas, as well as in the Middle East and Africa. The aim of the article is to show the reaction of courier companies to the COVID-19 pandemic through the example of InPost. The article also demonstrates that difficult pandemic conditions cause adjustment processes on the courier market related to the implementation of innovations by courier companies. Various innovative solutions introduced by InPost during the pandemic were analysed. The main features of InPost courier services that distinguish the company's activity compared to its competitors have been identified. It was shown that the company reacted innovatively to the difficult pandemic conditions, and its actions were positively assessed by consumers. To support this view, in the empirical part of the article, we will look at the research conducted in 2021 in Poland. The survey was conducted among young consumers (students of Lublin University of Technology aged 19-26).

Keywords: Innovation; courier services, parcel lockers, pandemic, COVID-19

1. Introduction

The dynamic technological progress that has been taking place in the world since the beginning of the 21st century has recently been further accelerated by the COVID-19 pandemic. The pandemic conditions have accelerated another industrial revolution - industry and economy 4.0 are being replaced by industry and economy 5.0, which allow for a harmonious and synergistic combination of human and device work (Breque, De Nul and Petridis, 2021).

An important element of Economy 5.0 is e-commerce. Electronic commerce has become the foundation of economic development over the years. Its significance and dynamic growth are the result of its ability to enable businesses to expand into new markets, and consumers to make convenient and secure purchases. The practicality of e-commerce has made it the fastest growing retail market. The COVID-19 pandemic has further contributed to the development of e-commerce. Social distancing, isolation, quarantine, and avoidance of public or crowded places have increased consumers' desire to shop online (Taher, 2021).

Currently, the development of e-commerce is determined by several factors, including digital transformation, the COVID-19 pandemic, and changing consumer behaviours. A demanding generation of Z has emerged in the economy. These are people who grew up in times of easy access to the Internet, have no problems with online shopping, and are familiar with new technological solutions.

The high potential of e-commerce stimulates the development of the Courier, Express and Parcel Market (CEP Market). With the increasing popularity of online shopping, e-commerce handling has become one of the main areas of activity for CEP operators and a driving force behind the development of this industry (Gulc, 2020).

The main objective of the article is to demonstrate the reactions of courier companies to the COVID-19 pandemic, using InPost as an example, and to identify innovative solutions introduced by InPost during the pandemic that distinguish the company's activities from its competitors.

2. Literature review on the e-commerce industry and the courier delivery market

Globalization, technological and technical progress, and the development of the electronic communication market are phenomena that have the strongest impact on all areas of economic activity in the 21st century. They

have led to the emergence of e-commerce. Its beginnings date back to the mid-1990s and are inseparably linked to the popularization of the Internet.

It is the easy and fast way of conducting transactions online that has led to the rapid development of e-commerce. In recent years, more and more people have been shopping online because it is convenient, saves time, and offers a wide range of goods. This is due to the increased availability of fast Internet, the development of mobile devices, and electronic payments.

The COVID-19 pandemic has further accelerated the development of the e-commerce industry. The pandemic accelerated the digitization process among consumers and changed their previous habits. People who had previously rarely or never used e-commerce began to shop online. One of the effects of the pandemic was a change in the age structure of e-commerce customers. Research (Toska et al., 2022, Watanabe, Omori, 2020, Lee, Lee and Lee, 2021) indicates that during the pandemic, interest in the internet and online shopping increased in older age groups (from the so-called Silver generation). Customer preferences regarding the method of parcel delivery have also changed. As a result of the pandemic, more and more customers prefer contactless parcel pickup (e.g., using parcel lockers), which allows them to avoid direct contact with couriers and minimize the risk of infection (Szpilko et al., 2021).

2.1 Development of the e-commerce industry

From March to June 2020, record-breaking online shopping activity was reported. In 2020, the share of e-commerce in global trade exceeded 16.5%, reaching a record value of 4.2 trillion dollars (Ciesielski, 2020), and the total time spent using e-commerce mobile applications increased by 40% in 2020 compared to the previous year (App Annie, 2021). In 2021, the global e-commerce market reached a value of 13 trillion USD, and it is predicted that the market will reach 55.6 trillion USD by 2027 (Astute Analytica, 2021).

In 2022, China was the largest e-commerce market, and forecasts predict that it will remain the leader until 2027. The value of the Chinese market in 2022 was 1,156.3 billion USD (Statista, 2023).

The Central and Eastern European region, led by Poland, is one of the fastest developing in the world. In the last decade, the Polish e-commerce market has been growing at a rate of around 20-25% annually. According to experts (The Chamber of Digital Economy, 2023), by the end of 2022, internet sales directed to consumers and businesses (B2C and B2B) were expected to reach a value of PLN 850 billion. Over the decade from 2013 to 2023, the value of the B2C e-commerce market increased fivefold, the value of the B2B e-commerce market increased 3.5 times, the share of digital sales in total retail sales increased threefold, and the number of registered online stores increased 2.5 times.

However, the intense development of the e-commerce sector is accompanied by many challenges, among which experts most often mention the efficiency of the supply chain and the need for further investment in last-mile logistics, including courier, express, and postal services.

Based on market observations and analysis of current trends, it is predicted that the main factors influencing the Polish e-commerce market in the coming years will be: inflation growth, expansion of marketplaces - leading global purchasing platforms, new technologies, and ongoing generational turnover (increased share of "digital native" generations (Millennials and Generation Z) in overall consumption, for whom digital shopping is a completely natural and often preferred option) (PwC, 2022).

According to the "Polish CEP 2022" report (Last Mile Experts, 2022), in the near future - despite the economic crisis and international tensions - the intensive development of the e-commerce and CEP industry will remain at a high level. The predicted growth in value and quantity also means the need for operators and e-sellers to secure adequate warehouse and logistics support. Currently, dedicated e-commerce facilities account for nearly 7.5 million square meters of warehouse space in Poland, or over 30% of total warehouse supply. Compared to the state in 2019, this is an increase of up to 84%, indicating a clear upward trend.

2.2 The factors influencing the development of the CEP industry

E-commerce growth drives demand for efficient functioning of courier, express, and parcel services (Mordor Intelligence, 2023). Q-commerce is on the rise, and customers expect fast and high-quality courier services. Timeliness, fast delivery, and safety make courier services appealing to businesses and consumers, with the market undergoing constant changes (Gulc, 2017).

First of all, the development of the courier shipments market is stimulated by the growth of online trading. With the development of e-commerce, the number of delivered packages has more than doubled in the last decade, and today, 10% of global retail sales are made online (Wang, Kern, 2021).

The global CEP market handles approximately 55.6 billion shipments every day (GS1 Poland, 2019).

The largest CEP market in the world is China, which accounts for 40% of the total global delivery volume. Quantitative and qualitative forecasts for the development of the global CEP industry predict continuous growth (Janczewska, Janczewski, 2020). The value of the global courier services market reached $375.5 billion in 2020. From 2021 to 2026, the market is expected to grow at an average annual rate of 6%. The growth rate in Poland is expected to be similar (Szpilko et al., 2021).

According to a 2019 report by Mordor Intelligence (Mordor Intelligence, 2019), it is expected that the courier services industry worldwide will be worth as much as $400 billion by 2024.

In 2021, the global CEP services market reached a value of $394 billion. It is forecasted (Imarc, 2022) that the market will reach a value of $519.6 billion by 2027. The growth trend is also continuing in Poland. In 2021, the value of the courier services market was 18.5 billion PLN, which represents a 16% increase compared to the previous year (Last Mile Experts, 2022). The growth rate is almost three times higher than the growth rate of Poland's GDP, which means that the potential of this market will not be exhausted for a long time (GS1 Poland, 2019).

An important factor influencing the development of the CEP industry is also the development of technology, especially in the area of logistics process automation and digitalization. The expansion of automatic sorting, delivery through robots and delivery drones (McKinsey & Company, 2019) shortens the delivery time and increases efficiency. The same goal is also served by the development of same-day delivery services. Many companies already offer same-day delivery services (Hausmann et al., 2014), and even delivery within a few hours.

Advanced parcel tracking systems allow customers to track their shipments in real time. This tool increases trust in courier companies, which builds customer loyalty.

Another important factor is the competition in the market. There are a large number of courier companies operating in the Polish market - global entities such as DHL, UPS or FedEx, as well as national companies such as InPost, Polish Post or DPD (Dynamic Parcel Distribution). Such a market structure encourages, and even necessitates, continuous investment and innovation to increase competitiveness.

In summary, the CEP industry in Poland is still in a phase of dynamic development and is growing at a pace consistent with global trends. In the coming years, further automation and digitalization of logistics processes, investment in new technologies, and competition between courier companies can be expected, which will contribute to improving the quality of services and shortening delivery times (Marczuk et al., 2015, Ratajczak, Lorenc, 2015).

It seems that the future shape of the CEP industry will depend primarily on technology and innovative technical solutions. These include various Industry 4.0 solutions (process automation, Internet of Things, artificial intelligence, Big Data, digital technologies for warehouse logistics, GPS software, and RFID (Radio-Frequency Identification) technology) (Cywiński, 2022).

A new and very important trend in the courier delivery market is sustainable mobility efforts (Perboli, Rosano, 2019). Many companies are introducing new solutions that allow them to reduce the impact of their operations on the environment. An example of this could be the use of electric vehicles for delivering packages.

One of the challenges facing courier companies is the increasing number of deliveries to private consumers.

Another challenge is the increasing competition in the courier delivery market. Many companies prioritize customer service quality, invest in developing new technologies, and offer services tailored to individual customer needs. As a result, courier companies will have to operate more innovatively and flexibly to meet market demands and increase their competitiveness.

2.3 The impact of COVID-19 on the courier delivery market

The COVID-19 pandemic has affected many industries and sectors of the economy. One industry that has particularly felt the effects of the pandemic is the courier delivery industry. On the one hand, the attractiveness

of courier services has increased due to the pandemic. On the other hand, restrictions on movement, lockdowns, quarantines, sanitary procedures, and changes in customer purchasing preferences have caused changes in the courier delivery market (Rokicki et al., 2022). As numerous epidemic restrictions have limited, and at times blocked, brick-and-mortar trade, the challenge for the courier delivery industry became to handle a huge number of orders resulting from the increasing scale of online shopping (Sułkowski et al., 2022). The pandemic has caused an increase in the frequency of online shopping and therefore the use of courier services, with consumers starting to prefer contactless forms of delivery and payment. Research (Szpilko et al., 2021) has shown that, in the assessment of consumers, the level of service quality has increased (compared to pre-pandemic times), primarily in terms of service safety, delivery time, and the availability of shipment tracking options.

The COVID-19 crisis has been identified by many courier companies as an opportunity for growth and to acquire new markets and customers. The response of many entities was to develop creativity and introduce new innovative solutions that address the new pandemic-driven economic conditions (Thukral, 2021). One example is the company InPost described in this article. The company started in 2006 in Poland. It operates not only in Poland but also in other countries across Europe, Asia, both Americas, and Africa. The global courier delivery market reached a value of $343 billion in 2019 and was expected to grow to $464 billion by 2027 (Singh, Mutreja, 2020). However, the increasing number of online purchases, caused by the pandemic, has affected the courier delivery market's development faster than expected in earlier forecasts (Gruenwald, 2020). With the closure of physical stores, customers began to use e-commerce more often, which in turn led to an increase in the number of courier deliveries. The global e-commerce market grew by 20% in 2020 (McKinsey & Company, 2020), prompting many companies to invest in developing their courier delivery services, introducing more flexible delivery services, and investing in new technologies.

3. InPost company

InPost is one of the largest courier companies in Poland, specializing in package delivery services.

Thanks to innovative solutions such as parcel locker networks, automatic sorting systems, and flexible operations, InPost has achieved dominance in the Polish parcel delivery market, despite the presence of large courier companies such as DHL, UPS, or FedEx.

InPost is the market leader in Poland, both in terms of volume and revenue (Last Mile Experts, 2022). In just the last year, the company has grown by almost 40%, and its key competitive advantage is the largest parcel locker network in Europe. DPD ranks second in the market, and both companies are responsible for about 64% of the volume and just under 50% of the revenue in the CEP market (tab. 1). As a leader in the industry, InPost is also perceived positively by consumers (as rated by 74% of respondents in a study conducted by the authors in 2022).

Table 1: The leading companies in the courier delivery segment in Poland in 2021

No.	Company name	Market share (in %) in terms of	
		volume	value
1	InPost	41.7	24.4
2	DPD	22.2	23.1
3	Polish Post	11.1	9.7

InPost constantly develops its services, adapting to the needs of its customers.

InPost also focuses on the development of sustainable logistics and introduces innovative solutions related to e-mobility and environmental protection. The company invests in electromobility and already uses a fleet of electric cars in some cities in Poland.

It also pays attention to environmental protection and strives to minimize its impact on it by reducing energy and water consumption, using eco-friendly packaging, and promoting recycling.

In addition, InPost is an innovator in the field of automated sorting of shipments. In 2019, it opened the most modern package sorting terminal in Europe in Gliwice, which enables the processing of up to 60,000 packages per hour. Currently, the company has 12 logistics centers. The new sorting centers meet very high requirements - both in terms of location and communication with main roads, as well as the appropriate number of docks and courier shelters.

As the first company in Poland, it introduced the possibility of tracking packages and correspondence, which had a direct impact on building consumer trust.

InPost also operates in the area of corporate social responsibility. In 2020, the company announced a commitment to carbon neutrality by 2025. InPost plans to reduce its greenhouse gas emissions by investing in renewable energy and improving the energy efficiency of its operations. It engages in social initiatives, for example, through the establishment of a scholarship fund for talented children and youth in 2022. It also supports various foundations, such as the IT Girls Foundation (since December 2022), which aims to increase the participation of women in the IT industry. InPost also conducts educational campaigns on environmental protection and encourages its customers to use more eco-friendly delivery methods, such as parcel lockers.

3.1 InPost parcel lockers

The network of InPost parcel lockers is one of the biggest advantages of the company. Transforming the last link in the supply chain into completely different, previously unknown devices has completely changed the look of this industry worldwide and made the Polish company a significant player in global markets.

Parcel lockers are intelligent boxes that allow for parcel collection and dispatching around the clock, without the need to wait for a courier. Parcel lockers provide over a tenfold increase in courier efficiency, who can deliver 600-700 packages to parcel lockers per day, while a traditional courier delivers about 60 packages per day to customers (Ostoj, 2015).

Parcel lockers have caused a decrease in courier burden despite the increasing demand for courier services. The journey of the parcel has shortened, and deliveries are simplified.

The logistics of package pickup and delivery to the InPost parcel lockers by couriers is managed by an IT system. If the chosen the InPost parcel lockers is full, the package is redirected to a temporary parcel locker, which is no more than 2 km away from the originally selected parcel locker.

Another factor increasing the efficiency of courier work is the ability to combine the tasks of package pickup and delivery. Ultimately, the InPost parcel lockers solve the "last mile problem," which is the final, most expensive stage of delivering a package to the recipient. This is not only an ecological solution, but also cheaper for the recipient and more efficient for the courier.

By the end of 2009, there were already 300 such devices in operation in Poland, and another 150 were added in 2010. A breakthrough moment for the development of InPost was the presentation of parcel lockers at Post Expo 2012 in Brussels. A week after the end of Post Expo, a wave of orders for Polish machines offered by InPost started. In September, 48 the InPost parcel lockers were sent to Australia, and in October, the first devices were installed in the UK, where there were eventually to be 1,300 by the end of 2013 (Morawski, 2021). Currently, the InPost parcel lockers are present worldwide, including in the United Arab Emirates, Estonia, Lithuania, Latvia, Czech Republic, Slovakia, Slovenia, Germany, Iceland, Ireland, Colombia, Brazil, the Netherlands, and Australia.

According to InPost data (InPost, 2023) by the end of 2022, the number of InPost parcel lockers around the world had approached 28,000, of which 8,600 are located in international markets and their number is still growing. Within one year, the number of parcel lockers increased by 120%. InPost is increasingly expanding its presence in international markets. In 2020, InPost signed an agreement with eBay to collaborate on package delivery to EU countries. In 2021, the company announced plans to expand into non-European markets, including the United States and Canada. The InPost parcel locker network comprises 27,939 lockers, of which 19,306 are in Poland (as of the end of 2022) and is constantly expanding. In the first quarter of 2022, the company opened 430 new lockers in Poland and 1,500 in Europe. During the same period, the InPost parcel locker network handled 68.5 million shipments, representing a 32% increase compared to the same period in the previous year. In Poland, the parcel lockers handled 61.4 million shipments, while outside of Poland, they handled 7.1 million shipments.

It is worth paying attention to the technological development of InPost parcel lockers. In 2020, the company introduced an innovative "Post-leasing Parcel Locker" system, which allows the use of existing parcel lockers instead of creating new ones. Thanks to this, InPost can develop its parcel locker network faster and cheaper, while also protecting the environment by minimizing the amount of materials used.

4. Methology

To identify and discuss the impact of the COVID-19 pandemic on innovations in courier services, the case of InPost was analysed. The analysis focused on the information provided on the company's website regarding their response to the pandemic reality. Additionally, additional insights were gathered by conducting survey research among consumers - InPost clients. In particular, our sample consisted of 873 respondents, representing Generation Z (students of Lublin University of Technology aged 19-26). The survey examined the use of InPost parcel lockers during the COVID-19 pandemic. A purposive sampling technique was employed, with the age of the respondents (qualifying them as representatives of Generation Z) as the criterion. While the sample was not representative, the obtained results can serve as a reason for further exploration of the selected research problem. The survey research was conducted using the Computer Assisted Web Interview (CAWI) technique.

A structured and standardized questionnaire was used as a research tool. It consisted of two parts: the core part containing questions related to the research topic, and the demographic section. Responses were measured on a 7-point Likert scale (strongly disagree, disagree, somewhat disagree, no opinion, somewhat agree, agree, strongly agree). The research was conducted in January-February 2021. In the following section, the key observations that emerged during the data collection process are presented and discussed.

5. Results and evaluation InPost's response to COVID-19

COVID-19 has become the biggest motivator in history for using remote forms of contact. The world has been forcibly pushed towards reducing interpersonal contact, resulting in an increase in interest in services provided by companies like InPost.

In response to the challenges faced by the courier, express, and parcel market during the COVID-19 pandemic, InPost introduced a series of innovative changes to its services to ensure the safety of its customers and employees.

InPost, anticipating an increase in demand for parcel locker services, began to expand its network in all locations. The pandemic conditions caused more and more deliveries to be made using parcel lockers instead of what other services (courier network, pickup at the post office or at a specific company's physical store. According to data from the E-commerce in Poland 2021 report, the most commonly chosen delivery method is delivery to InPost parcel lockers (77% of respondents), followed by courier delivery to home/work, chosen by 50% of respondents. In third place are deliveries to partner points (e.g., Żabka stores) (21%) (Gemius, 2021). In 2022, 81% of respondents chose parcel lockers, 43% chose courier delivery, and only 17% chose delivery to partner points (Gemius, 2022).

Our research has also confirmed this. 89.2% of respondents admitted that the pandemic caused an increase in the use of parcel lockers. 83.8% rated that during the pandemic, parcel lockers had an advantage over competitive forms of delivery (such as personal pickup or courier).

InPost also recognized the potential of using parcel lockers in areas other than e-commerce. It presented an innovative offer directed, among others, to local governments, called the "Office 24" service. It is a solution aimed at offices and public administration bodies, whose main task is to enable the handling of official matters practically at any time.

In 2020, the infrastructure was significantly expanded and the possibilities of handling shipments were increased by over 40%. This applies to both the number of InPost parcel lockers and the number of sorting and logistics centers. As volumes continue to increase (figure 1), these actions are being continued.

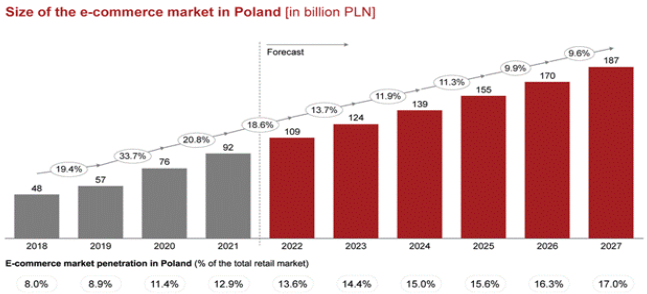

Figure 1: Size of the e-commerce market in Poland (in billion PLN)

InPost also introduced disinfection in their branches and parcel lockers, and provided their couriers with personal protective equipment such as masks and gloves. The company also encouraged its customers to use safe payment methods, such as card or online payments.

During the COVID-19 pandemic, InPost also showed social initiative. Together with its business partners and institutions, the company introduced the "Package for Medic" campaign, which involved free delivery of packages containing food and hygiene products for medical personnel.

In 2020, InPost introduced the InPost Box, an automated parcel pickup point that allows for contactless parcel pickup from the comfort of one's car. The company also launched the InPost Go service, which allows for parcel drop-off without the need to leave one's car.

In 2020, the company announced its investment in technologies related to unmanned deliveries. InPost plans to use drones and courier robots for delivering packages to areas that are difficult to access or in the case of very urgent shipments. As of yet, the company has not provided detailed plans in this area. In addition, InPost is developing its mobile applications, which allow customers to conveniently and easily use parcel locker services and track the status of their shipments. These applications also offer various features, such as the ability to file complaints, use insurance services, or generate shipping labels. Currently, the InPost Mobile app is used by 9 million users (Gemius, 2021).

Thanks to the app, opening the locker with the order was made possible not only through the panel on the parcel locker, as it was previously, but also through one's phone. This definitely facilitated parcel pickup and increased customers' sense of security, as they no longer had to worry about touching the screen on the parcel locker.

In 2020, InPost launched a service for sending packages through the app, which allows for sending packages to any parcel locker without printing a label.

In addition, InPost has abandoned the signature requirement for package pickup and introduced retrieval codes, which have eliminated the need for direct contact between the recipient and the courier.

In the era of the pandemic, InPost has presented more new features, such as weekend deliveries.

The company has coped well with the surge in work. The parcel delivery services to parcel lockers have increased, resulting in full capacity of the lockers. InPost's response to this phenomenon, which resulted in lower parcel locker efficiency and additional courier burden, was a lottery that encouraged customers to pick up their shipments more quickly.

InPost's actions during the pandemic were positively evaluated by the company's customers. During research conducted by the authors in 2021, 72.9% of respondents rated InPost's response to new customer needs arising from pandemic conditions as very good. The remaining respondents (27.1%) were dissatisfied and complained about the lack of a parcel locker near their place of residence. These were residents of rural areas.

Respondents also positively assessed elements of the company's activity that were important to them during the pandemic: fast delivery time (91.6%), attractive prices, competitive compared to other forms of delivery (85%), increased capacity of parcel lockers (68%), greater number of parcel lockers (93.5%), placement of parcel lockers in smaller towns (80.8%), introduction of an easier system for sending and receiving parcels (75.5%), possibility of using parcel lockers 24 hours a day (90.3%), easy operation of parcel lockers (88.7%), touchless operation of parcel lockers (74.5%), weekend delivery (85%), InPost Mobile application (74.9%), and the ability to track parcels (91.4%).

InPost's proper response to the difficult pandemic reality resulted in the strengthening of the company's position in the market. InPost expanded its operations and increased its revenues. InPost achieved double-digit growth on key markets in 2022, significantly increasing its share of revenue from international operations. The volume of handled shipments increased by 44% year over year, reaching 744.9 million units. Revenues for the year 2022 increased by 53.8% year over year, reaching 7.079 billion PLN (InPost, 2023).

All of these actions taken by InPost during the COVID-19 pandemic demonstrate that the company cares not only about its business interests, but also about the needs of society and its employees.

6. Conclusion

InPost quickly and effectively responded to the challenges posed by the COVID-19 pandemic by swiftly adapting its procedures and infrastructure. The company prioritized the safety and well-being of its employees and

customers by implementing measures to minimize direct contact and facilitate remote work. As part of these efforts, InPost increased the number of parcel lockers and introduced touchless parcel pickup options. Additionally, customers were provided with the convenience of online payment methods, and the mobile application was enhanced with special features that proved invaluable during the pandemic.

Moreover, InPost demonstrated its commitment to supporting local communities during these challenging times. The company donated over 200 tons of protective equipment to medical facilities, contributing to the crucial fight against the virus. Furthermore, InPost organized a charity campaign in which 100,000 PLN was donated to an infectious disease hospital, further aiding in the pandemic response (InPost, 2023).

It is worth noting that InPost's actions during the pandemic were well-received by the company's customers. Research conducted by the authors in 2021 revealed that 72.9% of the respondents rated InPost's response to the new customer needs arising from the pandemic as very good.

Individuals who rated InPost's response to COVID-19 negatively cited issues with timely delivery of parcels, overcrowding, and malfunctions of parcel lockers that hindered the pickup of shipments as reasons for their evaluation.

The main limitation related to the interpretation of the research results is the non-representative sample - only representatives of Generation Z, students from one study program and one university were examined. This does not provide a basis for generalizations regarding the research subject. Conducting future studies with a broader group of individuals using parcel lockers will enable a comprehensive examination of opinions regarding InPost's response to the pandemic reality.

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Tapping into Digital Technologies in Corporate Entrepreneurship: An Exploratory Multiple Case Study

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Abstract: Digital technologies can enable entrepreneurial processes and outcomes. However, current implications for scholars and practitioners on how to exploit the emerging digital technologies for entrepreneurship in the corporate context, i.e., corporate entrepreneurship, remain unclear. This issue is even more relevant today where the growing pervasiveness of digital technologies finds increasing applicability in corporate entrepreneurship activities. This present study contributes to the academic debate on corporate entrepreneurship in the digital era by offering an exploratory multiple case study – based on semi-structured interviews – that involved four incumbent organizations to deepen the knowledge of the role played by digital technologies in corporate entrepreneurship. We provide empirical evidence on how incumbents can exploit the enabling role of digital technologies to foster corporate entrepreneurship activities. Specifically, we document three enabling mechanisms of digital technologies in corporate entrepreneurship: (i) increasing the number and heterogeneity of inputs for corporate entrepreneurship activities; (ii) increasing the visibility of actors and resources involved in corporate entrepreneurship activities; (iii) accelerating innovation adoption rate in incumbent organizations. The outcome of this study is a framework that discusses the managerial actions required to support incumbents in making corporate entrepreneurship more prolific through digital technologies. In doing so, this study contributes to research on corporate entrepreneurship in the digital era. Results are of interest also to managers and practitioners, providing them practical insights to exploit the enabling role of digital technologies for corporate entrepreneurship activities.

Keywords: Corporate Entrepreneurship, Digital Technologies, Digital Transformation, Multiple Case Study

1. Introduction

Digital technologies – e.g. artificial intelligence and 3-D printing – are significantly transforming entrepreneurial processes and outcomes (Nambisan et al., 2019; Autio et al., 2018). Specifically, digital technologies have upended two broad assumptions that underlie our extant understanding of entrepreneurial processes and outcomes. First, they have rendered entrepreneurial outcomes and processes less bounded (Elia et al., 2020; Nambisan, 2017). Second, they have led to less predefinition in the locus of entrepreneurial agency (Berger et al., 2021; Nambisan, 2017). However, despite the huge proliferation and potential of digital technologies, existing literature has largely neglected the role of digital technologies in corporate entrepreneurship, i.e., entrepreneurship in incumbent organizations (Petzsche et al., 2022; Arvidsson and Mønsted, 2018; Burgelman, 1983). To answer this call, we explored the role of digital technologies in facilitating corporate entrepreneurship practices through an exploratory multiple-case study (Yin, 1984) involving four incumbent organizations implementing corporate entrepreneurship activities with digital technologies. The outcome of this study is a framework that illustrates how incumbents can leverage the enabling role of digital technologies for corporate entrepreneurship at organizational and project level. In doing so, our paper contributes to the research stream of corporate entrepreneurship and digital technologies discussing the potential, applications, and managerial implications of digital technologies in corporate entrepreneurship activities. The paper contributes to digital corporate entrepreneurship research by studying the organizational and process levers that management can adopt to foster corporate entrepreneurship through digital technologies. Specifically, we provide two main contributions to research and practice in corporate entrepreneurship in the digital age. First, we shed light on how digital technologies enable corporate entrepreneurship at organizational and project levels. Second, we extend the concept of digital technologies as enablers as evidenced in digital entrepreneurship literature (von Briel et al., 2018) also in the corporate context.

2. Literature review

2.1 Corporate entrepreneurship

In a dynamic and uncertain environment such as that created by digital transformation, corporate entrepreneurship is envisioned as a process that can facilitate firms' efforts to innovate constantly and cope effectively with the competitive realities companies currently face (Fisher et al., 2021; Tucci et al., 2018). Corporate entrepreneurship, or entrepreneurship in incumbent organizations, has been a topic of interest to scholars and practitioners for over the last four decades (Urbano et al., 2022; Burgelman, 1983). In the digital age, (corporate) entrepreneurship is now more in demand than ever before and digital technologies can make corporate entrepreneurship increasingly potent and prolific (Arvidsson and Mønsted, 2018). Although the body of research on corporate entrepreneurship has expanded and aroused an increasing amount of attention along the years and given the pervasiveness of the digital technologies, the profound impact of digital technologies on corporate entrepreneurship has yet to be addressed.

2.2 Digital corporate entrepreneurship

Digital technologies herald a new era in entrepreneurship, one in which the traditional ways and forms of pursuing entrepreneurial opportunities are increasingly reframed (Jocevski et al., 2020; Nambisan, 2017; Ghezzi et al., 2013). Nambisan (2017) discusses the impact of digital technologies on entrepreneurship process and outcome. And more, Nambisan and colleagues (2019) shade lights on three themes that could potentially serve as the basis for future research on entrepreneurship with digital technologies, i.e., openness, affordances, and generativity. Recently, digital technologies have attracted a growing interest also in corporate context (Ben Arfi and Hikkerova, 2021; D'Angelo et al., 2021; Cavallo et al., 2020; Joshi et al., 2019). Scholars are increasingly considering digital technologies as key differentiating factors for corporations to operate in the dynamic digital context. For instance, Arvidsson and Mønsted (2018) highlight how the large diffusion of digital technologies can make corporate entrepreneurship activities more potent and prolific. However, despite the pervasiveness and the potential of digital technologies, literature provides limited empirical evidence on how digital technologies can support and enable corporate entrepreneurship (Ghosh et al., 2021; Soltanifar et al., 2021). For instance, Martin-Rojas and colleagues (2020) analyse the application of social media platforms for corporate entrepreneurship, Ghosh and colleagues (2021) discuss cloud technology in corporate entrepreneurship while Pinchot and Soltanifar (2021) study internet of things for entrepreneurship in corporations. However, we found very few contributions that study empirically digital technologies in corporate entrepreneurship. Accordingly, the role of digital technologies in corporate entrepreneurship remain largely underexplored. Thus, the aim of this paper is to bridge this gap in existing literature and answer the following research question: "How can digital technologies support corporate entrepreneurship?"

3. Methodology

To answer our research question, our study is based on an exploratory multiple case study (Ghezzi and Cavallo, 2020; Eisenhardt, 1989; Yin, 1984). Case sampling was performed theoretically (Meredith, 1998), and following our interpretive stance. We believe that this sample of companies adequately fits with the theoretical setting and, therefore, it is suitable to respond to the research question proposed as companies are incumbent organizations operating in heterogenous traditional sectors and implementing corporate entrepreneurship activities leveraging on digital technologies. In our multiple case study, data were collected through multiple sources of information (Yin, 1984). 20 semi-structured interviews were the primary source of information. The interviews lasted between 45 and 70 minutes and performed between March and May 2022. The six interviews for Company A took place in March and in April 2022 with the Chief Technology Officer, the Chief Innovation Officer, the Head of Innovation and Corporate Venture Capital, the Innovation Manager and two Innovation Specialists (one interview each). The six interviews of Company B took place in March 2022 with the Chief Information Officer, the Program Manager and one Fellow Intrapreneur (two interviews each). The four interviews of Company C were performed in March and April 2022 with the Chief Information Officer, Chief Innovation Officer, the Head of Innovation LAB, and the Innovation Officer (one interview each) and the four interviews of Company D happened in May 2022 with the Chief Information Officer, the Head of Innovation and R&D, the Innovation Manager and the Innovation Specialist (one interview each). The protocol of the interviews was consistent with the study's research question: the informants were asked to describe the corporate entrepreneurship practices of their organizations as well as the barriers faced, the benefits and outcomes obtained using digital technologies in corporate entrepreneurship. Several secondary sources of evidence and

archival data were also added to supplement the interview data, including 23 strategic reports, 20 financial statements, 17 reports, and external documents and sources – 35 internet pages, 20 articles. This array of sources led to "data triangulation" essential for qualitative research to be trustworthy and persuasive (Siggelkow, 2007). Following the suggestions provided by Yin (2013), for each case study, we first analysed the role of each digital technology adopted in the corporate entrepreneurship activity. Thereafter, to identify the common patterns of actions and differences among each case study, a cross-case comparison was undertaken. Specifically, Company A is an incumbent firm operating in the energy sector and oriented to become a "life company". This company pursues sustain regeneration, i.e., development of new products/services (Covin and Miles, 1999) leveraging on a platform-based intrapreneurship program with the goal to collect internal entrepreneurial ideas from the employees of the organization. Company B is an IT multinational company oriented to organizational rejuvenation, i.e., the improvement of the organizational functioning of the organization (Covin and Miles, 1999). In particular, the company leverages on internal programs aimed to foster a digital entrepreneurial mindset culture and improve organizational processes. Company C is a large enterprise operating in the insurance sector pursuing strategic renewal, i.e., the pursuit of a new strategic direction (Covin and Miles, 1999) to digitalize their business. They established an "Innovation Community" composed by 30 internal employees selected from different departments with the role to create innovative solutions. Finally, Company D is a manufacturing company that established an outpost program in Italy, China, and America aimed to collect ideas from external stakeholders such as clients, or internal employees for developing new market opportunities in a logic of domain redefinition, taking the competitive battle to a new product-market arena (Covin and Miles, 1999).

4. Findings

4.1 Company A

Company A adopts an internal web platform to collect ideas emerged from "Call for Ideas" intrapreneurship programs, as well as business units needs. Company A leverages also on platform that connects the Innovation department with external actors, e.g., Corporate Venture Capital unit. Moreover, Company A can leverage on a shared Idea Knowledge Management (IKM) System that hosts the development process of the most promising ideas. To rapidly experiment ideas, Company A adopts rapid prototyping technology (CAD and 3D printing technology). These technologies allow to build the prototype in bootcamp days and present the solutions to the high-level management for the final evaluation. The digital technologies helped the company to perform and enable the following capabilities: (i) intercept embryonal internal and external ideas; (ii) contact solver from various background and geographic locations; (iii) generate further opportunities for entrepreneurial projects; (iv) guarantee an alignment among the business needs and the entrepreneurial resources; (v) improve the alignment among the business needs and entrepreneurial resources and (vi) develop a safe space environment for the employees to innovate.

4.2 Company B

Company B has a space dedicated to experiment ideas and formed by four main sections: (i) a collaboration hub dedicated to hackathons and workshops; (ii) a makerspace with digital tools such as 3D printers, a laser cutter, a PCB milling machine for creating prototypes; (iii) a room dedicated to augmented and virtual reality applications and (iv) a dedicated space to deep learning techniques. These digital tools allow Company B employees to experiment and to look at problems from different perspectives. Company B leverages on an internal web platform supported by social media applications to connect employees that can communicate among each others, join teams, and share ideas to develop corporate entrepreneurial projects. Moreover, the company leverages on an IKM system that collects and monitor established projects and teams involved in the innovation programs engaging employees from different geographical locations. Further, Company uses an artificial intelligence algorithm that allows to identify and filters specific innovation projects according to specific business needs. These digital technologies help the company to perform and enable the following capabilities: (i) increase the number of participants involved in the corporate entrepreneurship program; (ii) increase the control and visibility over the process and (iii) facilitate cross-department collaboration.

4.3 Company C

Company C launched the first community of clients 'Beta Tester' to facilitate experimentation. These activities are made possible through a digital web platform "Company C collab.it" that connects 22.000 users with the

goal of testing the ideas coming from the intrapreneurship program in a rapid way. Company C can leverage also on an Innovation Community, which involves every year a group of about thirty employees from various backgrounds and with different seniority and expertise. The participants, called explorers, are ambassadors that devote up to 20% of their working time to develop new entrepreneurial ideas. Employees, grouped in teams, meet virtually on collaborative platform where they follow different entrepreneurial projects from ideation to prototyping up to piloting. These digital technologies help the company to perform and enabled the following capabilities: (i) increase the efficiency of the entrepreneurial process; (ii) increase transparency of the resources involved and (iii) improve the reporting to high-level management.

4.4 Company D

Company D adopts a Product Lifetime Management system (PLM) system for corporate entrepreneurship projects and a gate-model project management system for the ongoing projects to the departments, who can monitor and provide feedbacks through the platform. The innovation department of Company D leverages on two main digital tools. First, a PLM system based on Cloud that hosts the concept of an idea and support the prototyping phase by collecting necessary info. This is shared among all the departments, who can contribute with information and feedbacks and approve the projects through the milestones. Second, a cloud-based 3D machine is used as internal prototyping builder. This 3D machine permits to pursue mass customization by generating small batches of personalized caps. Leveraging on the 3D machine, Company D was able to target a new segment market. Moreover, by testing its offer on a new e-shop, the company was able to access a higher volume of costumers also dispersed geographically who can customize and configure their offer directly from the web platform. These digital technologies helped the company to perform and enable the following capabilities: (i) increase the connection among departments; (ii) facilitate visibility of the actors involved in the entrepreneurial process and (iii) generate stepping stones for future innovations.

5. Discussion

In the following chapter the results are discussed, and an integrated framework has been proposed answering to this research question: "How digital technologies can support corporate entrepreneurship?". The framework (Figure 1) resulted as outcome of our multiple case study. Overall, independently from the typology of digital technologies adopted or the corporate entrepreneurship form analyzed in the cases under investigation, the framework presents digital technologies as enablers for corporate entrepreneurship at organizational and project level and specifically for these activities: (i) idea inflows; (ii) monitoring and controlling the progress; and (iii) the idea testing.

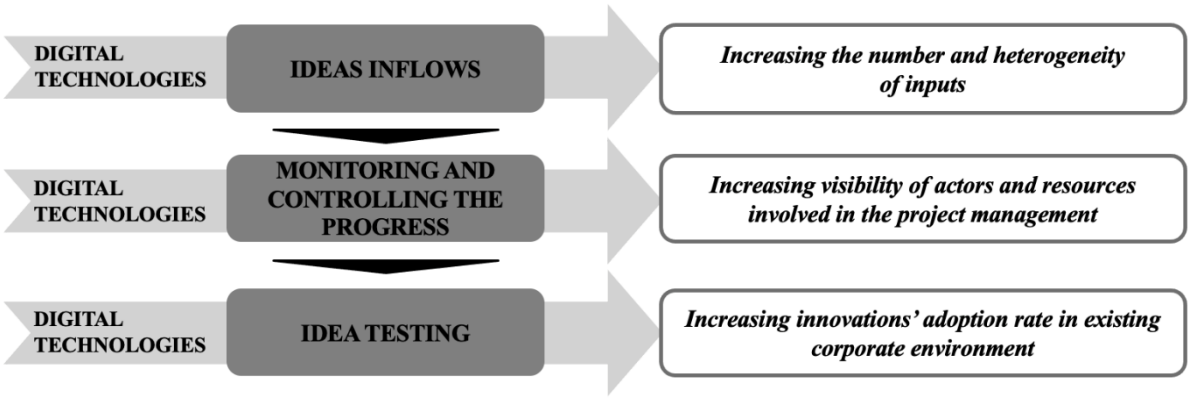

Figure 1: Research framework.

5.1 Digital technologies as enablers of corporate entrepreneurship

Our multiple case study highlights key insights regarding the role of digital technologies in corporate entrepreneurship. The first key finding concerns the role of digital technologies in enabling corporate entrepreneurship. Our study presents digital technologies as tools that support the entrepreneurial activity also in corporate context. For example, the innovation department of Company A, composed by ten employees, had not the capacity to manage the increasing number of incoming entrepreneurial and innovative ideas. By adopting an IKM system, the innovation team had the possibility to simultaneous handle the information of the

innovative projects, and set up an intrapreneurial program involving and connecting all the employees across the company. Similarly in Company B, the application of an internal web platform for hosting the virtual rooms and virtual prototyping tools, enable the company to perform a hackathon program involving about 80.000 participants. The possibility to engage this type of number of participants enable the department to collect several new ideas for the internal incubator of the company. Instead, Company D is able to address a new market and satisfy a completely new target of customers leveraging on the enabling possibilities offered by the 3D printing technology and web platforms. As a result, the concept of digital technologies as enablers for corporate entrepreneurship is line with the positive view present in entrepreneurship literature (Von Briel et al., 2018). Specifically, independently from the sector under investigation, the selected companies adopted digital technologies as enablers of three main activities of the entrepreneurial process inside corporations: (i) ideas inflows; (ii) monitoring and controlling the process; and (iii) idea testing activity. These phases emerged from the cases can be also related with the three phases "recognition of opportunity", "appropriation of opportunity" and "exploitation of opportunity" evidenced by the dynamic capabilities theory (Teece, 2007). More specifically, we identify three main enabling effects enabled by digital technologies: (i) increasing the number and heterogeneity of inputs; (ii) increasing visibility of actors and resources involved in the project management, and (iii) increasing innovations' adoption rate in existing corporate environment. Finally, to introduce the digital technologies in corporate entrepreneurship practices, companies should implement activities also at process level. Specifically, we identify two main implications at process level: (i) the redefinition of processes and roles of the innovation department; (ii) the establishment of a digital and entrepreneurial culture. Based on the above considerations, we propose the following propositions:

P1: Digital technologies can act as enablers of corporate entrepreneurship at organizational and project level.

P2: Digital technologies influence three main activities of the entrepreneurial process inside corporations: (i) idea inflows; (ii) monitoring and controlling the progress; and (iii) idea testing.

5.2 First enabling effect: Increasing the number and heterogeneity of inputs

By applying digital technologies in the "idea inflows" activity incumbents can increase the number and heterogeneity of inputs for new idea generation creating value for the organization. In other words, digital technologies allow to increase the alertness of the company to internal and external environment changes, thus facilitating firms to reduce costs in collecting internal and external ideas and inputs (for example by facilitating ideas gathering and improve problem solving by proposing ad-hoc challenges). Social media and web platforms emerged as the suitable digital technologies for this first enabling effect. Specifically, Company A adopts an internal web platform for scouting internal employees' ideas from internal departments from the business to the operations areas, to intercept embryonal business opportunities and include them in corporate venturing programs, as well as to interact with more than 20.000 experts coming from various backgrounds and locations. By including social media applications in the internal platform, Company B allows employees and stakeholders worldwide to interact and work together, for instance by autonomously create news teams, and propose continuously new solutions and enrich existing ideas with comments and feedbacks. This first enabling effect of digital technologies in corporate entrepreneurship is related to the nature and degree of openness, facilitated by digital technologies in corporate entrepreneurship—in terms of who can participate (actors), what they can contribute (inputs), how they can contribute (process), and to what ends (outcomes)(Nambisan et al., 2019, p.3). More specifically, this enabling capability generate various secondary effects for corporate entrepreneurship. First, it contributes to boost a digital entrepreneurial culture within the organization and mitigate middle managers "myopy" (Ghezzi, 2012; Braganza et al., 2009) and risk aversion towards the "new". Second, it allows the organization to acquire a depth understanding of the external environment and at the same time increasing their alertness to internal and external environment changes. This allows also to reduce costs in collecting ideas and inputs by facilitating ideas inflows.

5.3 Second enabling effect: Increasing visibility of actors and resources involved in the project management

By applying digital technologies in "monitoring and controlling progress" activity, incumbents can increase visibility of actors and resources involved in the project management providing organizational benefits. In particular, this allows to reduce complexity and coordination costs of handling resources and capabilities involved in the innovative projects and thus supporting the decision making of management on corporate

entrepreneurship activities. IKM, PLM systems, CID tools, AI, and ML technology emerged as the suitable digital technologies for this second enabling effect. Specifically, Company B adopts an AI algorithm that searches in a database the current entrepreneurial and corporate innovative projects and filter them according to specific company requirements. The company uses this tool to prioritize the ideas and develop concepts aligned with business current needs. For example, Company B was in search for solutions to improve their presence on social media market. Supported by the AI algorithm, the company selected ten worldwide most suitable idea applications, and started their development. Finally, one of these solutions was then commercialized and became part of the value proposition of Company B. While Company C designs, maps, and visualizes the entrepreneurial process of its concepts through CID tools to plan and control their advancement. This second enabling effect can be related to the concept of affordances, defined as the action potential or possibilities offered by digital technology in relation to corporate entrepreneurship (Nambisan et al., 2019, p.3). This second enabling effect provided by digital technologies create various secondary effects for corporate entrepreneurship in incumbent organizations. First, it allows to reduce complexity and coordination costs to manage heterogeneous actors and ideas involved in corporate entrepreneurship activities. Second, it supports the decision making of management providing a comprehensive and interacting guidelines suitable for corporate entrepreneurship and innovation projects in digital context (Ghosh et al., 2021). Third, it allows to measure and control existing resources, therefore providing practical insights to high-level management and aligning them concerning the development of their entrepreneurial activities (Ghezzi et al., 2013; Ghezzi et al., 2009). Fourth, by adopting collaborative digital tools opened to all corporate departments, it is possible to increase the engagement of employees in corporate entrepreneurship activities in organizations.

5.4 Third enabling effect: Increasing innovations' adoption rate in existing corporate environment

By applying digital technologies in the "idea testing" activity incumbents can accelerate corporate innovation adoption rate in corporate environment, and thus providing benefits also at project-level. Specifically, this third enabling effect allows the company to make the entrepreneurial process faster and thus increasing the customer-acceptance of innovations outcome. CAD tools, 3D printing, and Web platforms emerged as the suitable digital technologies for this third enabling effect.

For example, Company A adopts rapid prototyping systems to finalize in few weeks the ideas reaching the testing phase and propose the prototypes to the top management for the final decision. Company C instead adopts a web platform involving internal and external users that provides continuous and rapid feedbacks on weekly base on projects uploaded by the innovation team. This third enabling effect is related to the notion of generativity, defined as the capacity exhibited by digital technologies to produce unprompted change (through 'blending' or recombination) by large, varied, unrelated, unaccredited and uncoordinated entities/actors (Nambisan et. al., 2019, p.3). This third enabling effect provided by digital technologies generates various secondary effects for corporate entrepreneurship in incumbent organizations. First, it enables the company to speed up experimentation and testing process, while reducing costs in terms of prototyping, feasibility analysis, evaluation, and customer acceptance (Sanasi et al., 2021). Second, it improves experimentation process also in term of time reducing the experimentation cycle in incumbent organizations (Ghezzi, 2020). However, it is necessary to consider the investments and skills required to adopt digital technologies such as CAD software and generate the required output.

6. Conclusions

Our study contributes to the debate on corporate entrepreneurship in the digital era in many aspects. First, this study confirms the view of digital technologies as enablers of entrepreneurship (Von Briel et al., 2018) also in the corporate context. More specifically, this study highlights how digital technologies enable corporate entrepreneurship at the organizational and project levels. In particular, we shed light on digital technologies as enablers for corporate entrepreneurship for these activities: (i) idea inflows; (ii) monitoring and controlling the progress; and (iii) idea testing. In detail, by applying digital technologies in the "idea inflows" activity, incumbents can increase the number and heterogeneity of inputs for new idea generation creating value for the organization. By applying digital technologies in "monitoring and controlling progress" activity, incumbents can increase the visibility of actors and resources involved in the project management providing organizational benefits. By applying digital technologies in the "idea testing" activity, incumbents can accelerate corporate innovation adoption rate in the corporate environment, thus providing benefits also at the project-level. Second, our research revises the concepts of openness, affordances, and generativity (Nambisan et al., 2019) in the

corporate entrepreneurship context. From a managerial perspective, we believe the paper provides managers and practitioners operating in the field of corporate entrepreneurship and digital technologies with a set of tools, insights and examples. For instance, to successfully introduce digital technologies in corporate entrepreneurship, we suggest incumbent organizations perform the following activities: (i) the redefinition of processes and roles of the innovation department and (ii) the establishment of a digital and entrepreneurial culture. This finding is confirmed also by Ghosh and colleagues (2021) that highlight the need to develop a cultural transformation towards a digital operating model to favor digital corporate entrepreneurship. Despite the possibilities offered by digital technologies, the downside of digital technologies is a topic that deserves further attention. Finally, this research is not excepted from limitations. Our framework represents a foundation for future studies on corporate entrepreneurship in the digital age. Based on the framework proposed, future research could investigate more in-depth the relationship between specific digital technologies and enabling effects for corporate entrepreneurship. Moreover, future studies can analyze the enabling effects of digital technologies according to the corporate entrepreneurship form investigated (Covin and Miles, 1999). Future research can mend this study's limitations – related to the limited size and industry specificity of the sample consider and the observer bias characterizing qualitative method – by validating and customizing the framework in different contexts with different digital technology maturity. Finally, future studies applying mixed-method research can corroborate and extend the findings of this study.

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Corporate Effectuation in the Digital Age: the Role of Absorptive Capacity and Digital Skills

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Abstract: Effectuation has become a highly influential decision-making logic for entrepreneurs. While most studies have viewed effectuation as an approach to managing resource constraints in the new venture context, few of them have directly investigated the effects of effectuation as an approach to absorptive capacity (AC) in the corporate context. Specifically, the relationship between the usage of an effectual logic and its impact on the knowledge of individuals remains underexplored in corporate entrepreneurship (CE), i.e., entrepreneurship in incumbent organisations. Moreover, in a digital world characterised by the growing proliferation of digital technologies, digital skills can support the learning and knowledge absorption process of individuals in incumbent organisations facilitating the development of corporate innovation. By using the survey data from employees of an incumbent firm, we test hypotheses developed to examine the relationship between effectuation and entrepreneurial orientation (EO) as well as the mediating role of AC and the moderator role of digital skills in this relationship. The empirical results generally support our hypotheses by showing that (i) effectuation positively influences AC, and (ii) digital skills have a positive moderating effect on the relationship between effectuation and AC. No significant results emerged concerning hypothesis (iii) AC mediates the relationship between effectuation and EO. Drawing upon the findings of this study, we reframe effectuation as a concrete activity that enhances knowledge absorption and enlarges the scope of opportunities, and in turn fosters entrepreneurial actions in organisations. In doing so, we advance the extant understanding of corporate effectuation in the digital era, providing also managerial implications.

Keywords: Corporate Entrepreneurship, Digital Technologies, Effectuation, Absorptive Capacity, Digital Skills

1. Introduction

Effectuation, defined as "the process that takes a set of means as given and focuses on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001), has been successfully introduced to and then prospered in the field of entrepreneurship (Sarasvathy et al., 2003; Scazziota et al., 2023). Most existing studies in entrepreneurship view effectuation as an approach to overcome resource constraints and develop businesses starting from the available means (Chandler et al., 2011; Dew et al., 2009). Moreover, a consistent body of research investigates effectuation in the new venture context (Villani et al., 2018; Read et al., 2009). Some studies examine the conditions of whether entrepreneurs mobilise effectual principles (i.e., experimentation approach) when they launch new ventures in emerging industries (Sarasvathy, 2001). Other studies focus on how entrepreneurs process risks and returns in new venture development (Perry et al., 2012). Recently, scholars have started to investigate effectuation in the corporate context (Parker et al., 2021). However, we still know relatively little about when and why effectuation processes are employed in corporate decisions (Johansson and McKelvie, 2012; Von Briel et al., 2018). In addition, most empirical effectuation studies have examined effectuation as a dependent variable (Perry et al. 2012), while the consequences of using effectual reasoning remain underexplored. Further, research concerning the effect of effectuation on other constructs such as learning and Absorptive Capacity (AC) (i.e., ability to identify, assimilate, and exploit knowledge from the environment) is limited (Scuotto et al., 2022; Müller et al., 2021). Indeed, a growing body of literature urges to analyse effectuation in the digital entrepreneurship field (Nambisan, 2017; Ghezzi, 2019). In a digital entrepreneurial process characterised by high uncertainty, effectuation process is a necessary condition (Kraus et al., 2018). Furthermore, digital skills (i.e., the ability to adapt and exploit the possibilities offered by digital technologies) can help to reduce this uncertainty and support effectuation process and experimentation (Ghezzi and Cavallo, 2020; Peart et al., 2020). Here, we reframe effectuation as a behaviour enabling and fostering entrepreneurial actions and learning through experimentation (Wiklund and Shepherd, 2011). More specifically, we propose effectuation as an enabler for the experimentation of new opportunities enabled by digital technologies. Finally, at a broad level, Corporate Entrepreneurship (CE) literature (i.e., entrepreneurship in incumbent organisations) has been dominated by contributions at firm-level (e.g., Rauch et

al., 2009; Urbano et al., 2022), while few studies have explored the phenomenon at individual-level or team-level dimension (Pinchot, 1985). And more, few studies have expressly modelled the individuals' intrapreneurial behaviour in digital context (Pinchot and Soltanifar et al., 2021). Specifically, in this study, we investigate the role of experimentation and digital technologies in CE through the theoretical lens of effectuation (see Figure 1). More specifically, we built a model analysing the role of effectuation on Entrepreneurial Orientation (EO) (i.e., the degree to which an organisation exhibits a sustained pattern of entrepreneurial behaviour), while exploring the role of AC (which captures, transforms, and exploits knowledge) and digital skills that can enable effectuation process. The findings of this study provide several contributions to the existing literature. First, we extend our understanding on the role of effectuation in influencing CE. Effectuation is traditionally viewed in the literature as a behaviour aimed to overcome resource constraints (Sarasvathy, 2001). This study, in contrast, examines the role of effectuation in driving CE through generating and accumulating new knowledge. Second, this study complements prior research by investigating the role of effectuation in the corporate context. Prior studies primarily focus on the context of new ventures. Third, this research explores the role of digital skills as a moderator of the relationship between effectuation and AC, thus revealing boundary conditions in the digital context where firms can enhance the effects of effectuation. Finally, this study offers implications for practice to foster experimentation to innovate in organisations while exploiting the potential of digital technologies.

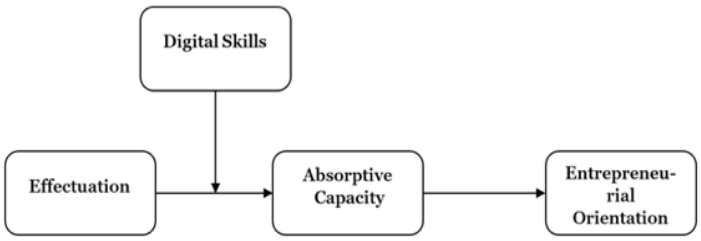

Figure 1: Research framework

2. Theory and hypotheses

2.1 Effectuation and absorptive capacity

The ability of a company to recognise new value and external information, and successfully assimilate and exploit them is known as absorptive capacity (AC) (Cohen and Levinthal, 1990). Effectuation is largely based on experimentation and could lead to processes of learning by doing through trial-and-error experiments which can favour AC routines (Parker et al., 2021). Accordingly, effectuation impacts AC in three main ways: first, effectuation directly affects exploratory learning which is one of the three processes that compose AC (Lane et al., 2006). Exploratory learning is described as the key action directed by effectuation logic to gain new knowledge and reduce uncertainty (Cai et al., 2017). Second, according to the effectuation logic, "action" reflects the experimental dimension defined by Chandler et al. (2011). Accordingly, action is a tool for knowledge acquisition enlarging the knowledge base (Djuricic and Bootz, 2019). Finally, companies which stimulate creativity and experimentation facilitate the effective use of AC in creating novel outcomes (Sakhdari and Burgers, 2018). In sum, in conditions where effectual logic is applied, AC will be stimulated, increasing the ability to capture new relevant knowledge and to pursue new opportunities. Accordingly, we propose:

H1: The use of effectual logic is positively related to individual absorptive capacity.

2.2 Effectuation, absorptive capacity, and entrepreneurial orientation

Corporate Entrepreneurship (CE) could be defined as the process whereby firms pursue innovation, renewal, and venturing (Burgelman, 1983). It usually implies practices as organisational rejuvenation, strategic renewal and domain redefinition (Covin and Miles, 1999). Within CE domain, the concept of Entrepreneurial Orientation (EO) refers to an organisational attribute reflecting how "being entrepreneurial" is manifested in organisations or business units (Covin and Slevin, 1989) through entrepreneurial activities. As informed by literature (Martìn-Rojas et al., 2020; Zahra et al., 2009), CE represents a positive function of AC, consisting in the recognition, assimilation, and exploitation of knowledge that corporate entrepreneurs should enhance and foster. The more the capacity to absorb external knowledge the more the individuals will undertake entrepreneurial actions manifesting EO. The literature has provided evidence about the relationship between AC and CE. It is largely

known that AC allows a company to blend new external and internal knowledge (Lane et al., 2006), which is an important condition for enabling CE and foster entrepreneurial actions (Ireland et al., 2009). Even more, AC increases the ability to recognise opportunities proactively instead of reactively (Thorpe et al., 2005) stimulating EO. Thus, adapting the previous considerations at individual level we hypothesise:

H2: Individual absorptive capacity is positively related to individual entrepreneurial orientation.

Integrating H1 and H2 we propose that AC mediates the influence of effectuation on EO, hence effectuation enhances AC which in turn influences EO. The more intensely the effectual logic is adopted by individuals the more likely they will develop and improve the ability to experiment and learn by doing. At the same time, they can develop the ability to build solid networks with external actors. This fosters exploratory learning (Cai et al., 2017), the recognition of opportunities, and the possibility to grab external knowledge improving AC. The action of effectuation becomes a tool for knowledge acquisition (Djuricic and Bootz, 2019). With an enlarged knowledge base and the ability to manage and exploit such knowledge individuals will be able to implement more entrepreneurial actions. Thus, we propose:

H3: Individual absorptive capacity mediates the relationship between effectuation and individual entrepreneurial orientation.

2.3 The moderating role of digital skills

Incumbent firms face the rapid progress of digital technologies and the consequently increased pace of innovation and dynamicity of the markets. Effectuation can be considered as an experimentally driven approach aiming at reducing uncertainty in such complex environments characterised by the pervasiveness of digital technologies. Individuals' ability to manage and exploit digital technologies can help organisations to better understand the possibilities offered by digital technologies (Autio et al., 2017). Digital skills, defined as the ability to develop and use ICT to participate in an environment increasingly dominated by electronically enabled information and the ability to synthesise this information into effective and relevant knowledge (Van Laar et al., 2017), can be helpful to create and reshape the ways resources are used and enlarge the set of solutions to solve problems. Specifically, we argue that digital skills positively moderate the relationship between effectuation and AC for several reasons. First, they can support exchange of information (both external and internal) thereby improving AC (Rehman et al., 2020). Second, digital skills can act as enablers for knowledge management (Joshi et al., 2019). Third, digital skills could even empower effectuation, by enabling a variety of possibilities that represent a significant increase in the number of possible means available for effectuation (Leong et al., 2016). Accordingly, we propose:

H4: Digital skills positively moderates the relationship between effectuation and individual absorptive capacity.

3. Methodology

3.1 Sample and data collection

We test these hypotheses using the survey data from an incumbent firm operating in the sector of energy and gas. The survey was issued to a total of 300 individuals with a final number of 79 responses (26.3% of response rate with 60 valid answers for a final percentage of 20% of valid answers). The questionnaire included all the necessary scales to measure the different variables of the model, and each scale was selected after detailed research aiming at checking its validity and reliability through the literature (Chandler et al., 2011; Bolton and Lane, 2012; van Laar et al., 2017). The variables of interest in this study are: (1) effectuation, (2) individual entrepreneurial orientation, (3) digital skills, (4) individual absorptive capacity. Each scale is composed by different sub-attributes. Specifically:

EFFECTUATION: Experimentation, Flexibility, Affordable Loss, Precommitments.

ENTREPRENEURIAL ORIENTATION: Innovativeness, Risk-Taking, Proactiveness.

DIGITAL SKILLS: Communication, Information Management, Collaboration, Creativity, Problem Solving, Critical Thinking.

ABSORPTIVE CAPACITY: Recognition, Assimilation, Transformation, Exploitation.

3.2 Reliability and construct validity

After data acquisition and cleaning it was necessary to perform some preliminary analysis to guarantee the validity of subsequent results. A first important step consisted into checking for non-response bias. The non-response bias refers to the possibility that people who did not respond to the survey are very different from people who responded creating potential problems for the significance of the sample. Therefore, it was important to test the eventual difference through a t-test. In this case, the non-response bias was tested by comparing two sub-samples: early respondents and late respondents (Borg and Tuten, 2016). In a T-test, the null hypothesis can be expressed as: $H0$: $\mu 1 = \mu 2$ (i.e., the two samples' means are equal). To perform the T-test, however, the assumption of homogeneity of variance (i.e., both groups have the same variance), needs to be tested. There were no significant results underlining differences between the means of the two respondents' groups, so it could be possible to move forward without additional considerations. Then, besides the quality check of the sample, it was necessary to test the reliability and validity of the constructs, and as indicator for the reliability, Cronbach's alpha was used (Table 1).

Table 1: Cronbach's alphas of the different scales.

Construct	Items	Alpha	Source
Entrepreneurial Orientation	10	0.817	Bolton D.L. & Lane M.D. (2012)
Individual Absorptive Capacity	14	0.78	Lowik et al. (2012)
Effectuation	20 (12 of effectuation)	0.78 (Experiment.); 0.85 (Afford. Loss); 0.70 (Flexibility); 0.62 (Precommit.)	Chandler et al. (2011)
Digital Skills	59	0.965	Van Laar et al. (2018)

The value of the different alphas of the scales showed values above the threshold of 0.7 (Cronbach, 1951), confirming their reliability. To validate the different scales, it has been performed a factor analysis, and since all the constructs were taken from the literature it was sufficient to check them through confirmatory factor analysis to understand if there was correspondence among the conceptual scales and the real data. However, confirmatory factor analysis (CFA) works better with larger sample and being the sample used for this study smaller than the level considered sufficient for CFA, traditional indicators revealed a lower level with respect to the standard ones. The average variance extracted (AVE) for all the variables, hence, was extracted analysing the factor loadings of exploratory factor analysis, revealing for each factor a sufficient percentage of variance explained.

4. Results

One of the first steps of the data analysis was to investigate existing relations among all the variables, studying the correlation matrix. Looking at the variables analysed, it is possible to notice a relevant correlation between AC and digital skills and between effectuation and AC. These results encourage the assumption made for the first hypothesis and the last one. The results are shown in Table 2.

Table 2: Correlations' matrix

	MEAN	S.D.	1	2	3	4	5	6	7	8	9	10	11
GENDER	0.4333	0.49	1										
AGE	41.38	9.18	-0.177	1									
TENURE	9.86	9.8	-.332**	.659**	1								
POSITION	1.15	0.48	.289*	-0.075	-0.099	1							
STUDY_TITLE	1.9	1.10	.358**	-0.191	-0.242	0.061	1						
FAMILYBACKGROUND	0.1833	0.39	.281*	0.174	0.046	-0.149	0.004	1					
ENTREP_EXP	0.1167	0.32	.311*	.287*	-0.197	0.103	-0.014	0.23	1				
EFFECTUATION	3.83	1.01	-0.175	0.145	0.012	0.019	-0.002	-0.13	0.02	1			
ENTREPRENEURIAL ORIENTATION	3.39	0.97	0.063	0.076	-0.061	0.128	0.026	0.097	-0.017	0.165	1		
DIGITAL SKILLS	3.34	1.05	.372**	-0.183	-.383**	0.205	.314*	0.06	0.185	.378**	.268*	1	
ABSORPTIVE CAPACITY	3.81	0.99	-0.021	0.095	-0.104	0.046	0.097	0.034	-0.018	.577**	0.198	.563**	1

** The correlation has significance at the level 0.01 (two tales).

* The correlation has significance at the level 0.05 (two tales).

The results of the regression analysis are reported in Table 3. To develop the empirical model, it was adopted the statistical technique of multiple hierarchical regression (Cohen and Cohen, 1983). The regression starts from an initial model containing only the control variables and for each following step an independent variable is added according to specific criteria and a new model is generated. To draw the conclusions the variation of R^2 and the level of significance are analysed for each model. In the first two models reported it is possible to see Individual Absorptive Capacity used as dependent variable to test its relationship with effectuation, according to the first hypothesis. In model 2 the variable of effectuation is added, and the results show that the variable has a great significance (p<0.01) and R^2 variation is significant too (0.287). This allows to conclude that the first hypothesis (H1) is supported: effectuation positively impacts absorptive capacity of individuals.

Then it was immediately tested the role of digital skills, introduced in model 3. The increase of R^2 is consistent (0.133) and the significance is high (p<0.001). Finally, it is tested the interaction of effectuation and digital skills, the product of the two constructs is added in model 4, furtherly increasing R^2 even if with a lower impact and significance level respect to the previous steps of the model. These results bring evidence to support the last hypothesis (H4). The second half of the mathematical framework shows the models designed to study the impact on the dependent variable of EO. Here, data do not enable to confirm the second and the third hypotheses as for H1 and H4. In model 7 is shown the impact of effectuation on EO as a direct effect, R^2 increase sensibly (0.045) but, even if R^2 across all the different models has an increase, the "delta" remains too small to confirm H2 and H3, even more the levels of significance are not satisfactory. Mediation, however, has been checked accordingly to the criteria explicitly indicated in the literature (Baron and Kenny, 1986).

Table 2: Quantitative results of the regression models

Dependent Variable	Absorptive Capacity				Entrepreneurial Orientation			
	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6	MODEL 7	MODEL 8
Variables	B	B	B	B	B	B	B	B
CONSTANT	-1.864*	-1.186	-1.011	-1.115	-1.583	-1.337	-1.399	-1.321
	(0.911)	(0.769)	(0.686)	(0.683)	(0.927)	(0.965)	(0.941)	(0.97)
GENDER	-0.204	0.024	-0.22	-0.276	0.01	0.037	0.072	0.07
	(0.338)	(0.284)	(0.261)	(0.261)	(0.344)	(0.345)	(0.347)	(0.35)
AGE	0.05*	0.03	0.033	0.035*	0.037	0.03	0.032	0.03
	(0.023)	(0.02)	(0.018)	(0.017)	(0.024)	(0.025)	(0.024)	(0.025)
TENURE	-0.046*	-0.032	-0.021	-0.025	-0.032	-0.026	-0.028	-0.026
	(0.021)	(0.018)	(0.016)	(0.016)	(0.022)	(0.023)	(0.022)	(0.023)
POSITION	0.192	0.12	0.024	0.065	0.339	0.314	0.319	0.311
	(0.294)	(0.245)	(0.219)	(0.219)	(0.3)	(0.301)	(0.299)	(0.303)
STUDY_TITLE	0.093	0.058	-0.012	-0.033	-0.001	-0.013	-0.01	-0.014
	(0.131)	(0.109)	(0.099)	(0.099)	(0.133)	(0.134)	(0.133)	(0.134)
FAMILYBACKGROUND	0.182	0.324	0.241	0.271	0.326	0.302	0.364	0.343
	(0.374)	(0.312)	(0.279)	(0.276)	(0.381)	(0.382)	(0.381)	(0.389)
ENTREP_EXPERIENCE	-0.716	-0.649	-0.713	-0.672	-0.693	-0.598	-0.674	-0.632
	(0.528)	(0.438)	(0.391)	(0.388)	(0.537)	(0.547)	(0.536)	(0.552)
EFFECTUATION		0.562***	0.349**	0.413**				
		(0.114)	(0.116)	(0.123)				
DIGITAL SKILLS			0.486***	0.473**				
			(0.128)	(0.127)				
EFFECTUATION * DIGITAL SKILLS				0.154				
				(0.106)				
ABSORPTIVE CAPACITY						0.132		
						(0.141)		
EFFECTUATION							0.152*	
							(0.139)	
MEDIATION (EFECTUATION AND AC)								0.115
								(0.171)
R squared	0.114	0.401	0.534	0.553	0.062	0.098	0.103	0.106
R sq adj	-0.005	0.307	0.45	0.462	-0,041	-0,044	-0.033	-0.055
Δ R squared	0.114	0.287	0.133	0.02	0.062	0.04	0.005	0.003

*p<0.05; **p<0.01;***p<0.001; Standard errors in parentesis

5. Discussion

This study investigates how effectuation impacts CE in incumbent firms, through individuals' absorptive capacity and digital skills. First, this study sheds light on role of effectual behaviour to improve learning capabilities and exploit knowledge in organisations (H1: Effectuation is positively related to individual absorptive capacity). Experiential organisational learning in this way can be stimulated (Cai et al., 2017) and consequently even absorptive capacity, with clear positive consequences on organisational opportunities. Results show a significant increase of prediction of individual AC (ΔR^2=0.28, p<0.001) providing strong empirical information. Second, our

study sheds lights on the enabling role of digital skills which characterise the last hypothesis (H4: Digital skills positively moderates the relationship between effectuation and individual absorptive capacity). Given the same effectuation level, an higher level of digital skills could help individuals to recognise and absorb more knowledge and exploit it through new opportunities. All these considerations find an empirical boost in the last hypothesis of the model, which results show a significant increase in the prediction of AC (R^2 = 0.53 overall and ΔR^2= 0.133, p<0.001) after the inclusion of effectuation and digital skills. Finally, we observed that the hypothesis H2 (H2: Individual absorptive capacity is positively related to EO), has not been confirmed by the data gathered. However, the conceptual model developed provides further insights on the impact that a good knowledge system within the firm has on entrepreneurial opportunities. As evidenced in the literature, CE is often defined as a positive function of AC (Zhara et al., 2009; Martìn-Rojas et al., 2020), since recognition, assimilation, and exploitation of knowledge foster individuals to undertake more entrepreneurial actions (Ireland et al., 2009). The same is recognised for EO, stressing even the importance of AC in developing EO in dynamic environments (Ruiz-Ortega et al., 2023). All these insights sustain the model developed here, and the results obtained provide a stepping-stone for future research. These results emerged may be useful for future research on CE in the digital era.

6. Conclusions

6.1 Theoretical contributions

Our findings contribute to the existing literature in fourth aspects. First, the findings extend our understanding of the role that effectuation plays in enhancing entrepreneurship in incumbent organisations. (Perry et al., 2012). Second, we uncover the link between effectuation and AC (H1). This study suggests that effectuation is also relevant in the context of incumbent firms. Effectuation can be the source of organisational knowledge base and enables incumbent firms to learn from the set of means available in the organisation and innovate in incumbents. Thus, effectuation may influence organisational learning rather than act only as a mechanism to manage resource constraints in the new venture context. In this study, we reframe effectuation as a behavioral theory that can enhance both external and internal absorption of knowledge with consequent enlargement of the opportunity set to be seized with entrepreneurial actions. Third, we analyse the impact of effectuation on CE mediated by AC (H3). We shed light on the role of effectuation and, in turn, experimentation in supporting CE activities, which is a topic that deserves further studies (Hampel et al., 2020). Fourth, we consider the enabling role of digital skills that update different, but related, research fields, i.e., experimentation and corporate entrepreneurship. This work is one of the first empirical studies in the emerging area of digital corporate entrepreneurship (D'Angelo et al., 2021; Arvidsson and Mønsted, 2018).

6.2 Implications for practice

Our study has two potential practical implications. First, managers of large corporations could leverage effectuation logic to identify, assimilate, and exploit knowledge from the environment (i.e., absorptive capacity) and in turn, create entrepreneurial initiatives in incumbent organisations and become more entrepreneurial (i.e., entrepreneurial orientation). This could be realised by understanding effectuation's principles and applying them in corporate routines. In other words, incumbents can translate and adopt effectuation in concrete experimentation methods such as the lean startup approach (Harms and Schwery, 2020), which, in turn, can enable incumbent firms to acquire and exploit knowledge from experiments and facilitate organisational learning. Second, this work offers insights concerning investment decisions and the promotion of digital technologies usage within companies. In other words, digital skills can act as enabler for AC (Roberts, 2015) in incumbent organisations by facilitating the identification, assimilation, and exploitation of knowledge from the environment. Therefore, managers need to cultivate digital skills of their individuals to improve the effectuation on absorptive capacity. Developing digital skills in the corporate workforce of incumbent organisations may help organisations to learn from experimentation and accelerate organisational learning.

6.3 Future research developments

Overall, this research focuses on effectuation theory, but future studies could investigate other interesting and related theories such as bricolage theory (Backer and Nelson, 2005) and exaptation theory (Dew et al., 2004) in similar empirical contexts. In particular, exaptation is suggested by Welter et al. (2016) to be at the intersection between bricolage and effectuation thus providing a new perspective to look at the entrepreneurship field in the digital age.

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Corporate Experimentation: Antitode or Oxymoron?

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Abstract: Experimentation in entrepreneurship has become the basis for the most influential approaches, e.g., lean startup, to launch and develop new ventures. Recently, the ideas developed around experimentation, strongly rooted in the startup context, have begun to be adopted by incumbent organisations, with the promise that these experimentation approaches can benefit corporate entrepreneurship activities, i.e., entrepreneurship activities in the corporate context, despite the established and corporate bureaucratic processes and practices. While there is a growing and significant body of literature investigating experimentation in the startup context, there is no corresponding research exploring the peculiar implications of experimentation in corporate entrepreneurship. Furthermore, current indications for managers and practitioners on how to exploit the benefits of experimentation approaches in the corporate context appear unclear. This issue is more relevant today when companies have to face fast-changing customer needs and market trends, as well as the design of complex value propositions. Through an exploratory multiple case study - based on semi-structured interviews – involving three incumbent firms, this study explores how experimentation is conducted in incumbent organisations and used as a tool to support corporate entrepreneurship. This study provides detailed empirical evidence on how incumbents can adopt experimentation approaches in the corporate context, together with a set of specific managerial practices. Specifically, we document corporate experimentation challenges at three levels of analysis: (i) experimentation-level challenges; (ii) firm-level challenges, and (iii) network-level challenges. Based on the findings of this study, we contribute to research and practice on experimentation in corporate entrepreneurship.

Keywords: Experimentation, Corporate Entrepreneurship, Lean Startup, Business Model Innovation, Digital Transformation

1. Introduction

The use of experimentation, defined as "an iterative process to reduce uncertainty, engage stakeholders, and promote collective learning at a relatively low cost" (Bocken and Snihur, 2020, p.4), has strongly rooted in the field of entrepreneurship, becoming one of the most effective approaches to launch and develop new ventures

(Hampel et al., 2020; Kerr et al., 2014). Scholars and practitioners have discussed at length the benefits that entrepreneurs can leverage by adopting experimentation (Thomke, 2020; Ries, 2011). Recently, the ideas developed around experimentation have been taken up by incumbent organisations, with the promise that this approach can benefit corporate entrepreneurship activities, i.e., entrepreneurship in incumbent organisations by accelerating them, reducing resource expenditure, and increasing the chances of success (Cabral et al., 2021; Ries, 2017). However, while there is a consistent body of research on experimentation in startups (Camuffo et al., 2020), the use of experimentation as a tool to support corporate entrepreneurship in incumbent organisations has not yet been systematically explored, despite the increasing interest among scholars and practitioners (Ghezzi, 2020; Mariani et al., 2021; Silva et al., 2020; Hampel et al., 2020). Therefore, by answering the call of Hampel and colleagues (2020), this study aims to investigate how incumbents engage in experimentation, in terms of antecedents, processes, and outcomes, to support their corporate entrepreneurship activities, drawing on an exploratory multiple case study (Yin, 1984) based on three incumbent firms operating respectively in the manufacturing, energy and information technology sectors. Our multiple case study contributes to research and practice on experimentation in corporate entrepreneurship. First, answering to the call of Hampel et al. (2020), we investigate experimentation in corporate entrepreneurship in terms of antecedents, process, and outcomes; second, we provide detailed empirical evidence about the challenges incumbents face in using experimentation in corporate entrepreneurship by illustrating the peculiarities in conducting experimentation in corporate context; third, we shed light on the enabling role of digital technologies for experimentation in incumbent organisations. Finally, our study offers practical insights for managers and practitioners involved in experimentation in a corporate context.

2. Literature review

2.1 Experimentation in entrepreneurship

Entrepreneurship is essentially about experimentation (Kerr et al., 2014). An experimentation-based approach to entrepreneurship allows to transform the fundamental assumptions of a business model into hypotheses that can be rigorously verified through experiments (Cavallo et al., 2020b; Ghezzi, 2020; Hampel et al., 2020). Experimentation has become very popular in startup context, and it is diffused in incubators and accelerators to launch and develop and support new business (Hampel et al., 2020). Literature shows various experimentation methodologies that are recognised as successful experimentation approaches for experimentation in entrepreneurship such as lean startup (Camuffo et al., 2020; Jocevski et al., 2020; Ries, 2011), design thinking (Brown, 2009) and agile development (Beck et al., 2001). Several studies have documented the benefits of experimentation for startups, in supporting new businesses development and enabling the growth and long-term survival of new ventures (Balocco et al., 2019).

2.2 Experimentation in corporate entrepreneurship

In recent years, experimentation has attracted an increasing interest also in the corporate context with the promise to boost corporate entrepreneurship activities by reducing resource requirements and increasing success rates of entrepreneurial activities (Ries, 2017; Ries and Euchner, 2013). The long-term existence of companies depends on their capacity to explore and experiment (Cabral et al., 2021), as experimentation may enable incumbents to overcome inertia and routines that prevent them to effectively apply the changes required to survive (Anthony and Tripsas, 2016). However, despite the relevance of the topic and the increasing interest among practitioners and academics (Hampel et al., 2020; Felin et al., 2019), the use of experimentation as a tool to support corporate entrepreneurship has not yet been systematically investigated, and research urges scholars to address this gap. For instance, Bocken and Snihur (2020) highlight the necessity to understand the boundary conditions for experimentation in incumbent organisations. Lindholm-Dahlstrand et al. (2019), stress the importance to explicit the system features that can lead companies to experiment. Other studies point out the relevance to investigate experimentation in mature contexts (Silva et al., 2021) or in not digital contexts (Mariani et al., 2021). To address this gap, taking the process view suggested by Hampel et al. (2020), we formulate the following research question: "How do incumbents engage in experimentation, in terms of antecedents, process and outcomes, to foster their corporate entrepreneurship activities?". We start from the key assumption that companies are not large versions of startups (Chesbrough and Tucci, 2020). In fact, despite corporate experimentation may present similar characteristics with traditional experimentation in new ventures, it may have peculiar characteristics that deserves dedicated research.

3. Methodology

3.1 Cases selection

This research has been designed as an exploratory multiple-case study (Yin, 1984) which is particularly useful to explore emerging topics in their real-life setting (Eisenhardt, 1989) and to reinforce the process of generalisation of results (Meredith, 1988). Specifically, we investigated experimentation antecedents, process and outcomes of three Italian companies respectively in the manufacturing, energy and software sectors. Several reasons led us to choose these cases. First, the heterogeneity in terms of sectors since an effective use of experimentation may depend on the type of industry where the company operates (Silva et al., 2020). Second, the heterogeneity in terms of organisational design to adopt experimentation and which could lead to different results. Third, we considered companies that present similar maturity in terms of years of adoption of experimentation in corporate entrepreneurship, to avoid comparing companies with different degrees of maturity for experimentation activities.

3.2 Data gathering and data analysis

In our multiple-case study, data were collected through multiple sources of information (Yin, 1984). Semi-structured interviews were the primary source of information. We conducted 25 semi-structured interviews (8 for case A, 8 for case B and 9 for case C) with an average duration of 1 hour. As case studies rely heavily on the correctness of the information provided by the interviewees for their validity and reliability, and these can be enhanced by using multiple sources or "looking at data in multiple ways" (Yin, 2003), several secondary sources

of evidence and archival data were also added to supplement the interview data, including strategic reports, informal emails and internet pages. The content analysis was performed according to the procedures of the Grounded Theory methodology (Glaser and Strauss, 1967). From the informants' exact words, we defined a set of first-order concepts iterating between data collected and relevant literature. Based on these, second-order concepts were developed and allowed us to view the data at a higher level of abstraction. Finally, the second-order themes were grouped into overarching dimensions representing the antecedents, process and outcomes of experimentation in corporate entrepreneurship.

4. Findings

4.1 Experimentation antecedents

The first area of investigation concerns the antecedents that lead incumbents to adopt experimentation in their entrepreneurial activities. In Company A, operating in the manufacturing industry, the need to progressively enter new markets and internationalise, exposed the company to a completely new customer base. To this end, the company adopts experimentation to learn about these new markets. Similarly, in Company B, operating in the energy industry, the huge proliferation of digital technologies allows the company to test new possible configurations that can be delivered on the market. Moreover, Company B, pursuing a decarbonisation strategy, leverages experimentation to bring new solutions to the market faster. Company C, operating in the software industry, adopts experimentation as an intrinsic business approach to compete. In this context, experimentation is essential for the company to stay competitive.

4.2 Experimentation process

The second area of investigation is related to the experimentation process in incumbent organisations. We focus on three main aspects of the experimentation process: (i) experimentation phases and methodologies employed; (ii) the organisational design adopted for experimentation in incumbent organisations; (iii) the challenges faced in conducting experimentation in corporate context. Concerning experimentation phases and methodologies, we can observe a convergency in the experimentation phases and methodologies in conducting experimentation in corporate context. In the first phase, the "ideation phase", a new entrepreneurial idea is generated in its minimal features with the involvement of internal and external stakeholders. This phase is typically carried out by adopting design thinking methodology (Brown, 2009) to perform many diverging and converging sessions and generate a business model of the entrepreneurial idea (Jocevski et al., 2020). In the subsequent "execution phase", the business model generated is tested and validated iteratively with customers up to its validation, following the guidelines provided by the lean startup methodology (Ries, 2011). Finally, in the "implementation phase", the corporates leverage agile methodology (Ghezzi and Cavallo, 2020) to support the more mature development of the business idea and to build the features of the product through agile sprints. While we found convergency in the application of experimentation phases and methodologies, we find heterogeneity concerning the organisational design to adopt experimentation in the corporate context. In Company A, experimentation activities are mainly carried out in the innovation department, which is the main responsible for the entire corporate experimentation process from the ideation phase up to the industrialisation phase. In Company B, experimentation is conducted in a separate area isolated from the existing organisational structure. In this way, the company can realise a "safe" area for experimentation outside the structural boundaries of the organisation. Finally, Company C, operating in the software industry, embeds experimentation at many levels. In particular, the company uses experimentation at three levels. First, they experiment with their entire organisation on existing products, involving all the corporate functions to continuously adjust the products according to market needs; second, they experiment to develop new products in the innovation department, similarly, to company A; and third, they experiment in a separate structure to find potential new business opportunities, similarly to company B. Focusing on experimentation process, the three incumbents show several challenges in conducting experimentation in corporate entrepreneurship. Company A reports cultural friction generated by the scepticism in accepting the results of experimentation and implementing the required changes in the established structures of the company. Company B shows the application and understanding of experimentation methodologies as one of the main challenges in conducting experimentation. Moreover, managers of Company B also point out the difficulty in measuring the outcomes of experimentation activities. Finally, Company C faces challenges regarding the organisational culture and the rigid processes that may hinder the effective use of experimentation. Specifically, the organisational functional structure made

difficult the horizontal communication flows and the mix of competencies needed to run experimentation activities.

4.3 Experimentation outcomes

The use of experimentation can lead to different types of outcomes in corporate entrepreneurship. In Company A, experimentation is used to support the launch of new products/services that are incremental and to establish more efficient production processes. In Company B, where experimentation is conducted in a separate structure, experimentation is used to generate new business lines and corporate spin-offs also with value propositions distant from the core business. Company C, where experimentation is diffused inside the organisation, presents a wide variety of experimentation outcomes such as new products, new business lines and improved organisational functioning. Through experimentation, the company can develop and spread entrepreneurial competencies associated with experimentation.

5. Discussion

As outcome of our multiple case study, we developed the conceptual model illustrated in Figure 1 that illustrates experimentation antecedents, process and outcome in corporate entrepreneurship. Experimentation antecedents are the elements that lead companies to embrace experimentation. Then, experimentation process in corporate context is illustrated with its phases and methodologies as well as the organisational designs adopted, and the challenges faced. Finally, experimentation outcomes represent the output in conducting experimentation in corporate context. In the following sections, we will discuss in detail each building block of the conceptual model presented in Figure 1.

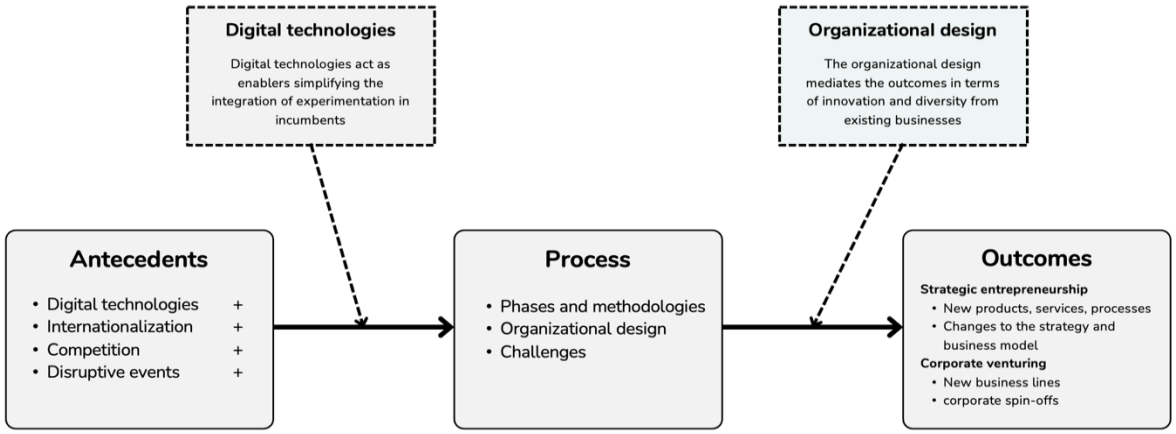

Figure 1: Conceptual model for experimentation in corporate entrepreneurship

5.1 Experimentation antecedents

Concerning experimentation antecedents, we can identify four factors that can push incumbents to adopt experimentation. First, the availability and proliferation of digital technologies can facilitate experimentation in scope and scale (Ghezzi et al., 2013; Autio et al., 2018). Second, internationalisation is another factor that can lead incumbents to adopt experimentation. Entering new countries and markets may imply facing new cultural contexts that could undermine the effectiveness of the company's traditional way of doing business (Cavallo et al., 2020a; Chandrashekhar, 2006). Third, competition is another important factor influencing the adoption of experimentation (Ghezzi et al., 2009; Bohnsack et al., 2019). In our study, experimentation emerged as a way for incumbents to keep up with an increasingly dynamic and competitive environment. Finally, our multiple-case study also confirms the role of experimentation in response to a disruptive event. Experimentation in disruptive environments allows the company to rethink its business model and implement the necessary changes as shown by Company C had to completely change its business model by experimenting in response to the disruptive phenomenon of decarbonisation. Focusing on the role of digital technologies in corporate experimentation, our findings show that the proliferation of digital technologies may force companies to adopt experimentation, thus acting as an antecedent for experimentation in corporate context. At the same time, digital technologies can simplify experimentation process, therefore also taking the role of enablers. More specifically, digital

technologies may have three enabling roles for experimentation in corporate context. First, digital technologies can enable a greater diffusion of entrepreneurial competencies within the company. In this aspect, digital technologies enable a "democratisation of competencies" which can favour experimentation (Thomke and Euchner, 2020). Second, digital technologies can make the internal organisational more flexible and responsive to the changes required for experimentation. Third, digital technologies can reduce the number of hierarchical levels in an organisation, thus making the structure flatter, that is fundamental for conduct experimentation (Nambisan, 2017).

5.2 Experimentation process

Concerning experimentation process in corporate context, we focus on experimentation phases and methodologies, the possible organisational designs and the challenges faced.

5.2.1 Experimentation phases and methodologies

Our findings revealed three experimentation phases, i.e., ideation, execution and implementation. During the ideation phase, incumbents generate an idea leveraging on design thinking (Brown, 2009). In the execution phase, incumbents validate their idea through the lean startup methodology (Ries, 2011). Finally, incumbents implement their idea using agile methodology and agile sprints (Hummel, 2014). This approach is also confirmed by literature (Shepherd et al., 2021). Indeed, design thinking provides the needed empathy and creativity to define a problem and generate preliminary solutions (Micheli et al., 2019). Lean startup needs to start from defined business model assumptions (Silva et al., 2021) to iteratively test them. Agile sprints can be used to build the features coming from lean startup experiments (Harms et al., 2020). Analysing experimentation phases and methodologies in corporate context, we observe that incumbents require more effort in the ideation phase than startups (Bocken and Snihur, 2020). Indeed, incumbents have to force themselves to generate and pursue entrepreneurial ideas that are more natural in startup context. In addition, incumbents may face higher difficulties than startups in the implementation phase. Incumbents have a pre-existing organisational structure that must accept and integrate the outcomes of experimentation. This can create cultural frictions with the existing structures.

5.2.2 Organisational designs for experimentation in incumbent organisations

Another important aspect concerning experimentation process is related to the choice of the organisational designs to enable corporate innovation through experimentation (Hampel et al., 2020). While we found convergency concerning corporate experimentation phases and methodologies, incumbents present heterogeneity in their organisational design to adopt experimentation. Specifically, we can identify three types of organisational designs, respectively: (i) a diffused experimentation approach; (ii) a concentrated experimentation approach and (iii) a separate experimentation approach. A diffused experimentation model refers to a configuration in which experimentation is pervasive throughout the entire company and every function is involved in the process. In this type of configuration, experimentation is conducted simultaneously and in synergy with the usual daily activities that the incumbents run. Our multiple case study shows that this configuration is used to experiment to innovate existing corporate products and services. A concentrated experimentation model implies a configuration where experimentation is confined in one or few business functions, and business activities are mostly separate from experimentation activities. Typically, experimentation takes place in the most innovative functions, such as the innovation or product development departments. Finally, a separate experimentation model consists in conducting experimentation in a totally separate structure from the existing organisation. In this case, the company creates a safe zone where experimentation activities are protected from organisational antibodies. The three models proposed, differ for their structural autonomy, which can be defined as the degree of integration of the experimentation process with the current processes and structure of the firm (Sharma and Chrisman, 2007). However, the possible configurations could vary from totally integrated, as in a diffused model, to totally separate, as in a separate model.

5.2.3 Challenges for experimentation in incumbent organisations

Our multiple case study show that incumbents may encounter several challenges in applying experimentation in corporate context. We identified three main types of challenges for experimentation in incumbent organisations, namely: (i) experimentation-level challenges; (ii) firm-level challenges and (iii) network-level challenges. Experimentation-level challenges are the frictions directly generated using experimentation, such as

how to properly learn experimentation methodologies, how to specify and apply them in the corporate context, and how to account for them in terms of key performances indicators of such activities. Firm-level challenges are the frictions generated by the interaction between the experimentation process and the organisation, such as cultural challenges with the management, the rigid organisational structures and processes. Network-level challenges are the frictions generated by the interaction between the experimentation process and the stakeholders involved in the experimentation such as customers and suppliers. Overall, experimentation-level challenges are common for both incumbents and startups, as they are intrinsic to the experimentation methodologies adopted by startups (Ghezzi et al., 2013; Ghezzi, 2019). On the other side, firm-level and network-level challenges are specific for incumbents engaging in experimentation, since incumbents have a much more structured organisation and a much denser network with respect than startups (Deligianni et al., 2022). Such challenges highlight the difficulty in conducting experimentation in corporate context. However, to mitigate firm-level and network-level challenges, incumbents can separate experimentation activities from the existing business activities of the company. In other words, incumbents can increase the structural autonomy to experiment, for instance experimenting in a separate structure, to reduce such challenges.

5.3 Experimentation outcomes

Experimentation in corporations may lead to different outcomes in terms of corporate entrepreneurship activities depending on the organisational design used to experiment. The diffused and concentrated experimentation models can be suitable to launch and develop new products, improve processes and competences, as well to renew the existing strategy. Thus, these experimentation configurations emerged related to strategic entrepreneurship (Covin and Miles, 1999), i.e., corporate entrepreneurship domain that includes a broad array of entrepreneurial initiatives such as strategic renewal, sustained regeneration, domain redefinition, organisational rejuvenation, and business model reconstruction (Hitt et al., 2001). Indeed, operating with the diffused or with the concentrated model, innovation outcome developed is usually incremental in nature. While the separate model of experimentation is more related to corporate venturing activities (Sharma and Chrisman, 2007), which refers to the creation of new businesses, for instance, in the form of new business lines or corporate spin-offs (Covin and Miles, 1999). Indeed, operating with a separate experimentation model, incumbents can generate ideas that are radical from the current businesses of the company. In conclusion, we could say that the organisational design used to experiment with incumbents influences the degree of innovation and diversity of the outcomes. Indeed, the higher the structural separation for experimentation, (i.e., structural autonomy) the higher the degree of innovation and diversity that the experimentation can generate for corporate innovation.

6. Conclusions

Based on the findings of this study, we contribute to research and practice on experimentation in corporate entrepreneurship. From the theoretical point of view, this article offers three main contributions to research. First, this study answers the call of Hampel et al. (2020), by investigating how experimentation is conducted in incumbent organisations in terms of experimentation antecedents, process and outcomes. Second, this study offers empirical evidence about the challenges at different levels of analysis that incumbent organisations face in using experimentation in corporate entrepreneurship (i.e., experimentation-level challenges; firm-level challenges and network-level challenges) thus highlighting the peculiarities in conducting experimentation in corporate context (Chesbrough and Tucci, 2020). Third, this study shade light on the role of digital technologies for experimentation in corporate entrepreneurship (Cavallo et al., 2020a; Arvidsson and Mønsted, 2018). This article also provides many practical implications for managers and incumbent organisations willing to adopt experimentation in their corporate innovation activities by illustrating the phases and methodologies to conduct experimentation in corporate entrepreneurship as well as the suitable organisational designs for experimentation in corporations. However, our study is not free from limitations. These depend on the small sample size, which could influence the relevance and generalisation of our findings; and the typical observation bias of qualitative studies that could result in the loss of valuable information and insights. These limitations are related to corresponding avenues for future research. First, future studies should replicate our research in different contexts to investigate similarities and differences in the adoption of corporate experimentation in incumbent organisations operating in digital and not-digital sectors. Second, future quantitative research may expand our research by considering quantitative evidence to statistically validate our findings. We think the managerial audience would benefit from adding quantitative elements to our research, such as the frequency

with which experimentation methodologies are adopted and the number of experimentation methodologies adopted for corporate entrepreneurship and innovation in incumbent organisations.

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Revisiting the Effect of R&D intensity on innovation Performance: An Instrument Variable Approach

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Abstract: The literature on innovation performance makes clear the important role of R&D in innovation performance. Studies that have investigated this relationship have generally assessed the effect of R&D investment on innovation performance. It is important to note that innovation performance and R&D investment are known to be closely associated with the possibility of reverse causality. Regressing innovation performance on R&D expenditure therefore poses an important statistical challenge of endogeneity. In the presence of endogeneity regression parameter estimates are biased and inconsistent and therefore hypothesis testing may be misleading. Using data from different sectors of OECD economies sourced from the OECD data base, instrumental variable analysis is conducted through a two stage least square using the number of R&D personnel as instrument. Again, the literature assumes that innovation is an increasing function of R&D. However, considering R&D is combined with other factors, some of which are fixed, the possibility that R&D will experience diminishing returns cannot be overlooked. This means that the dominant linear relationship authors specify in these studies may not be wholly accurate. We captured this effect by modeling a quadratic relationship to reflect the diminishing returns to innovation performance. The findings of the study show that the number of R&D persons exhibit a nonlinear inverted U-shaped relationship with innovation performance. The policy implication of the findings of the study is that R&D activities must be commensurate with the size of other organizational factors to ensure that changes in R&D activities solicit a favourable response from innovation performance.

Keywords: R&D intensity, innovation performance, instrumental variable, OLS regression.

1. Introduction

The relationship between R&D intensity of firms and innovation performance is one of the most researched topics in innovation literature. The focus of investigation in this area of study has been how changes in R&D spending of firms affect innovation performance of firms. The fundamental assumption of these studies is that innovation performance of firms is a linear function of R&D intensity (Teng & Yi, 2017; Savrul & Incekara, 2015). The R&D intensity of firms is seen as an indication of the capacity of firms to be able to absorb external knowledge. The overall R&D capacity of firms help in the design of technique for efficient resource use (Lin, et al., 2021). The R&D intensity has been a source of competitiveness that allows firms to improve their innovation performance. Studies that investigate the link between R&D Intensity and innovation performance of firms have generally found R&D intensity to influence the performance of innovation. There are however, isolated instances of studies that have shown that R&D intensity is not a source of innovation performance. The transition into knowledge economy has made it imperative for firms to engage in R&D activity as a channel to improve innovation performance. It is widely known, both theoretically and empirically that R&D intensity and innovation performance of firms have served as a channel to economic growth (Zhylinska, et al., 2020; Afonso, 2016; European Commission , 2005; Aghion & Howitt, 1998). The interest in R&D intensity and innovation performance is the results of the desire of firms and economies to experience growth. It is for this reason that governments and firms commit a lot of resources to the course of increasing R&D intensity and ensuring innovation performance. The literature on the relationship between innovation and R&D has investigated different dimensions of this linkage, all with the aim of understanding the role of R&D in improving innovation performance. An important area of focus for studies in this area have been the role of policies in effectively transmitting R&D activities to improving innovation performance (Bloom, et al., 2002). The general position of the literature has been that governments policies stimulate private R&D to improve innovation perfomance (Chen, et al., 2021). Other authors have considered dimensions such as the additionality effect of R&D tax credit in private R&D expenditure of firms. In this area of study there is no consensus among authors. Whereas some authors have shown that R&D tax credit stimulates private R&D expenditure of firms (Castellacci & Lie, 2015), there are a number of other authors who suggest that R&D tax credit does not solicit increased private R&D expenditure (Marinoa, et al., 2016). Some other studies have argued that R&D tax credit crowds out private R&D expenditure and therefore the natural link between R&D expenditure and innovation performance is broken. A typical explanation for the break in the link between R&D and innovation performance has ranged from firm specific factors, issues with minimum threshold of R&D as well as the role of government policies instrument for innovation performance-R&D tax credit and subsidies.

The literature account on innovation performance places much emphasis on sectorial difference and how that influences innovation performance. The inconsistencies in the effect of R&D on innovation performance has been attributed to differences in the sectors investigated. It is known that innovation perfomance in some sectors are more responsive to changes in R&D expenditure of firms (Malerba, 2005; Castellacci & Lie, 2015). Other aspects of the organisation that have been cited as a reason why there are incosistencies in the effect of R&D on innovation performance have been the diversity in the composition of R&D staff. For example Garcia, Zouaghi and Garcia, (2017) have shown that the R&D team characteristics is important in influencing how R&D affects innovation perfomance. There are a litany of reasons cited in the literature to explain why R&D have not always improved innovation perfomance as expected. Other reasons cited in the empirical literature for the differences in the effect of R&D expenditure on innovation performance make the argument that the relationship between R&D activities of firms are moderated by some other factors which are either internal or external to the firm. These moderating factors could make a lot of difference in the outcome of the relationship between R&D and innovation (Zhu, et al., 2019).

One area that needs to be given attention to determine the source of and resolve these inconsistencies in the effect of R&D expenditure on innovation performance is the statistical approach in modeling the relationship. A large portion of the empirical literature that has been devoted to analysing the relationship between R&D investment and innovation peformance have been relational studies that apply regression analysis mainly (Leung & Sharma, 2021; Kim, et al., 2011; Mairesse & Mohnen, 2005). Intuitively, the relationship between R&D investment and innovation performance of firms could be argued to be endogenous. Whereas authors have regressed innovation performance on R&D expenditure, we argue that innovation perfomance of firms can also explain R&D expenditure of firms. Higher innovation means that firms will have more resources to invest in R&D. This is a recipy for endogenous regression models which biases upwards the effect of R&D on innovation performance. The other aspect of modelling the relationship between R&D expenditure of firms and innovation performance that is yet to be given attention in the innovation literature is the role of diminishing returns to R&D investment. The status quo is that increasing R&D investment proportional increase innovation performance. This is a simplistic view of the relationship. A more deeper and realistic view is to consider integrating into the model diminishing returns to R&D investment to capture the effect increasing R&D investment in the face fixed firm resources. In this study therefore, an attempt is made to determine the effect of R&D investment on innovation performance instrumenting R&D investment with number of business enterprise researchers and integrating diminishing returns to the number of business enterprise researchers.

2. Literature Review

The literature review focuses on the relationship between R&D investments of firms and its effect on the innovation performance of firms. The literature focuses on data analysis techniques as well as the outcome of the studies.

2.1 R&D and Innovation Performance

Studies on the relationship between R&D investments on firms and innovation performance have generally suggested that the causal effect is from R&D to innovation (Vershinin, 2021; Prokop & Stejskal, 2019). That is to say that R&D investment determines the innovation outcomes of firms. There is empirical evidence that indicates R&D intensity of firms can be connected to innovation performance. However, evidence from the literature has shown that in some instances countries with high R&D intensity have not gained much in terms on innovation performance (Savrula & Incekara, 2015). The authors further stressed that some environmental factors influence the effect of R&D investment on innovation performance. This is an indication of the possibility of having a high error term in an innovation regression if care is not. There are large number of environmental factors that affect factors that determine innovation performance and predisposes these innovation influencing factors to the problem of endogeneity and therefore biases the effect of the influencing factors upwards. Studies on the effect of R&D on innovation performance have used both country level and firm level data and the findings have generally been invariant to the data type. Findings of these studies have shown that innovation performance generally increases with increasing R&D investments. In a study by Mairesse and Mohnen (2005), the authors used data from the third community innovation survey (CIS 3) on French manufacturing firms covering the periods 1998 to 2000. The authors, using tobit regression revealed that R&D intensity of firms is positive and significantly related with innovation performance. The findings of Mairesse and Mohnen (2005) also revealed that sectoral differences matter. They showed that innovation performance of low technology sectors is more responsive to changes in R&D than the case in high technology sectors. The strong relationship

between R&D intensity of firms and their innovation performance has been widely documented in the extant literature. This has been argued by several authors to be an indication that R&D intensity of firms is a strong determinant of innovation. However, Mairesse and Mohnen (2005) argues that part of the reason for this strong relationship is as a result of the endogeneity of R&D investment in innovation performance model. There is also evidence of causality moving from innovation to R&D (Harris & Moffat, 2011) breaking the traditional relationship between R&D and innovation with causality from R&D. The reverse causality identified by Harris and Moffat (2011) is confirmed in a study by Guloglu and Tekin (2012) where a granger causality test revealed that innovation performance granger cause R&D expenditure. These are not isolated cases where R&D has been confirmed to be indogenous in an innovation performance model. In a study to determine the relationship between R&D, innovation and productivity, Baum, et al. (2017), using community innovation survey for Swedish manufacturing and service sector data showed that R&D is endogenous in determining innovation performance of firms. Eventhough the issue of endogeneity in the relationship between R&D and innovation has been generally overlooked, evidence from the empirical literature suggests that authors admit its presence and the consequence of biasing R&D coefficients and rendering OLS inconsistent in the determination of the effect of R&D on innovation performance (Carboni & Medda, 2021;Medda & Piga, 2014)

Another aspect of the relationship between R&D and innovation perfomance that has been given little attention is dimishing return to R&D. Firms investment in R&D do not solicit the needed increases in innovation perfomance. The concept of diminishing returns explains the reduction in the effect of an input variable on an output as an increasing amount of the input varaible is exerted on other fixed input factors. In the R&D innovation perfomance model, R&D investments are conbined with other firm input factors that may be fixed at a point in time and therefore could explain why firms may experience slow growth in innovation in spite of increased R&D investment. In a study by Barbero, et al. (2021), the authors used data envelopment analysis to investigate the efficiency in the use of innovation inputs to translate into innovation outcomes. The findings of the study showed that in most countries the transmission of innovation inputs into to innovation outputs have not always shown evidence of increasing returns to innovation inputs or constant returns, but rather decreasing returns to innovation inputs is a common phenomenon in most countries. The literature on innovation has made clear that innovation is a network of activities and interactions in an organisation (Palmberg, 2006; Metcalfe, 1995). This is an indication that innovation inputs are in interaction among themselves and other organisational factors to generate innovation performance outcomes. Increasing investment in some innovation inputs without doing the same with the other inputs will mean applying more of some resources to a limited amount of other resources. This is what leads to diminishing returns. The carrying capacity of some resources is limited relative to other resources and therefore increasing some innovation inputs without a commensurate increase in the complementary input for innovation increasingly reduces the effect of increased innovation inputs on innovation outcomes. The issue of R&D activities translating into innovation and the associated diminishing returns to R&D is not a new phenomenon even though largely neglected. The presence of fixed factors in the innovation activity processes predisposes increased R&D activities to diminishing returns (Houser, 1998). In the view of the author, diminishing return to R&D is the source of reduction in innovative activity when subsidies propel expansion in R&D intensity in the Schumpeterian growth model. Firms, governments, and policy makers in general are quick at finding means to increase the R&D capacity of firms, but very little is normally done to improve other complementary resources for innovation activities in organisation. It is well known that R&D tax credit and subsidies are policies designed to improve the R&D capacity of firms but hardly are there policies that looks at resource requirements of other segments of the organization which may not be directly in line with R&D activities of firms but without which R&D activities are stalled. Findings from the literature show that the inability of firm resources to respond to increasing internal and external R&D decreases return to R&D and explains why increasing R&D capacity of firms have on some occasions have not generated the expected innovation outcomes (Lokshin, et al., 2008).

From the review of the literature, two important issues about the relationship between R&D activities and innovation performance are raised, the fact that the relationship between R&D and innovation performance raises the problem of endogeneity and the fact that such a relationship is affected by diminishing returns. This will mean that the usual OLS approach adopted in such an estimation is biased and not consistent. Besides, the relationship between R&D and innovation cannot be linear but nonlinear to capture the effect of diminishing returns to R&D. Integrating these two important but largely neglected assumptions into our model, we formulate the following hypotheses for testing:

H_A: There is a significant relationship between R&D intensity of firms and innovation performance.

H_B: There is an inverted U relationship between R&D intensity and innovation performance.

3. Methodology

In this study, we seek to model the relationship between R&D intensity and innovation performance. Data for the study is sourced from the OECD database. The data is a country level data on four OECD countries, Czech Republic, Poland, Slovakia, and Hungary. Data sourced from the OECD database include foreign direct investment from the OECD countries to these sampled countries. Included in the data sourced from the OECD database include patent count as a measure of innovation performance, R&D expenditure of firms, GDP, imports, and exports to and from the sampled countries respectively and the number of R&D personnel of the firm. The data spans from 2003 to 2012. The choice of this data span is because of the unavailability of data for some variables.

In analysing the relationship between R&D intensity and innovation performance, multiple regression has generally been the technique employed in the extant literature, specifically panel OLS linear regression or simple OLS depending on the type of data being used (Lokshin, et al., 2008; Mairesse & Mohnen, 2005) and probit regression (Lööf, 2017) depending on whether the dependent variable is dichotomous. In this study we depart a bit from what is generally done by authors. In this study, we use instrumental variable analysis to estimate the relationship between R&D intensity and innovation performance. The use of instrumental variable analysis is to deal with neglected problem of endogeneity in the relationship between R&D and innovation performance. In estimating the relationship between R&D and innovation performance, the study further assumes diminishing returns to R&D and therefore adopts nonlinear regression model. The model is implemented through a two stage least squares. The study models an OLS regression with the endogenous variable as a predictor. We argue in this study that R&D intensity is endogenous in an innovation performance model because it is correlated with the error term. The basis for taking this position is that several organizational factors contribute to the creation of innovation besides R&D. These influencing factors cannot be captured fully in a regression model. Consequently, it swells the error term and correlates with R&D causing the problem of endogeneity. Evidence from the literature confirms the reverse causality between innovation performance and R&D of firms (Guloglu & Tekin, 2012; Harris & Moffat, 2011), an important source of endogeneity. Central to this study is to effectively capture the causal effect of R&D on innovation performance. By this the study deals with the problem of endogeneity which biases the effect of R&D on innovation upwards and renders the OLS inconsistent. The study also adopts a more realistic approach to estimating the effect of R&D on innovation performance. In modelling the relationship, we recognized the fact that R&D could experience diminishing return as the scale of R&D rises. The intuition is that there are large number of activities and resource requirements apart from R&D investment that need to be present in some required and commensurate quantities to combine with R&D investment to improve innovation performance. If firms increase R&D investment without a commensurate increase in activities and resources in other areas necessary to improve innovation performance, continuous increase in R&D investment will yield smaller and small levels of innovation performance. Thus, rather than a linear relationship, in this study we model the relationship between R&D and innovation performance as a nonlinear relation to accurately capture diminishing returns to R&D.

Equation 1 is an OLS regression that links innovation performance measured by patent count to R&D intensity and some other control variables and a crisis dummy to take care of periods with economic crises that can potentially affect innovation performance.

$$Inn_{it} = \beta_0 + \beta_1 R\&D_{it} + \beta_2 Trade_Openness_{it} + \beta_3 FDI_spill_{it} + \beta_4 GDP_{it} + \beta_5 FDI_OECD_{it} + \beta_6 Crisis_Dummy_{it} + \varepsilon_{it} \quad (1)$$

Where Inn is innovation performance, R&D is R&D intensity, Trade_openness is trade openness, FDI_spill is knowledge spillover from FDI, GDP is gross domestic product, FDI_OECD is FDI from OECD countries to the four sampled countries.

In equation 1, we argue that R&D intensity is not independent of the error term. That is $Cov(R\&D, \varepsilon) \neq 0$. This means that E $[\hat{\beta}_{OLS}] \neq \beta$ and therefore R&D is endogenous. The expectation that as N ∞, $\hat{\beta}_{OLS} = \beta$ is violated making the estimates inconsistent.

To deal with the problem of endogeneity and be able to assess the causal effect of R&D intensity on innovation performance, a two stage least square estimation is employed. The first stage of the two stage least square is presented as equation 2. At this stage an instrument is determined. The basis for determining the instrument is that $Cov(R\&D, \text{R\&D_pers}) \neq 0$ and $Cov(Inn, \text{R\&D_pers}) = 0$. Theoretically, the size of a firms R&D personnel cannot directly influence innovation unless through the research activities of the firm also known as

the intensity of R&D. This makes the number of R&D personnel a good variable to be used as an instrument for R&D intensity.

$R\&D_{it} = \beta_0 + \beta_1 R\&D_pers_{it} + \beta_2 Trade_Openness_{it} + \beta_3 FDI_spill_{it} + \beta_4 GDP_{it} + \beta_5 FDI_OECD_{it} + \beta_6 Crisis_Dummy_{it} + \varepsilon_{it}$ (2)

R&D_pers is the number of R&D personnel.

In equation 2, the study presents the equation for the first stage of the two stage least squares. In this model R&D intensity is regressed on the instrument (number of R&D personnel) and the control variables.

Equation 2 allows us to derive an unbiased estimate of R&D intensity and the regressors. We then use the coefficients from equation 2 to predict R&D intensity as shown in equation 3.

$\widehat{R\&D}_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 R\&D_pers_{it} + \hat{\alpha}_2 Trade_Openness_{it} + \hat{\alpha}_3 FDI_spill_{it} + \hat{\alpha}_4 GDP_{it} + \hat{\alpha}_5 FDI_OECD_{it} + \hat{\alpha}_6 Crisis_Dummy_{it}$ (3)

$\widehat{R\&D}$ is an unbiased estimate of R&D intensity and there is no correlation between $\widehat{R\&D}$ and ε. In equation 3 $\widehat{R\&D}$ is a linear combination of the instrument, R&D_pers and control variables. These regressors are independent of the error term, ε. This means that $\widehat{R\&D}$ is also independent of the error term and therefore an unbiased estimate of R&D intensity. Now that we have an unbiased estimate of R&D intensity, the second stage model of the two stage least square can be fomulated.

$Inn_{it} = \beta_0 + \beta_1 \widehat{R\&D}_{it} + \beta_2 Trade_Openness_{it} + \beta_3 FDI_spill_{it} + \beta_4 GDP_{it} + \beta_5 FDI_OECD_{it} + \beta_6 Crisis_Dummy_{it} + v_{it}$ (4)

Where v is the error term.

In equation four innovation performance is regressed on an unbiased estimate of R&D intensity and control variables.

To integrate into model 4 diminishing returns to R&D intensity the estimate of R&D intensity, $\widehat{R\&D}$ must enter the regression model as a polynomial with degree 2 as shown in equation 5.

$Inn_{it} = \beta_0 + \beta_1 \widehat{R\&D}_{it} + \beta_2 \widehat{R\&D}^2_{it} + \beta_3 Trade_Openness_{it} + \beta_4 FDI_spill_{it} + \beta_5 GDP_{it} + \beta_5 FDI_OECD_{it} + \beta_7 Crisis_Dummy_{it} + v_{it}$ (5)

4. Results and Discussions

This section of the study presents the results of the data analysis, the interpretation of the results and the discussions of the results. The results are presented in two parts, one on the effect of R&D intensity on innovation performance and the other on the role of diminishing returns to R&D intensity and its effect on innovation performance.

Table1: Effect of R&D intensity on Innovation Performance

	Model 1	Model 2	Model 3	Model 4
Independent/Dependent Var	Innovation	R&D intensity	Innovation	Innovation
C	3.340665** (1.491236)	-2.869330** (0.897769)	0.057493 (0.911517)	-0.835411 (0.950995)
R&D_int	1.386520*** (0.176130)		0.389302** (0.169887)	0.358556* (0.192644)
R&D_int^2				-1.758413* (1.063033)
R&D_pers		0.471293*** (0.065816		
Trade_openness	-0.787448*** (0.305776)	0.911667*** (0.134937)	1.094313*** (0.119743)	1.128933*** (0.142609)
FDI_spill	-0.071242 (0.135321)	-0.053085 (0.085637)	0.613037*** (0.070819)	-0.679735*** (0.081527)
GDP	1.18E-07*** (2.66E-09)	-2.85E-09 (1.69E-09)	1.18E-08*** (1.69E-09)	111E-08*** (1.84E-09)
FDI_OECD	8.18E-07 (6.06E-07)	-178E-07 (3.84E-07)	1.20E-08*** (4.50E-07)	8.16E-07* (4.21E-07)

	Model 1	Model 2	Model 3	Model 4
Crisis_Dummy	0.356754** (0.163604)	-0.310360*** (0.095334)	-0.046283 (0.095953)	-0.090233 (0.153200)
R-squared	0.813098	0.995392	0.928033	0.919069
Adjusted R-squared	0.779116	0.994554	0.914948	0.901366
F-statistics	23.92724	1188114	70.92379	51.91439
Prob(F-statistic)	0.000000	0.000000	0.000000	0.000000

*Standard errors in parentheses; *P< 0.1, **P<0.05, ***P<0.01 Both dependent and independent variables are in logs except crisis dummy.*

Table 1 presents the results on the effect of R&D intensity on innovation performance. Model 1 presents an OLS estimation of the effect of R&D intensity on innovation performance. The results suggest the model is significant and R&D intensity also significantly explains the variation in innovation performance. A percentage point change in R&D intensity leads to a 1.38 percentage change in innovation performance in the same direction. Models 2 presents the first stage of the two stage least square where R&D intensity is regressed on the instrument, number of R&D personnel. The results show that the number of R&D personnel is positive and highly significant and a coefficient of 0.47. The high significant level is an indication from model 2 that number of the number of R&D personnel is a strong instrument. In testing the hypothesis that R&D intensity significantly explains innovation, model 3 presents instrumental variable estimate of the relationship and the second stage of the two stage least square. The results from model 3 confirm the hypothesis that there is a significant relationship between R&D intensity and innovation performance. The results suggest that increasing R&D intensity by one percentage points results in an increase in innovation performance by 0.3 percentage points. This contrasts with model 1 where the OLS estimates that increasing R&D intensity by one percentage point leads to an increase in innovation performance by 1.38 percentage points. This confirms the belief that OLS estimates are biased upwards and inconsistent. A comparison between the adjusted R-squares in model 1 and model 3 indicates that the instrumental variable model in model 3 presents a better modeling of the relationship than what is shown in model 1. The findings of the study provide evidence that instrumental variable approach models the relationship between R&D intensity and innovation performance better than OLS.

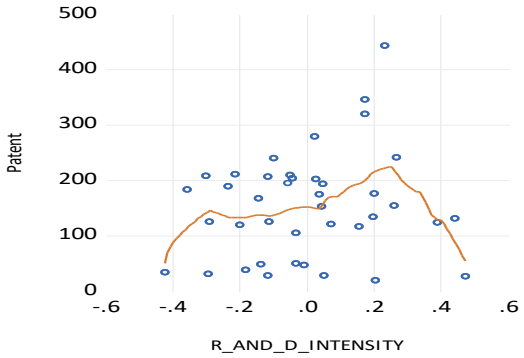

Figure 1: Scatter Plot of Relationship between R&D intensity and Innovation Performance

Model 2 tests the hypothesis that the relationship between R&D intensity and innovation performance is an inverted U shaped. The results of the analysis confirm the hypothesis that the relationship between R&D intensity and innovation performance is an inverted U shape. Both the first degree and second-degree polynomial are significant with the first-degree polynomial being positive and the second-degree polynomial being negative. Figure 1 presents a scatter plot of the relationship between R&D intensity and innovation performance. The curve in figure shows that at lower levels of R&D intensity innovation performance increase at an increasing rate until innovation performance reaches around 220 patent counts after which further increase in R&D intensity leads innovation performance increases at decreasing rate until it reaches a peak of around 230 patent counts. Any further increase in R&D intensity after innovation performance reaching its peak results in a fall in innovation to 110 patent count for an R&D intensity of 4 per cent. Innovation performance fell to 50 patent count when R&D intensity increased to 5 per cent. The relationship exhibited in figure can be interpreted as following the law of diminishing returns. As R&D intensity keeps increasing without a commensurate on other organization resources which aid in R&D (fixed factor), a further increase in R&D intensity leads to a less than a proportionate increase in patent count and eventually the patent count falls. The fall in patent count is because the fixed factors can no longer accommodate the increasing R&D intensity.

The study findings, though gives a new approach to understanding the relationship between R&D investments of firms and innovation performance some portions of the study findings are in sync with the prior literature. The general position of positive relation between R&D and innovation performance in the prior literature (Mairesse & Mohnen, 2005) has been confirmed even though the current study also showed that the positive relation is switched to negative at a point due to diminishing returns. It is also important to stress that findings of the study suggests that firms, in their quest to improve innovation performance tend to belief that R&D is the sole reason for improved innovation performance. The study findings show that increasing R&D activities of firms have not been commensurate with increased investment in other firm resources and activities that are not directly linked to but may be important for R&D activities. This is the source of diminishing returns to R&D investment. When firms focus on improving investment in R&D without a commensurate increase in other firm resources and activities, increasing R&D activities and investments at a point becomes inefficient. The evidence of diminishing returns to R&D intensity is a confirmation of Barbero, et al. (2021) who makes the point that generally the application of R&D in the bid to improve innovation performance has been inefficient due to decreasing returns to R&D intensity. The findings of the study also give credence to Palmberg (2006) and Metcalfe (1995) who have taken the position that everything within the organisation matters for innovation performance. This means that focusing on the intensity of R&D alone without paying attention to other areas of the organisation will generate less innovation outcome relative to increasing R&D intensity.

R&D intensity, as confirmed by the findings of this study, in accordance with the position of the literature. The study also confirms Mairesse and Mohnen (2005) assertion that estimating the relationship between R&D investment and innovation performance could be associated with endogeneity problems. This has been shown to bias the effect of R&D on innovation upwards, a postion our findings confirm. The litertaure position that OLS is inconsistent in estimating the relationship between R&D intensity and innovation performance (Carboni & Medda, 2021; Medda & Piga, 2014) has been confirmed by the findings of the current study. The findings of the study has shows that modeling the relationship based on OLS is difficient but instrumental variable analysis produces a more robust and accurate estimation of the effect of R&D on innovation performance.

5. Conclusions

The natural conclusion of the study based on the findings is that R&D intensity remains an important source of innovation performance. However, its effect on innovation performance as presented by the knowledge literature is over emphasized due to the inappropriate estimation of the relationship generally. The choice of OLS as an estimation technique for such as relationship biases the effect of R&D investment on innovation performance upwards. It is concluded that instrumental variable analysis implemented through the two stage least square rather than OLS is a much better estimation technique in modeling the relationship between R&D intensity and innovation performance. Other aspects of the organization are important in this discourse but have been overshadowed by the rather artificially embellished role R&D investment. The role of other aspects of the organization in the determination is relegated to the background. This is the source of the inefficiencies in transmitting R&D investments into innovation performance. It is concluded that the almost total neglect of other aspects of the organization has been an important source of the inefficiencies in transmitting R&D investment to innovation performance. The diminishing returns to R&D intensity is explained by the increased R&D intensity without a commensurate increase capacity of other organizational resources.

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Innovation Culture in French Organisations

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Abstract: The aim of this study was to measure the relative impact of culture and processes on innovation performance. Contrary to processes, culture represents all implicit factors influencing daily behaviour. Culture gathers the unwritten rules of the social game and serves as social cement for an organisation. Processes correspond to identified and formalised practices and rules, including having a dedicated team or qualified collaborators for running product design and development, for example. Based on the scientific literature, we designed a survey to assess these three sides of innovation (culture, processes and performance). We analysed the answers of 432 French innovation managers in order to identify the predictors of Innovation performance. The whole model appears highly explanatory and shows that innovation culture holds a predictive power nearly four times as high as innovation processes. In particular, eagerness for radical change, which is not so common in French organizations, is the strongest predictor of innovation performance. Collective discovery skills and innovation climate were also good predictors of innovation performance, whereas risk aversion and tradition appear as marginal negative predictors. . These results are original because practitioners and researchers mainly produce guidelines focused on innovation processes, methods and tools as if they were the only drivers of innovation. However, the major challenge for stimulating innovation could be to understand the organization's culture and design processes that will be both congruent to the existing culture and likely to initiate a first step to cultural change, which remains long and uncertain.

Keywords: Innovation, organisational culture, innovation processes, innovation performance

1. The three dimensions of innovation in organisations

Innovation is considered as central to solve major problems of societies (e.g., social and demographic challenges, climate change). In the past, Innovation has contributed to progress (Noailles-Siméon, 2017) and nowadays it is still alleged to fuel society's transformation towards more wellbeing and more prosperity (OCDE, 2016). In the literature, there are many different approaches to innovation. One kind of approach can be found in the Oslo Manual (2018), which defines innovation as a result (a new or improved product or process made available to potential users). Another type of approach can be seen through the existing innovation assessment tools, which mix inputs, outcomes and process indicators to measure innovation performance (Edquist *et al.*, 2018; European Commission, 2018). Some authors also explain innovation through intangible factors, such as the psychological profile of their leader (Christensen, 2011). The concept of innovation is therefore polysemous in itself (Beylat and Tambourin, 2013; Battistelli, 2014).

We propose to model innovation through an analogy with the interactionist paradigm known as the Lewin equation (Lewin, 1936), which models human behaviour (B) as the result of interactions between personal characteristics (P) and situational features (S): $B = f(P,S)$. In our case, the target behaviour is innovation performance in the organization. The situational features may correspond to all observable innovation rules that were formalized as a process, or a framework to innovate. The personal characteristics, in the case of an organization, may refer to implicit cultural features influencing innovation. We therefore model innovation as follows:

Innovation performance = f(innovation culture, innovation process).

Both process and culture define how people act in firms, but they are fundamentally different. We consider that innovation process gathers rules that are explicit, and usually written. They correspond to identified and formalized practices and rules. Innovation processes include having a dedicated team or qualified collaborators for running product design and development, for example (Boly, Camargo and Morel, 2016). In contrast, culture gathers the unwritten rules of the social game (Hofstede, Hofstede and Minkov, 2010) and serves as social cement for the organization (Cameron and Quinn, 2011). Innovation culture refers to the rules that are implicit and seldom officially described, make innovative thinking natural within the organisation and encourages innovation activities at all levels of the organisation (Davies and Buisine, 2018).

1.1 Innovation culture

Innovation culture manifests itself through the significance of innovation all-over the organisation and the innovativeness of people and teams (Davies and Buisine, 2018, 2022). However, it is also embedded in the

national culture of the country where the organisation is located. Hofstede et al. (2010) point out that two cultural dimensions are linked to innovation: power distance and uncertainty of avoidance. In France, power distance and uncertainty of avoidance are both high. High power distance means that innovation is rather run top down, reserved for executives. High uncertainty avoidance means that rules and plans are needed and that novelty takes time to be accepted.

Significance of innovation appears altogether through the types of innovation usually promoted in the organization, the innovation strategy chosen and how the underlying risk is managed. Regarding types of innovation, the OECD used to consider four types of innovation: product, process, organisation, and commercialisation (OECD, 2005). Disruptive vs. incremental innovation, also called radical vs. progressive innovation (OECD, 2005), is another innovation typology. Innovative companies promote disruptive innovation and also prove to be able to take smart risks (Christensen, 2011). In contrast, incremental innovation is likely to be non-discriminatory, as a manager cannot reasonably hinder improvement of existing products or processes, but non-innovation related to maintaining tradition should be more representative of a culture refraining innovation.

Innovation strategies are usually summarized into three main approaches: Technology Driver, Market Reader and Need Seeker (Jaruzelski, Staack and Goehle, 2014). The most common strategy in France is the former, and in the Silicon Valley it is the latter (Péladeau *et al.*, 2013). Hwang and Horowitt (2012) take Silicon Valley as innovation ecosystem reference and compare it with the Amazonian forest. Using this metaphor, they explain that innovation would occur preferentially in flourishing contexts, rich in interactions, and would often emerge from "weeds" that develop spontaneously without having been expected or encouraged. This image contrasts with that of the field (planted with “seeds”), with a well-defined process, everything all lined up, in which weeds are regularly eliminated. These images match with two contradictory philosophies underlying innovation, opposing large groups to start-ups (Guillemot *et al.*, 2016).

Most innovative companies concentrate innovative people and teams (Christensen, 2011; Barnhill, Smith and Oja, 2021). Innovative people have developed discovery skills at a high level: associating, observing, questioning, experimenting, and networking (Christensen, 2011). Among them, innovative leaders have specific achievements: they can be credited for having invented new products and being willing to change the world (Christensen, 2011). Beyond discovery skills, regulatory-focus is also predictive of innovation behaviours at the team level (Rietzschel, 2011). Promotion-oriented teams are seeking benefits aimed at an ideal. They are opposed to prevention-oriented teams, which focused on avoidance of losses. The former perform better on idea generation and diffusion than the latter (Rietzschel, 2011). Regulatory focus can be measured quite simply using proverbs (Faur, Martin and Clavel, 2017). In addition, to be innovative, a team needs to be preserved from competition, remain open to new ideas, and be able to challenge, trust, support and help one another (Amabile *et al.*, 1996).

1.2 Innovation process

Innovation processes are materialised in design, funding, human resources and networking activities (Amabile and Pratt, 2016; Boly, Camargo and Morel, 2016). For Guillemot et al. (2016), in large groups, innovation processes are rather positivistic, long, based on quality and competitiveness, and involving experts, among whom some are experts in innovation management (Amabile and Pratt, 2016). But all employees can also be involved (Garcia and de Peganow, 2013). In France, funding is a state action lever to support innovation, in particular through Tax Credit (Pisani-Ferry, Harfi and Lallemant, 2016; Aghion, Chanut and Jaravel, 2022). All these tangible features are part of what we call Innovation process in the present study.

1.3 Hypotheses

The aim of this paper is to capture and measure innovation culture in French organisations, and to assess its relative impact on innovation performance in comparison with innovation processes. Referring to our initial equation *(Innovation performance = f(Innovation Culture, Innovation Process))* we set out two hypotheses :

H1: Innovation Culture is a predictor of Innovation Performance.

H2: Innovation Culture and Innovation Process are orthogonal dimensions.

To test these hypotheses, we ran a cross-industry section survey, as described in the following section.

2. Method

2.1 Sample

The survey was intended for decision-makers holding an overview of their organization's innovation practices. It was emailed to approximately 72,500 contacts, among which around 53,500 addresses were correct. We received 621 answers. After removing incomplete or duplicated data, we had a final sample of 432 respondents. We carried out a systematic review of the data using Société.com, LinkedIn, Google and corporate websites in order to categorise data into sectors and size of company as shown in Table 1.

Table 1: Companies represented in the survey by branches and employees.

Number of societies	Staffs					
Branches	**[0-10[**	**[10-50[**	**[50-250[**	**[250-1000[**	**[1000 et + [**	**Total**
Others	5	2	6	7	11	31
Manufacturing industry	19	14	33	13	79	158
Construction	1		4	1	5	11
Trade, Transport, Accommodation and Catering	4	4	9	6	23	46
Information and Communication	17	21	9	4	9	60
Financial and insurance activities		2	1	3	13	19
Real Estate Activities	2		3		1	6
Specialized, Scientific and Technical Activities, Administrative and Support Services	37	23	14	8	19	101
Total	85	66	79	42	160	432

2.2 Material

In order to measure innovation performance, culture and process, we designed a questionnaire survey. It was intended for top-managers and had to be quite short, approximately 40 items to be evaluated using a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Innovation performance was measured through a unique self-assessment item "We are a very innovative company" (item 22).

2.2.1 Measuring innovation culture

Table 2 presents the 27 items of the survey related to innovation culture. Items 1 to 4 deal with innovation types, two on the product, via disruption and tradition, and two on how to work, via the same concepts. Items 5 to 7 address innovation strategies (Techno-driver, Need-seeker and Market-reader). Items 8, 9, 10 and 35 deal with risk management. Therefore, 11 items deal with significance of innovation all-over the organisation. We also introduced 12 items dealing with innovative people and teams (items 15 to 20, 27 et 28, 37 to 40). Finally, items 23 to 26, addressing power distance and uncertainty avoidance and inspired by the VSM 2013 (Hofstede, Hofstede and Minkov, 2013), were included.

Table 2: Items related to innovation culture.

Topic	Sources	Items
Innovation types	(OCDE, 2005)	1. We are able to invent radically-new products or services.
		2. We offer long-standing optimised products or services.
		3. Sometimes we completely change the way we work.
		4. We are known for our traditional know-how.
Innovation strategy	(Péladeau *et al.*, 2013; Jaruzelski, Staack and Goehle, 2014)	5. Our strategy focuses on technological added value.
		6. Our strength is to know how to imagine new uses.
		7. We are fully listening to the requirements expressed by clients.
Risk	(Hwang and Horowitt, 2012; Guillemot *et al.*, 2016)	8. We are highly responsive to internal and external opportunities.
		9. We only launch a product when we are sure it will be a success, even if it means delaying its launch.
		10. In our business, we should make no error.
		35. Confidentiality is more important than communication.
Innovative people	(Christensen, 2011; Barnhill, Smith and Oja, 2021)	15. Most of our executives made significant contributions to new products or services.
		16. We are convinced that we will change the world.
		17. We are excellent administrators.
		18. All our collaborators have many ideas to contribute to organization, products or services evolutions.
		19. All our employees have the right and the duty to ask questions.
		20. Staff experiments new ideas every time it is possible.
Innovative team	(Amabile *et al.*, 1996; Rietzschel, 2011)	27. There is no competition between services.
		28. Employees are systematically supported in their initiative.
		37. Prevention is better than cure.
		38. Nothing is impossible to a willing heart.
		39. Nothing ventured, nothing gained.
		40. Better safe than sorry.
National culture	(Hofstede, Hofstede and Minkov, 2010, 2013)	23. Before taking any decision, we systematically consult each collaborator who could be impacted by it.
		24. An organisation structure in which some employees have two managers should be avoided at all cost.
		25. The future is a source of opportunity for us.
		26. One can be a good manager without having a precise answer to every question that a subordinate may raise about his or her work.

The 27 Innovation Culture items (1 to 10, 15 to 20, 23 to 28, 35, and 37 to 40) are also consistent with one other, with a Cronbach alpha of 0.812. They form a coherent dimension that we call Innovation Culture.

2.2.3 Measuring innovation process

Positivism of the innovation process is addressed in items 11 to 14. Items 13, 21 et 29 deal with human resources, and items 30 to 32 to innovation funding (see Table 3).

Table 3: Items related to innovation processes.

Topic	Sources	Items
Design processes	(Boly, 2008; Guillemot et al., 2016)	11. The innovation circuit is clearly identified in terms of choices and decision-making.
		12. Our innovation projects are managed in a linear or even sequential logic.
		14. We set up indicators to measure performance of our innovation processes.
Human ressources	(Amabile et al., 2016)	13. We easily identify people with the expertise sought on important topics of the moment.
		29. At least one individual have recognised expertise in innovation management.
		21. We regularly engage all employees on innovation topics.
Innovation funding	(Pisani-Ferry et al., 2016; Aghion et al., 2022)	30. Without external funding, we would not be able to innovate.
		31. We always find a way to fund the projects we care about.
		32. We receive government subsidies or tax credits for our innovation projects.
Network and competitors		33. We belong in promising networks.
		34. We systematically consult our networks to develop our future products or services.
		36. We clearly know our position compared to companies that innovate in our field.

Items related to Innovation Process (11, 12, 13, 14, 21, 29, 30, 31, 32, 33, 34, 36) aggregate with a Cronbach alpha of 0.772. They form a coherent dimension, that we call Innovation Process.

2.3 Procedure

The survey was circulated by email. It was introduced by the following text: “In this questionnaire we provide a list of statements about your company. For each of these, indicate your level of agreement by answering on a scale ranging from 1 (not at all) to 7 (totally). There is no right or wrong answer, only your opinion matters. We invite you to respond as spontaneously as possible. Thank you for your participation!". Data were collected using Sphinx, then transposed to Excel and analysed using SPSS21.

3. Results

3.1 Validation of the three sides of Innovation

To test the validity of our equation, we need a reliable measure of its three sides, namely Innovation performance, Innovation Culture, and Innovation Process. Innovation performance is assessed through unique item 22. Although its normality is not verified (KS (429) = 0.138; $p < 0.001$; SW (429) = 0.939; $p < 0.001$), the distribution of responses appears symmetrical, with a slight shift to the right (Figure 1). In particular, we observe that respondents used the entire scale, from 1 to 7. We therefore considered this item as a valid self-assessment of innovation behaviour and innovation performance.

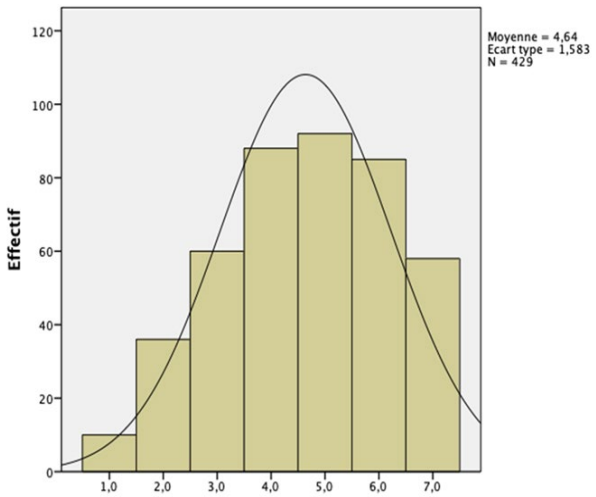

Figure 1: Distribution of ratings to item 22 “We are a very innovative company”.

Innovation Process will be assessed through the aggregation of the 12 items listed in Table 3, which constitute a reliable dimension, as previously mentioned. Finally, as Innovation Culture is the main topic of this study, we decided to go a step further than the mere aggregation of Table 2 items and performed a Principal Component Analysis in order to identify potential subdimensions of innovation culture. Table 4 presents the results highlighting 8 such sub-dimensions.

Table 4: PCA results on Innovation Culture items.

Item	Innovation climate	Radical innovation	Risk aversion	Organizational optimism	Tradition	Collective discovery skills	Administration	Hierarchy
28_Innovative team	0,807	0,061	-0,07	0,139	0,016	0,1	0,093	0,138
27_Innovative team	0,778	0,08	-0,03	-0,013	-0,014	0,016	0,027	0,069
23_National culture	0,641	0,059	0,255	0,167	0,004	0,276	-0,172	0,016
15_Innovative people	0,607	0,165	0,244	0,09	-0,064	-0,01	-0,027	-0,183
8_Risk	0,557	0,245	-0,118	0,206	0,082	-0,083	0,5	0,109
19_Innovative people	0,514	0,093	-0,036	0,283	0,059	0,239	0,031	0,138
7_Innovation strategy	0,481	0,221	-0,101	0,097	0,224	-0,046	0,444	0,239
1_Innovation type	0,13	0,751	-0,022	0,066	-0,015	0,184	-0,129	-0,012
5_Innovation strategy	0,087	0,72	0,143	0,092	0,031	-0,113	0,19	-0,221
6_Innovation strategy	0,213	0,654	-0,04	0,215	0,009	0,2	-0,105	0,137
3_Innovation type	0,172	0,535	-0,08	0,125	0,047	0,182	0,064	0,21
16_Innovative people	0,034	0,459	0,033	0,239	-0,148	0,391	0,014	-0,119
40_Innovative team	-0,071	0,022	0,72	-0,129	0,04	-0,047	-0,028	0,18
9_Risk	0,071	-0,004	0,655	-0,033	0,186	0,207	0,096	0,038
10_Risk	0,002	-0,038	0,642	-0,053	-0,037	-0,114	0,452	-0,065
37_Innovative team	0,162	-0,015	0,596	0,057	0,264	-0,138	-0,219	0,198
35_Risk	-0,121	0,332	0,341	-0,295	-0,101	0,007	0,338	0,179
38_Innovative team	0,129	0,052	-0,021	0,741	-0,177	0,112	0,128	0,202
25_National culture	0,136	0,32	0,009	0,66	0,125	0,107	0,089	-0,098
39_Innovative team	0,243	0,2	-0,188	0,623	0,032	-0,04	-0,075	-0,019
2_Innovation type	0,051	0,106	0,144	0,012	0,823	-0,039	0	-0,072
4_Innovation type	-0,043	-0,109	0,131	-0,043	0,789	0,073	0,18	0,111
18_Innovative people	0,174	0,3	-0,008	0,029	0,061	0,753	0,051	-0,02
20_Innovative people	0,496	0,253	-0,05	0,151	-0,007	0,539	0,071	0,068
17_Innovative people	0,026	-0,215	0,198	0,145	0,283	0,274	0,611	0,023
24_National culture	0,106	-0,028	0,141	0,137	0,018	-0,135	-0,029	0,772
26_National culture	0,121	0,063	0,319	-0,118	0,023	0,22	0,201	0,602

Principal Component Analysis _ Varimax rotation with Kaiser normalization _ Converged after 18 iterations

The first dimension gathers seven items dealing with relationships and dialogue between stakeholders: managers with employees, teams with one another, organization with customers. Discussions rely on questioning and listening; leaders are innovative. The items come from various sources, but they all describe an atmosphere, a work environment conducive to innovation. We will call this dimension **Climate for innovation**.

The second dimension comprises five items, two of which dealing with disruptive innovation, relative to products and services (item 1) and organizational innovations (item 3). Two others relate to innovation strategies conducive to disruptive innovation: techno-push on the one hand (item 5) and need-seeking on the other hand (item 6). The last one (item 16) deals with a characteristic of innovative leader seeking disruption. These sources relate to definitions and practices of disruptive innovation. We will call this dimension **Radical Innovation**.

The third dimension brings together five items dealing with the need for control (item 9, 10, 35) and prevention motivational orientation (Rietzschel, 2011). Motivation, if directed towards prevention, seeks to avoid losses, instead of gaining profits. We call this dimension **Risk Aversion**.

The fourth dimension is composed of three items, two of them related to a promotion motivational orientation (Rietzschel, 2011), the third one to a low uncertainty avoidance index (Hofstede et al., 2010). We call this dimension **Organisational optimism**, by analogy to the optimistic person considering that life brings positive events (Seligman, 2011; Gangloff and Malleh, 2017).

The fifth dimension consists of two items dealing with traditional and mastered know-how and products. We will call it **Tradition**. The sixth dimension contains 2 items related to discovery skills shared by individuals, hence the name **Collective discovery skills**. The seventh dimension has only one item, which we will call **Administration**, and the eighth dimension consists of an item related to power distance, and an item related to the control of uncertainty, both related to the role of the hierarchical manager. We call this dimension **Hierarchy**.

Finally, we checked the reliability of each of these subdimensions, as summarized in Table 5. The Hierarchy subdimension, which appears insufficiently reliable, was removed from further analysis.

Table 5: Reliability of Innovation dimensions.

Innovation sides			Cronbach's Alpha
Innovation performance			Single item
Innovation process			α = 0,772
Innovation Culture	Dimension 1	Climate for innovation	α = 0,800
	Dimension 2	Radical Innovation	α = 0,755
	Dimension 3	Risk aversion	α = 0,649
	Dimension 4	Organizational optimism	α = 0,630
	Dimension 5	Tradition	α = 0,662
	Dimension 6	Collective discovery skills	α = 0,687
	Dimension 7	Management	Single item
	Dimension 8	Hierarchy	α = 0,524

3.2 Test of H1

To test H1, we performed a multiple regression analysis with Innovation Performance as Dependent Variable, Innovation Process and all subdimensions of Innovation Culture as predictors. The results (see Table 6) highlight four significant positive predictors: Innovation Process, Innovation Climate, Radical Innovation and Collective Discovery Skills. Two marginal negative predictors also arise: Risk Aversion and Tradition. Organizational Optimism and Administration do not predict innovation performance. The whole model has an explanatory power of R2 = 0,644.

The sum of absolute values of standardized coefficients (Beta) for significant and marginal subdimensions of Innovation Culture amounts to 0,871, which is nearly four times as high as the predictive power of Innovation Processes (0,226). Hypothesis H1 is largely validated.

Table 6: Regression analysis with Innovation Performance as Dependent Variable.

Model	A	Beta	t	Signification
Constant	-1,706			
Innovation Process		**0,226**	5,719	p < 0,001
Innovation Climate		**0,144**	3,904	p < 0,001
Radical Innovation		**0,454**	11,584	p < 0,001
Risk Aversion		-0,054	-1,678	p = 0,094
Organizational optimism		0,023	0,648	p = 0,518
Tradition		-0,057	-1,829	p = 0,068
Collective Discovery Skills		**0,162**	4,267	p < 0,001
Administration		-0,03	-0,95	p = 0,343
Dependent Variable: Innovation Performance				

3.3 Test of H2

To test H2, we created a composite index of Innovation Culture based on the regression results (Innovation Culture = 0,144 x Innovation Climate + 0,454 x Radical Innovation – 0,054 x Risk Aversion – 0,057 x Tradition + 0,162 x Collective Discovery Skills) as well as a weighted index of Innovation Process (with a 0,226 weight). We

computed the linear correlation between these indices, which proved positive and significant ($r = 0.590$; $p < 0.001$), as can also be seen on Figure 2. Hence Hypothesis H2 should be rejected.

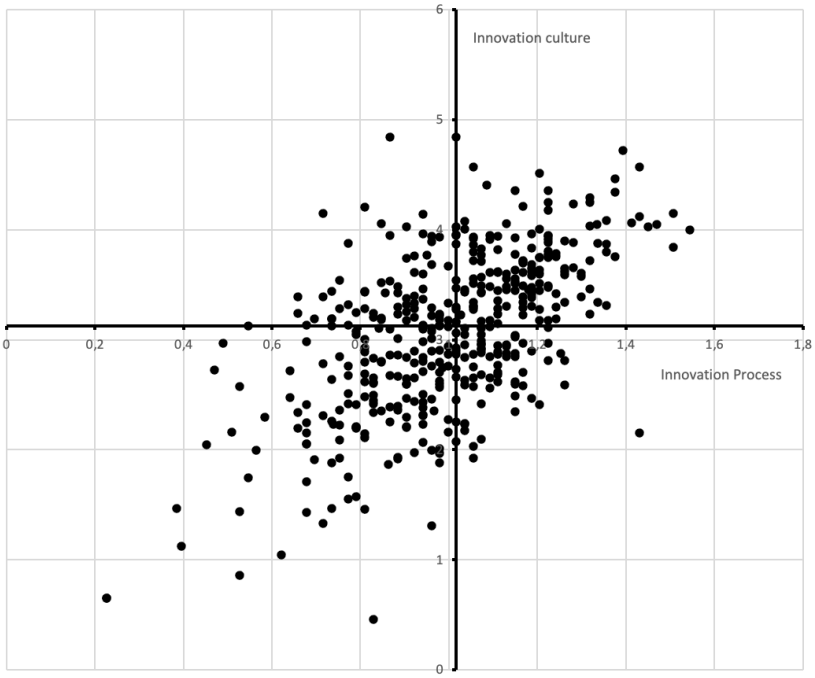

Figure 2: Scatterplot of Innovation Culture and Innovation Process indices for our respondents.

4. Discussion

The aim of this study was to try and measure the impact of cultural traits of organizations on their innovation performance and to assess the relative impact of such implicit invisible factors with regard to the impact of formal innovation processes. The whole study was built on an analogy between Lewin's equation of individual psychology and the innovation equation of a company. This analogy in itself may be insightful for managers and practitioners to understand what organizational culture is: culture may act as the personality of the company and influence the behaviour of its members outside of their awareness and willingness. This may explain why innovation is natural in some companies and painful in others, why innovation processes sometimes fail and why innovation sometimes flourishes without a clear process, without explicit efforts or investments.

To demonstrate the role of innovation culture, we had to find a way to measure it, show its impact on innovation performance (Hypothesis H1) and show that innovation culture was independent from innovation processes (Hypothesis H2). We designed a questionnaire based on scholarly literature and performed a cross-industrial survey in France. The responses of a qualified sample of 432 executives were analysed and highlighted a few original results.

Regarding innovation performance, during this first step we did not have access to an objective measure, and had to rely on self-assessed innovation performance in French executives. We had anticipated a bias in our data in the form of a ceiling effect, as it might be tempting to declare one's company as highly innovative. Because the distribution was slightly shifted rightwards, we may consider that respondents tended to overestimate the real innovativeness of their organization. However, we should mention that the whole scale was used, including the lowest innovation score, which we consider positive and indicative of the honesty of our respondents and of the quality of our data.

Another interesting set of results concerns the subdimensions of organizational and innovation culture. Our analyses highlighted 8 clusters in the cultural data collected, among which 5 may play a significant or marginal role on innovation. The first two subdimensions, namely Innovation climate and Radical innovation, are particularly interesting. Innovation climate refers to a healthy but rather passive attitude towards innovation: openness but limited proactiveness, resulting in incremental innovation and progressive improvement. In contrast, Radical innovation promotes a riskier approach, far from being frightened by disruptive change, and eventually stimulating it. These two dimensions illustrate the innovator's dilemma as theorised by Christensen

(2011): willingness to develop participatory innovation responding as closely as possible to customers' demands (here: Innovation climate) may interfere with the development of disruptive ideas (here: Radical innovation). Innovation climate correlates with uncertainty avoidance (item 23 in our survey), which is a notable characteristic of French culture and may further contribute to inhibit radical innovation. However, our regression analysis shows that Radical innovation is the first predictor of innovation performance in our sample of French companies. This result illustrates the tension, sometimes up to a double bind, that French companies may experience when developing innovation projects while stressed to secure the business.

The second cultural predictor of innovation performance is what we called Collective discovery skills, in particular individual creativity and experimental spirit. This dimension may be enhanced through acceptance, acknowledgment, or recruitment of creative people in the organization, despite their tendency to be a bit less submissive and a bit more difficult to manage. Similarly, stimulating an experimental mind may appear as a source of risk and distraction from an organizational viewpoint, although they remain useful sources of innovation.

Although insightful, our study holds several limitations which draw avenues for future research: firstly, we are currently in the process of crossing our data with econometric measures of innovation such as the Community Innovation Survey data collected in European Union member states. The subsequent round of analyses will enable us to perform a new test of hypothesis H1 and compare the results with this first study. It will also offer the opportunity to analyse the relations between declarative and objectified data on innovation performance. A second limitation, inherent to cross-industrial surveys, is that we had only one respondent per firm in our sample. Hence a highly valuable perspective would be to collect the perception of innovation culture, processes (and performance) from a panel of employees from each company, study the consistency of their perception, and consolidate current data to deepen our analyses.

All in all, our results on the drivers of innovation performance are original as they emphasize the unexpected weight of culture with regard to formal processes. Although scholarly literature and consulting activity mainly focus on recommendations and interventions for structuring innovation processes, our findings stress the need for further studies regarding the mechanisms of organizational culture. However, contrary to our hypothesis, innovation culture and innovation process are not orthogonal dimensions of the organisational life. This means that companies holding an innovative culture are more likely to exhibit structured innovation processes. Likewise, the implementation of innovation process may shine a light on the innovative side of the company's culture and contribute to develop it. Anyhow, to develop innovation, culture and processes should be addressed alongside: when innovation processes require to be formalised, this should be compliant to the existing culture to be effective and efficient. Likewise, if culture would gain to increase its innovativeness, this evolution could be supported by the introduction of new practices through innovation processes. Here the key to success would rely on the design of a commitment process. Even if cultural transformation is always a long and uncertain challenge, this may appear as necessary to increase innovation, and more widely to adapt to a changing world.

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From Failing Forward to Thriving: How Entrepreneurial Learning Shapes Ecosystems

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Abstract: Drawing on entrepreneurial cognition and experiential learning theories, this article explores the complexities of entrepreneurial learning from business failure and its reflections on the entrepreneurial ecosystem. Qualitative research was conducted through individual in-depth interviews and focus groups, and data were subjected to content analysis using NVivo software. The analysed data relate the nature of the failure to its reflections on entrepreneurial learning and the most relevant contents used in the resurgence of the entrepreneur. How the entrepreneurial ecosystem absorbs and recycles learning from failure impacting new business creation was analysed. This study explored emerging economies' themes based on the triangulation of data from startups from different industries and maturity levels from the perspective of founding partners, directors and employees and incubator and accelerator managers. The article offers a vision of entrepreneurial learning due to exceptional failure. The results presented in this paper demonstrate that learning from a critical event profoundly impacts the performance of entrepreneurial ecosystems and influences their vocation and the accession of new ventures to the industries analysed. These results encourage research in areas such as learning to model or replicating the proposed approach in other ecosystems. In practical terms, the findings can support policymakers in identifying localised factors that can be leveraged to produce macro-level change by identifying appropriate incentives for social networks and experiential knowledge sharing. The article presents a new perspective on entrepreneurial learning. It offers evidence that micro-learning strategies adopted and developed after critical events impact the performance of the entrepreneurial ecosystem related to the creation and diffusion of new ventures.

Keywords: Fail; Failure; Startups; Entrepreneurial Learning; Experiential Learning; Entrepreneurial Ecosystems.

1. Introduction

Failure is one of the most critical events an entrepreneur can face. It plays a crucial role in entrepreneurial learning, and knowledge about the learning process, which enables an entrepreneur to resurface after a failure, is considerably fragmented in the literature (Lattacher & Wdowiak, 2019). The entrepreneurial ecosystem can profit from vibrant learning after critical events (Cope, 2011; Espinoza-Benavides & Diaz, 2019).

Failure can be considered a common phenomenon, considering the high risks and uncertainties inherent in entrepreneurial activity (Politis, 2008). However, the reflexes generated from their learning improve the knowledge stock of the individual since they can facilitate successful entrepreneurial resurgence. Moreover, these entrepreneurs can remain in the ecosystem by creating new businesses and becoming serial entrepreneurs, mentors, and employees of other companies or institutions (Lattacher & Wdowiak, 2019; Ucbasaran et al., 2013).

In several entrepreneurial ecosystems, most startups are not creating major innovations or significant technological breakthroughs. Shane (2009) defines as dangerous the belief that simply encouraging more startups is the key to the future economic vibrancy of society or to revitalising economic stagnation or decline in regions. Instead, we argue that successful or unsuccessful entrepreneurship within an ecosystem generates critical entrepreneurial resources such as investment capital, skilled workers and entrepreneurial knowledge. This, in turn, supports the creation of future high-growth ventures. Essential ecosystem resources such as entrepreneurial knowledge, financial capital, successful mentors and skilled workers are created or attracted over time by entrepreneurial activity and public investment (Cannavacciuolo et al., 2017).

As success or failure cases are recycled across the ecosystem, other entrepreneurs can use them to avoid similar failures. The recycling of learning from failure is a crucial process for better managing the flow of resources in ecosystems. (Bahrami & Evans, 1995). The knowledge, skills and talent associated with failed ventures are also recycled through the larger ecosystem. Business failure is usually a function of market timing, meaning failed entrepreneurs can gain valuable experience. Workers from failed ventures are also returned to the workforce, taking the skills and insights they developed in previous incidents (Corona et al., 2006).

However, recycling talent and knowledge from failed enterprises depends on a local culture that does not punish failure but treats it as a learning experience. If cultural attitudes punish failure, the remaining entrepreneurs

associated with failure cannot use the knowledge and skills they have developed (Cardon et al., 2011).
From a research perspective, entrepreneurial learning from failure is interesting for a few reasons: (1) it constitutes an emerging field (Ucbasaran et al., 2013); (2) it links the context of failure to learning theories that can, in addition to improving understanding under the phenomenon, enable theory advancement (Liu et al., 2019) and (3) it facilitates a dynamic view of entrepreneurship (Cope, 2005).

From a practical perspective, understanding the reflexes of failure allows us to look at its manifestations over time to manage the impact on the failed entrepreneur and the ecosystem in which they are embedded to manage its multi-level effects (Klimas et al., 2020). Furthermore, entrepreneurial cognition following a critical event usually affects the knowledge structures people use to make evaluations, judgments or decisions involving opportunity assessment, venture creation and growth (Mitchell et al., 2002). Hence, to explore how learning processes are shaped by a context of fault or failure (Ucbasaranet al., 2001), we apply a process-focused lens of entrepreneurial cognition that moves towards a view of entrepreneurial cognition embedded within specific social situations with specific social actors (Mitchell et al., 2011) from a processual perspective informed by experiential learning theory (Kolb, 1984).

This article aims to explore the complexities of entrepreneurial learning from failure and its reflections on the entrepreneurial ecosystem through the research question: How do the effects of entrepreneurial failure manifest in entrepreneurial ecosystems? Specifically, (1) what is the nature of failure and its impact on entrepreneurial learning? (2) What are the contents of learning from failure? (3) What is its application in an entrepreneurial resurgence? (4) How does EE recycle learning from failure, and how is this learning absorbed?

This research is justified by offering insight into entrepreneurial learning due to the exceptional failure circumstance. Furthermore, this study also advances by presenting a new perspective on entrepreneurial learning and providing evidence that microlearning strategies adopted and developed after critical events impact the performance of the entrepreneurial ecosystem related to the creation and diffusion of new ventures (Cao & Shi, 2020).

To provide a coherent picture, the content of the study is represented as follows: the next section presents the theoretical framework associated with entrepreneurial failure and entrepreneurial learning. Then, the criteria used in sample selection, content categorisation, and the techniques applied to analyse the interviews are indicated. This is followed by the presentation of the research results and, finally, the considerations of the work carried out and the implications of the results obtained.

2. Theoretical Background

2.1 Entrepreneurial learning

Entrepreneurship is a learning process, and entrepreneurs can experience vibrant learning after critical events (Minniti & Bygrave, 2001). Entrepreneurial learning focuses on how and when learning occurs, is a promising field of research at the interface of entrepreneurship and encompasses a wide diversity of theoretical perspectives: experiential learning, organisational learning, social cognitive theory, population ecology and configuration theory (Wang & Chugh, 2014). Among these approaches, experiential learning has been increasingly influential in research about entrepreneurial learning (Fust et al., 2018).

Experiential learning defines entrepreneurial learning as a subjective updating of knowledge grounded in experiences (Cope, 2005; Politis, 2005). In this perspective, learning emerges through personal reflection and direct action, and the nature of the experience significantly influences the learning process and its outcomes (Lattacher & Wdowiak, 2019). Insignificant experiences involve incremental and adaptive changes and cause a lower level of learning. In contrast, critical experiences involve a considerable reflection process and can lead to a high level of learning and significant changes in the entrepreneur's mind and behaviour (Pittaway & Thorpe, 2012).

As a critical event in the entrepreneur's life, this study will pay attention to entrepreneurial or perceived failure. The research findings will be related to the experiential learning framework proposed by Kolb (1984) as it is the dominant theoretical framework used to understand the entrepreneurial learning process (Morris et al., 2012) and because it understands learning as the process by which knowledge is created through the transformation of experience. From this perspective, for the entrepreneur to effectively learn from a critical experience, they must first be exposed to a concrete experience and subsequently analyse it through reflective observation. The

insights generated will shape new knowledge through abstract conceptualisation and should be tested via active experimentation, as shown in Figure 1.



Figure 1: Experiential learning framework - adapted from Kolb (1984)

Although the process is cyclical and non-sequential, the concrete experience is the starting point and basis for learning by acting as a reference to test abstract concepts (Kolb & Kolb, 2018). The initial reaction to the critical event is the formative element of experiential learning and comprises a preliminary assessment and comparison of the event with existing abstract concepts. The next step involves deeper analysis and reflective observation conducted deliberately with the inclusion of diverse perspectives. For abstract conceptualisation to occur, creativity is required to integrate observations into logically sound theories, and finally, the application of conceptual knowledge generates active experimentation (Lattacher & Wdowiak, 2019).

2.2 Entrepreneurial failure

Manifested as an essential field of research in the late 1990s, business failure was considered an inherent part of entrepreneurship (McGrath, 1999). Despite ambiguities regarding its understanding, this study adopts the perspective of He et al. (2018), which treats failure as any harmful deviation from the actual outcomes expected by the entrepreneur. In this sense, it includes: (1) non-survival of the company, which may mean its closure or change of market and products; (2) organisational failure by not reaching the minimum thresholds of economic viability; and (3) the entrepreneur's perception of failure by insufficient objective (financial) or subjective (individual goals) development (Josefy et al., 2017; Ucbasaran et al., 2013).

Many understandings exist about business failure (Jenkins & McKelvie, 2016). Failure is measured objectively, primarily by economic performance (Yamakawa et al., 2015). The subjectivity of measurement lies in comparing individually defined targets and actual results. Another way of subjectively measuring failure considers the personal attitude and situation of the entrepreneur by differing in how deeply failure impacts them psychologically and financially (Cope, 2011).

In summary, the lens of this study focuses on failure, defined by the fact that it is cognitively perceived as such by the entrepreneur, regardless of whether the firm survives. Hence, fault and failure are adopted here as critical experiential learning events. It follows Ucbasaran et al. (2013) going beyond the narrow failure criterion.

2.3 Entrepreneurial ecosystems and startups typology

The functionality of an ecosystem is determined by the ability of entrepreneurs to access the resources within it. Well-functioning ecosystems are dense networks between entrepreneurs, investors, advisors and key players based on long-term trust and a localised culture that encourages networking and connections for knowledge exchange. This structure supports the flow of resources and facilitates access for entrepreneurs (Spigel, 2018).

On the other hand, malfunctioning ecosystems lack dense social networks that allow entrepreneurs to access critical resources. Depending on the ecosystem, this may be due to a lack of community trust or cultural perspectives that punish failure and discourage intensive networking between entrepreneurs and other actors. As a result, entrepreneurs may find it challenging to sustain or re-enter the entrepreneurial ecosystem after an episode of failure (Spigel, 2017).

Entrepreneurs create ventures that take many forms, suggesting a very heterogeneous landscape (Davidsson, 2005) that, even in post-failure episodes, if treated as a learning experience and shared with other ecosystem elements, can reflect in the opening of new ventures led by more mature entrepreneurs.
Considering the full range of possibilities, focusing on for-profit sectors, at least four main categories of ventures can be identified. As Morris et al. (2015) articulated, these categories of startups include survival, lifestyle, controlled/aggressive growth or high-growth ventures.

The four categories are differentiated based on their relative emphasis on growth, innovation and reinvestment in the business, their means of extracting revenues or returns, the main types of stakeholders involved with the business, and the main managerial challenges faced by the founder (Morris et al., 2015). Surviving startups:

Provide bare subsistence for the entrepreneur and their family, allowing little more than a precarious existence. These ventures may or may not be formally registered, typically have no premises, few assets, and no commercial banking relationships, and operate on cash or barter. They exist to meet financial needs, and there is usually no ability to reinvest. Launching these ventures is often necessary, driven or motivated by demand factors, and the companies typically operate in highly competitive, price-based and largely undifferentiated markets.

Lifestyle startups: Provide a relatively stable environment and income stream for owners based on a business model and a maintenance approach to management. Reinvestments are relatively modest and made to maintain market competitiveness. These ventures typically have facilities in a single location and do not seek expansion or growth. As a result, the number of employees remains relatively constant. Given limited capacity, it is difficult for these startups to achieve savings from operations.

Managed growth startups: have a viable business modelled to seek steady growth over time, as reflected in occasional new product launches, periodic entry into new markets, steady expansion of facilities, locations and staff, and development of a solid local and regional brand. Reinvestment in these businesses is usually continuous despite moderate regional growth. Aggressive / high-growth startups are often technology-based ventures with solid innovation capabilities that seek exponential growth and are equity-funded. The launch of these ventures is driven by the opportunity to create markets. Their market focus is typically national or international, and they often become candidates for initial public offerings or takeovers.

Following Shane's ideas (2009), the start-ups selected for this study belong to distinct categories, all utilising and generating technology for the ecosystem, creating innovations and technological advances in different proportions and stimulating employment and income for the region where they operate.

3. Methodology

This study is classified as exploratory-descriptive research (Prodanov & Freitas, 2013), with a qualitative approach (Creswell, 2010) and a multiple case study (Yin, 2015) was conducted as a scrutiny strategy in which one or more processes, activities or individuals were explored over a limited period. The objects of study were eight startups of distinct industries of the exact geographical origin with validated and marketed products. All of them had founders, managing partners or team members directly involved in episodes of failure in previous ventures within the same entrepreneurial ecosystem where they are inserted, and some of them also had episodes in other ecosystems.

The choice of the sample, characterised in Figure 2, was based on the classification of each startup in different stages of maturity (Morris et al., 2015), as explained in the theoretical framework, so that it was possible to verify whether there were similarities or not in the way they processed experiential learning from failure.

	Age (years)	Domain (focus)	Nº employees	Business type	Market situation	Product stage	Enterviews
SURVIVAL	2	product	3	B2C	not commercialized	prototype	all team
SURVIVAL	3	service	6	B2C	not commercialized	prototype	all team
LIFESTYLE	3	product & service	7	B2B	fewer customers	beta	founder & manager
LIFESTYLE	3	product & service	10	B2C	fewer customers	beta	founder & manager
MANAGED GROWTH	5	product & service	62	B2B	growth in selling	live	manager
MANAGED GROWTH	7	product & service	37	B2B	growth in selling	live	manager
HIGH GROWTH	7	product & service	23	B2B	growth in selling	live	founder
HIGH GROWTH	8	service	17	B2G	growth in selling	live	founder & manager

Figure 2: Characterisation of the startups

For data collection, the sources of data evidence highlighted by Yin (2015, p. 74) were considered: "in-depth interviews and participant observation". It was also conducted via Skype, eight semi-structured in-depth interviews, a method which, according to Yin (2015), is one of the primary sources of knowledge for the study, three of them individually and others in a focus group (Morgan, 2010) with the entire startup team in order to realise information and feelings that individuals have about certain specific issues and map, through data triangulation (Denzin & Lincoln, 2008) the institutional practices performed and their perceptions about the experiential learning process (Josefy et al., 2017).

The pre-test interview to validate the research instrument was discarded after adjustments. A new startup at the same maturity stage was interviewed instead to avoid bias and information bias. The content analysis was structured in categories defined a priori from the literature about the themes of failure and entrepreneurial learning so that the investigation of core meanings and subsequent recognition of clusters in themes (Bardin, 2009) were carried out (Figure 3).

CAUSES	Background	cultural aspects
		social aspects
		legal aspects
		economic aspects
		educational aspects
		technologival aspects
	Drivers	determinists
		voluntary
		emotive
EVENT	Nature of failure	fault
		failure/ fail
EFFECTS	Indirect	pain/ mourning
		learning
		recovery
	Direct	economic aspects
		psychological
		social
	Long-term results	environmental
		organisational
		individual

EXPERIENTIAL LEARNING	massive learning	type of failure
	reflective observation	learning opportunities
	conceptualisation of learning	personal conclusions
	active experimentation	application of new learning

ENTREPRENEURIAL LEARNING	personal & social emergency	entrepreneurial identity development
		past life
		family experiences
		social relations
		entrepreneurial education & training
	contextual learning	participation in communities of practice
		immersion in the industry
		recognition of opportunities
		cultural adherence in networks
	negotiated venture	shareholdings and mergers
		negotiation of structures and practices
		negotiation of roles
		engagement in the network
		external relationships

Figure 3: Categorisation tree

The data from each startup was analysed individually in NVivo software. In addition, the interview excerpts were crossed for each node (analysis group) seeking to establish relations and verify contradictions to understand the complexities of entrepreneurial learning from failure and its reflections on the entrepreneurial ecosystem.

Based on existing theories and findings in the literature and to facilitate the understanding of data interpretation, a framework was developed to study experiential learning from failure and its effects on entrepreneurial learning. The study framework presented in Figure 4 favours the visualisation of its process, antecedents, effects and perceived results for the entrepreneur, startup and ecosystem.

All interviewees, independent of position, had already experienced or perceived failure and were in their career's second or more venture. All belonged to the same entrepreneurial ecosystem of Ceará – Brazil. Although they used information technology in their solutions, they belonged to different industries and startups at different stages of maturity.

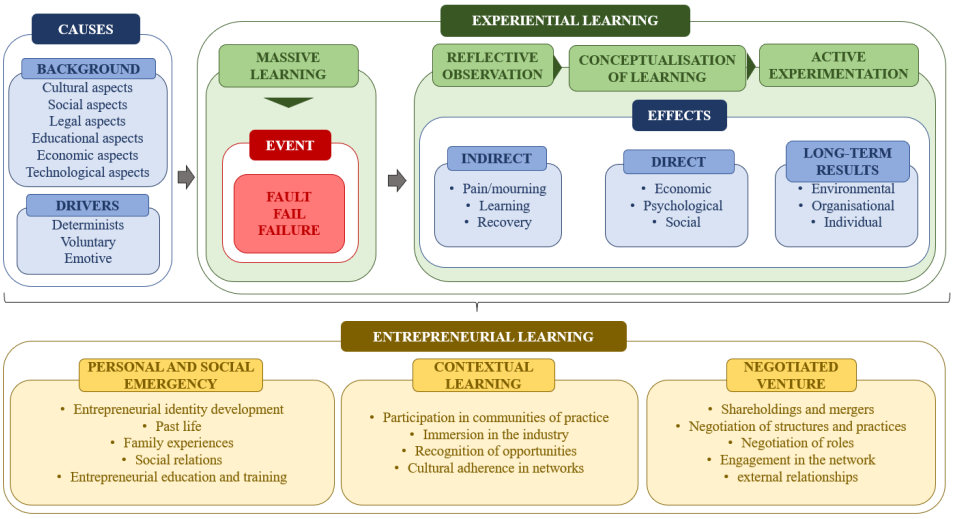

Figure 4. Framework for studying entrepreneurial learning from failure - adapted from Lattacher & Wdowiak,2019; Klimas et al., 2020; and Rae, 2005.

4. Results analysis

4.1 Causes of failure

The leading causes of failure or failure are related to economic, legal and educational aspects, such as financial instability, legal insecurity due to loopholes in current legislation and lack of entrepreneurial education. As all of them had higher education in technology and complementary courses in management, educational and technological aspects were not barriers to the success of previous ventures. Although not enough, cultural and social aspects were pointed out as fostering success. The engagement with actors in the ecosystem and support from public agencies, development agencies and universities were listed as the primary motivators for the entrepreneurial resurgence, whether with the opening of new ventures or with the reinsertion in the ecosystem as mentors, consultants or employees of other startups or institutions.

4.2 Drivers of Failure

None of the interviewees alleged emotional drivers for closing the business venture. Previous ventures were not closed due to a change in professional path, family or personal aspects. Legal and economic support failures were pointed out among deterministic drivers, with a lack of specific credit lines and public institutions with specific post-acceleration programs. Only the founders of the fast-growing startup narrated voluntary drivers for the closing of the previous venture, listing the possibility of selling the company for a value above the market value, which enabled the opening of two new firms.

4.3 Massive Experience

The startup in the survival phase had a previous failure episode where the form closed before reaching the commercial balance of operations. All the others terminated activities due to economic infeasibility with some subsequent financial commitment to creditors. Only the high-growth startup presents a previous failure event with the company's abandonment by commercial decision. The papers were traded and exchanged for stakes and mergers with more significant ventures.

4.4 Reflective observation and indirect effects of failure

Regardless of whether they considered their previous experience a failure, all affirmed having gone through a period of pain and mourning since the leading personal and organisational objective was to turn the business into a unicorn. The first, second and fourth startups pointed to the proximity with incubation and acceleration programs of universities and public institutions as fundamental for the recovery and opening of new businesses and the proper reflection of the barriers to success.

4.5 Conceptualisation of learning and direct effects of failure

The most significant direct effects cited were psychological. As the interviewees, at the time of the previous venture's failure, were university students or recent graduates and had the support of family and the university, there were no significant economic and social traumas. All of them mentioned the support of public institutions as fundamental for reducing social traumas since they were encouraged to reinsert themselves in the entrepreneurial ecosystem as mentors or part of new ventures. The great learning pointed out was the strengthening of the feeling of belonging to the ecosystem and the sharing of learning about which path not to follow with other startups.

4.6 Active experimentation and long-term results

The results ranged from a greater maturity to better networking within and outside the entrepreneurial ecosystem. Incubation and acceleration programmes were listed as fundamental for organisational outcomes such as opening new firms, encouraging young entrepreneurs and acting as mentors. Knowledge sharing, improved individual and organisational reputation and excellent proximity to key players were listed as the primary long-term outcomes of the entrepreneurial ecosystem.

4.7 Personal and social emergence of entrepreneurial learning

Only the founders and managers of later-stage startups stated that they had family influence and a prior history of entrepreneurship. All cited the university as the leading promoter of the development of entrepreneurial identity. All had gone through one or more incubation and acceleration programmes within Ceará's entrepreneurial ecosystem. Startups two, three and four have already been accelerated by other external and international ecosystems and point to this experience as the most responsible for developing solid social relationships with clients and intermediaries.

4.8 Contextual entrepreneurial learning

Participation in communities of practice and insertion were listed as fundamental for entrepreneurial recovery, and their absence was the most significant cause of failure and failure by all interviewees. All pointed to networking and cultural adherence as fundamental for expanding contacts at all ecosystem levels and improving the recognition of new growth opportunities.

4.9 Negotiated enterprise and entrepreneurial learning

Only startups three and four, in stages of greater maturity and growth, have already undergone processes of paper sales, participation in other businesses and mergers, and angel investment from individuals and companies. Startups one and two, in survival stages, did not trade papers but only terminated business activities and returned to activity in other ventures by engaging in the network of relationships external to the previous organisation.

5. Conclusions

The effects of failure manifested themselves positively in the entrepreneurial ecosystem of Ceará since all entrepreneurs shared their experiences in a welcoming environment, with institutional support at various levels and were reinserted as mentors and employees of other firms and institutions, opening in the future, new ventures that are spread in various industries and at different stages of maturity. All generating employment, income and technological advancement for the region.

The nature of the failures and failures was presented objectively, with the closure of firms, and in a subjective manner, the sale or abandonment of the company due to non-economic factors. All these experiences generated entrepreneurial learning in developing individual entrepreneurial identities and improving network relations. The learning contexts, although diverse, had in common the previous participation in incubation and acceleration programmes linked to universities.

The primary learning contents were improved managerial practices, better recognition of opportunities, expanded relational connections within and outside the ecosystem to give new ventures greater robustness, and increased peer recognition that positively influenced individual and organisational reputation. The learnings were applied to an entrepreneurial resurgence in various ways, some in the form of mentoring and consultancies, others through sharing of experiences and contacts in communities of practice, and finally, with the opening and maintenance of new ventures that reached high development stages with technology diffusion and employment and income generation.

The most significant impact of entrepreneurial resurgence from failure was the welcoming attitude of the ecosystem and the culture of learning recycling at both individual and peer organisational levels.
From a research perspective, entrepreneurial learning from failure systematised through the experiential learning process makes it possible to link the context of failure to learning theories to enhance understanding of the phenomenon and enable theory advancement in addition to facilitating a dynamic view of entrepreneurship (Liu et al., 2019; Cope, 2005).

From a practical perspective, our research highlights the value of a highly interactive mode of knowledge transfer, starting from a critical event and reverberating throughout the entire entrepreneurial ecosystem. Indeed, founders and intermediaries (incubators and accelerators) help develop the ecosystem by accelerating the failure of some companies. In this sense, our findings suggest that government policymakers should judge startups based on the experience of their team; that is, their experience in building connections, developing founders, coordinating mentors, and selecting participants (founders and mentors). These evaluation standards should benefit individual founders and the broader entrepreneurial ecosystem. The sample could be expanded to include more gender diversity and age variations to identify cultural differences between generations and

multicultural teams, given the advent of today's ease of remote working and hiring foreigners. Such differences could point to new multicultural perspectives that foster psychological contracts with new perspectives.

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A Value Proposition Analysis of Emerging Circular Economy Business Models in the WEEE Sector

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Abstract: Due to the rapid economic growth, growing demand for high-tech products, and decreasing service life of products, global waste generation from the electrical and electronic equipment sector is increasing. From the environmental and economic perspective, the circular economy (CE) emphasizes e-waste prevention as it is one of the fastest-growing waste streams having both valuable and rare materials as well as toxic substances. It is common to manage electrical products at their end-of-life through circular practices however, knowledge and implementation of CE in the waste electrical and electronic equipment (WEEE) sector still need to be improved. End-of-life practices center on recycling, and the percentage of valuable resources recovered is low. There is a missing insight into the business opportunities for alternative end-of-life options such as reusing, repairing, and re-manufacturing that hold stakeholders from implementing circular strategies. To fill the gaps identified, we developed a research question for investigating and analyzing the services offered and the electrical products adaptable to CE business models (CEBMs) of young companies operating in the WEEE. This study aims to explore the business models (BMs) of circular practice-based business options such as buyers and sellers of used and refurbished electronic devices, information technology asset dispositions (ITADs) companies, and e-waste recyclers to enhance other researchers with a better understanding of business options toward end-of-life e-waste handling and emerging issues in this industry. We conduct a literature review on CEBMs in the WEEE and conduct a multiple-case analysis of 412 emerging circular companies in the WEEE selected from the Crunchbase database to explore their BMs. Key findings show that most young WEEE companies focus on IT and telecom equipment and consumer electronics. Emerging WEEE companies mostly involve asset management and e-waste Recycling service, followed by ITAD services, trade-in/buyback, and reselling of preowned and refurbished electrical devices service, and e-waste collection, recycling, and disposal service. These companies provide unique offerings such as information security, compliance, trustworthiness, convenience, quality, social responsibility, and charitable purpose. Studies in the future may explore other dimensions of these BMs to gain a comprehensive picture and support the design of CEBMs.

Keywords: circular economy (CE), WEEE, e-waste, business model, value proposition, waste electrical and electronic equipment

1. Introduction

The electrical and electronic equipment (EEE) sector generates several types of electronic waste, which contain precious and base metals (Gold, Silver, Copper, Cobalt, Palladium, Lithium, etc.) as well as hazardous materials (Lead, Cadmium, Mercury, Arsenic, Beryllium, etc.) (Bressanelli et al., 2020). The amount of electronic waste or waste electrical and electronic equipment (WEEE) is growing by 3-5% per year, making it one of the fastest-growing waste streams (Cucchiella et al. 2015). The Global E-Waste Monitor also indicates that the global WEEE production was 53.6 Mt in 2019 and is expected to reach 74.7 Mt by 2030 (Forti et al., 2020). WEEE has become a global priority waste stream due to various pressing concerns such as the significant quantity of WEEE is astonishing, with potential health and environmental impacts, as highlighted in studies by Ongondo & Williams in 2011a and 2011b. Furthermore, resource depletion is emphasized by Kumar et al. (2017) and ethical concerns are also raised regarding the improper disposal and management of WEEE (Ongondo & Williams, 2011a). However, despite the growing rate of WEEE generated, the recycling rate is still low, with only 17.4% being collected and properly recycled (Forti et al., 2020). The rest, a large 44.3 Mt, ends up untreated or in landfills, posing a grave threat to the environment and human health. Given these concerning statistics, effective strategies for managing and safely disposing of e-waste are urgently needed to tackle this growing crisis. The linear economy model, which promotes a "take, make, waste" approach, has been increasingly recognized as unsustainable. In response, the circular economy (CE) model has appeared as a practical alternative in recent years, with increasing support from the European Union and other organizations. The CE aims to reduce resource depletion and promote economic benefits by increasing the product lifecycle by prioritizing reuse and remanufacturing over recycling for improved resource recovery.

The circular economy also encourages the closure of the loop of products, components, and materials, leading to serviced leasing and sharing business models (BMs) (Rosa et al., 2019; Urbinati et al., 2017). Applying CE strategies to the WEEE industry in general can promote sustainable development in both the environment and

the economy. However, the implementation of CE in the WEEE industry is still a challenge for companies, organizations, and governments. Literature shows that end-of-life practices in the WEEE focus on recycling, and the percentage of valuable resources recovered is low. There is a missing insight into the business potential for alternative end-of-life strategies such as reusing, repairing, and re-manufacturing that hold stakeholders from implementing circular strategies. With the projected increase in global e-waste generation to 74.7 Mt by 2030 (Forti et al., 2020), it is now more important than ever to examine the development of CE practices in the WEEE industry. Our study focuses on analyzing how CE practices are incorporated into the BMs of young companies using the "6R" CE strategies as the scope of the research shown in Figure 1 since their BMs are more receptive to change and improvement. To achieve this goal, the research question of the study is formulated as follows "What are the value propositions offered by the CEBMs of young companies in the WEEE sector?". The paper is organized into different sections, starting with a literature review in section 2 that discusses the CE in the WEEE industry, and the value propositions offered by BMs in the sector. Section 3 outlines the research method used to identify and analyze the value propositions offered by young companies in the WEEE industry. The results of the exploratory multiple-case analysis are presented in section 4, and section 5 presents a discussion of the findings and conclusions of the study.

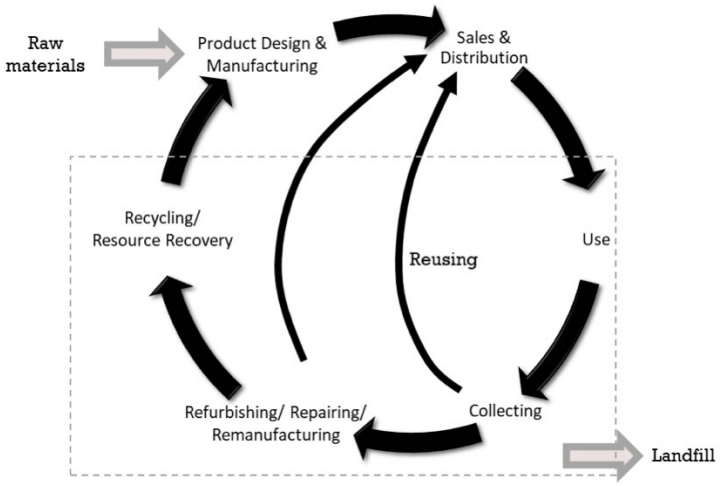

Figure 1: Circular economy approach and scope of the research.

2. Literature Review

2.1 Circular Economy in the WEEE

Although the concept of circular economy (CE) is still an emerging concept (Velenturf et al., 2019), with no established theoretical framework or academic consensus on its definition (Kirchherr et al., 2017), it is widely acknowledged that the current linear business production model is resource intensive. As per Kirchherr et al. (2017), the primary emphasis of CE is on achieving economic benefits, followed by environmental quality and social equity. Circular Economy prioritizes the principles of reuse, recycling, and recovery to reduce resource depletion, increase economic benefits, and extend the product lifecycle. Although recycling is a core principle of CE, it prioritizes the reuse and remanufacturing of electronic devices over recycling to improve resource recovery (Ghisellini et al., 2016). The adoption of CEBMs by individual organizations is crucial for the transition from a linear economy to a CE (Lewandowski 2016). The goal of CEBMs, as described by Lahi et al. (2018), is to minimize resource usage, increase durability, and maximize value retention. Simply put, CEBMs strive to keep products, components, and materials at their maximum value throughout their entire life cycle (Korhonen et al., 2018). Therefore, the EEE sector is one area that could benefit from the greater adoption of CEBMs, and there is a need for new BMs to facilitate the transition from a linear economy to a CE.

Circular models have been widely proposed for the lifecycle management of electronic products (Macarthur, 2013). Such models prioritize the reuse and repair of products over recycling after the first use cycle. However, despite the significant, mostly conceptual, research in this area, there is still a lack of substantial insight and evidence into the technological and business potential for alternative end-of-life options based on reuse, repair, and remanufacturing. This lack of insight keeps the relevant stakeholders from implementing circular strategies (Parajuly & Wenzel, 2017). When it comes to WEEE, the principles of the CE are applied through a focus on, the

reuse, resale, repair, refurbishment, remanufacture, and recycling of products, with the aim of extending their useful lifetimes and recovering raw materials from their waste (Cordova-Pizarro et al., 2019). This study aims to present a comprehensive view of the development of CE practices in the WEEE industry by examining the value proposition offered by young companies. Specifically, the study focuses on analyzing the BMs of these companies and their use of the "6R" CE strategies, which include reuse, resale, repair, refurbish, remanufacture, and recycling (Potting et al., 2017). The circular strategies discussed in Potting et al.'s (2017) work are depicted in Figure 2.

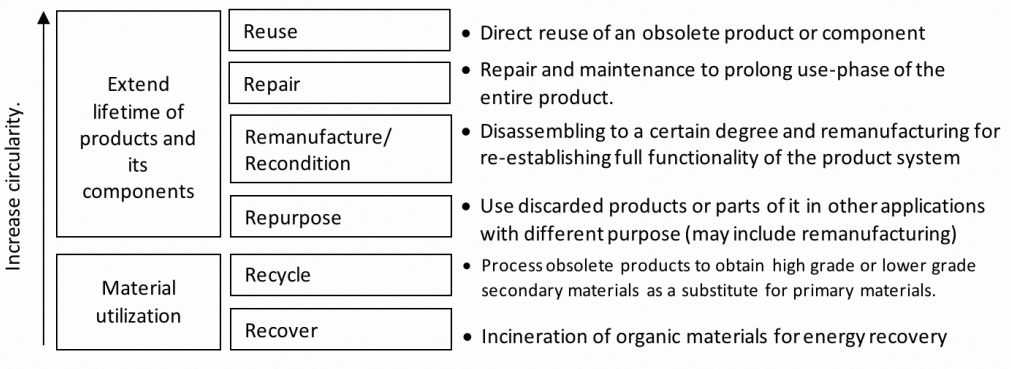

Figure 2: "6R" strategies of circular economy (Potting et al., 2017)

2.2 Value Propositions Offered by WEEE Companies

A company's value proposition encompasses the unique offerings and products/services it offers to its customers (Lüdeke-Freund et al., 2019; Osterwalder et al., 2005). In the WEEE industry, companies provide services approaching CE practices including the 6R strategies. To examine the products offered by young companies in the WEEE sector, this study refers to the categories of products identified by the WEEE directive (European Parliament Directive, 2012) which includes large household appliances, small household appliances, IT and telecommunications equipment, consumer equipment, lighting equipment, electrical and electronic tool, toys, leisure, and sports equipment, medical device, monitoring and controlling equipment and automatic dispensers. The unique offerings provided by businesses in the WEEE sector are discussed as follows.

Unique offerings provided by WEEE companies: A strong value proposition in this industry entails the ability to provide unique offerings such as information/data security, convenience, compliance, and environmentally responsible solutions for managing electronic waste.

- *Information Security:* effective management of electronic waste must prioritize data security or information security, as protecting user data and ensuring original equipment manufacturer (OEM) brand protection are crucial concerns (Kissling et al., 2013). Consumers are concerned about data security issues relating to the disposal of personal consumer electronics. Moreover, information security is a major factor that influences users' decision to recycle IT and telecommunication equipment (Bai et al., 2018; Cole et al., 2019; Zhang et al., 2019). Proper destruction of data is necessary to safeguard customer privacy (Koga et al., 2013), and this should be done in compliance with relevant data destruction standards and regulations, including on-site and off-site data destruction options. End-of-life electronic recycling businesses need to provide proper documentation to ensure that data is completely wiped from the discarded devices, which helps to set up appropriate data destruction processes and demonstrate their compliance with proper standards and regulations.

- *Incentives* are a crucial factor in encouraging consumers to recycle unwanted electronic devices. Research has shown that providing incentives can significantly impact consumers' willingness to recycle (Bai et al., 2018; Ongondo & Williams, 2011a). Ongondo's (2011a) study found that incentives were necessary to spur cell phone recycling in the UK. Various types of incentives that can be offered, including financial return in exchange for the device (Chi et al., 2014; Kwarteng et al., 2018; B. Wang et al., 2019), store credit, gift cards, courier coupons or vouchers, prize draw entry or discount on a new device (Li et al., 2012; Zhang et al., 2019), competitive pricing or providing the appropriate price for products/services delivered (Cole et al., 2019; Kwarteng et al., 2018; Nasiri & Shokouhyar, 2021), free shipping (envelopes, bags, boxes), environmental incentive, and more. Different incentives elicit different levels of willingness to recycle, as stated by Ongondo (2011a). Financial incentives have been found to have significant effects on the desire to recycle electronic devices as shown by studies conducted by (Wang et al., 2011) and (Dwivedy & Mittal, 2013).

- *Convenience:* it is a system established by companies to facilitate the 'easy' or 'less effort' return of end-of-life products for repair, reuse, and recycling. This factor is critical for consumers in the WEEE sector which affects their decisions toward end-of-life electronics recycling (Zhang et al., 2019). Proximity and easy-to-find drop-off points, as well as access to the collection spot, are key elements in motivating consumers to recycle their old electronic devices (Bai et al., 2018; Chi et al., 2014; Zhang et al., 2019). To achieve convenience, door-to-door pick-up services are also popular collection modes due to their ease of use (Bai et al., 2018; Yin et al., 2014; Zhang et al., 2019). Other important factors include ease of the process (Wagner, 2013), timely payment (Bai et al., 2018; Wagner, 2013), or courier collection (Kwarteng et al., 2018; Zhang et al., 2019), and providing all services at a single point of contact, which offers suppliers a one-stop solution for collection, preparation for reuse, and recycling of used products (Kissling et al., 2013) are discussed as the main value propositions customers need towards convenience.

- *Compliance*: Recycling, transportation, and disposal of electrical equipment need a company's compliance with a variety of state, federal, and even international environmental regulations. For instance, IT asset disposition needs to be performed in compliance with data security, environmental, and industry regulations. Compliance with regulations is crucial to the asset management and disposition services to ensure the proper handling of the proprietary and private data as well as the toxic components in retired IT assets. In general, compliance with legal and environmental regulations on electronic waste disposal is a significant concern for companies engaged in e-waste management (Schiller et al., 2016). The handling of electronic waste must comply with legal requirements (e.g., general data protection regulations (GDPR), NIST cyber security, health insurance portability, and accountability act (HIPAA)), environmental standards (responsible recycling (R2), e-steward, ISO 14001...) and other standards (quality management system, occupational health, and safety (OHS)).

- *Social responsibility:* **WEEE** contains hazardous materials that pose significant threats to both human health and the environment, making it essential to dispose of such waste with utmost care. To promote social responsibility regarding the management of end-of-life electrical devices, businesses adopt various sustainable practices such as zero-landfill policies and engaging the marginalized members of the community. The proper recycling of electronic equipment, done in a responsible, safe, and ethical manner, is crucial for businesses to distribute products for reuse (Nasiri et al. 2021; Kissling et al. 2013). Thus, securing a reliable recycling solution that prioritizes environmental sustainability and safety is a significant concern for businesses.

- *Quality:* In the current refurbished and secondhand electrical devices market, access to high-quality, used, or refurbished electronic devices is becoming increasingly important (Kissling et al., 2013). By offering these devices at a lower cost than the new ones, consumers can save money while still enjoying the peace of mind that comes with a guarantee or warranty. Appropriate warranty plans can eliminate any potential risk of purchasing a refurbished device, making them a more attractive option for consumers (Nasiri & Shokouhyar, 2021).

- *Trustworthiness:* is about establishing credibility and trust with customers and stakeholders from collection to preparation for reuse to redistribution (and to recycling and disposal if relevant) of used products (Chi et al., 2014; Kissling et al., 2013; Ongondo & Williams, 2011a). It also incorporates the transparent processes with complete chain of custody documentation such as by providing a certificate of data destruction and recycling S. Shokouhyar (2021) H. Bai et al. 2018, M.S. Nasiri and S. Shokouhyar 2021

- *Charitable purpose:* it is a practice of businesses providing customers with the option of donation or charity within their e-waste recycling programs. The donated devices can then be refurbished or repurposed and given to individuals or communities in need, such as schools, non-profit organizations, or underserved areas (Koga et al., 2013; Kwarteng et al., 2018; Li et al., 2012).

Table 1: Unique offerings provided by businesses managing EEE at their end-of-life from literature.

Category of Offerings	Description	Subcategories of Offerings	Literature support
Information Security	Assurance of data protection during e-waste disposal and recycling processes.	Data Wiping Secure Transport Data Destruction	H. Bai et al. (2018), C. Cole et al. (2019), R. Kissling et al. (2013), Koga et al., (2013), Y. Zhang et al. (2019)
Incentives		Economic Incentives: - Cash payment	H. Bai et al. (2018), X. Chi et al. (2014), C. Cole et al. (2019, R.

Category of Offerings	Description	Subcategories of Offerings	Literature support
	Providing economic and environmental benefits to encourage e-waste recycling.	- Store credit, gift cards, courier coupons, or vouchers - Discount on a new device - Competitive Pricing Free shipping	Kissling et al. (2013), Koga et al., (2013), Bo Li et al. (2012), M.S. Nasiri and S. Shokouhyar (2021), Ongondo FO & Williams ID (2011a), J. Yin et al. (2014), Y. Zhang et al. (2019), Y. Zhang et al. (2019), Louise Canning (2006), B. Wang et al. (2019), Z. Sharifi and S. Shokouhyar (2021)
		Environmental Incentive	
Convenience	Providing easy and hassle-free options for e-waste disposal and recycling.	Convenient Drop-off Locations	H. Bai et al. (2018), X. Chi et al. (2014), C. Cole et al. (2019), Kissling et al. (2013), Koga et al., (2013), Ongondo FO & Williams ID (2011a), J. Yin et al. (2014), Y. Zhang et al. (2019), T.P. Wagner (2013), Louise Canning (2006), B. Wang et al. (2019)
		Door-to-Door Pick-up Service	
		Mail-back Programs/Courier Collection	
		One-Stop Recycling Solution	
		Ease of process	
		Timely Payment	
Compliance	Ensuring adherence to relevant laws, regulations, and standards in e-waste management.	Legal Compliance (GDPR, NIST, HIPAA…)	Kissling et al. (2013), Ongondo and Williams, (2011b)
		Environmental Standards (R2, e-steward, ISO 14001…)	
		Other standards (QMS, OHS)	
Social responsibility	Demonstrating commitment to social and environmental well-being through e-waste initiatives.	Community Engagement	Kissling et al. (2013)
		Sustainable Practices	
Quality	Offering high-quality, certified, and reliable used equipment with warranties/guarantees.	Certified Refurbished Products	C. Cole et al. (2019), R. Kissling et al. (2013), M.S. Nasiri and S. Shokouhyar (2021), Z. Sharifi and S. Shokouhyar (2021)
		Warranty/Guarantee	
Trustworthiness	Establishing credibility and trust with customers and stakeholders.	Transparent Processes (certificate of data destruction and recycling)	H. Bai et al. 2018, M.S. Nasiri and S. Shokouhyar 2021, Sharifi and S. Shokouhyar (2021)
		Track-and-Trace Capability	
Charitable Purpose	Incorporating charitable contributions or donations into e-waste recycling programs.	Donation Options	H. Bai et al. (2018), Koga et al., (2013), Bo Li et al. (2012), Ongondo FO & Williams ID (2011a)

3. Research Methodology

To explore business model innovation for the CE, we employed a literature review and multiple case study strategies. To conduct our literature review, we searched for publications related to CEBMs in managing electrical and electronic equipment at the end of life. We focused on the Scopus and Web of Science (WoS) core collection databases, using a Boolean conjunction of keywords. ("circular economy" OR "closed$loop" OR "reverse logistic*" OR "recycl*" OR "end of life" OR "reus*" OR "refurbish*" OR "Repair" OR "maintain*" OR "recover*") AND ("E-waste*" OR "electronic-waste*" OR "electr* waste*" OR "electr* scrap*" OR "electr* garbage" OR "electr* rubbish" OR "WEEE" OR "waste* electr*" OR "obsolete electr*") AND ("Business model*" OR "value proposition*" OR "value creation*" OR "value delivery*"). We found 93 articles, of which we assessed the titles and abstracts for relevance to the value proposition study. We excluded publications focusing on technical recycling practices or research with no connection to BMs in the WEEE sector. The final dataset includes 15 articles that met the study's objective and are used to identify value propositions from the literature.

We analyzed 412 young companies selected from Crunchbase. To identify a wide range of circularity-based firms, we conducted a thorough search on Crunchbase, one of the most comprehensive tech-startup databases. Our search strategy involved using the keyword "Sustainability" which we combined with the industry group "Sustainability," "Consumer Electronics and Hardware," "Information Technology," and "Commerce & Shopping" resulted in 25,884 companies. After applying a filter to select companies with an active operating status, we conducted a detailed analysis of each company's website and the short and long descriptions of the companies' profiles on Crunchbase. Subsequently, we specifically included companies belonging to the EEE sector, which focuses on the end of a product life cycle. Furthermore, we excluded companies without a functional website, resulting in a total of 412 companies.

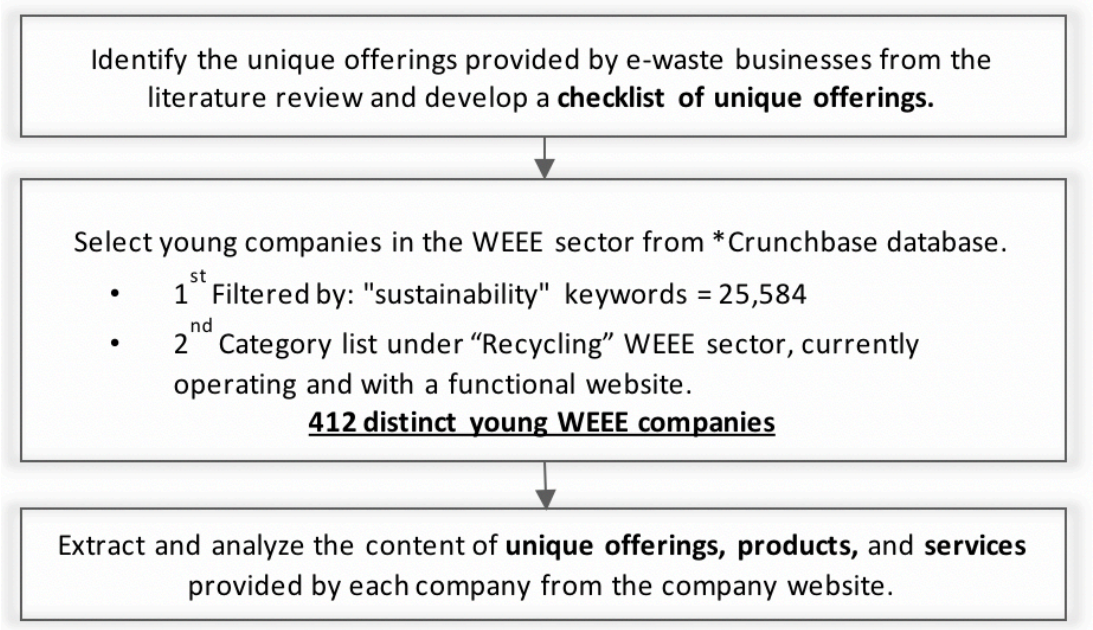

Figure 3: Research Method

4. Result and discussion

4.1 Unique Offerings Provided by Young Companies in the WEEE

Using a checklist developed from our literature review, our analysis of young companies in the WEEE sector finds several unique offerings provided by different BMs. These offerings include information security, compliance, trustworthiness, quality, social responsibility, incentives, and charitable purposes. Companies prioritize information security by offering data wiping and physical destruction through on-site or in-house service. Conveniences such as door-to-door pick-up, and drop-off options, customized solutions that are easy to use, and fast services are also other offerings. In addition, companies offer financial and environmental incentives, competitive pricing, high-quality refurbished products, compliance, and environmentally friendly processing as their main value propositions. Companies predominantly offer their customers a strong emphasis on Information Security (45.9%), Compliance with legal regulations and environmental standards (42.1%), and Trustworthiness (24.5%). In addition, companies primarily focus on Secure Data Wiping (69.4%) and Data Destruction (57.5%) as their key offerings. They also prioritize legal compliance related to Data security (56.6%) to ensure a robust and trustworthy service for their customers.

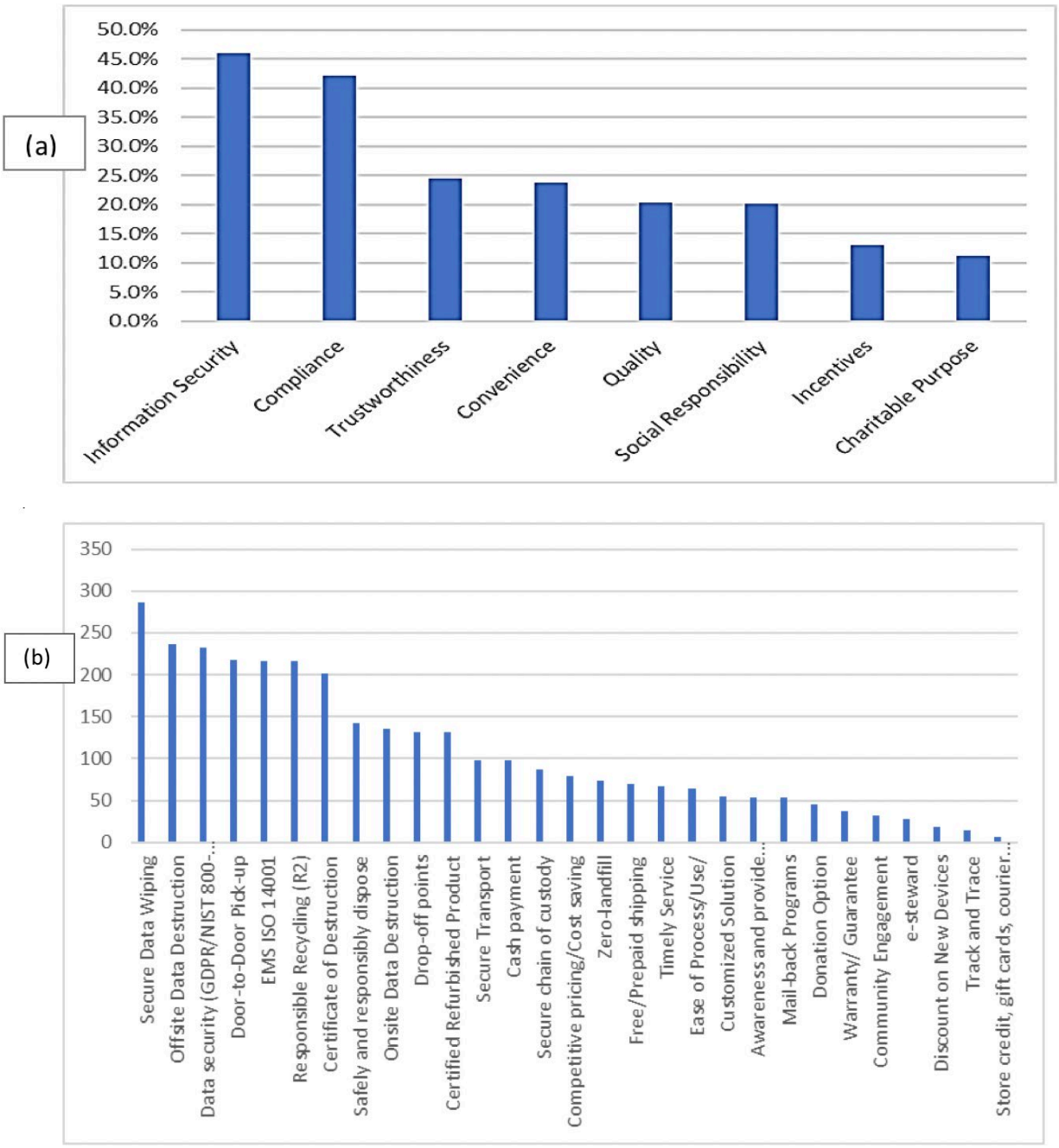

Figure 4: Unique Offerings of Young WEEE Companies (a) by Main Category and (b) by Subcategories

4.2 Products Processed by Companies in the WEEE

After analyzing 412 young companies based on the product categories outlined in the WEEE Directive 2002/96/EC, we found that most companies (67.9%) focus on IT and Telecommunications Equipment, which includes smartphones (77.3%), computers (71%), laptops (69.5%), and tablets (57.2%)). In addition to ITT, companies in the WEEE sector also prioritize Consumer Equipment and PV (14.9%), which mostly VCR/DVD/Blu-Ray players (27%) and audio-visual equipment (25.3%), as well as Small Household Appliances (6.3), such as toasters (12.4%), vacuum cleaners (12.4%), blenders (11.8%), and microwaves (11.8%). These product categories are prominent in the BMs of young companies in the WEEE sector.

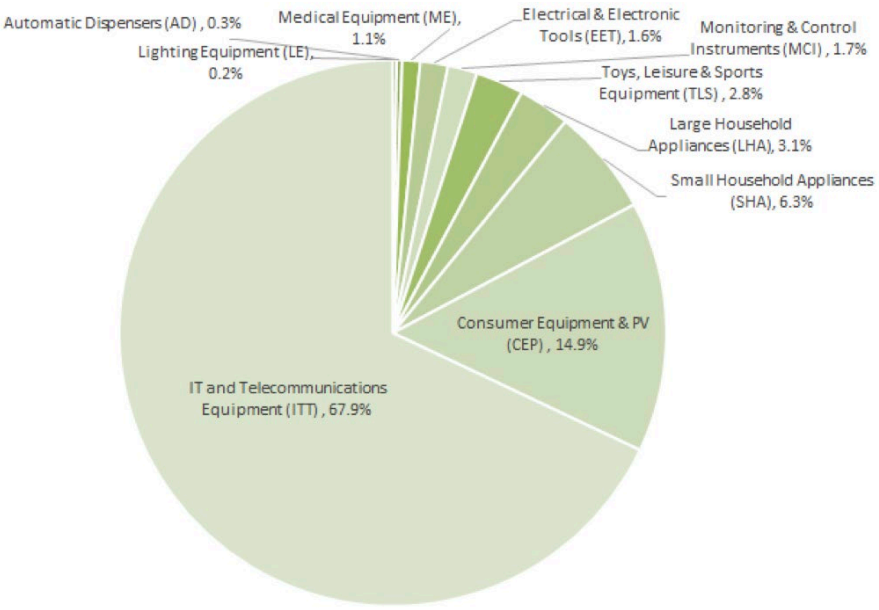

Figure 5: Product categories processed and delivered by WEEE young companies.

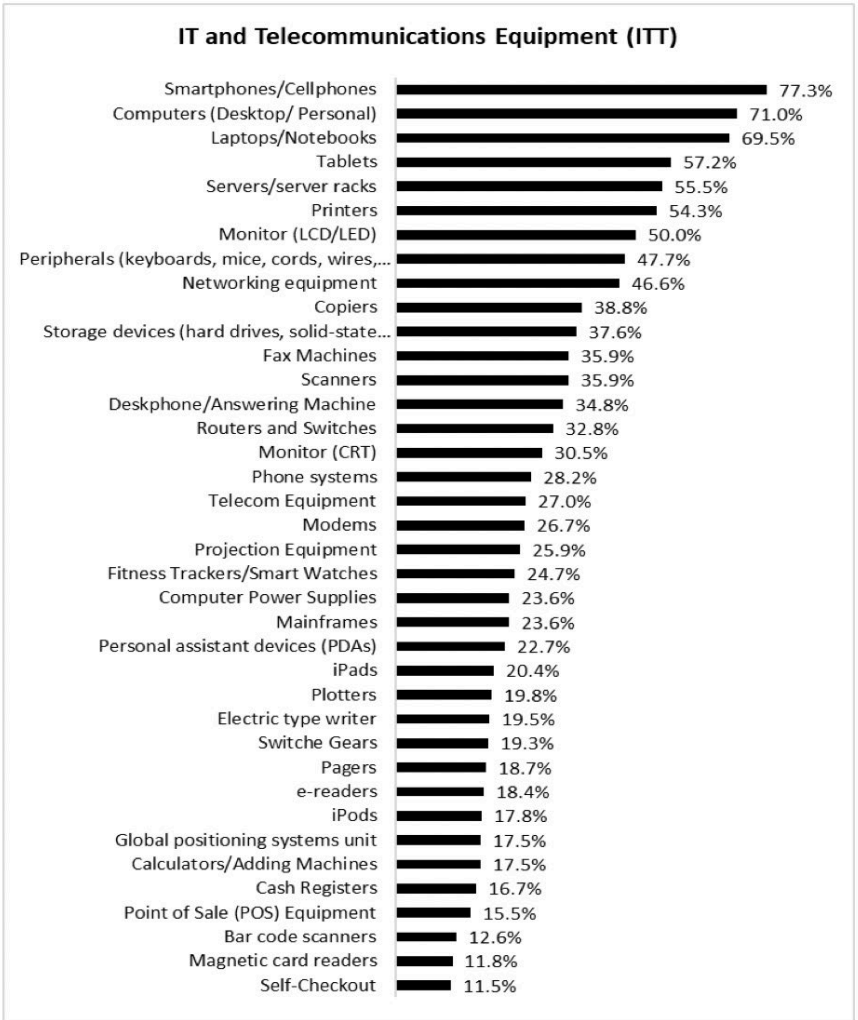

Figure 6: IT and Telecommunication Equipment Processed by Young Companies Operating in WEEE

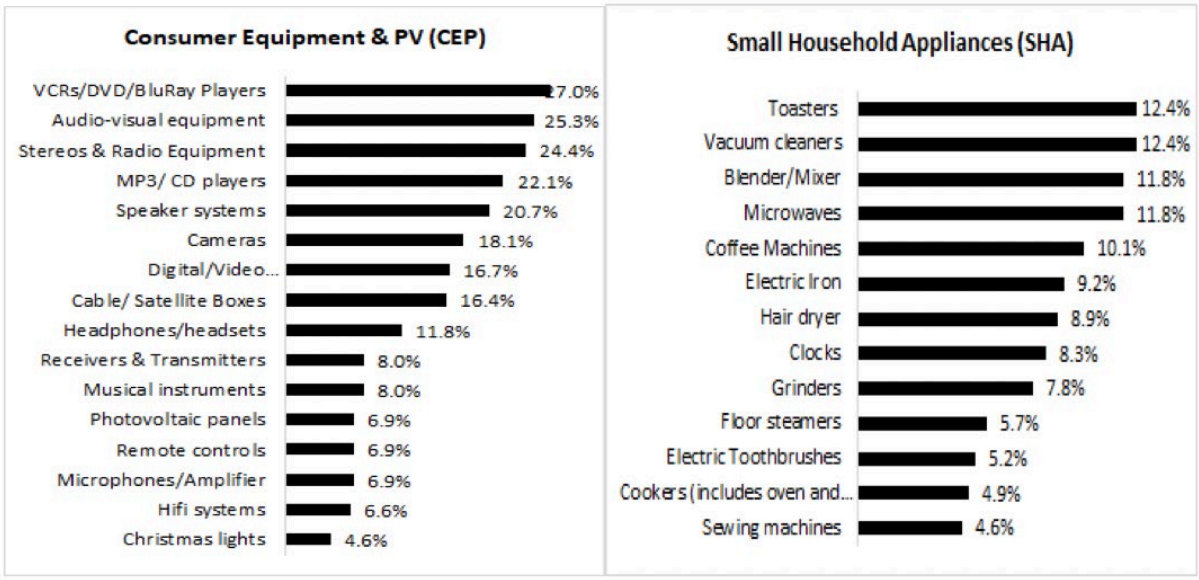

Figure 7: Electrical Devices Processed by Young Companies in the WEEE (a) Consumer Equipment and (b) Small Household Appliances

4.3 Services Offered

In our analysis of the 412 companies' websites, we found six primary service categories offered by the BMs of young companies in the WEEE sector. These service categories include asset management and e-waste Recycling service (38.3%), followed by ITAD Services (25.2%), trade-in/buyback and reselling of preowned and refurbished electrical devices service (18.9%), e-waste collection, recycling, and disposal service (15.8%), platform service for buying and selling of used electrical devices (1%), and IT support services (0.7%). Data destruction services are found common for all the BMs focusing on removing information from IT and telecommunication devices, using a variety of methods such as data destruction software tools, degaussing, and physical destruction. Data wiping is a process used to securely erase data from a storage device, making the original data unreadable. This method involves overwriting the existing data on the device with random or meaningless data, which destroys the original data and makes it impossible to recover using data recovery tools. Specialized software tools are used for data wiping. Another method of secure data destruction is degaussing, which uses electromagnetic fields to disrupt the surface area of the storage device where data is stored. Physical destruction of electronic devices involves shredding or crushing the storage device into small pieces or particles to ensure that data stored on the device is irretrievable and secure. The data destruction services can be delivered on-site or at a specialized facility and typically come with a certificate of data destruction, verifying that the storage device has been securely erased or physically destroyed in compliance with specific data destruction standards. In the following section, we will discuss the identified services offered by these businesses and their related unique offerings in more detail.

Asset management and e-waste Recycling service: Most of the young companies in the WEEE sector provide comprehensive services, from collecting old devices, and preparing for reuse to recovering valuable materials. These companies collect e-waste and repair/remanufacture for reuse or manage it responsibly by dismantling and sorting it. They employ specialized techniques to extract valuable materials from e-waste, contributing to resource conservation. Furthermore, they ensure that the recovered materials are treated and processed for reuse or recycling, promoting sustainability and circular economy principles while minimizing the environmental impact associated with electronic waste disposal.

IT Asset Disposition (ITAD): ITAD companies offer a set of services that involves the secure, compliant, and environmentally responsible disposal of electronic equipment and data. ITAD companies work with businesses and organizations to manage the disposal of assets, which are near or at the end of their lifecycles. These services typically include asset tracking and reporting, secure data destruction, secure transportation, redeployment, refurbishment and resale, environmentally responsible disposal, and recycling to maximize the IT asset value recovered while minimizing the risks associated with retiring active data-bearing equipment and following environmental protocols. ITAD services help businesses and organizations manage the lifecycle of their

electronic equipment and data, from acquisition to disposal, while protecting sensitive data and meeting regulatory requirements.

Trade-in or buyback and re-commerce services: businesses that offer trade-in or buyback and re-commerce services allow their customers (individuals or businesses) to sell their used electronic devices, such as smartphones, tablets, and laptops, in exchange for cash or credit toward a new one. The companies first assess the value of the device based on its condition, age, and other factors. Then provide an offer for the customer, and if customers agree, they can send the device to the company or bring it to a designated location for verification and processing. Finally, the company performs cleaning and data sanitation before reselling the devices online or in retail stores with a high-quality certified product at a lower price than new devices. Other companies even perform refurbishing or upgrade used equipment before reselling it. Furthermore, certain companies may offer warranties or return policies on their used mobile devices to offer customers an extra sense of security.

E-waste collection, recycling, and disposal service: in this business, offer the responsible and environmentally friendly disposal of electronic devices such as computers, laptops, and mobile phones. Recycling companies accept these devices through door-to-door pickup or drop-off points, dismantling, part harvesting shredding/crushing, and finally and extracting valuable materials and components while ensuring that hazardous materials are disposed of properly. These materials can be recycled and repurposed for new electronic devices, which helps to reduce the environmental impact of electronic waste. Many of these companies are certified by environmental organizations and adhere to strict standards such as R2, e-Stewards, and ISO 14001 to ensure environmentally responsible recycling. These companies also provide certificates of destruction and recycling that verify that the devices have been securely erased, physically destroyed, or recycled in compliance with specific standards.

Platform service for buying and selling used electrical devices: Based on the analysis of young WEEE companies, it appears that only a few businesses have been identified as offering an online marketplace for buying and selling used electrical devices. Platform service helps reduce electronic waste by allowing customers to trade in their used electronic devices. However, this segment of the market is relatively underrepresented compared to other areas of WEEE management.

IT support services: a business that specializes in electronic repair and replacement and offers various services to fix electronic devices such as smartphones, tablets, and laptops. They usually employ trained technicians who can diagnose and repair common hardware or software issues, including cracked screens, broken buttons, malfunctioning charging ports, and battery replacements. In addition, they may also provide software-related services such as virus removal, data backup, and software updates. Some repair businesses offer on-site repair services, while others only operate in-store. The main objective of an electronic repair business is to provide quick, easy, and cost-effective solutions to individuals and businesses in need of repair services for their electronic devices.

5. Conclusion

We conducted a literature review on CE-based BMs and analyzed 412 emerging circular companies in the WEEE industry selected from the Crunchbase database to understand their BMs. Based on the analysis of young companies in the WEEE sector, the research concludes that companies predominantly prioritize information security, compliance with legal and environmental standards, and trustworthiness in their BMs. key offerings of these companies primarily revolve around secure data wiping and physical data destruction, along with legal compliance related to data security. The most prominent product categories in the WEEE sector are IT and telecommunications equipment, including smartphones, computers, laptops, and tablets. Consumer equipment, as well as small household appliances, are also notable in their business models. In terms of service categories, asset management & e-waste recycling hold the highest focus, followed by ITAD services, trade-in/buyback & reselling of used and refurbished electrical devices, and e-waste collection, recycling, and disposal services are key findings. However, platform services for buying and selling used electrical devices and IT support services are less prominent but still present in a few companies business models. Based on these results, recommendations and suggestions are presented as follows.

- Since information security is a top priority for companies in the WEEE sector, strengthening information security measures is essential for businesses to continuously improve and enhance their security practices. This may include investing in secure data erasure technologies, and regular security audits to ensure the protection of sensitive customer data.

- As compliance with legal regulations and environmental standards is a significant focus for these companies, enhancing environmental compliance is crucial to stay up to date with changing regulations and adopting environmentally friendly practices in their operations. Companies can consider obtaining relevant certifications to show their commitment to sustainability and responsible waste management.
- While secure data wiping and data destruction are key offerings, companies can consider diversifying their services to supply a more comprehensive and integrated approach to e-waste management. This could include offering repair and refurbishment services to extend the lifespan of electronic devices, thereby promoting the circular economy principles.
- While IT and telecommunications equipment are prominent, there is potential for young companies to explore opportunities in other product categories such as consumer equipment and PV, and small household appliances. By addressing these fewer dominant categories, companies can tap into new markets and widen their customer base. Targeting Less Dominant Product Categories:
- The low representation of platform services for buying and selling used electrical devices suggests an untapped opportunity in this area. Companies can consider developing user-friendly online platforms that help the trade of used electronics, encouraging customers to participate in the circular economy by giving their used devices a second life.
- As young companies in the WEEE sector, raising awareness among customers about the importance of responsible e-waste management is crucial. Companies can engage in educational initiatives to inform customers about the benefits of recycling, the potential environmental impacts of improper disposal, and the advantages of supporting circular economy practices.

Overall, the research shows valuable insights into the strategies and priorities of young companies in the circular economy business model within the WEEE sector. In general, this study finds that emerging companies in this sector are focused on extending product lifecycles through repairing, remanufacturing, reusing, and remarketing, and have the potential to work towards a CE if an adequate amount of used electronic devices are supplied by users. Therefore, as this sector is highly suitable for implementing CE principles, and young companies are more suitable for BM innovation, future studies should focus on studying the BMs of these companies beyond the value proposition dimension.

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Understanding Social Responsibility in Portuguese Companies: Characteristics, Innovations, and Stakeholder Perspectives

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Abstract: Social responsibility has emerged as a crucial topic in the corporate landscape, recognised by market perception as a valuable asset for gaining a competitive advantage. This voluntary initiative by companies is driven by social and ethical engagement, leading management to seek shared values and positive interactions with stakeholders. This study aims to identify the characteristics of companies adopting social practices and evaluate innovative social responsibility practices in Portuguese companies. Furthermore, it explores the understanding of social responsibility among companies and stakeholders, examines motivations behind employing these practices, analyses the benefits of their inclusion, and identifies the main challenges hindering their implementation. Data were collected through questionnaires administered via the Google Forms platform. The findings reveal that most respondents consider social responsibility relevant to the company's growth and development, placing emphasis on human capital as a vital organizational asset. Motivations primarily revolve around worker welfare and satisfaction. Key benefits include proactive positioning, strategic integration, and decision-making incorporating social concerns. Major obstacles include the absence of direct profitability, resistance from older employees, limited resources and time for action and innovation, lack of participation, employee mistrust, and inert mindsets. The article concludes by discussing limitations and suggesting avenues for future research.

Keywords: Social Responsibility, Corporative Social Responsibility, Corporate Social Innovation, Stakeholders, Innovation, Leadership.

1. Introduction

Social responsibility is assuming an increasingly significant role in both public and private contexts (Wenqi et al., 2022). Its growing prominence can be attributed to its presence as a cultural phenomenon (Marchi, 2022) and within the business domain (Chandler, 2022), as socially responsible practices become more prevalent (Liang & Renneboog, 2017; Yan et al., 2019). Companies are voluntarily adhering to legislation aimed at training and qualifying individuals, promoting gender equality, enhancing workplace quality of life and mental health (Singh & Misra, 2022), and addressing issues related to social inclusion, health and safety, volunteering, and various psychosocial matters within organisations (Gangadharan, 2006; Osieranski et al., 2023).

Evaluating the social dimension involves examining the global impact, such as dignified and participatory work relationships, elimination of child labour, employability, human rights, gender equality, and combating discriminatory practices (Rixom et al., 2023; Tejedo-Romero & Araujo, 2022). Similar expectations extend to partners, including suppliers (Księżak, 2016; Shang et al., 2014).

Envisioning a socially responsible organisation entails viewing the company as a dynamic organism, constantly evolving in relation to people, the environment, and stakeholders, and offering innovative solutions that positively impact its reputation in the marketplace (Banerjee, 2008; Kotler & Maon, 2016; McWilliams et al., 2006).

Europe, particularly the United Kingdom, stands out as a leader in social responsibility, contributing to the development of values, norms, and perceptions that align more closely with the theme (Carroll & Shabana, 2010; Matten et al., 2005; Voltan, 2017). In the past two decades, the concept of corporate social responsibility (CSR) has become increasingly linked to the creation of shared value (CSV) and the emergence of hybrid organisations.

This paper aims to investigate the characteristics of companies that adopt social practices and evaluate the innovative social responsibility practices implemented by Portuguese companies. Additionally, it explores the perceptions of social responsibility among both companies and stakeholders, examines the motivations behind implementing these practices, analyses the benefits derived from their inclusion, and identifies the primary challenges faced in their implementation. Quantitative research of descriptive nature was used, and a questionnaire was conducted at the Polytechnic Institute of Cávado and Ave (IPCA), in Portugal. After the introduction, Section 2 deals with the concepts of Corporate Social Responsibility and Corporate Social Innovation. Section 3 presents the Methodology, and Section 4, the results, and conclusions, as well as directions for future research.

2. Literature Review

Corporate Social Responsibility (CSR) is a well-established and integral concept in contemporary research within the field of Business and Society, closely tied to business ethics (De Bakker et al., 2005; Singh & Misra, 2022). The academic roots of CSR can be traced back to the 1950s, particularly with the influential work of Bowen (1953), which introduced the notion of social responsibilities that extend beyond market boundaries and emphasise values beyond mere profit. Subsequent publications, including those by Carrol (1999), Swanson (1999), Windsor (2006), and the theoretical framework developed by Garriga and Melé (2004), have provided comprehensive and supported reviews of CSR. Furthermore, works by Maignan and Ralston (2002) and Matten and Moon (2004) have explored cultural perceptions and the significance of CSR. The concept of Organisational Social Performance (DSO) has also been expanded upon (Swanson, 1999; Wood, 1991), while Corporate Citizenship has been included (Matten & Crane, 2005).

Corporate social responsibility entails a company's dedication to sustainable economic development by enhancing the quality of life for employees, their families, the local community, and society as a whole (Watts, 2000). This concept has evolved as individuals have become more aware of their social rights and responsibilities and have grown less tolerant of unethical practices (Latapí Agudelo et al., 2019). Consequently, companies are increasingly embracing socially responsible practices, not solely as a pragmatic response to the environment, but also as a reflection of shifting societal values (Matten & Moon, 2020; Wang, 2016).

The European Commission has played a prominent role in advocating for social responsibility, urging Member States and other countries to engage in discussions and initiatives related to this theme. Examples of these efforts include the publication of the Green Paper "Promoting a European Framework for Corporate Social Responsibility" in 2001, the establishment of the High-Level Group on Social Responsibility in 2002, the formation of the European Alliance on CSR in 2006, and the presentation of a Compendium on National Public Policies in 2004 and 2007, among other initiatives. Additionally, international organisations such as the United Nations (UN), Organisation for Economic Co-operation and Development (OECD), International Labour Organisation (IOL), and European Union (EU) have also been actively promoting corporate social responsibility.

In Portugal, there is a growing inclination among companies to embrace social responsibility as a core component of their corporate identities. This trend is evident in the increasing number of awards that acknowledge exemplary internal social responsibility practices. Such progress is encouraging, and merits enhanced visibility and recognition (Gonçalves et al., 2020). While the adoption of Portuguese and international standards for corporate social responsibility is not mandatory, their implementation can bring added value to organisations. Certification in these standards can lead to increased recognition and competitive advantage, particularly when dealing with multinational clients. Notable international standards in this realm include ISO 26000:2011, which provides guidelines for social responsibility, the SA 8000:2008 standard which mandates certification, and the AA 1000:2008 standard, which offers advisory and consultative guidelines for corporate responsibility (as outlined in Table 1).

Table 1: International and Portuguese Standards for Corporate Social Responsibility (own elaboration)

Standard	Type	Subject
IS0 26000:2011	Certifiable International Standard	Social Responsibility Guideline
SA 8000:2008	Consultative International Standard	Standard on Social Responsibility
AA 1000:2008	National Consultative Standard	Corporate Responsibility (accounting, auditing, social and ethical reporting)
NP 4460 –1:2007	National Consultative Standard	Ethics in Organisations
NP 4460 –2:2010	National Consultative Standard	Ethics in Organisations
NP 4469 –2:2008	National Consultative Standard	Social Responsibility Management System

Standard	Type	Subject
NP 4469 –2:2010	National Consultative Standard	Social Responsibility Management System
NP 4522:2013	National Consultative Standard	Family Responsible Organisations
AGENDA 2030	Action Plan - Voluntary Membership	Sustainable Development

The progression of organisational innovation gives rise to a dedicated unit or department focused on novel practices and ideas, which contributes to the emergence of a sustainable strategy field. Within the corporate context, this innovative system is referred to as Corporate Social Innovation (CSI). CSI goes beyond solely pursuing outcomes for shareholders, as it also generates social advancements, including enhanced employee motivation and improved organisational adaptation and interaction (Dionisio & de Vargas, 2020). These transformations extend beyond corporate identity and strategies aimed at gaining a competitive advantage (Du et al., 2011; Herrera, 2015).

When companies embrace both Corporate Social Responsibility (CSR) and Corporate Social Innovation (CSI), they achieve improved market performance and enhance their corporate reputation, which is a highly discussed and sought-after objective in today's business landscape. Corporate reputation encompasses a set of principles ascribed to an organisation, reflecting its past actions and its potential for future endeavors. These principles encompass financial stability, product and service quality, commitment and performance of top management, transparency, ethics, and market competitiveness (Maaloul et al., 2023).

To foster innovative organisations, it is essential to undertake actions that can generate greater benefits for the innovation process. These actions include fostering a shared vision, having leadership that possesses a strong inclination towards innovation, establishing an appropriate organisational structure, identifying key individuals who can support training and development efforts, and cultivating a workforce that is dedicated to embracing new approaches. Additionally, effective teamwork plays a crucial role in facilitating the innovation process (Allal-Chérif et al., 2023).

Socially responsible companies adopt good practices to generate greater competitive strength in problem-solving, optimising results, and having a clear perception of the constant changes and innovations within their organisation. They recognise that learning and fostering good relationships contribute to the results and strategies of the organisation, creating space for policies that promote quality of life at work, beyond allowing workers to perform their jobs but also generating positive results in their lives (Carayannis et al., 2015).

However, CSR consciousness involves raising the mindset of an organisation and its members concerning these concerns. The approach may be top-down or bottom-up for strategic or altruistic reasons (Fatima & Elbanna, 2023), including a commitment to CSR by adding it to statement documents (Drempetic et al., 2020) and communicating goals to both internal and external stakeholders while accounting them for their actions (Marques-Mendes & Santos, 2016),

3. Methodology

This study aims to identify the key characteristics of companies that have already adopted social practices and evaluate the main innovative practices of Social Responsibility (SR) in Portuguese companies. Additionally, the specific objectives of this study are to: i) analyse the understanding of these companies and their stakeholders regarding SR, ii) identify the main motivations for companies to engage in socially oriented practices, iii) analyse the primary benefits associated with the inclusion of these practices, and iv) identify the main challenges in implementing these practices.

To achieve these objectives, a questionnaire-based approach was employed. The questionnaires were distributed using the Google Forms platform and collected data from both companies and stakeholders. The questionnaire was developed based on a review of the existing literature and consisted of items designed to explore the understanding of social responsibility, motivations for adoption, and perceived benefits and challenges associated with implementing social responsibility practices. The questionnaire was divided into three main sections: sociodemographic data, company profile, and social responsibility. The socio-demographic data section included questions about the age, gender, and position of the respondents within their respective

companies. The company profile section collected information on the number of employees, the source of social capital, the sector of activity, and any certifications already obtained. The main focus of the study, social responsibility, was assessed using a combination of open-ended and closed-ended questions. The closed-ended questions utilised a 5-point Likert-type scale ranging from 1 - "Strongly disagree" to 5 - "Strongly agree". These questions aimed to understand how companies perceive the concept of social responsibility and their positioning in relation to it and society.

Data were collected by administering the questionnaires to students enrolled in the first and second years of the master's degree program in Integrated Quality, Environment, and Safety Management Systems (SIGQAS) at the Polytechnic Institute of Cávado and Ave (IPCA). All 47 students included in the study were already employed by companies actively engaged in socially responsible activities, as evidenced by their sustainability reports and CSR disclosures. The data collection period took place in May and June 2021, during the Covid-19 pandemic.

4. Results and Discussion

4.1 Socio demographic

Considering gender, respondents were mainly female (76.8%), as can be seen in Figure 1.

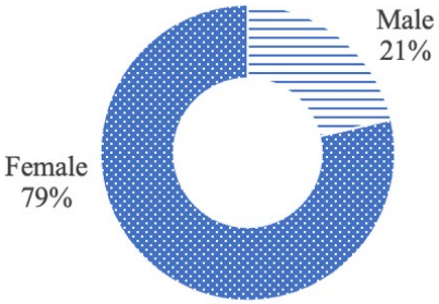

Figure 1: Gender of the respondents

In what concerns age, the range belonging to 28 - 37 years old represents 28.6%, followed by 23 - 27 years range, with 14.7%. The respondents are engineers and directors of the Department of Quality and Safety in the companies they are working on. They all are qualified and are taking a master's degree in areas where these thematic are studied and emphasized.

4.2 Company profile

The companies are all from the North of Portugal. They are the majority of Small and Medium Enterprises (SME), representing 83% of the sample. 50% of the companies belong to the manufacturing industry, 43% to extractive industries, and the other respondents are from agriculture, hunting, and fishing, representing 7%.

Most of the companies have no certification in Social Responsibility (64%), 28% have the SA 8000 international certification and 7% have the ISO 26000 certification (figure 2).



Figure 2: Certifications obtained in Social Responsibility

In what concerns the origin of the Capital, 50 % of the companies are Portuguese, 7% are foreign and 43% are mostly Portuguese, as can be seen in figure 3.

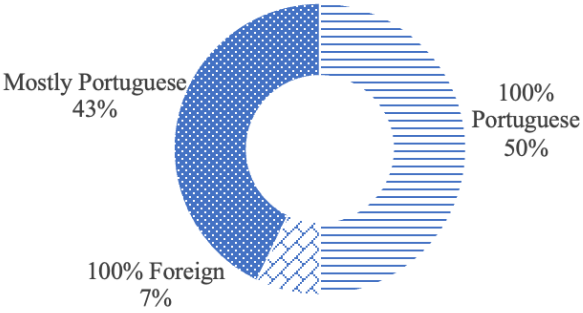

Figure 3: Origin of Capital

4.3 Social Responsibility

The study aimed to gain insights into the perspectives of the respondents (master's students) regarding the topic of Social Responsibility (SR). Most participants viewed SR as significant and vital for the growth and development of companies. However, one participant expressed the opinion that although the theme is increasingly important, companies are not adequately prepared for it.

To explore the understanding of SR among companies, a series of predetermined questions aligned with the literature review was administered. The summarised responses are presented in Table 2 below.

Table 2: How Social Responsibility is applied/understood

35.7%	Respect for human, environmental and ethical rights
21.4%	Strategy leading to profit and shareholder satisfaction
21.4%	Strategy whose objective is to give greater social emphasis to the company
14.3%	Business practice that contemplates respect for society and the community in which it is inserted
7.1%	Commitment tending to develop the quality of life and the environment

Furthermore, an effort was made to determine the extent to which respondents identified with specific questions that had been formulated. The summarised results are presented in Table 3.

Table 3: How the company positions itself in relation to Social Responsibility

42.9%	Through Social, Corporate and Environmental Responsibility, company positions itself as a proactive actor, integrating these concerns into the strategy and decision-making process
28.6%	Through Social Responsibility, company communicates its standards of behaviour to stakeholders who in turn influence its values, culture, integrity, strategy and operation
21.4%	Through Social Responsibility, company engages in public policies that are conducive to promoting an inclusive and responsible green economy in its sector of activity
7.1%	Through Social Responsibility, the company generates a new business model that aims to reconcile profit with social inclusion and impacts

In terms of the presence of a Code of Conduct within the companies, most respondents (78.6%) indicated that their respective companies have such a code. However, only 35.7% of the companies prepare a Social Responsibility Report.

Table 4 provides a summary of the main motivations expressed by the respondents for implementing Social Responsibility actions, with the well-being and satisfaction of employees emerging as one of the primary drivers.

Table 4: Motivations for actions of Social Responsibility

28.6%	The welfare and satisfaction of workers, as they are the company's greatest asset
21.4%	The challenges of globalisation
14.3%	The positive market image

14.3%%	Increased competitiveness
7.1%	Transparency in social activities
7.1%	Defence of the environment and human rights of the business quality benchmark
7.1%	Access to financial support

When respondents were asked about the prioritisation of specific issues in their company's Social Responsibility practices, such as older workers, individuals with disabilities or disadvantages in the job market, women, and the inclusion of ethnic minorities, their summarised responses are presented in Table 5.

Table 5: Privileged practice in the company

14.3%	Women
7.1%	People with limitations and disadvantages in the market
7.1%	Inclusion of people from ethnic minorities
71.4%	None of the previous situations

Regarding the inquiry about the primary challenges associated with implementing Social Responsibility practices, the responses varied. Except for two respondents who did not provide an opinion, all others expressed their views. The collected answers have been categorised and are presented in Table 5.

Table 6: Collected answers in what concerns main entropies

Does not generate direct profit
Decrease in the number of wastes
Awareness of the importance by top management
Pleasing everyone
Lack of sensitivity on the part of the company's older employees
Organizational culture that devalues the implementation of sr actions
Time
Lack of participation
Distrust on the part of employees
Resources
Inactive mentality

Regarding the inquiry about how respondents perceive the relationship between the long-term success of the company and the practice of Social Responsibility, 42.9% of the participants stated that it is fundamental. This was followed by 28.6% who considered it important, while 14.3% regarded it as weak, 7.1% believed it to be non-existent, and another 7.1% viewed it as neutral.

5. Conclusion

This study aims to identify the main characteristics of companies adopting social practices as well as to evaluate the main innovative Social Responsibilities (SR) practices in Portuguese companies. It also intends to analyse the understanding that these companies and stakeholders have of Social Responsibility, to identify the main motivations of these companies to employ these practices aimed at society, to analyse the main benefits with the inclusion of these practices and to identify the main entropies for the application of these practices.

The companies questioned are all from the North region, are all small and medium sises (SME), with national capital or majority national capital, and most of them are not certified in SR, and when they do, the certification chosen is the SA 8000. The main innovative SR practices in Portuguese companies are related to the Code of Conduct, women, people with limitations and disadvantages in the market, as well as the inclusion of people from ethnic minorities. However, the low percentage of companies preparing SR reports suggests a potential gap in transparent reporting. When analysing the understanding that these companies and stakeholders have

of Social Responsibility, most of them understand it as relevant, essential for the growth and development of the company, and sustained in human capital as one of the most important assets of the organisation. When identifying the main motivations of these companies to employ these practices aimed at society, the welfare and satisfaction of its workers, since they are the company's greatest differential, seems to be the principal factor. Analysing the main benefits of the inclusion of these practices, companies position themselves as proactive actors, integrating these concerns into the strategy and decision-making process. Finally, the main obstacles to the application of these practices are the indirect profit, lack of sensitivity on the part of the company's older employees who are not always collaborative, time for actions and innovations, lack of participation, mistrust on the part of employees, resources, and inactive mentality/mindset. Overall, the findings emphasize the importance of SR in organizational strategies and decision-making. They provide valuable insights for companies seeking to enhance their SR practices, address challenges, and align their actions with societal expectations.

The main limitations of this study are related to the fact that it is a convenience sample, of small size, associated with a specific geographical area. For future studies, it would be interesting to replicate it in a larger number of companies, possibly in different countries and with different sizes. A complementary qualitative approach would certainly bring a greater richness to the results found. Another suggestion is more linked to the relationship between leadership and Corporate Social Responsibility, as the inclusion of all stakeholders (internal and external) should be a priority to promote some social good. In this sense, leadership seems to be mandatory not only to gather the demands of shareholders but also to consider and balance the expectations of all stakeholders to accomplish the best interests in the long term.

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EPI²C Entrepreneurship & Design Thinking

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Abstract: Entrepreneurship is a high-stakes, action-oriented game played on a field defined by competition and collaboration. However, across academic entrepreneurship programs, education formats range from almost exclusively classroom-based to highly experiential to hybrid. The entrepreneurship program at the authors' institution has generally favored traditional classroom boundaries, augmented by non-mandatory experiential opportunities. Realizations derived from the covid-19 pandemic and ensuing movement to virtual instruction are driving rapid, ongoing change in the institution's entrepreneurship program. Pandemic-driven isolation and additional isolation resulting from largely asynchronous virtual delivery of education have had negative impacts. Changes have been enacted to combat these factors that are generally antithetical to the hands-on nature of entrepreneurship, while contributing to decline in entrepreneurial performance across an array of measures. Seen in the face of the same factors, was a marked increase in business plan proposals featuring apps, creations, or other solutions emphasizing human-interaction. Relative to entrepreneurship education, these increases are taken to indicate hunger for (predominantly) face-to-face competition and collaboration. When linked with broad trends toward social and environmental responsibility, clarity emerged as to the sort of pivot needed in the trajectory of entrepreneurial and other education at the institution. The transformation in trajectory is captured by the motto "*do good, make a difference, change the world*", symbolizing determination to focus on things that matter. Similarly, the pivot is captured by the acronym EPI²C, representing five targeted program aspects: "*Experiential, Purposeful, Imaginative, Innovative & Creative*". Together, these drove rebranding of the program as "*EPI²C Entrepreneurship & Design Thinking*", thus highlighting the enabling role of design thinking in many entrepreneurial endeavors. Delineated herein is program reinvention driven by the preceding motto; use of United Nations Sustainable Development Goals (UN SDGs) to support the motto; the role of design thinking; the relationship specific meanings and distinctions among the EPI²C descriptors; and specific program innovations. Also discussed is improved student performance associated with program reinvention.

Keywords: Experiential Learning, Innovation, Purpose-Driven Change, Social & Ecological Impact, Sustainability, UN Sdgs.

Advantage: Program reinvention deeply embeds social & environmental responsibility in assessment criteria for competitive events such as business plan competitions and even ordinary course content. This is done via, e.g., formal consideration of the United Nations Sustainable Development Goals and the 10 Principles of the United Nations Global Compact.

1. EPI²C Pillars

EPI²C is an acronym created with the dual intentions of capturing the program pillars in a meaningful and easily recalled way, while also intending to communicate the idea of embracing grand or wicked challenges, solutions to which convey broad benefits, including social or environmental benefits.

As an acronym, EPI²C represents five pillars: *Experiential*, *Purposeful*, *Imaginative*, *Inventive* and *Creative* (or "creation"). It is not these words used independently that are to be emphasized, but rather the collective power captured by their integration and synergy.

EPI²C context-driven definitions of its pillars are provided in Table 1. The execution context for *EPI²C* is found in its core values, perspectives, and strategies and is described in Table 2.

Table 1: Context-Driven Definitions of the EPI²C Pillars

EPI²C Pillar (core value)	Contextual Definition
Experiential	People learn in many ways: experiential learning is learning by doing. It requires interacting with people, the world, and its elements.,
Purposeful	Purposefulness intentionally drives one's actions toward specific objectives or outcomes. EPI²C believes in confronting meaningful challenges.
Imaginative	Being imaginative is here regarded as the ability to generate new ideas, images or concepts in the mind, of things not fully perceived by one's senses.
Innovative	Being innovative is realizing new ideas, advanced capabilities, features, or original designs in policies, products, processes, systems or services.
Creation	Creativity is intelligence having fun (Albert Einstein). It is purposeful integration and transformation of what has been imagined, senses, experienced, or otherwise discovered into a mental or tangible or other model or

EPI²C Pillar (core value)	Contextual Definition
	rendering. Creation is regarded as subsequent action required to move from model to market and is commonly composed of a collection or series of acts that are performed iteratively.

Table 2: EPI2C Core Values, Perspectives and Strategies.

EPI²C Core Value	EPI²C Perspective	EPI²C Strategy
Experiential	*Entrepreneurship* is action oriented. *EPI²C* is its sandbox.	*EPI²C* supplies relevant events in which individual and collaborative engagement is encouraged as a means of generating increased entrepreneurial acumen & activity.
Purposeful	*EPI²C* is highly intentional, tenacious, and well-reasoned in its objectives, strategies, stakeholder-centrism, and impacts, including environmental and social impacts.	*Design Thinking* is used to better understand and systematize relationships among ideas and entities to forcefully confront challenges that matter and to form full or partial difference-making solutions.
Imaginative	The mind is an *EPI²C* canvas used to paint and generate mental imagery or conceptual models that are initially unshackled from the bonds of reality. Later, these are tangibly anchored through iteration, innovation, and creation.	*EPI²C* routinely provides ideation venues, with participants expected to actively ideate at both individual and collaborative levels, and to create crude prototypes using supplies from a rudimentary *designer's toybox* and/or in a *makerspace* environment.
Innovative	*EPI²C* transforms and upcycles *existing* entities, ideas, or experiences in ways that create or redistribute value. Innovation is an (often) iterative process that unleashes the potency of people and ideas.	*EPI²C* focuses on challenges that matter by iteratively developing fresh and valuable ideas, ways of doing things, products, services, institutions and relationships. These are forged in the crucibles of courses, competitions, and via projects.
Creation	*Design Thinking* is used to translate mental imagery or models, and crude prototypes into more refined concepts or concrete realizations of services, systems, products, processes, or enterprises previously known or fully experienced by their creator(s).	Workshops, challenges, and projects provide ample opportunities to advance ideas from concept to creation. Examples include the *Human-Centered Innovation & Design Workshop; EPI²C Entrepreneurship & Design Challenge, Faulkner Entrepreneurship & Design Challenge, and Werth Technology Challenge.*
Enabling Resources	Available resources include the *EPI²C Entrepreneurship & Design Thinking* curriculum, *Management & Entrepreneurship Department*, *Center for Entrepreneurship & Design Thinking*, *EPI²C* faculty and mentors from the professional community, and various workshops, competitions and other events.	

Within the *EPI²C Entrepreneurship & Design Thinking* program, the position held is that an entrepreneurial mindset is essential, and that application of both systems thinking and design thinking is critical to success. Mindset is regarded as the set of beliefs shaping how one makes sense of themselves in relation to the world around oneself and it influences how one thinks, feels, and acts in any given situation. It is one's sense of self.

Today's entrepreneurs and explorers and discoverers of old are similar in their strong senses of purpose, firmly held beliefs, willingness to sacrifice, and efforts to generate necessary resources. Entrepreneurs navigate uncertainty leading to risk and high failure rates.

Action-based resiliency in the face of failure is a hallmark of those with entrepreneurial mindsets. They generally perceive and thrive on opportunities with embedded risks, and as such, entrepreneurial ideas often arise from discontent or in conflict with authority, tradition, or the *status quo*. Though not universally so, such discontent is often driven by social, environmental, economic, or intellectual challenges. Discontent creates a matrix of internal opportunities and threats that helps entrepreneurs formulate strategies and new ways of doing things.

2. Systems & Design Thinking

From concept to creation, *EPI²C* applies *Design Thinking* and to *Systems* Thinking to craft and deploy creative, imaginative, purposeful, and difference-making solutions to confront challenges that matter. *EPI²C* is highly experiential, and its solutions are born of innovations and designs arising from projects, workshops and competitive or noncompetitive events.

Systems thinking uses holistic or integrative analytical methods and strategies, focusing on whole systems, more so than on constituent parts. *Systems thinking* attends to how systems parts – that is, elements or processes – relate to, compete with, collaborate with, or are in conflict with one another, especially as related to overall system performance.

Strategic objectives of systems thinking may include system improvement, optimization, maintenance of status quo level performance, disruption or destruction of the system, identification, or gradual system decay. In other

words, while we intend systems thinking as a constructive practice in which to engage, it can also be weaponized, if so desired.

Though the tools and methods of *design thinking* may and are used in many non-design thinking settings, they are commonly used when a *design problem* is identified. A *design problem* arises when there is an unsolved issue or collection of issues to be considered while designing a product, product, system, service, or organization.

Design thinking is an iterative process that seeks to understand users, challenges assumptions, redefines problems, and creates innovative solutions that can be prototyped and tested. It employs a set of cognitive, strategic, and practical procedures used by designers, along with the body of knowledge surrounding how people reason when facing design problems.

Many entrepreneurial challenges and opportunities have embedded design problems, hence design thinking is relevant to leveraging such opportunities or challenges. Design thinking tools and methods are wholly consistent with EPI^{2}C and are often deployed using an algorithmic approach similar to the one provided in Figure 1.

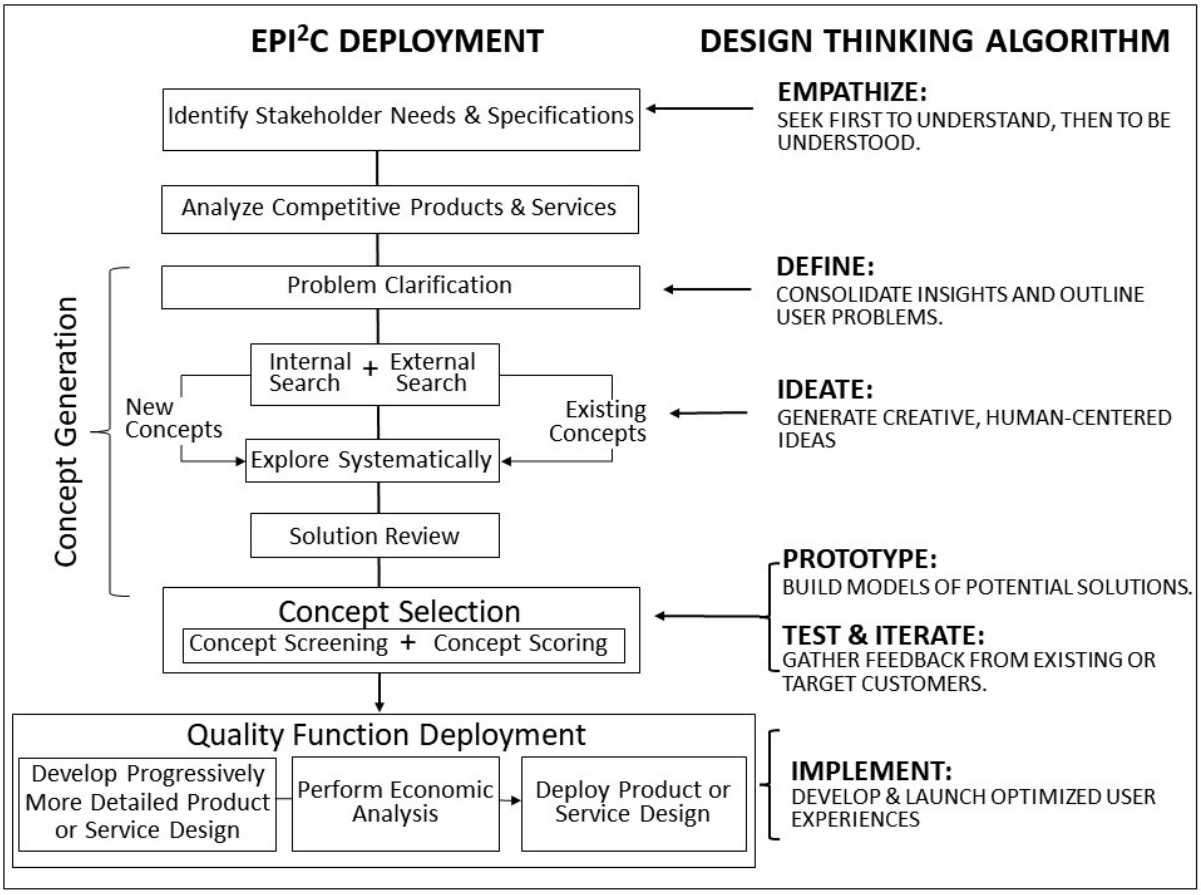

Figure 1: Design Thinking and Deployment of EPI^{2}C Principles

3. Do Good, Make a Difference, Change the World

To be clear, the EPI^{2}C Entrepreneurship & Design Thinking program delivers content broadly applicable to entrepreneurship. That having been said, a hallmark of the program is its focus on things that matter, as captured in its motto "*do good, make a difference, change the world*". Things that matter span and transcend economic, societal, and environment boundaries, with various examples represented by the *United Nations Sustainable Development Goals* (UNSDGs), the *United Nations Global Compact (UNGC) 10 Principles*, and the *United Nations CEOs Water Mandate* (UN CEO).

This is driven by the belief that currencies of the future (Edgeman 2020) are not just dollars, yen, euros, or pounds, but such things as water, warmth, food, safety and security. As such, innovation in or design of products, processes, systems, services, or businesses that are economically sustainable, with promise for social and or environmental benefit, are of special interest to EPI^{2}C. Figure 2 portrays the 17 goals of the UNSDGs, whereas Table 3 provides the UNGC 10 Principles.

The United Nations Global Compact (UNGC) is the world's largest corporate sustainability initiative (https://unglobalcompact.org/), with 22,000 corporate members, each providing an annual communication on progress (COP) detailing the progress made toward the 10 principles cited in Table 3. While the principles are primarily intended to motivate organizations to made steadfast progress toward broad targets, these principles can be pursued in large and small companies alike and that they can be used from the outset in the design of how a company chooses to operate. Beyond that, selected principles such as principle nine – development and diffusion of environmentally friendly technologies – most certainly can be incorporated into the design and development of a large number of technology-based products, whereas principles seven and eight can clearly motivate the way in which almost any service is provided and the environment in which it is offered.



Figure 2: The 17 United Nations Sustainable Development Goals.

Table 3: United Nations Global Compact 10 Principles for Business Conduct

	Human Rights	Principle
1	Businesses should support and respect the protection of internationally proclaimed human rights.	
2	Businesses should make sure that they are not complicit in human rights abuses.	
	Labor	**Principle**
3	Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.	
4	Businesses should eliminate all forms of forced and compulsory labor.	
5	Businesses should abolish all forms or child labor.	
6	Businesses should eliminate discrimination with respect to employment and occupation.	
	Environment	**Principle**
7	Businesses should support a precautionary approach to environmental challenges.	
8	Businesses should undertake initiatives to promote greater environmental responsibility.	
9	Businesses should encourage development and diffusion of environmentally friendly technologies.	

Anti-Corruption	Principle
10	Businesses should work against corruption in all its forms, including extortion and bribery.

The UN CEO Water Mandate is concerned with water stewardship, and hence with a set of practices that promote and foster sustainable and equitable management of freshwater resources. Water stewardship practices range from water use efficiency at an organization's own operations, to engagement with suppliers, to long-term multi-stakeholder river basin projects, and beyond. It helps ensure that water users not only manage their own risks and seize opportunities related to water such as ensuring a business has the water needed to continue production processes, while also promoting long-term water security for all. The Water Mandate requires that all endorsers must be a private sector business with at least 10 employees and must become a member of the UNGC within six months of formally endorsing the Water Mandate, after which, endorsers are expected to make continual progress in six carefully defined commitment areas: direct operations, collective action, supply chain and watershed management, public policy, transparency, and community engagement, (https://ceowatermandate.org/).

The UN SDGs, UNGC 10 Principles and UN CEO Water Mandate commitment areas are examples of things that matter. As such, these and like considerations are at the forefront in EPI^{2}C projects and competitions, that competition judges look for, in the sorts of organizations visited during study tours, and in the topics addressed by speakers.

4. All in One Place

As with many other algorithms, the components of EPI^{2}C and the context in which it resides can be compartmentalized. For example, one can be highly purposeful or intentional in what they do, without having an entrepreneurial mindset, and without practicing design thinking. Similarly, one can be imaginative, without being purposeful or without making real that which is imagined.

The intent herein, however, is to embed the EPI^{2}C pillars within the disciplines (practices) of design thinking and systems thinking, and in so doing, to focus on things that matter. Examples of things deemed to matter are found in, but not limited to, the UN SDGs, UNGC 10 Principles, and UN CEO Water Mandate Commitments areas. Figure 3 is intended to capture this holistic view.

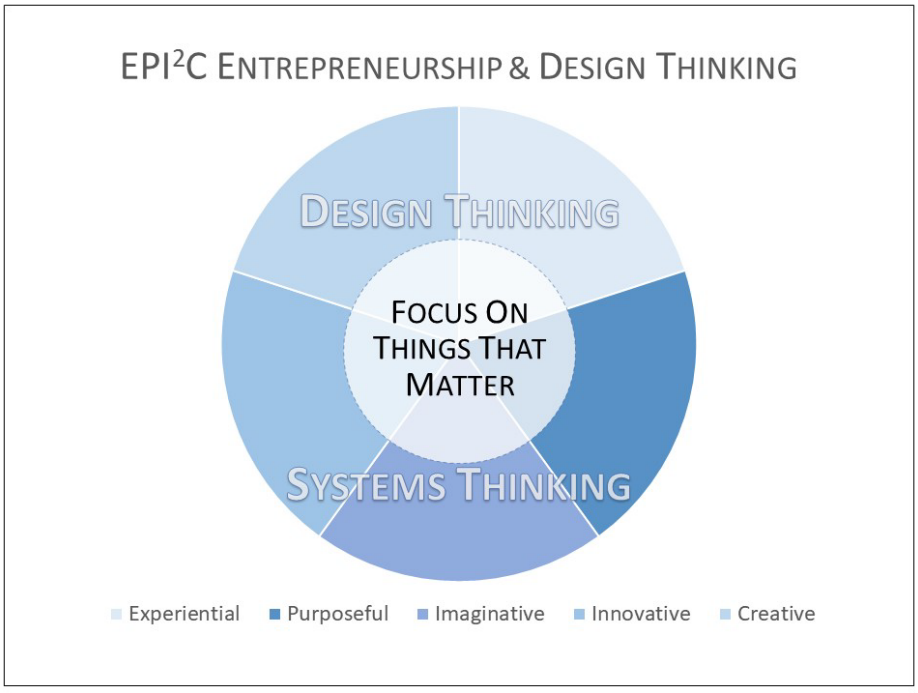

Figure 3: Holistic View of EPI^{2}C Entrepreneurship & Design Thinking.

The faintness of both "design thinking" and "systems thinking" in Figure 3 are intended to convey the importance of these becoming cultural – e.g., the way we routinely do things – to *EPI^{2}C* practice. The pronounced core of "focus on things that matter" is intended to communicate the importance of keeping things that matter at the

forefront of our consciousness and subsequent efforts, with the relative transparency of and dashed line surrounding "things that matter" each intending that these should permeate or "bleed into" the objects of *EPI²C* practice.

5. Making it Real: EPI2C Entrepreneurship and Design Thinking in Practice

The *EPI²C* curriculum begins with a course entitled *Concept to Creation*, and that is its intent – to develop a concept into a working model. Development into a working model is, however, greatly aided by voluntary participation in selected activities – each of which carries the opportunity to earn academic credit by those needing or desiring such credit.

Participation in these activities may be pursued independently of and prior to, concurrent with or subsequent to completion of *Concept to Creation*. Those opportunities include a nearly weekly series of Zoom conversations entitled *Dialogs with Doers* that features entrepreneurs, creators, designers, and social influencers. Table 4 provides a small sample of *Doers* participating in this series.

Also included are a highly intensive, two-Saturday workshop entitled *Human-Centered Innovation & Design Thinking* (HCIDT), as well as fall and spring competitions with approximately $10,000 each at stake and entitled the *EPI²C Sustainable Venture Challenge* (fall) and the *Faulkner Entrepreneurial Challenge for a Better Future* (spring). Students engaged in the *EPI²C Entrepreneurship & Design Thinking* program also compete in external challenges and the message of focusing on things that matter is a well-received one.

Table 4: Dialogs with Doers Guest List – Examples to Date.

DOER	DESCRIPTION
Hunter Lovins	Co-developer of the concept of natural capitalism and Founding President of Natural Capitalism Solutions. Professor & Program Founder in the Bard College Sustainable MBA.
Dr. Joseph DeFeo	Juran Institute CEO – Global Quality Improvement Expert. Academician of the International Academy of Quality (IAQ), a joint global "hall of fame" of the American Society for Quality, Japanese Union of Scientists & Engineers, and European Organisation for Quality.
Dr. Michael Goodsite	Pro Vice-Chancellor (Energy Futures), Professor & Director, Institute for Sustainability, Energy and Resources (ISER), Professor, University of Adelaide.
Dr. Stuart Hart	University of Vermont: Grossman Distinguished Professor. Co-developer of the Base-of-the-Pyramid Concept. Well-known sustainable innovation expert.
Dr. Abha Rishi	CEO, Atal Incubation Centre – Professor of Practice & Chair of the Centre for Innovation & Entrepreneurship Development Birla Institute of Management Technology (BIMTECH). Fulbright & Chevening Scholar.
Dr. Mike Donnelly	Former Principal Special Advisor to Scotland's First Minister. Queen Margaret University (Glasgow, Scotland).

Human-Centered Innovation & Design Thinking is a highly interactive workshop spread over four intensive Saturdays in which participants apply each tool presented with respect to a project that is identified within the first two hours of the workshop. Tools presented are organized within the design thinking approach cited on the right side of Figure 1 and are intended to follow the progression in Table 5.

The *EPI²C Sustainable Venture Challenge* and the *Faulkner Entrepreneurial Challenge for a Better Future* differ primarily in the maturity of ideas in the proposals brought forth. All entries are assessed relative to publicly available criteria (https://www.fhsu.edu/cob/entrepreneurship/) that are substantially similar to those cited in Table 6.

The *EPI²C Sustainable Venture Challenge* is held over a Friday evening through Sunday night period each November and begins with ideation leading to very crude idea pitches, around which seven-to-ten teams form and develop on Friday evening, with approximate 10-to-12 hour on each of Saturday and Sunday that focus on building out the idea, relative to selected criteria that are known to competitors. Expert coaching in such areas as digital design, marketing, startup financing, and more is available. Preliminary presentations are provided on Sunday morning, at which time initial feedback is provided. Final presentations are delivered and judged by an external panel of experts on Sunday evening, with four monetary prizes disbursed immediately afterwards.

The *Faulkner Entrepreneurial Challenge for a Better Future* takes place over the course of approximately five weeks and three stages and is open to all university students in the U.S. state of Kansas, competing individually or as a team. An initial written submission is required and evaluated with reference to published criteria by a

panel of external assessors. Feedback is provided and eight entrants are selected for participation in the semifinals, which are held four weeks later, so that semifinalists have time for in-depth revision of their proposals, which are presented face-to-face before a panel of judges. Presentations are limited to 10 minutes, plus five minutes for questions and answers. Judges provide additional feedback, and three finalists are identified. Finalists have one week to respond to feedback, with revised proposals presented one week later and limited to 15 minutes each with 10 minutes feedback. First, second and third place winners are identified at that time and monetary prizes are disbursed.

Other courses available in the *EPI²C Entrepreneurship & Design Thinking* curriculum include ones addressing venture acquisition, venture harvest, technology-based entrepreneurship, and intellectual property.

Table 5: Human-Centered Innovation & Design Thinking Workshop Content & Progression.

CONCEPT	INTENTION	APPROACHES & TECHNIQUES
Empathize	Discover User Needs & Voice of the Customer	Voice of the Customer Methods: Kano Customer Needs Model, Garvin's Dimensions of Quality, Service Quality Dimensions, Ethnography, Surveys, Social Listening.
Define	Organize Ideas	Affinity Diagrams,
	Relate Ideas	Cause-and-Consequence: Interrelationship Digraphs and Identification of Enablers and Bottlenecks, Force Field Analysis, Cause-and-Effect Diagrams, L-Shaped Matrices.
Ideate: Generate Ideas	Prepare to Brainstorm	Cloud Seeding: Image Seeding, Seed Words-Sentences-Paragraphs and Dialogues, Aroma Seeding, Flavor Seeding, Sound Seeding: Words & Lyrics, Multi-Seeding.
	Frame Brainstorming	Ideal Final Result (IFR), Minimal Final Solution, What are We Willing to Sacrifice, What Must Not be Sacrificed, Brainwriting, Greatest Hits (what are the top n traits), Starvation Diet (what if you only had 50% of what is needed?), What Have Others Done, What Hasn't Been Done, What is Unacceptable and What Isn't, What Isn't Said or Seen, Legendary Figures, Legacy: How Do You Want to Be Remembered, Currency: What do Your Target Customers Value.
	Ideation: Brainstorm	Get to Work
Prototype	Crude Prototyping	Sketches, Clay or Other Physical Models (e.g. Lego Models, etc.)
	Prioritize & Weight Ideas	Multi-Voting, L-Shaped & Other Matrices, Nominal Group Technique (NGT).
	Concept Generation & Selection	TRIZ – the Theory of Inventive Problem Solving, Concept Trees, Concept Screening Matrices, Concept Scoring Matrices.
Test & Iterate		It is Financially Sustainable, Does it Yield or Contribute to a Social Good, Is it Environmentally Sustainable, Is it Circular, World War Z – The 10th Man Contrarian or Devil's Advocate Approach, Extreme Conditions: Will it Work in The Arctic or Jungle, SWOT Plot Analysis, Failure Modes & Effects Analysis (FMEA), How Does it Compare to the Ideal Final Result (IFR).
Implement	Activate the Concepts	The House of Quality, Quality Function Deployment.

Table 6: Faulkner Entrepreneurial Challenge for a Better Future Assessment Criteria

ASSESSMENT CRITERIA SCALE FOR 10 AND 15 POINT (10/15) CRITERIA					
Absent = 0	Very Weak = 2/3	Weak = 4/6	Satisfactory = 6/9	Good = 8/12	Excellent = 10/15
Concept (10)					
• Is the concept clear and compelling. As a standard, consider the one for REC Watches at: https://www.recwatches.com/universe/					
Alignment (10)					
• How clearly is it aligned with "*focusing on things that matter*"? • Does it have clear potential for positive social or environmental impact?					
Purposeful (10)					
• Is a high degree of intentionality evident? • Is the problem to be solved or opportunity to be leveraged clearly identified? • Are objectives clearly identified?					
Business Model / Commercialization and Economic Sustainability (15)					

• Is there a clear / credible revenue model and cost structure? • Is there a well-defined description of how the venture makes money OR • If financial profit is not the primary objective, what other currencies are generated? • Is there a credible plan to acquire resources needed to deliver the concept to market? • Is the description of key resources, partners and activities clear? • Is the value proposition clear and compelling?
Market Characteristics / (15)
• Is an appropriate target market / specific customer identified? • Has the market size been reasonably estimated and is it sufficient (red ocean or blue ocean)? • Can a sufficient market share be captured and is there a realistic plan to do so? • Is there an appropriate strategy for marketing and delivery of the concept to the market?
Is it Differentiated from Competition (10)
• Competitive analysis: is there a clear description of the competition? • Was a clear case for differentiation provided? • Is the scope of differentiation sufficient? • Is the quality of the proposed solution sufficient?
Intellectual Property (10)
• Is there a likelihood that some elements may be patentable? • Is there a likelihood that some elements are worth trademarking or copyrighting? • Is the problem / opportunity and/or its solution significant, relevant or "elegant"? • Are new ideas evident? Are any advanced capabilities introduced? • Are any original designs, policies, products, processes, systems or services evident?
Founding Individual / Team (10)
• Does the founding individual/team have the necessary knowledge and skills? • What gaps are there and how will they be filled? • Has needed advice been identified and are those advisors available?
Has a Convincing Case been Made(10)
• Is there a legitimate path forward? • Is the team capable of following that path?
TOTAL =

REMARKS:		

6. Other EPI²C Engagement and Opportunities

It is evident that the *EPI²C Entrepreneurship & Design Thinking* program is more than its curriculum. It is composed of both coursework and experience-driven cocurricular or extracurricular activities. Often, these are hybrid in nature, given that various activities such as competitions, dialogs with doers, and other activities are – via fulfillment of marginal additional requirements – available as for-credit options. Other activities, selected ones of which are also available either for participation purposes or may be enrolled in for academic credit, include competitions sponsored by other universities or organizations, participation in the university chapter of the *Collegiate Entrepreneurs Organization* (CEO), election to *Sigma Nu Tau* – America's only national honorary, and participation in the *Venture Valley Collegiate Cup* – a entrepreneurship and financial literacy game.

Much of the activity associated with the program and its students is coordinated by the *Center for Entrepreneurship* (https://www.fhsu.edu/cob/entrepreneurship/).

Participated in on a less common basis is an annual study trip, conducted during a ten-day break in the university's academic schedule each March. Study tours require fund-raising efforts to partially offset their cost and include relevant company or organization tours, museum or cultural site visits, and a limited amount of free time. As examples, a group of 19 students, accompanied by three adult facilitators, traveled to Aarhus and Copenhagen, Denmark to visit Vestas Wind Systems, Maersk, and "The Kitchen" (the business incubator at Aarhus University). Equally, the group visited such significant venues and sites as the Moesgaard Museum, ÅRoS Kunst (art) Museum, Den Gamle By (the world's first open air museum), the Danish Resistance Museum, Amelienborg Palace to see the changing of the royal guard, historic churches, Nyhavn (the "new harbor"), the Little Mermaid, and historic churches. In March 2024 a study tour to the Czech Republic is planned and in March 2025 a visit to Adelaide University and the energy innovation district in Adelaide (Australia) is planned. Additional future tours include ones to businesses in Silicon Valley, California and in Napa Valley, California.

Finally, the university operates Hansen Scholarship Hall – a residence facility for approximately 30 students, who must be actively engaged in entrepreneurial courses and activities. Students residing in Hansen Hall may be enrolled in any primary program of study, with currently represented programs including agribusiness, art & design, accounting, biology, finance, management, chemistry, marketing, economics and many more. The hall is a mixed-gender one with individual occupancy rooms, and an intentional blend of approximately two-thirds

domestic students and one-third international students. Current home nations of international students residing in Hansen Hall include Brazil, Spain, Paraguay, Venezuela, Poland, Hungary, and Senegal.

7. Summary

The *EPI²C Entrepreneurship & Design Thinking* program emphasizes *Experience*, *Purposefulness*, *Imagination*, *Innovation*, and *Creation*. It blends traditional coursework with highly experiential learning activities and opportunities. Further, the program is distinct in that – while it is open to all sorts of entrepreneurial emphases and outcomes – it "*focuses on things that matter*", as captured in the statement "*do good, make a difference, change the world*". As such, many of the projects in which students engage place intentional emphasis on socially and / or environmentally positive outcomes.

The program – like the world itself – is subject to innovation and redesign. The process of program reinvention is itself approached through a design-thinking lens as one means of living what we teach.

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International Quality Award Models: Innovation Enablers or Inhibitors?

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Abstract: Historical development of models and criteria supporting major international quality awards is driven more by continuous or incremental improvement than by breakthrough improvement. This has been the case in particular relative the most enduring such awards - the European Foundation for Quality Management (EFQM) Business Excellence Award, America's Baldrige National Quality Award for Performance Excellence (MBNQA), and the Shingo Prize for Operational Excellence. In possible contrast are initiatives such as the United Nations Sustainable Development Goals (UN SDGs) and the imputed urgency for improvement, innovation and change associated with these, due in large to the sheer scope and magnitude of change needed – especially with respect to societal or environmental challenges.

While sufficiently rapid iteration across a large enough number of cycles has the potential of rivaling the magnitude of innovation attained through a focus on breakthrough improvement, such an approach is unlikely to precisely match the destination of innovation attained through breakthrough improvement approaches. One significant reason is that incremental improvements often target minor course corrections with well-defined trajectories, whereas breakthrough efforts target larger strides with more mystery between the point of origination and the targeted destination.

Differences in these approaches impact products and services reaching the market in many ways, hence impacting their marketplace performance. Among differences of note are ones in the natures of the product or service brought to market, the timing of their market arrival, the levels of creativity and innovation required, design innovations introduced, consumer receptivity and perception of iteration vs. innovation, perceived impact, consumer perception of the company, and – not to be ignored – risk and reward elements.

Questions explored herein are whether the models and criteria used by international quality award frameworks enable innovation and entre-intrapreneurship, inhibit these, or are innovation and entre-intrapreneurial neutral. Similarly, the impact of the UN SDGs in relation to innovation are discussed.

Keywords: Breakthrough Improvement, Excellence Models, Incremental Improvement, Sustainable Development Goals.

Advantage: Significant organizational and global challenges demand innovation. Concurrently, if organizations do not prosper, they are unable to contribute to solutions to such challenges, whether those challenges are economic, environmental, or social in nature. Specific modes of innovation and improvement are discussed, as are potential enablers or inhibitors thereof.

1. Excellence Models and Sustainability

In the modern sense, excellence models – also referred to as enterprise excellence, business excellence, or operational excellence, organizational excellence, or performance excellence models were birthed in the late 1980s with the development of America's Malcom Baldrige National Quality Award, the EFQM Excellence Award, the Shingo Operational Excellence Model and other organizational performance-based models such as the balanced scorecard (Kaplan and Norton 1992). Increasingly, these have acknowledged and elevated the role of innovation in driving enterprise performance, so that innovation has become a standard element in organizational strategy, as a key driver of enterprise performance and prosperity (Hertz, Barker and Edgeman 2018; Edgeman 2019). It is worth noting that, relative to the Hertz, Barker and Edgeman (2018) reference that Dr. Harry Hertz is Director Emeritus of the Malcolm Baldrige National Quality Award program for the US National Institute of Standards and Technology, US Department of Commerce and Shaun Barker is a long-time architect of the Shingo Operational Excellence Model, while Rick Edgeman served as the first research director at the Shingo Institute – home of the Shingo Prize for Operational Excellence.

The possible exception in the prior list is the Shingo Operational Excellence Model emphasizing lean enterprise methods and drivers. Lean enterprise approaches tend to favor incremental improvement, and hence generally smaller but more numerous steps forward, wherein the likelihood of radical course corrections are small and larger, (radical) innovation driven changes are rarer (Edgeman 2020a).

The modern sustainability movement arose at about the same time as the enterprise excellence movement, with a key early development being the sustainable development definition established by the Brundtland Commission:

> Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs. (Brundtland 1987).

Subsequent seminal sustainability works include the tome *Cannibals with Forks* by Sir John Elkington (1997) that popularized the concept of triple bottom line performance (economic profitability, environmental quality, and social justice), along with works introducing natural capitalism (Lovins et. al. 1999), and the idea of the base of the pyramid (Prahalad and Hart 2002). These cemented the applicability of sustainability to comprehensive business performance, with the criticality of innovation to both sustainability and business performance – especially strategic innovation at the base of the pyramid – further established in works by Anderson and Markides (2007) and Hart and Christensen (2002).

Increasingly, sustainability models and measures have come to resemble enterprise excellence models and their integration yielded sustainable enterprise excellence models (Edgeman 2013; Edgeman and Eskildsen 2014). Early arguments for integration were offered by Edgeman (2000, 2001) and Edgeman and Hensler (2001), with significant progress toward rigorous quantitative modeling and analysis developed by Hensler and Edgeman (2002) and Edgeman and Hensler (2005).

2. United Nations Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by *all* United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are 17 Sustainable Development Goals (UN SDGs). These are an urgent call for action by all countries - developed and developing - in a global partnership. The UN SDGs fundamentally recognize that ending poverty and other human deprivations must be compatible and aligned with strategies that improve health and education, reduce inequality, and spur economic growth. Conjunctively and concurrently with these, climate change and preservation of earth's biosphere – its oceans, forests and air – must be vigorously addressed (Plummer et. al. 2020).

The UN SDGs can be seen graphically in Figure 1. Each of the 17 goals has a number of associated targets – 169 in total – so that there is far more to each goal than meets the eye. Additionally, each goal has an intended interpretation so that the nations, organizations, and individuals interesting in advancing progress toward one or more of the goals should direct close attention to resources provided by the United Nations. See: https://sdgs.un.org/goals It is important to note that the goals are integrated, meaning that actions with impacts relative to one goal are likely to impact other of the goals.

The UN SDGs are briefly summarized in Table 1. While many logical groupings of the UNSDGs can be identified,

Table 1 indicates one such set of groupings that aims to multiply the impacts of the goals (Abundant Earth Foundation 2023) by noting selected embedded themes or synergies.

These groupings – each of which requires varied forms or combinations of social, environmental, and technological innovation can be explained as follows (Abundant Earth Foundation 2023):

Reducing overall inequality (group 1) within and among nations is reliant on reducing poverty and dependence on external food sources, and on ensuring that no one is left hungry. Poverty elimination requires elimination of hunger and, therefore, inequalities. Globally, approximately 700 million people are under-or-malnourished, and this population is expected to increase this. To combat this, focusing on tackling poverty is the most critical step towards achieving SDG 2 and 3.

Good health and wellbeing depend in large on pollution reduction or elimination. Globally, approximately 22 million people die each year from soil, water, or air contamination and pollution (Edgeman, 2015; Edgeman and Wu 2015). Clean water, sanitation, and affordable clean energy are crucial to reducing premature death. Air pollution from fossil fuel combustion killed over 8 million in 2018, causing increased disease rates, and decreased quality of life. Water pollution caused 1.8 million deaths in 2015. To promote good health and well-being, we must reduce death and contamination of the air, soil and water by shifting away from use of chemicals, plastic, and pollutants toward implementing affordable infrastructure that promotes clean water and energy. Reducing reliance on and use of fossil fuel in turn reduces petrochemical use, oil spills, and contaminated wastewater.

Strong institutions promote sustainable development and protect human rights. Attainment of justice requires emphasis on sustainable growth and the right of people to work for industries that provide safe and secure environments and employ sound safe practices. Economic growth must not come at the expense of peace and social justice. Access to reliable and accessible infrastructure is key to resilient, inclusive, and sustainable societies.

Gender equality cannot be achieved without ensuring quality education for all women and girls around the world. Equal access to education is central to fostering women's rights. Enrollment numbers can give the illusion of gender equality when in fact the quality of education provided is also critical, so that disparity of quality and access across genders must be addressed. Women and girls must be safe from gender-based violence and must have access to education tailored to ensure their safety and prosperity.

Cities and communities must collaborate, protect each other, and partner to ensure sustainable development and ethical consumption/production across borders. Collective natural resources can be used sustainably and to streamline supply chains through networks of resilient and safe cities and communities. This collaboration can work to promote fair trade, partnerships, strengthen voluntary commitments, and enhance capacity development.

Climate action encompasses protecting all life, both on land and below water. Effective mitigation of the effects of climate change requires understanding that all human, ecological, and planetary systems are interconnected and therefore cannot be separated from each other. By working to take urgent action on climate change, we must use our water sources respectfully to ensure not only human survival but the survival of all marine ecosystems and resources. Further, climate action is dependent on using our common land resources sustainably, while working to restore and protect land, water, and other resources and environments that have already been degraded.



Figure 1: United Nations Sustainable Development Goals (UN SDGs) (https://sdgs.un.org/goals)

Table 1. United Nations Sustainable Development Goals Organized into Impact Groups

GROUP 1: REDUCING OVERALL INEQUALITY		GROUP 4: EQUALITY THROUGH EDUCATION	
GOAL 1	No Poverty	GOAL 4	Quality Education
GOAL 2	Zero Hunger	GOAL 5	Gender Equality
GOAL 10	Reduced Inequalities		
GROUP 2: ACCESS TO SAFE CONDITIONS		**GROUP 5: SUSTAINABLE PARTNERSHIPS**	
GOAL 3	Good Health & Well-Being	GOAL 11	Sustainable Cities & Communities
GOAL 6	Clean Water & Sanitation	GOAL 12	Responsible Consumption & Production
GOAL 7	Affordable & Clean Energy	GOAL 17	Partnerships for the Goals
GROUP 3: SUSTAINABLE GROWTH		**GROUP 6: HOLISTIC CLIMATE ACTION**	
GOAL 8	Decent Work & Economic Growth	GOAL 13	Climate Action
GOAL 9	Industry, Innovation & Infrastructure	GOAL 14	Life Below Water
GOAL 16	Peace, Justice & Strong Institutions	GOAL 15	Life on Land

It is now well-established that innovation is a key driver of progress toward meeting UN SDGs (Cordova and Celone 2019; Walsh et. al. 2020; Zhou and Etzkowitz 2021).

Given that the UN SDGs or their close relatives are embedded in essentially all modern sustainability models, the interconnectedness of sustainability and innovation are evident. Further, the magnitude of challenges that humanity faces mandate rapid and significant change, with such change almost inevitably requiring innovation.

3. Integration

When one visits a physician, often they want to know what their current state is, and how to improve that current state so that it eventually becomes a better future state. The same is often true of nations, communities, networks, or organizations.

This is typically driven by core values or conditions that inform strategy. Strategy must then be transformed via policies, practices, processes and the like to produce results and their impacts.

This implies that "results" are "end of the pipe" or that "what goes in governs or influences what goes out". In other words, strategy influences results (performance), though of course strategy must be deployed. If specific performance is desired, then corresponding strategy should be developed and deployed.

The preceding description is analogous to that of an excellence model, wherein one such model that represents a high-level sustainable enterprise excellence model is provided in Figure 2, below. What is desired is "triple bottom line performance", implying that corresponding "triple top line strategy" must be formulated and subsequently deployed (Edgeman, Eskildsen and Neely 2015).

What is seen, then, is that innovation must play a prominent role in triple top line strategy – at least if the sort of performance desired includes progress toward UN SDGs. The innovation desired should include innovation for sustainable results and, in addition, innovation efforts themselves should be sustainable. Innovation for sustainable results implies that at least some innovation targets include social and / or environmental ones, whereas sustainable innovation is concerned more with the process and continuity of innovation efforts (Edgeman, Neely and Eskildsen 2015).

4. Innovation in Excellence Models

The most common use of models such as the one in Figure 2 is organizational self-assessment, where self-assessment can be thought of as regular and routine evaluation of all relevant strategies, means of deployment, performance and impact. In many organizations self-assessment is ongoing, but with special emphasis on annual cycles. Such evaluation is generally performed with respect to specified criteria and goals, with key objective of deriving insight into the organization's recent and current performance, and foresight as formulation and deployment of new or revised strategies.

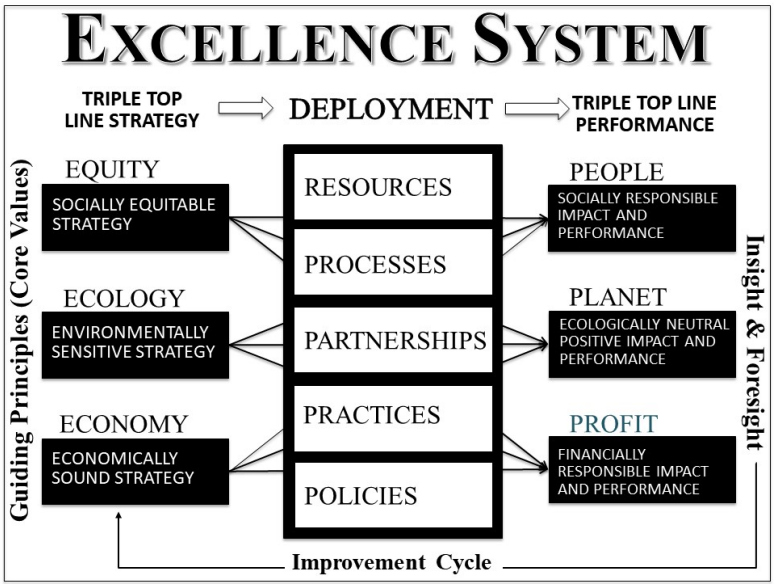

Figure 2: Excellence Model Translating Triple Top Line Strategy into Triple Bottom Line Performance.

In general, this approach can be thought of as an ongoing search for best and next best practices and sources of competitive advantage (Edgeman 2017, 2018) and routinizing these practices to create virtuous behavioral and performance cycles. Though rarely described in such a way, self-assessment is also about identifying and correcting or eliminating behaviors and practices that have created or have the potential to create vicious performance cycles, and transformation thereof into virtuous cycles. (Edgeman et. al. 2020).

5. Summary

Sustainability / sustainable development and enterprise excellence have long been on near parallel paths, yet paths steadily in the process of merging – or at least – have been forging significant intersections.

Driving this has been increasing pressure on organizations exerted by governments, consumers, and investors to be more socially and environmentally responsible, along with competitive pressures to be more efficient and better stewards of the resources necessary to make an organization form profitably.

There is a "new" or clearer understanding of "profit" that is emerging – a 4,000 years old one from ancient Judaism that regards profit as that which remains after all obligations are met. Obligations is, of course, the operative word and it is connected to increasing emphasis on social and environmental obligations.

Organizations must – however – be economically sustainable as well, so that the notion of triple bottom line performance is becoming increasingly front-and-center. Innovation is thus seen as a key enabler of triple bottom line performance, that results from development and deployment of associated triple top line strategy, with innovation a critical element in that strategy.

Influential business excellence models such as America's Baldrige National Quality Award, the European Foundation for Quality Management Excellence Model, and the Shingo Operational Excellence Model explicitly integrate innovation (Din, Asif, Awan and Thomas, 2020) innovation. That said, the Shingo Model favors innovation through traditional lean methodologies wherein innovation comes through a series of smaller incremental improvements, whereas the Baldrige and EFQM models favor more aggressive innovation methods that deliver larger results faster (Hertz, Barker and Edgeman 2018). Neither these models nor their principles or criteria explicitly address social or environmental sustainability, though all address economic performance. Relative to social or environmental sustainability, these models tend to take a "do not harm" approach, leaving their explicit consideration to firms making use of these models. In other words, in and of themselves, these models neither help nor hinder progress toward sustainability objectives – instead, they aid organizations in their quests to become better, and hence to pursue sustainability goals more efficiently and effectively, should they choose to do so. Such choices are, heretofore, optional.

Importantly then, is incorporation of "virtuous targets" into organizational innovation objectives. Exemplary virtuous targets are suggested by the UNGC 10 Principles or the 17 UN Sustainable Development Goals. Advancement of progress toward such targets can be made by intentionally embedding such targets in innovation objectives, and purposefully and routinely assessing whether progress toward these targets is sufficient in both speed and magnitude, and making course corrections as necessary (Coulson-Thomas, 2022; Politis and Grigoroudis, 2022). Doing this via use of an excellence model that fits organizational culture is one means of accomplishing these things.

Innovation is not, however, a key element only. It is essential if humanity is going to effectively address wicked Anthropocene age environmental and social challenges (Edgeman 2020b).

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Startup Competitions Decoded: Unpacking the Phenomenon's Dimensions

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Abstract: Drawing on a typological theorizing style (Cornelissen, 2017), this paper investigates and deconstructs the fuzzy nature of startup competitions (Cornelissen, Höllerer and Seidl, 2021). Despite the pivotal role that startup competitions play in promoting innovation and shaping policies related to business creation and welfare there exists a scarcity of comprehensive research that thoroughly investigates the organizational architecture and overall effects of these contests on entrepreneurial ecosystems' actors. Furthermore, the presence of conceptual fragmentation necessitates a process of synthesis to prevent the dispersion of scientific efforts and to enhance understanding of the essence and constituents of the phenomenon (Ferreira, Fernandes and Ratten, 2016; Howard and Crayne, 2019; Law, Wong and Mobley, 1998). The methodology utilized in this study is a validated approach that combines a systematic literature review with subsequent inductive analysis of the selected articles (Thomas and Tee, 2022). This article makes two distinct contributions to the existing body of literature. First, this study contributes to the startup competitions and entrepreneurship literature by providing a typological theoretical framework that examines the conceptual dimensions of this phenomenon. Additionally, this research seeks to identify the key actors involved in these competitions and emphasize the potential of utilizing such events as intervention tools at micro and macro-organizational levels. Furthermore, this study makes a valuable contribution to the existing body of literature that examines the intersection of entrepreneurship and organizational studies. This study presents a theoretical framework that focuses on the unique characteristics of organizational actors involved. It illustrates the potential design of multiple SUCs architectures based on the objectives and deliberate impacts that these actors aim to achieve. From the perspective of managerial implications, this work provides fuel for thought and a practical instrument for all organizations that intend to conduct a startup competition on purpose. This paper functions as an in-depth guide for all relevant stakeholders, including organizers, participants, accelerators, incubators, and other involved actors. This phenomenon illustrates how each actor is prompted to take action upon acquiring a specific scope.

Keywords: Startup competitions, new venture formation and growth, business support strategies and practice, typological theorizing, multidimensional perspective

1. Introduction

Entrepreneurial competitions among startups serve as organizational platforms where participants engage in the pursuit and advancement of innovative ideas (Stolz, 2020). Startup competitions (SUCs), also known as strategic entrepreneurial activities, have been conceptualized in two ways within the literature. Firstly, they are defined as discrete events (Stolz, 2022). Secondly, they are viewed as tools or mechanisms employed to accomplish organizational objectives (Schwartz et al, 2013; Tipu, 2019). Additionally, SUCs have been recognized as the principal means of establishing and fostering a network comprising multiple actors within an entrepreneurial ecosystem (Stolz, 2020). Furthermore, despite its centrality, the scholarly literature that examines the phenomenon in organizational settings is characterized by notable semantic and conceptual fragmentation.

Scholars have analyzed SUCs by examining the diversity in their linguistic roots and the range of outcomes they produce. The utilization of specialized terminology, such as *business plan competition* (Stolz, 2020; Tipu, 2019), *pitch contest* (Stolz, 2020), and *ideas* and *new venture competition* (Howell, 2021), highlights various modes of engagement, knowledge acquisition, and assessment, as well as diverse organizational contexts and developmental phases encountered during the early stages of these competitions. Furthermore, when examining the various types of SUCs, it is evident that the terms competition, cup, and award, merely to mention a few, provide limited insight into their organizational configurations. Moreover, alongside considerations of semantics and the utilization of multiple designations, this fragmentation also encompasses the definitional component that seeks to establish the theoretical essence of the concept.

From a micro-contextual standpoint, Contigiani and Young-Hyman (2021) have categorized SUCs as occurrences wherein teams generate and present an idea with the aim of securing the ultimate prize, as determined by a panel of judges who determine the most outstanding participant. The phenomenon's nature has been recognized by others from a macro-contextual standpoint, and it has been argued that SUCs can be viewed as

policy instruments for entrepreneurship, providing aspiring entrepreneurs with opportunities to grow their businesses (Schwartz et al, 2013). Scholars have conducted investigations on SUCs as mechanisms primarily intended for students (Kwong, Thompson and Cheung, 2012; Watson, McGowan and Smith, 2015). According to Li (2016), SUCs are competitive events that aim to inspire college students to develop business plans and present them to a panel of judges. In summary, the existence of ambiguity regarding SUCs can be attributed to the utilization of numerous interchangeable terminologies and fragmented definitions.

Furthermore and since these competitions are thought to be a tool that is responsible for awakening the entrepreneurial flame among aspiring entrepreneurs, all in the entrepreneurial ecosystem can get involved in them (Tipu, 2019). Entrepreneurial ecosystems, to put it briefly, are a collection of interrelated organizations and individuals in charge of how entrepreneurship functions in a particular region (Spigel and Stam, 2018). Moreover, SUCs, as a hub linking several actors, may depend on public and private organizations, including universities, research centers, coworking spaces, banks, consulting firms, chambers of trade and commerce, law firms, and venture capitalists (Der Foo, Kam Wong and Ong, 2005; Passaro, Quinto and Thomas, 2017; Stolz, 2020), as well as a combination of both. It is difficult to theoretically disentangle the phenomenon because of the variation that is seen in the SUCs' literature and the multiplicity of actors surrounding them (Stolz, 2022).

Despite the pivotal role that startup competitions play in promoting innovation and shaping policies related to business creation and welfare there exists a scarcity of comprehensive research that thoroughly investigates the organizational architecture and overall effects of these contests on entrepreneurial ecosystems actors. We pose the following research question. What are the conceptual foundations of SUCs? In order to address the inquiry at hand and align with the stated research objectives, this article employs a systematic literature review (Tranfield, Denyer and Smart, 2003), complemented by an inductive analysis of the selected sample (Thomas and Tee, 2022). The findings elucidate the inductive process employed in discerning the conceptual constituents that form the basis of SUCs. The primary contribution of this article is to analyze and elucidate the concept of SUCs by employing a typological approach to theorizing (Cornelissen, 2017; Law, Wong and Mobley, 1998). This approach involves the identification, decomposition, and recomposition of SUCs within a multidimensional and holistic framework, thereby shedding light on their conceptual essence.

2. Review method

The academic discourse surrounding SUCs is a relatively recent field of study, yet it is experiencing significant growth in terms of scholarly production (Dane et al, 2023). Furthermore, the presence of conceptual fragmentation necessitates a process of synthesis to prevent the dispersion of scientific efforts and to enhance understanding of the essence and constituents of the phenomenon (Ferreira, Fernandes and Ratten, 2016; Howard and Crayne, 2019; Law, Wong and Mobley, 1998). Given the aforementioned premises, the review process involves the analysis of the entirety by breaking it down into its constituent parts, with the aim of comprehending the overall coherence and integrity of the whole (Schwandt, 2007). Following Thomas and Tee (2022), our approach is both general and comprehensive. The methodology utilized in this study is a validated approach that combines a systematic literature review with subsequent inductive analysis of the selected articles (Thomas and Tee, 2022).

Specifically, the systematic nature of the review, in accordance with Tranfield, Denyer and Smart (2003), is essential for the rigorous extraction of a sample and the future potential for replication and transparency of the results (Denyer and Tranfield, 2009). In order to establish the inclusion criteria, we implemented various filters including database selection, language, type, and area of knowledge pertaining to the scientific publications being analyzed. The data were collected from Web of Science (ISI) that included SUCs and synonyms in their titles, abstracts, and keywords (n = 175). The selection of the database is driven by its recognition as a valid repository in the fields of organizational and entrepreneurship studies, and its ability to strike a suitable equilibrium between the quantity and relevance of the selected items (Crisan et al, 2019; Eveleens, Van-Rijnsoever and Niesten, 2017; Mian, Lamine and Fayolle, 2016). The scope of this study was limited to documents written exclusively in the English language. Furthermore, the focus was specifically on identifying articles and reviews that were considered relevant to the fields of business, management, and economics area. Ultimately, following a comprehensive review of the abstracts of the remaining articles, a total of 42 scientific contributions were chosen as the sample for subsequent analysis.

Complementarily (Thomas and Tee, 2022), the inductive technique is applied to the selected sample (n = 42) in order to extract from the literature conceptual facets of the phenomenon (Corbin and Strauss, 2008). The articles were coded using the qualitative data analysis software Nvivo. Initially, our coding was mainly driven by the

research question and the available data in our sample. Our analysis focused on the utilization of SUCs within the arguments presented in the articles, the nomenclature employed to refer to these competitions, and the theoretical framework to which they were associated (Nordin and Kowalkowski, 2010). Following Elo and Kyngäs (2008) we started coding without setting a framework in advance (Hsieh and Shannon, 2005). Then, we identified second-order themes thanks to axial coding (Corbin and Strauss, 2008).

3. Analysis and discussion

Figure 1 provides a comprehensive overview of the outcomes derived from the inductive analysis, illustrating the progression from a specific to a broader, more generalized conceptualization (Finfgeld-Connet, 2014).

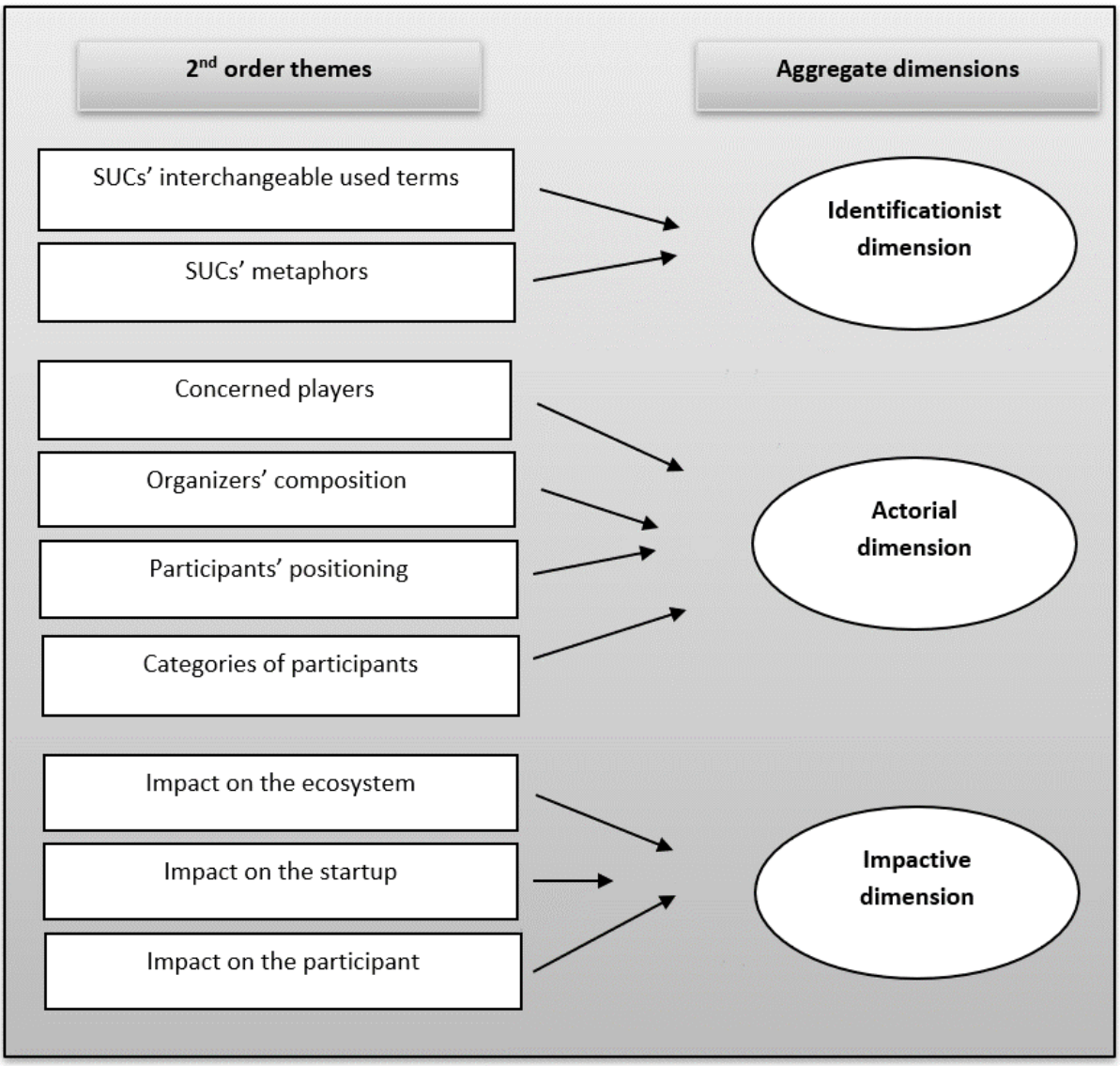

Figure 1: Data structure: aggregate dimensions

The subsequent paragraphs elucidate the process by which we established the linkage between the first-order themes and the subsequent second-order codes, ultimately leading to the identification of the three conceptual dimensions that encapsulate the phenomenon. The authors highlighted 50 first-order themes from the 42 selected articles. Moreover, 9 second-order themes arose from the primary authors' interpretations of the research (Corbin and Strauss, 2008). Some of them were identified in the literature and extended.

In summary, the findings indicate that the identificationist, actorial, and impactive dimensions are the conceptual factors that define SUCs. The identificationist dimension is the primary concept of focus. Scholars across various academic disciplines, each with their own specific objectives, have employed a range of terminology to denote these competitive events. Moreover, it was observed by the authors that scholars encountered difficulties in

establishing a clear definition for the term "SUCs" within the existing body of literature. Furthermore, the consideration of the actorial dimension played a pivotal role in delineating the characteristics of SUCs. This is primarily because the position of actors within the entrepreneurial ecosystem significantly influences the development and outcomes of competitions. The impactive dimension serves to clarify the distinct effects of SUCs on various organizational entities engaged in competitive activities, namely the ecosystems' organizations, startups, and participants.

3.1 Identificationist dimension

The identificationist dimension seeks to integrate the diverse conceptual fractures found in the literature regarding the terminology and metaphors. Specifically, it involves two second-order themes: the interchangeable used terms and the foremost used metaphors to address SUCs.

Semantic fragmentation holds significance in multiple ways. For instance, certain lines of analysis refer to the phenomenon as *business plan competitions*, while others highlight it as *pitch competitions*, thereby underscoring the varied outcomes that are anticipated or rewarded in such competitions. Alternative terminology includes *ideas competitions* as opposed to *SUCs* or *new venture competitions*. These terms emphasize contrasting perspectives, one emphasizing the embryonic nature of anticipated activities, while the other focuses on a more organized output in a novel business endeavor, which may or may not possess the attributes of an innovative startup. The terminology employed to characterize the notion of competition, such as contest, cup, or award, signifies the inherent sporting essence of this phenomenon. However, these terms do not encompass particular organizational designs. Moreover, there is a diverse range of metaphors associated with SUCs. They have been identified as either static, referred to as *anchoring events* or *windows*, which can facilitate connections among actors in the entrepreneurial ecosystem (Parente et al, 2015; Stolz, 2020), or dynamic, serving as *vehicles* for opportunities (Cant, 2018). In accordance with Schwartz et al (2013), SUCs are policy *tools* or *means* to assist aspiring entrepreneurs, while Watson, McGowan and Smith (2015) argue that they function as *causal mechanisms* for extracurricular entrepreneurship education, enabling individuals to experiment and evaluate their ideas within a simulated real-world environment. SUCs constitute a diversified pool from multiple perspectives as they were named differently and linked to heterogeneous organizational constructs (e.g., risks, conflicts, innovation, and diversity).

3.2 Actorial dimension

The actorial dimension specifies which players are engaged in SUCs, their organizational characteristics, and how they contribute to their creation, growth, and implementation. In fact, it englobes four second-order themes: the concerned players, organizers' composition, participant's positioning, and categories of participants. Building a SUC often requires all the combined efforts of entrepreneurial ecosystem players. However, anyone who wants to organize a SUC is called to consciously select the configuration of the actors involved on the basis of each one's characteristics. The composition of the actors of the SUCs is therefore made up of organizers and participants. The organizers can be public via entrepreneurship support programmes, private such as enterprises, financial organizations, and consulting offices, or a combination of both (Passaro, Quinto and Thomas, 2017; Stolz, 2020). Another distinction that exists among organizers is that they can be academic or not (Stolz, 2020; Tipu, 2019). The article's analysis displayed a long list of actors that intervene in the organization of SUCs, for instance, accelerators, coaches, consultants, coworking spaces, experienced entrepreneurs, investors, judges, sponsors, university staff and academics, venture capitalists, bankers, and financiers (Stolz, 2020; Stolz, 2022; Tipu, 2019). Having said that, this diversification is not limited to the organizers.

Participants are a crucial asset of SUCs and they are also diversified. The status of this actor is variant across teams within SUCs. The first distinction is that participants can be first-time entrepreneurs or repeat entrepreneurs (Botha and Robertson, 2014). Second, they can prefer self-employment over organizational employment, to be latent entrepreneurs or would-be entrepreneurs (Li, 2016). If SUCs' participants identify a business opportunity in the market, they become potential entrepreneurs. Then, they reach the status of intentional entrepreneurs when their experiences and skills push them to take the decision of being self-employed. Next, the nascent entrepreneurs are the ones that dedicate resources to establish the startups. Ideally, a SUC's participant is positioned in between the last two shades of entrepreneurs (Passaro, Quinto and Thomas, 2017). A startup can be launched by a lone entrepreneur (Der Foo, Kam Wong and Ong, 2005), even though the majority goes for the team's option (Tipu, 2019).

3.3 Impactive dimension

The impactive dimension clarifies how SUCs affect the social system at both the macro and micro levels, focusing on the entrepreneurial ecosystem, startups, and participants. Firstly, SUCs serve as a mechanism that sustains the entrepreneurial ecosystem. From this standpoint, the purpose of establishing these competitions is diverse. These tools are primarily utilized to aid in the mitigation of poverty. Indeed, it has been argued that nations have the potential to leverage SUCs as a means to stimulate economic well-being and generate employment opportunities. This can be achieved by fostering entrepreneurial endeavors among individuals, thereby contributing to the overall improvement of society (Cant, 2018). Additionally, Stolz (2020) highlights its significance as a focal point for regional development. Governments have the potential to allocate funds towards SUCs in order to facilitate the establishment of small-scale enterprises by local residents, thereby promoting self-reliance within rural and remote regions. In addition, there has been an increasing interest among authorities to provide support for the process of knowledge and technology transfer (Parente et al, 2015), recognizing its significance in fostering the growth of nations and scientific research. SUCs, therefore, have a significant impact on not only the entrepreneurial ecosystem but also on various other ecosystems. Thus far, the aforementioned impacts have resulted in a rise in the number of entrepreneurs operating within the ecosystem. Additionally, it has been observed that SUCs contribute to enhancing the caliber of these entrepreneurs and their respective startups (Schwartz et al, 2013).

SUCs impact also the microenvironment as they enhance the teamwork within the startup (Wen and Chen, 2007). These competitions lift the reputation of the business ideas (Schwartz et al, 2013; Tata and Niedworok, 2020). One of the most usual roles of SUCs is providing monetary support to business ideas (Park, Pulcrano and Leleux, 2020) by helping startups to attract co-founders and strategic partnerships (Tata and Niedworok, 2020) and offering other nature of rewards (Brentnall, Rodríguez and Culkin, 2018). To reach and convince investors, SUCs need to help participants in marketing their business ideas (Cant, 2018). SUCs stimulate business growth (Tipu, 2019) as they play the role of catalyzer for entrepreneurship. SUCs do not impact only startups, they present “an initial baptism of fire for participants” (Stolz, 2022). They are searching for knowledge and guidance to discover new ideas. These learning hubs are a panacea for skills’ development individually and collectively (Passaro, Quinto and Thomas, 2017). Another important facet of SUCs is rejuvenating networking (Watson, McGowan and Cunningham, 2018). This can be done horizontally by interchanging ideas among the team members and vertically thanks to the coaches and consultants at the disposal of the participants (Stolz, 2022). Finally, taking part in SUCs can be for the sake of testing and experiencing (Cant, 2018; Kwong, Thompson and Cheung, 2012). In brief, participants can be derived by several aimed impacts depending on their needs.

The impactive dimension of a SUC is a function of its actorial. Clearly, it is possible to have a combination of actors that have complementary aims. For example, the government aims to create new jobs for freshly-graduates who are seeking opportunities to gain skills that enable them to create their own projects. However, this is not always granted as it is possible that their ultimate goals can be not complementary.

4. Conclusion

Drawing on a typological theorizing style (Cornelissen, 2017), this paper investigates and deconstructs the fuzzy nature of startup competitions (Cornelissen, Höllerer and Seidl, 2021). In this vein, the present study has endeavored to put forth two distinct objectives. To begin with, this study aims to elucidate the fundamental tenets of SUCs by conducting an extensive review of relevant literature. This analysis is further enhanced by employing an inductive approach to interpret the findings derived from a carefully selected sample of 42 scientific articles. The authors utilized an inductive approach to analyze their data, resulting in the synthesis of 50 initial codes that were further grouped into 9 higher-level codes, and finally synthesized in three overarching dimensions. Second, the authors consolidated the various dimensions of SUCs by providing a comprehensive overview, thereby elucidating its conceptual essence over time.

This article makes two distinct contributions to the existing body of literature. First, this study contributes to the startup competitions and entrepreneurship literature by providing a comprehensive typological framework that examines the conceptual dimensions of this phenomenon. Additionally, this research seeks to identify the key actors involved in these competitions and emphasize the potential of utilizing such events as intervention tools at micro and macro-organizational levels. Furthermore, this study makes a valuable contribution to the existing body of literature that examines the intersection of entrepreneurship and organizational studies. This study presents a theoretical framework that focuses on the unique characteristics of organizational actors involved. It illustrates the potential design of multiple SUCs architectures based on the objectives and deliberate impacts

that these actors aim to achieve. From the perspective of managerial implications, this work provides fuel for thought and a practical instrument for all organizations that intend to conduct a startup competition on purpose.

This paper functions as an in-depth guide for all relevant stakeholders, including organizers, participants, accelerators, incubators, and other involved actors. This phenomenon illustrates how each actor is prompted to take action upon acquiring a specific scope. Finally, our study is not without any limitations. Methodologically, it relies on a unique database (ISI). Therefore, future research can analyze other samples extracted from other databases and presumably identify new conceptual dimensions.

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Who am I as an Entrepreneur? Exploring Formation of Entrepreneurial Identity

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Abstract: This paper explores how participation in accelerator programs, which are aimed at scaling ventures, influences the self-perceptions of the participants. An entrepreneur's identity is considered important in both theory and practice, but few studies have investigated how the identities of entrepreneurs/founders are affected by their participation in a program that is aimed mainly at the venture and not the person behind the venture. By providing access to resources, mentorship, and support, which help entrepreneurs test hypotheses and problems, as well as identify markets and business models for their ventures, an accelerator helps entrepreneurs increase their confidence, skills, and knowledge. These factors are important because they enable entrepreneurs to better understand themselves and their perceived opportunity space and choice of actions. Data were collected through in-depth interviews with 14 entrepreneurs that had participated in two different accelerators with slightly different programs. The findings indicate that the accelerators influenced both the personal identify and role identity of the participating entrepreneurs. However, the impact of the accelerator varied according to the self-perceptions of the entrepreneurs' pre-participation and how far they had come in developing their business concepts. Their admittance to an accelerator in itself boosted their identities. We found no difference between the private accelerator program (PA) and the governmental program (GA). The paper contributes to the literature on entrepreneurial identity formation and the effects of accelerators.

Keywords: Accelerator, Entrepreneurial Identity, Identity Formation, Eco-System

1. Introduction

It is well documented that the founder/entrepreneur is important for gathering resources, inspiring interest and upholding the stamina of a new venture. Indeed, when asked, investors often say that the person behind an idea is as important as the idea itself, pointing to the entrepreneur's personal knowledge and skills or their identity. During the last decades, the question of entrepreneurial identity has received interest in both practice and theory; however, documentation on the role of entrepreneurial eco-systems in fostering entrepreneurial identity is sparse and called for (Jones, Ratten, Klapper, & Fayolle, 2019; Mmbaga, Mathias, Williams, & Cardon, 2020; Wagenschwanz, 2021). Some studies suggest that academic entrepreneurship education fosters changes in the self-perceptions of students both as persons and in an entrepreneurial role and focuses much less on how participation in a program aimed at facilitating actual *business development* influences *the person behind* the idea/start-up admitted to such a program (Ulmer & Pape, 2022).

Research indicates that self-perceptions of entrepreneurs and 'what they do' (Read & Sarasvathy, 2005) play a critical role throughout the entrepreneurial process, largely influencing their choices and behaviours (de la Cruz, Jover, & Gras, 2018; Radu-Lefebvre, Lefebvre, Crosina, & Hytti, 2021; Wagenschwanz, 2021). Studies on entrepreneurial identity have found that identity affects entrepreneurs' perceived opportunity space (Alsos, Clausen, Hytti, & Solvoll, 2019; Radu-Lefebvre et al., 2021), their ability to acquire resources important for building a start-up (Ahsan, Zheng, DeNoble, & Musteen, 2018), and their ability to acquire entrepreneurial competence and skills (Donnellon, Ollila, & Middleton, 2014). According to scholars such as Navis and Glynn (2011) and Alsos et al., (2019), entrepreneurial identity is particularly important in the early stages of business development, when the available resources heavily rely on the entrepreneur's personal resources and ability to convince stakeholders.

The purpose of this study is to explore how participation in an accelerator, a type of program that targets start-ups in their early phase of development, influences how the participating entrepreneurs perceive changes in their identity as both persons and entrepreneurs. The study contributes to the literatures on both entrepreneurial identity formation, and the effects of accelerators.

2. Theoretical framework

2.1 Who am I, and what can I do?

In psychology, identity is an experience of one's own characteristics and similarities with and differences from other people. The fundamental question of identity is *who am I* and *what is my place in (*in the world)? Hence,

identity refers to the meanings that individuals attach to themselves based on their experiences and reflections. Identity refers to a person's set of meanings, including attitudes and beliefs, attributes, and subjective evaluations of behaviour, that define him/her in a situation. Early studies of identity distinguish between the concepts of role identity and personal identity (Murnieks & Mosakowski, 2007; Tajfel & Turner, 1979). *Personal identity* is based on a person's inner life, and early definitions focused on the central, distinctive, and enduring features of an individual or group/organisation (Albert, Whetten, Cummings, & Staw, 1985). Hence, personal identity is linked to personality and expresses self-conception. We show who we are through individual choices and actions, as well as the communities with which we associate (Ashforth & Mael, 1989). Personal identity is related to the individual more than a role or position (Stets & Burke, 2000) and is thereby activated across situations (Gecas, 2000). On the other hand, *role identity* addresses the external life, carrying expectation for actions and behaviours (Jain, George, & Maltarich, 2009). Adding context, role identity encompasses how a person defines the sum of norms and expectations associated with a role and whether he or she identifies with that role and behaviour (Bell et al., 2019; Crosina, 2018). In start-ups this can encompass role identities such as entrepreneur, founder, innovator, organiser, facilitator, inventor, developer (Shepherd & Haynie, 2009). Both personal- and role identity are central concepts in the study of (entrepreneurial) practices. Over time and with increased experience, there may be an evolving alignment between personal identity and role identity (O'Neil, Ucbasaran, & York, 2022).

O'Neil et al. (2022) argue that personal identity is particularly important for those new to entrepreneurship, as they may not have a clear understanding of relevant role identities within this context, and further, personal identity can act as a guide when forming relationships relevant to entrepreneurship. However, by observing other entrepreneurs, new entrepreneurs develop standards of who an entrepreneur should be and how they should act, hence an understanding of their role (Donnellon et al., 2014; Murnieks & Mosakowski, 2007). Entrepreneurial activity associated with different roles can considerably vary and entrepreneurs tend to gravitate to one or more specific role identity that directs them towards specific entrepreneurial activity (Shepherd & Haynie, 2009). Mathias and Williams (2017) argue that it is unlikely that first-time entrepreneurs will fully understand the variety of role identities that are implicated in entrepreneurial activity; instead, the role is discovered and negotiated throughout the entrepreneurial process. ,

2.2 Accelerators as identity shapers

Start-up companies must quickly become financially sustainable to succeed. Different education programs set up for target groups, from high school students to experienced entrepreneurs, are central parts of fast-growing entrepreneurial eco-systems supported by governments and investors to increase the prospects of success. Many of these programs include some sort of realistic training, often assisting existing ventures. Many studies document that working with real cases is an educational tool that help students gain a broader understanding of the entrepreneurial role and identity (Donnellon et al., 2014). Though targeting start-ups in early phase, and not students of entrepreneurship, accelerators build on the same idea of learning-by-doing. In general, accelerators place a strong emphasis on educational components (Gonzalez-Uribe & Leatherbee, 2018).

Accelerators target entrepreneurs in the early phase of a start-up, providing a limited mentorship and educator program that is aimed at developing and upscaling new ventures (Cohen, Fehder, Hochberg, & Murray, 2019). By providing workshops and seminars delivered by directors, mentors and guest speakers, and providing arenas for presentations and feedback, accelerators seek to increase the likelihood of the entrepreneurs making well-informed decisions and at avoiding potential pitfalls in the venturing process (Cohen et al., 2019; Hallen, Bingham, & Cohen, 2016). Indeed, research shows that accelerators not only advise entrepreneurs in the quality and validity of their business ideas, but also by questioning many fundamental assumptions about the execution of their business ideas (Ulmer & Pape, 2022). As entrepreneurial climate and learning from peers are considered important factors in acceleration, admitted start-ups move their businesses to accelerator headquarters for the duration of the program. Research indicates that like-minded audiences may play a pivotal supportive role in helping founders understand their entrepreneurial identity (O'Neil et al., 2022; Hallen, Cohen, & Bingham, 2020).

There is scant research on how accelerators may influence entrepreneurs' identities. However, previous studies indicate that participants achieve a *new understanding of self* as one of the takeaways from participation in accelerators or similar types of programs (Nielsen & Lassen, 2012; Tobiassen, Elvekrok, Jahnsen, & Løtvedt, 2018). In another study, Tobiassen, Elvekrok, and Skreosen (2022) found that entrepreneurs participating in an accelerator program tended to experience tension in the feedback and mentoring processes that seemed to trigger identity reflection. Ulmer and Pape (2022) found that participants in an accelerator program started to self-identify as founders (entrepreneurs) during the program. Hence, new self-confidence and enhanced passion for the entrepreneurial journey prepared the entrepreneurs for their leading role in the new venture development (Ulmer and Pape, 2022). In a case study of entrepreneurship education Donnellon et al. (2014) found that an action-based educational program facilitated entrepreneurial identity construction in the students. The authors argue that construction of an entrepreneurial identity is a critical part of developing entrepreneurial competence as skills and knowledge.

3. Method

The study adopts an exploratory research design to explore how participation in accelerator programs influence entrepreneurial identity. Data were collected through in-depth interviews with 14 entrepreneurs participating in two different Norwegian accelerators: one governmental accelerator and one private accelerator (seven informants in each accelerator). Both accelerators were fixed-term, cohort-based programs for start-ups, based on educational components - such as workshops, personal mentors, practise in front of peers,- and culminating in a finale in which the participants pitch their ventures to investors. To achieve the sought for atmosphere of entrepreneurship and learning (Hallen et al., 2020), the participants are situated within the accelerator throughout the program period. Post-participation, relationships are maintained through an alumnus. The strong emphasis on mentorship and the opportunity to pitch their ideas directly to actual investors differentiate accelerators from other parts of the entrepreneurial eco-system. Some, but not all, accelerators invest equity in the start-ups, amplifying the interest in their success. The governmental accelerator program (GA) targeted start-ups with international ambitions and took place in Silicon Valley and New York, USA. The private program (PA), which targets both domestic- and internationally oriented start-ups, took place in Oslo, Norway. The private accelerator invests in some of the start-ups, the governmental does not. The interviews in the governmental accelerator were conducted in 2017 and in the private accelerator in 2022.

The selection of participants was based on the following criteria: (1) to secure better memory of the program, they had participated in the accelerator during the last 12 months before the interviews, (2) they were the founder or part of the founding team in the participating start-up company, and (3) they were active participants in the accelerator program in question. The participants varied in age, education and previous experience. Their start-ups were in the domain of technology. Most of the participants were men, corresponding to the finding that there are far fewer female entrepreneurs in the technology sector in Norway (Kubberød, Jones, & Pettersen, 2021). Table 1 gives an overview of the anonymised participants.

To ensure consistency, a semi-structured interview guide was employed (Yin, 2013). The questions encompassed how participation in the accelerator influenced the way the participants understood themselves and their firms, including their identity as entrepreneurs. The interviews lasted 30 to 60 minutes and were recorded and subsequently transcribed to ensure reliability (Yin, 2013). The interviews were conducted by master's students, with supervision from one of the authors. The primary data were supplemented with secondary data, e.g., data from LinkedIn, websites, newspaper articles and podcasts.

All, except one, start-ups were founded by teams of entrepreneurs, and many of the respondents used 'we' instead of 'I' in the interviews. Given that many start-ups are created by teams and not just one individual (Wagenschwanz, 2021) and that the accelerators preferred to include start-ups with more than one founder, this result is not surprising.

Table 1: Participants

NAME	GENDER	AGE	EDUCATION/EXPERIENCE	ENTREPRENEURIAL EXPERIENCE	
ARNIE	Male	Mid-forties	Master's in architecture. Industry experience	Entrepreneurial experience	PRIVATE (PA)
BERTH	Male	Early twenties	High school diploma	Nascent (team)	
CHARLES	Male	Mid-thirties	Industry experience	Nascent (team)	
DANIEL	Male	Mid-twenties	Bachelor's in psychology. Master's in entrepreneurship	Nascent (team)	
ERIC	Male	Mid-forties	Master's in business and economics Start-up education. Industry experience	Entrepreneurial experience (team)	
FIONA	Female	Late twenties	Bachelor's in business administration Industry experience	Entrepreneurial experience (solo)	
GABRIEL	Male	Late thirties	Master's in physics. Project manager, software developer	Entrepreneurial experience	
ANN	Female	Late twenties	Master's in economics. Start-up education	Nascent. International start-up experience.	GOVERNMENTAL (GA)
BIRGITTE	Female	Mid-thirties	Master's in film production Industry and international experience	Previous start-up experience	
GUNNAR	Male	Late twenties	Dual master's in engineering + business/ entrepreurship. Industry experience	Nascent (team)	
DAVID	Male	Mid-twenties	Master's in industrial economics and technology management	Nascent (team)	
ERWIN	Male	Mid-twenties	Master's in industrial economics and technology management	Nascent (team)	
RICHARD	Male	NA	Electronics engineer. Industry experience, particularly in marketing	Nascent entrepreneur (team)	
EMANUEL	Male	Mid-thirties	Several years of military leadership experience Industry experience	Previous start-up experience	

The data were re-coded by the authors following the Gioia method (Gioia, Corley, & Hamilton, 2013; Magnani & Gioia, 2023). To strengthen the validity and reliability of the data and to reduce potential personal bias in interpretation, the authors jointly performed data analysis following an individual–group procedure to ensure perspective (Miles, Huberman, & Saldana, 2014; Yin, 2013). First, the interviews were reviewed multiple times, individual notes were taken and terms, phrases and statements that seemed meaningful were extracted (Magnani & Gioia, 2023). Second, the authors discussed and further interpreted the data, establishing 1-order codes and themes. As the analysis and interpretation of the data emerged, patterns in the data were analysed, searching for categories and dimensions. The resulting data structure is presented in Table 2.

Combining deductive and inductive analyses, the authors' theoretical preconceptions helped in their interpretation of the data. The findings indicate that participation in an accelerator program influences identity, both at the personal level and in the role of entrepreneur. As a part of the findings, propositions regarding accelerator influence on participant identities are formed.

Table 2: Data structure

CONCEPTS (OBERVATIONS IN THE DATA MATERIAL)	CATEGORIES	DIMENSIONS
ACCESS TO MENTORS	SELF-REFLECTION, GROWTH	PERSONAL IDENTITY – WHO I AM
BEING CHALLENGED		
BEING BELIEVED IN		
ACCESS TO ROLE MODELS IN PEERS AND MENTORS	CONFIDENCE IN ROLE	ROLE IDENTITY – WHAT I DO
ROLE PLAY, TRAINING IN SKILLS, PITCHING		
FROM PRODUCT ORIENTATION TO MARKET /BUSINESS ORIENTATION	ROLE-DEFINING KNOWLEDGE AND SKILLS	
LEARNING TO THINK BIG - NEW MINDSET		
BEING AMONG EQUALS	BEING PART OF THE ENTREPRENEURIAL COMMUNITY	
ACCESS TO THE ENTREPRENEURIAL ECO-SYSTEM		

4. Results and discussion

4.1 Self-reflection and personal growth

Many of the participating entrepreneurs claimed that they underwent personal development through participation in an accelerator program. Independent of age and previous experience, the entrepreneurs argued that participation influenced them as a person, which was advantageous for developing their start-ups and enhanced their passion for the entrepreneurial journey. The first category found to contribute to participants' self-reflection is the centrality of mentoring. By presenting the participating entrepreneurs with an experienced mentor who was available for discussions and questioned their thinking, the participants were able to reflect on their personal motives and needs, who they are and who they can be. As stated by two of the experienced entrepreneurs,

> *It (participation) formed our identity as persons and gave us 'movement and drive'. To receive positive feedback and recognition from others gave us a lot. Arnie, PA*

> *After participation, you think everything is possible, you realise that there is not a big difference between them (those who succeeded us) and you realise that you can identify with them. I thought differently before participating in the accelerator. Emanuel, GA*

This was not the case for the young and inexperienced entrepreneurs (Berth, Daniel, and Erwin). Being treated seriously by the mentors and those they met through the programs influenced their self-perception. Being trusted to be able to succeed is important for personal growth.

> *Before the accelerator, we were teenagers with no experience…We were just testing out stuff to see if it could work. But they (the accelerators) believed in us, they treated us professionally…We became more grown-up and were no longer kids through our participation in the accelerator program. Berth, PA*

> *Maybe it is related to my personality more than anything else, but I learned a lot from talking with the accelerator team and from their experience…. It was important for me to show to my more experienced co-founder that I was self-confident and could do this. Daniel, PA*

However, being under observation by mentors and peers within the accelerator can also be a challenging process. Constant surveillance and self-evaluation can challenge a person's wellbeing and result in wounded pride for the participants. A young, sole entrepreneur stated

> *I thought the others became more confident than me, I felt increasingly like an idiot, and thought 'what am I doing here?' It was really bad for my self-confidence. However, I learned a lot about myself, and also to trust other people. I understood that they (the accelerators) wanted to help me and support me. Fiona, PA*

Further, one of the participants argued that the ongoing one-to-one conversations with the assigned mentor were important to understand her personal motives for building her business. Having a clear understanding of who you are and your own values are important in decision-making, especially when your business is new and the path forward may take many turns. She claimed that the value dialogues with the mentor helped her determine which collaborators to approach:

> *My mentor talked a lot about how important it is to choose investors that fit my ethos and my company's ethos and that it is important to remember who you are and for whom you are starting your company. Birgitte, GA*

The pattern of the observed concepts in the data material are summarised as

Proposition 1a: Participation in an accelerator influences participants' personal identities by triggering their self-reflection and awareness of personal values, and

Proposition 1b: The effect on personal identities are stronger for young and nascent entrepreneurs

4.2 Confidence in (entrepreneurial) role

We also found that building skills through some kind of roleplay or practical training was considered important to gain confidence in the entrepreneurial role. Notably, practicing pitching to 'investors' were mentioned by all

entrepreneurs as very useful but also challenging. Indeed, being challenged was mentioned as important by many of the participants.

> *(…) they are very harsh, make you stand on a chair and tell you what to do, and then spend ten seconds slaughtering you afterwards. It is part of the way to face it, so I think they balanced it well. They were good. Emanuel, GA*

The start-ups are generally invited/admitted to the program based on a product/service idea and know less about markets and business models. To make the pitch concise and clear, participants had to explore all sides of running a business. Hence, the pitching gave the participants not only new skills but also confidence as entrepreneurs. Several of the respondents argued that this step was crucial for acquiring investors.

> *(…) if I have to choose one thing, I probably have to choose the pitch (...) We trained a lot. I gained a lot of confidence in pitching. Birgitte, GA*

> *I became better at telling our story and selling the product, because we did it a thousand times in front of scary and very important people. Hence, coming home and talking to an investor suddenly became less scary. Ann, GA*

Being around other entrepreneurs, both peers and mentors, on a daily basis presented each participant with many role models that were willing to share their experience. Being accepted and respected as a part of an entrepreneurial community fostered the participants' confidence in their role as entrepreneurs. In particular, the mentors were role models:

> *All ten companies in that group were completely impressed by what she, the mentor, was able to achieve. In general, I think that we had good mentors. Richard, GA*

The pattern of the observed concepts in the data material are summarised as

Proposition 2: Participation in an accelerator influences participants' entrepreneurial role identity by building confidence in their role as entrepreneur.

4.3 Role-defining knowledge and skills

Another pattern in the data reflected how the accelerator inspired the participants to 'think big' and equipped them with a mindset that was more favourable for succeeding in a start-up. Overall, the findings indicate that the entrepreneurs participating in the governmental accelerator (set to the USA) experienced that the American mentors were somewhat tougher than the Norwegian mentors. Being exposed to an American mindset and culture was very challenging for many of the entrepreneurs but simultaneously gave them the belief that they could make better decisions and succeed in their role as entrepreneurs.

> *The mentors could be a bit scary…I have never been so personally challenged in my whole life. It is difficult to say exactly how, but this experience certainly built character. I returned from the USA with another mentality. I learned that if you are going to succeed, you must have the confidence to talk about yourself and your company and you must be able to 'sell' yourself. I totally changed in this respect. Richard, GA*

The findings indicate that some of the entrepreneurs, particularly those new to entrepreneurship and with an international ambition (Gunnar, David, and Erwin participating in GA), were overconfident regarding how easy it would be to succeed internationally:

> *We just thought we could start selling internationally and approach retailers in Europe and the USA. We understood during the program that it would not be that easy... Gunnar, GA*

Even though they were encouraged to 'think big', it was necessary for the participants to be realistic about their own competence and access to resources. Through lecturing and feedback throughout the program, these entrepreneurs realised that they had to take a 'step back' and be better prepared for an international expansion.

> *I think that the greatest benefit of participating in the program was that although we made the decision ourselves, the mentors helped us bring clarity into critical decisions, which was absolutely crucial. Erwin GA*

When asked if they had a business strategy before participation in the program, one participant relayed

> We thought so, but it was torn to shreds by the mentors. It was fantastic. We were really shot down (…) But that was really what was needed (…) You become sharpened and realise that they ripped us to shreds because they had to. You received their honest opinions. Some entrepreneurs go to family and friends and ask what they think of their product, and only get pleasantries. That feedback takes you nowhere Richard, GA

Other participants noted that the challenge of 'what they do' , that initially tended to be focusing more what they produced than what kind of need their business served and how to develop a profitable business, helped them gain a better understanding of their entrepreneurial role:

> *The main thing is simply to observe more the whole aspect of running a start-up in relation to being very focused on product development (...) We learned the business aspect, i.e., not only being very product-focused, but gaining much broader expertise in running the company (...) Gabriel, PA*

The pattern of the observed concepts in the data material are summarised as

Proposition 3: Participation in an accelerator influences participants' entrepreneurial role identity by equipping them with role-defining knowledge and skills.

4.4 Affiliation to the entrepreneurial community

Being part of the accelerator, one among peers, and with access to professionals that had been in the same situation was recognized as important by many. The accelerator gave access to a wider network of entrepreneurs, alumni, and the wider entrepreneurial eco-system. This approach helped participants see themselves as part of an entrepreneurial community:

> *(…) there is no difference between them and me. It is not that everyone is the same, but you see many people who succeed that you can identify with. He fixed it, so there is no reason why I should not get it done. Emanuel, GA*

> *I think it is like a need of security, that you are not alone. It is often very lonely being an entrepreneur, and when you are not, at least for me, who has been and is in an environment with other entrepreneurs; otherwise, I think it was. That was nice. To come into and sort of be a part of more than just being alone. Charles, PA*

By joining the accelerator, participants begin to label themselves as entrepreneurs. For the younger and less experienced entrepreneurs, their understanding of self and role changed the most. One of the participants said that they came in as mates building an app, and left being an entrepreneurial team creating a business:

> *The three of us, just mates really, we worked with the product because it was fun (…) However, now we are a team and more aware of each other's strengths, building a business together. Berth, PA*

The pattern of the observed concepts in the data material are summarised as

Proposition 4: Participation in an accelerator influences participants' entrepreneurial role identity by bringing them into an entrepreneurial community.

5. Conclusion

This paper contributes to an enriched understanding of how participation in accelerators, influence's identity at the personal level (who I am) and role level (what I do). While the effect on personal identity primarily reinforced and clarified the inherent self-understanding, several of the participants experienced considerable changes in their self-perception in the role of entrepreneur. This accords Ulmer and Pape's (2022) findings that accelerators can provide assistance and important stimuli facilitating and strengthening entrepreneurs' entrepreneurial identity, and increase feeling of self-worth (Mmbaga et al., 2020).

All participant entrepreneurs experienced some changes in personal identity, yet the change in self- perception seemed the largest for the youngest and least experienced entrepreneurs. Corresponding to the findings of Watson et al. (2015), the accelerator program helped the entrepreneurs become more aware of their own strengths and weaknesses, more confident, and more capable of gathering new resources to develop their ventures. Through increased awareness of own strength and weaknesses, their role (organizer, marketer, etc) in the entrepreneurial team became clearer (Sherperd and Haynie, 2009), leading to a narrowing of their role

set, which can be advantageous for venture growth (Mathias and Williams, 2018). Interestingly, many participants reported improved compliance between personal identity and role identity post-participation.

Referring to the intensive onsite practical work with start-ups during the accelerator period, several entrepreneurs experienced increased dedication to their start-up and their role as entrepreneurs while participating in the accelerator. Having daily access to other entrepreneurs (masters) as role models facilitated transfer of tacit knowledge improving the journeymen's entrepreneurial skills and embeddedness in the accelerator community. Corresponding to previous research (Ahsan et al., 2018) the mentors turned out to have considerable influence on personal- and role identity for most entrepreneurs. In line with Kakarika, Niniari, Guillen and Mayo (2022), the harsh feedback combined with support seemed to strengthen personal identity Being a part of a peer community on the other hand, seemed to primarily affect role identity.

The results are based on a relatively small sample size. Further research should be conducted to test the developed propositions with a larger sample.

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Patterns of Successful Founding Team Composition and Funding Outcomes

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Abstract. When it comes to assessing a startup's chance of success, equity investors apply a specific set of criteria to minimize risk. In their decision-making process, most venture capitalists (VCs) agree with giving priority to the team composition, hence the popular saying: "*Always consider investing in a grade-A team with a grade-B idea. Never invest in a grade-B team with a grade-A idea*." In this paper, we explore the profile of technology-based startup teams that are most likely to secure a Series-A funding round from VCs. From a methodological point of view, we applied a strongly quantitative approach, integrating several data mining techniques according to a multidisciplinary perspective, between data science and entrepreneurship. As for the company information, we used Crunchbase as our primary source, considering a set of U.S.-based startups founded from 2000 to 2017. For each venture we algorithmically integrated team-related information from the founders' public LinkedIn profiles. Overall, we analysed more than 2,100 teams, involving a total of about 4,600 founders. Each founders' experience was analysed by considering their professional background. Overall, more than 29,000 work experiences have been taken into consideration. Statistical analysis was carried out on both individual founders and their team organization. Both founders and teams were evaluated in terms of heterogeneity of prior experience and similarity of co-founder profiles using the Gini coefficient and Jaccard index, respectively. Statistics are expressed according to the companies' sector and their fundraising profile. In fact, the different sectors are mapped on a 4-quadrant chart to identify different combinations between founders' profiles (specialists VS generalists) and teams characteristics (combining co-founder with similar or diverse background). Results reveal the impact of team similarity and variety in terms of prior working experience. The findings provide valuable insights for scholars dealing with tech-driven startups teams, aspiring entrepreneurs looking for co-founders and for VCs seeking to invest in promising startups.

Keywords: startup, team, venture capital, data mining, linkedin

1. Introduction

In the highly competitive and rapidly evolving landscape of technology startups, the role of the founding team has emerged as a critical determinant of success (Muñoz-Bullon et al., 2015).

Over time, scholars in Entrepreneurship have explored different perspectives for analysing the characteristics of a founding team. The main areas of investigation include human capital, social capital, psychological traits, and team variety. Human capital theory (Becker, 1964; Unger et al., 2011) highlights the importance of founders' experience, education, and skills as signals for a team's potential for future success. Social capital theory (Aldrich and Zimmer, 1986; Shane and Cable, 2002) emphasizes the role of networks and relationships in facilitating access to resources and opportunities. More recent research has investigated the role of the founding team's psychological traits (Koellinger et al., 2007; Hmieleski and Baron, 2009), such as risk-taking propensity, tolerance for ambiguity, and self-efficacy. Finally, increasing emphasis is being given to the team diversity (Ruef et al., 2003; Bouncken et al., 2016) in terms of demographics, cognitive styles, and values, in determining the success of startup ventures. In this paper we focus on both human capital and team variety, considered from the work experience perspective (Hashai and Zahra, 2022). Specifically, human capital is analysed starting from the career path of each individual founder. On the other hand, variety within the team is considered in terms of heterogeneity and complementarity of the co-founders' professional background.

When discussing about human capital and variety of founders' profiles, two types of career paths can be outlined: so-called specialists and generalists (Custódio et al., 2013; Kaiser and Müller, 2015, Xiao et al., 2020). Generalists have interdisciplinary backgrounds leveraging a broad range of skills and knowledge across multiple domains. Thanks to their cross-sectional expertise, generalists can quickly adapt to new situations and challenges, allowing startups to pivot more easily and leverage new opportunities; they can facilitate communication between different departments, promoting a collaborative work environment and can identify connections between seemingly unrelated fields, leading to innovative ideas and solutions. However, as they act as "Jack of all trades, master of none", generalists may struggle to excel in highly specialized or technical roles that demand focused expertise. On the other hand, specialists own deep knowledge and expertise in a

specific domain. They have spent considerable time and effort mastering a particular field, and their skills are often crucial in addressing complex, domain-specific challenges. Thanks to their vertical expertise, specialists are often more efficient in their specific areas, as their deep expertise enables them to work quickly and accurately. However, being focused on a single topic only, specialists may struggle to adapt to new domains or to connect the dots together. In the context of technology-based startups, the choice between generalists and specialists in a founding team can significantly impact the venture's level of success, innovation and adaptability.

One of the first specific situation in which a team is evaluated in depth is the fundraising process. In fact, when it comes to assessing a startup's chance of success, equity investors apply a specific set of criteria to minimize risk (Ferrati and Muffatto, 2021). Specifically, most venture capitalists (VCs) agree with giving priority to the team composition in their decision-making process (Franke et al., 2006; Franke et al., 2008). As VCs highly prioritize the quality of the team as a go/no-go factor, in this paper we explore possible relationships between the characteristics of the founding team and its ability to raise a series-A funding round.

However, the rationale applied by VCs in evaluating the efficacy of a founding team also depend on the specific industry in which the startup operates, due to the specific challenges that characterize each sector. For this reason, in our analysis we also considered each team according to their sectors.

This study thus aims to address the following research question: "*Considering the industry in which a startup operates, how can the human capital of individual founders and the variety within the founding team affect the ability to raise a series-A funding round?*"

From a methodological perspective, we addressed the research by applying a highly quantitative approach. In fact, in both the data collection and the data analysis phases, we applied advanced data mining techniques. As for the ventures' information, we used Crunchbase as our primary data source (Ferrati and Muffatto, 2020). Also, in order to analyse each founder's professional background in detail, for each company we algorithmically integrated team-related information from the founders' public LinkedIn profiles (Gloor et al., 2011; Banerji and Reimer, 2019). Indeed, this paper aims to contribute to the literature by exploring the potential of data science to study team-related topics using complex data sets.

The structure of the paper is as follows. First, we describe the methodological process, from data collection, to professional experiences coding and classification, to the definition of variables and indices. Next, we present the analysis results, highlighting the values of two considered indices (Gini coefficient and Jaccard index) calculated for founders and teams respectively in different sectors. Finally, we discuss the results and present future research opportunities.

2. Methodology

The entire research activity was carried out by applying an advanced data science approach. Data science is an interdisciplinary field that combines domain expertise, programming skills, and knowledge of mathematics and statistics to extract valuable insights and knowledge from complex data sets. It involves the entire data lifecycle, including data collection, cleaning, analysis, visualization, and communication of results. In the following sections we describe in detail all the specific phases for the research performed. i.e., data collection, work experience classification, variable definition, index analysis. All operations were performed using the Python programming language.

2.1 Data collection

Since our research approach is based on the analysis of large amounts of data, the choice of the most suitable datasets to use highly influences the quality of the results. Considering the scope of the research, data were obtained from two complementary data sources i.e., Crunchbase and LinkedIn. We used Crunchbase as our main reference for companies. Companies' information was then enhanced by integrating each founder's LinkedIn profile.

Crunchbase is one of the most relevant databases collecting information on technology-driven companies. The data considered was retrieved on February 5, 2021. Overall, the Crunchbase database is organized into seventeen individual .csv files and the following five datasets were considered in this study: *Organizations*, *People*, *Jobs*, *Investments* and *Funding rounds*. Specifically, the *Job* dataset was used to identify all job positions with a "founder" or "co-founder" title. The founders' job positions were then linked to the founders' information in Crunchbase (dataset *People*) and the respective founded companies (dataset *Organizations*). For both

companies and persons, Crunchbase provides a variable with the URL of the respective LinkedIn profile. At this stage, both companies that did not report a valid company LinkedIn URL and companies that did not report all founders LinkedIn URL were discarded. An intermediate sample of 83,347 companies was so obtained. Once the set of companies with a complete set of LinkedIn URLs was obtained, their profiles were integrated with their fundraising information (datasets *Investments* and *Funding rounds*). For each company we tracked the entire funding history, in terms of the number of funding rounds, raised amount (in total and in the eventual series-A), and timing (date of the eventual series-A or of the last funding round). At this point we obtained an intermediate sample of 61,172 companies. Companies were then additionally filtered by considering only U.S.-based ventures (26,430 remaining companies). Since the research aims to analyse the dynamics within founders' teams, only companies with number of founders between 2 and 4 were included i.e., companies with solo-founders were excluded (8,562 remaining companies). Finally, an additional filter was applied by considering the year of foundation of the companies. Specifically, we considered companies founded between 2000 and 2017. The year 2017 was selected by starting from the year 2020 (note that we extracted Crunchbase data in 2021, so we applied a principle of prudence) and subtracting 3 years. The value of 3 years was calculated on the sample as the average number of years to collect a series-A round. In this way, we were sure that companies with no series-A had already passed the average number of years (i.e., 3 years) to collect a series-A. At this point we obtained an intermediate sample of 6,826 companies. The data provided by Crunchbase are mainly related to the companies' registry (location, year of foundation, industry) and their fundraising track record. On the other hand, founders-related information is not sufficiently detailed to allow in-depth analysis of professional backgrounds.

For this reason, we used the list of founders obtained from Crunchbase as the starting point for the extraction of the founders' public LinkedIn profiles. For this purpose, a custom algorithm was implemented to automatically search and collect the founders' public profiles. It is important to note at this stage that only publicly available information was used. It is also crucial to point out that the use of only public data actually led to a significant reduction in the final sample size. Indeed, several cases can occur at the time of extraction that actually result in a discard of at least one founder's profile and consequently of the related company. Examples of cases that lead to the discarding of a founder's profile are: public LinkedIn page not accessible, accessible but empty person public profile (no information provided), incomplete sections (e.g., education section is available, but there is no information about the professional experience). Due to these cases, the final sample used in the study was therefore much smaller than the one initially obtained from Crunchbase. The final sample consists of 2,109 companies (i.e., founding teams), 4,673 founders' profiles and 29,694 founders' prior work experience.

Finally, in order to consider the timing of the fundraising process, we also used the investment date provided by Crunchbase to classify companies according to three possible classes of outcomes. Table 1 summarizes the number of teams (i.e., companies) and founders related to each outcome.

Table 1: Number of teams (i.e., companies) and founders related to each fundraising outcome

Class	Description	N teams	% teams	N founders	% founders
Outcome 0	Companies with no series-a	1,194	56.61%	2,558	54.74%
Outcome 1	Companies that raised a series-a within 3 years from foundation	461	21.86%	1,080	23.11%
Outcome 2	Companies that raised a series-a after 3 years from foundation	454	21.53%	1,035	22.15%
Total		**2,109**	**100.00%**	**4,673**	**100.00%**

2.2 Work experience classification

Once the complete dataset of companies with their founders and related work experience was created, an intensive reclassification activity was required to analyse the professional backgrounds. Within the LinkedIn profile, all individual work experiences have the same format consisting of: the title of the experience, the name of the organization, the duration (start date - end date - duration), the geographic location, and a brief description of the activity (please, note that not all information is always fully provided). The key information (also mandatory) for understanding the specific activity is the so-called job title. Due to the way this variable is designed, its analysis is particularly challenging. In fact, this field is designed as a "free text" data type and

actually allows the user to write what they consider most informative for the job identification. Thus, considering the high variability of this variable, a reclassification of the possible values toward a manageable but significant number of experience areas was first necessary in order to perform a statistical analysis.

In order to classify the variety of existing occupations in a consistent way, several governments have developed different occupational taxonomies (e.g., SOC for US occupation and NOC for Canadian occupations). An advanced job classification system is provided by the O*NET Program, the U.S. nation's primary source of occupational information (National Center for O*NET Development, 2023). The O*NET database, contains standardized and occupation-specific descriptors on almost 1,000 occupations covering the entire U.S. economy. The considered taxonomy is based on the 2018 SOC system (i.e., Standard Occupational Classification, by U.S. Bureau of Labor Statistics) but also provides several grouping schemes that combine different occupations together based on multiple aggregation criteria. Specifically, the 16 "career clusters" groups together occupations within the same field that require similar expertise. As in this research we wanted to explore the impact of the heterogeneous/homogeneous profiles of the founders on the investments collected, O*NET's "career clusters" are a valuable rationale for experience classification.

The LinkedIn experience reclassification process has therefore resulted in categorizing each LinkedIn "job title" into one of the 16 possible "career clusters". It was therefore necessary to create an algorithm to let the two systems communicate with each other. The reclassification system we developed propose an original search strategy for specific keywords within the extended job title stated on LinkedIn. The system was designed from an analysis of job titles' format which generally consists of 3 sections: type of contract, responsibility, and area. As in Figure 1, in the case of "*full-time lead software developer*", "full-time" represents the type of contract, "lead" describes the responsibility, and "software developer" is the occupation area.



Figure 1: Breakdown strategy for job titles analysis

Since for the purposes of our research, the most important element is the "area", a search strategy focused on optimizing the retrieval of this information was applied. Specifically, our algorithm was structured in 3 sequential phases: (1) searching for any "contract type" information, (2) searching for any "responsibility" information, and finally (3) searching for any "area" information. Where the first 2 steps were successful (i.e., the algorithm found information on contract type and/or responsibility), the part of the text referring to them was dropped from the title string. The third step (i.e., "area" identification) was then applied only to a portion of text that should most likely contain information about the area itself. This strategy has made it possible to eliminate much of the informational noise present in the job titles on LinkedIn. In each of the three steps of the algorithm, to search for each piece of information, the possible classes of each part were first identified and then a comprehensive list of keywords related to each class was created. In total, more than 850 unique keywords have been considered. The algorithm searched for all the keywords associated with each class and, where found, assigned the corresponding class to the portion of text. Table 2 shows the different possible classes that can be associated with the three types of information.

Table 2: Possible classes that can be associated with each part of a job title

Job title parts	Possible classes
Type of contract **7 possible classes**	*full time · part time · contract · independent contractor · temporary · on call · volunteer*
Responsibility **13 possible classes**	*founder · strategy · executive · senior management · middle management · specialist · associate · entry level · student · researcher · advisor · trainer · other*
Area i.e., O*NET "career clusters" **16 possible classes**	*agriculture, food & natural resources · architecture & construction · arts, audio/video technology & communications · business, management & administration · education & training · finance · government & public administration · health science · hospitality & tourism · human services · information technology · law, public, safety, corrections & security · manufacturing · marketing · science, technology, engineering & mathematics · transportation, distribution & logistics*

Figure 2 shows how the job titles of the 29,694 experiences extracted from LinkedIn were uniquely associated with one of the 16 O*NET "career clusters". As can be seen, more than 21% of all the founders' experiences can be associated with the area of "business, management & administration", followed by "information technology" (20%), "science, technology, engineering & mathematics" (15%), "marketing" (14%), "finance" (8%) and "arts, audio/video technology & communications" (6%). All other "career clusters" together collect less than 10% of the experiences while in 6% of the cases the algorithm didn't find any keywords related to any cluster, confirming the vast variability of the job titles on LinkedIn (result "unknown"). Note that in the latter cases of uncertainty, we prudently preferred to associate an "unknown" label rather than enforcing the association of an incorrect cluster.

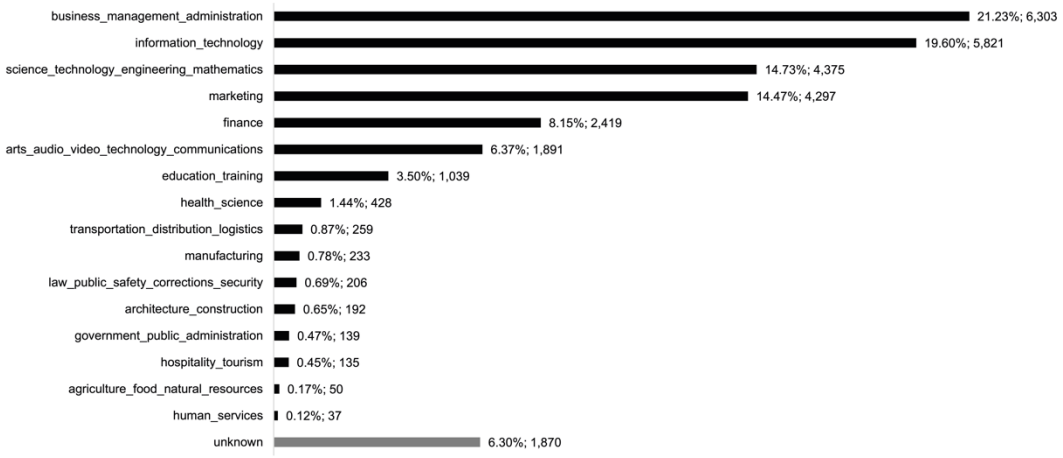

Figure 2: Percentage and number of job titles on LinkedIn related to each O*NET "career clusters"

2.3 Variable definition

The experiences classification process was the starting point for defining the set of key variables to analyse. Specifically, from each founder's LinkedIn experience, the classification algorithm allowed us to identify the number of experiences each founder had in each of the 16 "career clusters". Since we also knew the duration of each experience, the number of months of cumulative experience in each of the 16 "career clusters" was also calculated for each founder. At this stage it is important to emphasize that both any experience of the founders after the foundation of the considered company and the experience itself in the founded company were excluded from the computation. In fact, our research wanted to focus on the analysis of the work background prior to the startup's foundation. Finally, in order to consider the level of heterogeneity and homogeneity of each founder's areas of experience, for each of the 16 "career clusters", the relative duration of experiences was calculated as a ratio of the total duration of the professional career. In this way, each career cluster was associated with the percentage of time the founder spent in that area. Moreover, to allow analysis by sector, the 744 "categories" provided by Crunchbase were also considered. Note that due to the high cross-sectorial activities of tech-driven startups, multiple categories may be associated with the same company. In order to improve the classification system, the 744 existing categories were reclassified into 57 technology-sectors and founders' and teams' profiles were then analysed according to them. Finally, in order to consider the timing of the fundraising process, we also considered the three possible fundraising outcomes as represented in Table 1.

2.4 Index analysis

In this research we wanted to analyse the profiles of the founders and teams in terms of homogeneity or heterogeneity. For this purpose, we decided to summarize the profile of each founder and team through the use of two statistical measures. Specifically, for each founder we computed the value of the Gini coefficient associated with their profile, and for each team we determined the value of the Jaccard index.

The Gini coefficient is a statistical measure traditionally used to quantify income or wealth inequality within a specific population (Equation 1). More generally, the Gini coefficient can be used to measure the heterogeneity of a distribution. When normalized (Equation 2), it ranges from 0 to 1, where 0 represents perfect homogeneity (i.e., data are equally distributed over all k modes, which have equal relative frequency) and 1 represents perfect heterogeneity (i.e., only one of the k possible modes is observed).

Equation 1: Gini coefficient

$$G = \sum_{i=1}^{k} f_i^2 \qquad 0 \leq G \leq \frac{k-1}{k}$$

Equation 2: Normalized Gini coefficient

$$G_N = G\frac{k}{k-1} \qquad 0 \leq G_N \leq 1$$

In our case, we calculated the normalized Gini coefficient for each founder by considering the relative duration of their experiences in each one of the 16 possible "career clusters" (k = 16) expressed as a percentage of the total career duration. In this way, a high G_N value (i.e., closer to 1) models a founder who has gained experience in only one or a few occupational areas (high heterogeneity) and thus has a more specialist profile. On the other hand, a low G_N value (i.e., closer to 0) models a founder who has gained experience in many different occupational areas (high homogeneity) and thus has a more generalist profile.

As for the analysis of the complementarity of the founders within the same team, the Jaccard index was considered instead. The Jaccard index is a statistical measure used to quantify the similarity between two sets (Equation 3). It is calculated by dividing the number of elements in the intersection of the two sets by the number of elements in the union of the sets. It ranges from 0 to 1, where 0 indicates no similarity (no shared elements) and 1 represents complete similarity (identical sets).

Equation 3: Jaccard Index

$$J(A,B) = \frac{|A \cap B|}{|A \cup B|}$$

In our case, we calculated the Jaccard index for each team by considering the similarity of co-founders' career, that is, the number of "career clusters" in common among two or more co-founders (each co-founder is considered as a set). In this way, a low *J* value (i.e., closer to 0) models a team whose co-founders have very different professional backgrounds (low similarity) and thus can create synergies across multiple areas. On the other hand, a high *J* value (i.e., closer to 1) models a team whose co-founders have worked in many areas in common (high similarity) and thus can further strengthen the profile they already have individually.

3. Results

In our data analysis, we wanted to explore the relationship between the characteristics of both individual founders and teams as a whole as a function of the company's industry and the outcome of the fundraising process. For this purpose, we carried out a statistic analysis of both the normalized Gini coefficient and the Jaccard index for each of the 57 categories and each of the 3 possible fundraising outcomes.

In appendix, Table A 1 describes in detail the mean of each of the two indices for each sector and for the 3 different outcomes. It should be noted that since multiple categories are usually associated with each company on Crunchbase, the same founders and teams may contribute to the mean of multiple categories. The colour gradient on each column allows to immediately identify the sectors with higher (red) and lower (green) values of each index. Please note that both indexes have minimum value of zero and maximum value of 1. Considering outcome 1 (i.e., companies that raised a series-a within 3 years from foundation), it is interesting to evaluate the sectors that require higher or lower values both in terms of the specialization of individual founders and in terms of the variety of members within the team. For example, the outcome 1 case of the "gaming" sector has a lower G_N value than the other two possible outcomes (equal to 0.36, i.e., more generalist profile of individual founders) and also a lower J value (equal to 0.23, i.e., greater variety of experience among the founders). On the other hand, always considering the outcome 1 scenario, the "life science and biotechnology" sector requires individual founders to have a rather specialized profile (G_N equals 0.45) and similarity among the profiles of the founders (J equals 0.48).

To explore possible insights into the data, considering each of the 3 possible fundraising outcomes, the 57 categories were plotted within a 4-quadrant scatter plot as in Figure 3. The x-axis shows the mean of G_N and the

y-axis shows the mean of *J*. Low values on the x-axis represent more generalist founders (having more homogeneous work experiences), while high values on the x-axis represent more specialist founders (having more heterogeneous work experiences). On the other hand, low values on the y-axis represent teams made up of founders with more diverse profiles while high values on the y-axis represent teams composed of founders with more similar profiles. Each point represents a specific sector (the numerical labels correspond to the different sectors as in Table A 1). The dashed lines represent the average value of G_N and *J* calculated over all categories. The 4 graphs in Figure 3 represent respectively (a) all three outcomes with different colours (Outcome 0, 1 and 2), (b) only outcome 0, (c) only outcome 1 and (d) only outcome 2.

It can be seen from the figure that different sectors have different positions in the 4 quadrants. This position also changes according to the fundraising outcome considered. For example, considering outcome 1 (Figure 3.c i.e., companies that raised a series-A within 3 years of foundation), it can be noted that the "transportation" sector (label 53) is located in the slightly-upper right quadrant i.e., more specialist founders and more similar team members. In contrast, the "design" category (label 17) is located in the slightly-lower left quadrant i.e., more generalist founders and teams consisting of founders with more diverse backgrounds. When considered for each sector, this analysis provides a useful benchmark for making an initial analysis of the most characteristic team configurations in different sectors and for different fundraising profiles. However, note that the maximum values of both the normalized Gini coefficient and the Jaccard index are not very high (maximum value 0.61 and 0.58, respectively) suggesting the non-extreme specialization of individual founders and the synergistic complementarity of profiles within the team.

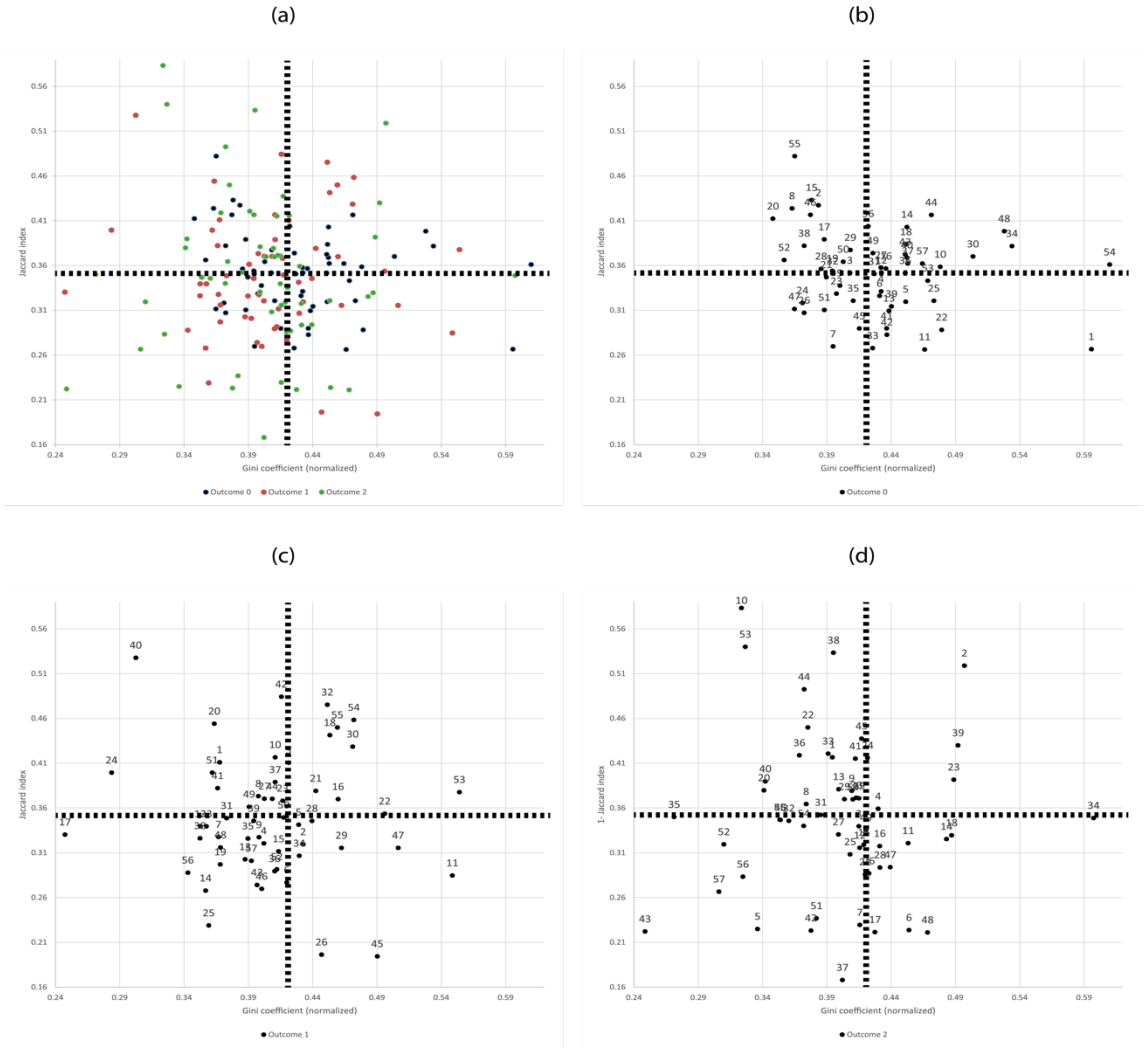

Figure 3: Analysis of Gini coefficient and Jaccard index for both founders and teams of companies in different sectors and with different fundraising profile

4. Conclusion and opportunities for future research

In this research, we proposed an original method to quantitatively analyse the founding team of technology companies. Starting with the identification of target companies on Crunchbase, we reconstructed the professional background of the founders through an analysis of their public LinkedIn profiles. To perform a statistical analysis, the extremely large variety of job titles declared on LinkedIn were mapped back to the 16 possible "carer clusters" of the O*NET program, by using an original classification strategy. The profiles of both founders and teams were then analysed by repurposing the Gini coefficient and the Jaccard index. The results were then plotted considering the mean values of the two indices for different sectors and fundraising profiles.

For the purpose of future research, it is useful to report some current limitations. For example, in the present research we considered only the founders' professional background, thus not including either the education aspect or the personality aspects of the founders. While education-related information can also be gathered from public profiles on LinkedIn, a large-scale analysis of character and psychological aspects requires a different approach and is certainly very challenging. Another limitation relates to the category classification provided by Crunchbase. Since multiple categories can be associated with each company, the same founders and teams can contribute to the statistics of multiple categories (reflecting, however, the inter-industry aspect of tech-driven startups).

Finally, consider possible future developments, it would be interesting to perform an inferential statistics analysis in order to investigate possible causal relationships between the characteristics of both founders and teams and the companies' fundraising profile.

Applying a data science approach, the results of our study can provide insight to both scholars on topics related to founding teams, aspiring entrepreneurs in search of a co-founder, and equity investors in their decision-making process.

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http://www.crunchbase.com

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Appendix

Table A 1: Analysis of Gini coefficient and Jaccard index for both founders and teams of companies in different sectors and with different fundraising profile

				Outcome 0		Outcome 1		Outcome 2	
Label	**Sector**	**#founders**	**#teams**	**G_N**	**J**	**G_N**	**J**	**G_N**	**J**
1	aerospace	33	11	0.60	0.27	0.37	0.41	0.39	0.42
2	agriculture and farming	50	19	0.38	0.43	0.43	0.32	0.50	0.52
3	apps	414	158	0.41	0.35	0.42	0.41	0.41	0.34
4	as a service	557	209	0.43	0.33	0.40	0.32	0.43	0.36
5	augmented / virtual reality	92	34	0.45	0.32	0.43	0.34	0.34	0.23
6	beauty and wellness	159	60	0.43	0.33	0.42	0.28	0.45	0.22
7	clothing and apparel	136	45	0.39	0.27	0.37	0.33	0.42	0.23
8	cloud	222	78	0.36	0.42	0.40	0.37	0.37	0.36
9	commerce and shopping	576	192	0.40	0.34	0.40	0.33	0.41	0.38
10	communication protocols	56	17	0.48	0.36	0.41	0.42	0.32	0.58
11	community and lifestyle	196	77	0.47	0.27	0.55	0.28	0.45	0.32
12	consumer electronics	677	241	0.43	0.35	0.35	0.34	0.42	0.32
13	consumer goods	101	37	0.44	0.31	0.39	0.30	0.40	0.38
14	corporate applications	73	26	0.45	0.40	0.36	0.27	0.48	0.33
15	corporate functions	249	91	0.38	0.43	0.41	0.31	0.42	0.32
16	data and analytics	1029	370	0.44	0.36	0.46	0.37	0.43	0.32
17	design	149	53	0.39	0.39	0.25	0.33	0.43	0.22
18	development tools	198	81	0.45	0.38	0.45	0.44	0.49	0.33
19	education	234	79	0.39	0.35	0.37	0.30	0.41	0.37
20	electronic hardware	55	21	0.35	0.41	0.36	0.45	0.34	0.38
21	energy	96	36	0.39	0.35	0.44	0.38	0.42	0.29
22	events	81	31	0.48	0.29	0.50	0.35	0.38	0.45
23	financial services	556	196	0.40	0.33	0.42	0.37	0.49	0.39
24	food and beverage	163	56	0.37	0.32	0.28	0.40	0.42	0.42
25	gaming	83	35	0.47	0.32	0.36	0.23	0.41	0.31

26	government and military	57	19	0.37	0.31	0.45	0.20	0.42	0.29
27	hardware	101	33	0.43	0.36	0.40	0.37	0.40	0.33
28	health care	589	216	0.39	0.36	0.44	0.35	0.43	0.29
29	ict	705	251	0.41	0.38	0.46	0.32	0.40	0.37
30	internet of things	109	40	0.50	0.37	0.47	0.43	0.41	0.37
31	internet services	624	219	0.43	0.35	0.37	0.35	0.39	0.35
32	life science / biotech	171	60	0.39	0.35	0.45	0.48	0.36	0.35
33	manufacturing	163	59	0.43	0.27	0.36	0.34	0.39	0.42
34	media contents manag.	75	33	0.53	0.38	0.43	0.31	0.60	0.35
35	media digital media	86	34	0.41	0.32	0.39	0.33	0.27	0.35
36	media entertainment	100	36	0.45	0.35	0.41	0.29	0.37	0.42
37	media music and audio	65	26	0.45	0.36	0.41	0.39	0.40	0.17
38	media publishing	100	41	0.37	0.38	0.35	0.33	0.40	0.53
39	media social media	183	69	0.44	0.31	0.39	0.35	0.49	0.43
40	media video	128	47	0.45	0.37	0.30	0.53	0.34	0.39
41	messaging and telecom	154	52	0.44	0.29	0.37	0.38	0.41	0.42
42	navigation and mapping	55	19	0.44	0.28	0.42	0.48	0.38	0.22
43	platforms software	95	36	0.45	0.37	0.40	0.27	0.25	0.22
44	privacy and security	206	71	0.47	0.42	0.41	0.37	0.37	0.49
45	productivity	77	27	0.42	0.29	0.49	0.19	0.42	0.44
46	professional services	260	102	0.38	0.42	0.40	0.27	0.35	0.35
47	real estate	287	100	0.36	0.31	0.51	0.32	0.44	0.29
48	robotics	110	43	0.53	0.40	0.37	0.32	0.47	0.22
49	sales and marketing	663	249	0.43	0.37	0.39	0.36	0.42	0.34
50	software	1634	587	0.40	0.36	0.42	0.35	0.41	0.37
51	sports	178	64	0.39	0.31	0.36	0.40	0.38	0.24
52	sustainability	73	26	0.36	0.37	0.41	0.29	0.31	0.32
53	transportation	61	23	0.47	0.34	0.55	0.38	0.33	0.54
54	personal mobility	34	11	0.61	0.36	0.47	0.46	0.37	0.34
55	shipping and delivery	86	28	0.36	0.48	0.46	0.45	0.35	0.35
56	vehicles	89	30	0.42	0.40	0.34	0.29	0.32	0.28
57	travel and tourism	131	49	0.46	0.36	0.39	0.30	0.31	0.27
			Min	0.35	0.27	0.22	0.00	0.25	0.17
			Max	0.61	0.48	0.78	0.53	0.60	0.58
			Mean	0.43	0.35	0.41	0.34	0.40	0.35

The Multidimensional role of Social Entrepreneurship: A case Study Approach Within an International Project Context

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Abstract: Social entrepreneurship creates social value and has a multidimensional impact (e.g. economic, environmental, cultural). This is related to the complexity and multidimensional approaches to current societal problems such as climatic changes and socioeconomic crises. The paper explores this multidimensionality by presenting three Portuguese case studies of social entrepreneurship operating in diverse domains. The study is based on primary and secondary data on the selected social enterprises. The analysis explores the motivations and constraints in forming a social enterprise and the impact of entrepreneurial activity. There is evidence of multiple roles played by these entrepreneurial agents, and, therefore, their critical role in the response to the problems that current societies face.

Keywords: social entrepreneurship, sustainable development, case study, Inspire project

1. Introduction

Current societal problems (e.g. climate change, social exclusion, and poverty) demand innovative and multidimensional answers. Social entrepreneurship presents important potentialities in this regard. Social entrepreneurs implement social innovation processes, enlarging the "economic and technological reading of the role of innovation in development to encompass a more comprehensive societal transformation of human relations and practices" (Moulaert & Nussbaumer, 2008, in MacCallum, 2009; Moulaert & Nussbaumer, 2005). With this in mind, the paper presents and compares three cases of social entrepreneurship that illustrate the multidimensional (economic, social, environmental, and cultural) impact of social entrepreneurship and its critical role in dealing with the complex and diverse challenges we face in the current context. The cases under analysis integrate an Erasmus+ project, Inspire (Social Entrepreneurs Network), whose primary goal is to create an inspiring learning HUB based on the identification of transferable practices aiming to support social entrepreneurship's development in different European countries. The paper uses a case study approach by analysing primary and secondary data obtained respectively through a structured questionnaire and from information taken from the websites of these social enterprises. The paper is organized as follows. The next section presents the relevant literature on the multidimensions of social entrepreneurship. Section 3 discusses the methodology, and Section 4 analyses the case studies. The last section of the paper concludes.

2. Literature review

Research on social entrepreneurship (SE) experienced significant growth after the 2008 crisis (Lehtimäki et al., 2021; Macke et al., 2018; Pinto et al., 2016; Rahdari et al., 2016; Sekliuckiene & Kisielius, 2015; Parente & Quintão, 2014; Phillips et al., 2015; Peredo & McLean, 2006). The explanation for this growth is due to the urgency of finding answers to complex social problems in a context of increasing economic liberalism and, in the case of Europe, the shrinking of the Welfare State. Research in this area shows that SE is a complex topic with different definitions and perspectives. To the seminal works on conventional entrepreneurship (e.g., Cantillon, Say, Schumpeter, and Drucker), the literature adds the names of Stevenson and Dees as presenting fundamental contributions to conceptualisation in this research area (Rahadari et al., 2016).

According to OECD, "social entrepreneurship is the process through which specific types of actors – the "social entrepreneurs" – create and develop organizations that may be either social enterprises or other types of organizations. It also designated a field including a broad set of initiatives with a social impact dimension in a spectrum ranging from for-profit to non-profits" (OECD, 2023). More recently, the European Commission defined a social enterprise as being "an operator in the social economy whose main objective is to have social impact rather than make a profit for their owners or stakeholders. It operates by providing goods and services for the market in an entrepreneurial and innovative fashion and uses its profits primarily to achieve social objectives. It is managed in an open and responsible manner and involves employees, consumers and stakeholders affected by its commercial activities" (European Commission, 2023).

In the case of Europe, Lehtimäki et al. (2021) claim that there are significant differences in the definitions of social businesses between nations and that not all of them have an official definition. According to Carnegie (2003, in Peredo & McLean, 2006), "social entrepreneurship is a multidimensional construct formed by the intersection of a number of defining characteristics". Pomerantz defines social entrepreneurship as "the development of innovative, mission-supporting, earned income, job creation of licensing, ventures undertaken by individual social entrepreneurs, nonprofit organizations, or nonprofits in association with for profits"(Pomerantz, 2003).

The conceptual diversity in this area of research is tributary to several lines of inquiry or perspectives on the topic. It is possible to identify two major schools: the European and the American. The first is anchored in the social economy tradition with new developments since the 1990s, namely through the solidarity economy approach (e.g., Defourny, 2014; Defourny & Nyssens, 2008). In this context, it should be highlighted that the European approach known as the Emergence of Social Enterprise in Europe (EMES) considers enterprises initiated by citizens to produce specific goods and services for communities as social enterprises. In the UK, for instance, enterprises are registered as Community Interest Companies (Lehtimäki, 2021: 170). It should also be noted that the growing European interest in the theme of SE in the 2000s corresponds to the development of a phenomenon that has its roots in the USA in the 1980s in the areas of economics and management (Parente & Quintão, 2014), that is, the American school. This, in turn, presents two trends: the business management school, focused on the economic sustainability of organizations; and the social innovation school, focused on the role of the entrepreneur as an economic and social actor. This approach addresses SE's social impact (Parente & Quintão, 2014), that is, the production of social transformation.

Despite the diversity of perspectives, there are some common elements in the conceptual design of SE, namely the identification of opportunities and the creation of social value. Regarding the first dimension, Parente & Quintão state that "opportunities are crucial for social entrepreneurs, since the concept may refer to the discovery, definition and exploitation of opportunities that improve social well-being through widespread access to quality products and services. Such opportunities arise from the creation or exploitation of discontinuities or changes, often unpredictable in social, economic, political, or technological structures" (Parente & Quintão, 2014: 28). In addition to the identification of opportunities and the creation of social value, the literature also proposes the consideration of other aspects, such as innovation, risk tolerance and the refusal to accept resource constraints for the action to be undertaken (Morris et al., 2011, in Rahdari et al, 2016; Phillips et al., 2014; Peredo & McLean, 2006), which can also be understood as resilience.

The European Union (EU) promotes cross-functional cooperation in its funded innovation projects, which are viewed as challenging collaborations to co-create knowledge. These requirements call for including several stakeholders in the co-creation of knowledge at all phases of the process (Vos, 2017). A substantial group of individuals from business, academia, government, and civil society—all of whom have extremely diverse backgrounds—often takes part in innovation initiatives financed by the EU. It can encourage imagination, inventiveness, and complex problem-solving.

Those characteristics involve multidimensionality, namely in SE impact. This multidimensional nature can be addressed in different ways: on the one hand, social problems are complex, presenting socioeconomic, cultural, and environmental dimensions. As Phillips et al. (2015) pointed out, "social entrepreneurship makes important contributions to a nation's social, economic, cultural, and environmental wealth" (Phillips et al., 2015: 4). Also, Pinto et al. refer that social entrepreneur skills generate "economic, social and environmental value for organizations and individuals" (Pinto et al., 2016: 35). The purpose, that is, the social value created by social entrepreneurship is, or tends to be, multidimensional, and this impact stems from the complex, multidimensional nature of social problems. On one hand, this growing complexity results from facts (e.g. economic crises, public health crises such as pandemics, and climate change) and, on the other hand, from the integration of societal and civilizational values (e.g. ecological and environmental values, gender equality), including the design and implementation of public policies in these multiple domains of social life. In this regard, it is interesting to note the growing approach to social entrepreneurship within the concept of sustainability in its three pillars (economic, social, environmental) (e.g., Lethimäki et al., 2021) in a clear expression of the multidimensionality of the impact of social entrepreneurship. According to the authors, "social enterprises (...) run with a mission to create both social and economic value. They operate with a dual, social, economic, or even triple purpose if environmental value creation is included, as it is in a triple-bottom-line of sustainability" (Lethimäki et al., 2021: 168). Like entrepreneurial activity in the conventional sense, social entrepreneurship deals with the increasing demands on environmental and ecological aspects. According to Lehtimäki et al. (2021), who present research on social entrepreneurship as an agency for sustainability, social entrepreneurs can solve

environmental problems more efficiently, albeit on a local scale, without a global impact. Before that, already Rahdari et al., who presented a proposal on “achieving sustainability through Schumpeterian social entrepreneurship”, had mentioned that SE is "one of the most powerful and practical tools to address and fulfilling social responsibilities of companies, since its primary objective is to solve societal problems which include problems that run the gamut from environmental and social challenges to economic predicaments created by businesses themselves" (Rahdari et al, 2016: 348). Macke et al. (2018) refer the following within their proposal for a social entrepreneurship research framework: "the discussion about the social role of entrepreneurship is linked to the concept of development, which can be understood as a network of concepts directly associated with adjective 'local', 'integrated' and 'sustainable' (Macke et al., 2018: 679).

To sum up, SE is being presented in the literature as a powerful tool within current sustainability challenges. SE addresses those challenges through the creation of social value, by responding, in an innovative way, to identified opportunities, that is, complex problems with a multidimensional nature. In the research presented, the multidimensionality of SE is identified by addressing three vectors/axes/lines: the contexts, main drivers, and impacts of the innovative responses to social problems of the selected case studies (table 1).

3. Methodology

The paper adopts a multiple-case study approach and compares three cases of SE in Portugal to illustrate the multidimensional impact of social entrepreneurship and its critical role in dealing with existing complex and diverse challenges. The multiple case study approach enables the identification of patterns and trends that may not be evident in a single case study (Yin, 2018).

The three cases under analysis integrate an Erasmus+ project, Inspire (Social Entrepreneurs Network), whose primary goal is to create an inspiring learning hub based on the identification of transferable practices aiming to support social entrepreneurship's development in different European countries. The project consortium chooses the course of action, which is outlined in the project proposal and subsequent plans. As a result of the consortium participants' ongoing interaction and collaboration on the project (Ruoslahti, 2018), new innovations may develop as a result of their workflow, knowledge sharing, and the development of new collaborative products such as courses, training materials, books, videos, guidelines, Moocs, digital courses, and case studies.

In order to co-create knowledge and innovation, collaboration with end users is required, and they should be actively involved (Ruoslahti, 2018). End users are usually involved in the initial project requirements development. They might also work on developing and testing the pilots’ solutions (Henriksson et al., 2018). To manage and involve stakeholders throughout the project and to facilitate knowledge co-creation, the majority of projects create innovation networks or communities of practice or knowledge.

The cases were selected to capture social enterprises created to address different types of social problems: desertification of the Portuguese countryside, the inclusion of individuals with disabilities, and economic integration of regional communities and individuals at risk of social exclusion.

In order to ensure that the results are reliable and valid, data was collected from multiple sources. Primary data was collected through semi-structured interviews, conducted in September 2022. The interview schedule included questions on the history of the social enterprise, the entrepreneurial process and its challenges, and the impacts of its activity. The interviews were transcribed, and the transcriptions were sent back to the entrepreneurs to verify the accuracy of the process. Secondary data was collected from the social enterprises’ websites and from other online sources (namely newspapers, and reports) for complementary and triangulation purposes.

Qualitative analysis of the interview transcriptions and secondary data was performed, by coding, considering the categories presented in the analytical framework.

4. Case studies

4.1 Brief description of social entrepreneurship cases

4.1.1 RuralVive: Supporting Rural Development and Combating Desertification Through Social Entrepreneurship in Portugal

RuralVive is a multisectoral cooperative founded in 2016 by Cristina Oliveira, its executive director, and a collective of social entrepreneurs. They aimed to promote rural development and combat the desertification of the Portuguese countryside by supporting local entrepreneurs. The enterprise contributes to the emergence of small businesses, job creation, and population settlement in the low-density territories where it operates, mainly Pampilhosa da Serra, Moura, and Mêda.

RuralVive answers to societal challenges through innovative solutions. In this process, it faces many obstacles related to funding that are overcome by attracting new clients since government support for social entrepreneurs is lacking in Portugal. It survives by seeking support from entities specialized in social entrepreneurship, creating a network of contacts, and being resilient.

4.1.2 SEMEAR: Empowering Individuals with Disabilities Through Social Inclusion and Practical Training

SEMEAR is a social inclusion project that provides practical training and social skills to young people and adults aged 18 to 45 with intellectual and developmental difficulties to help integrate them into the labor market. Joana Santiago, its founder and president, started the project in 2005 as a BIPP Association (BIPP is the Portuguese acronym for Information Bank from Parents to Parents) to provide information on existing resources to support the social inclusion of people with disabilities. SEMEAR was established in 2014 to promote the employability and socio-professional integration of young people and adults with intellectual and developmental difficulties, centered on three pillars: certified training, organic agricultural production, and transformation. SEMEAR developed business areas that accounted for 40% of the project's revenues in 2022.

The main challenges for SEMEAR have been financial sustainability, articulation and intermediation with companies, turnover of personnel, and adjustments to training methodologies to address the changing target audience. Partnerships with various public and private entities have been vital to SEMEAR's success.

4.1.3 Social Entrepreneurs Agency (SEA): A Vehicle of Social Entrepreneurship and Individual Empowerment

The Social Entrepreneurs Agency (SEA) was founded in 2007 by a collective of social entrepreneurs headed by Frederico Cruzeiro Costa. SEA is a multisectoral cooperative that aims to economically integrate local communities and people at risk of social exclusion through individual empowerment.

SEA has established projects that support the economic integration of regional communities and individuals in various locations. The Agency has developed and implemented new social entrepreneurship projects that aid in creating new jobs, income-generating activities, capacity building for individuals, and developing entrepreneurship skills for the labor market. With these activities, SEA contributes to social, environmental, cultural, and economic sustainability, favoring local and integrated development. To satisfy the demands of a labor market that is constantly changing, SEA seeks to socially innovate with solutions based on place- and people-centered tactics that have a significant positive social impact.

4.2 Discussion

The cases reflect a vision of SE, where the social enterprises were founded by citizens to produce specific goods and services for communities. They address complex social problems and aim for the creation of social value. RuralVive is focused on low-density territories and seeks to promote, support, and develop the endogenous potential of these territories by stimulating social entrepreneurship to combat depopulation and unemployment. SEMEAR aims to promote the integration of disabled people into the labor market through an innovative training approach and a strong network of partnerships. Through individual empowerment, SEA promotes the economic integration of local communities and people at risk of social exclusion. RuralVive and SEA are registered as cooperatives and SEMEAR is a non-profit association.

The founders of the SEs have identified the opportunities in different ways. RuralVive resulted from a mixture of personal motivation to create social impact through a non-profit organization and the exploitation of the results of research conducted during a master thesis. The SEA's founder also felt the appeal to create social impact ("to leave my mark, help others"), which was combined with the appeal to continue the family path in entrepreneurship and the competencies acquired through academic and professional trajectory. SEMEAR's had a quite different process: The motivation to create the BIPP association was born from a personal need to answer to a need felt by the founder: to obtain information on existing resources to support the social inclusion of people with disabilities. The association was created as a platform for parents, with the objective of providing information on the existing resources in Portugal. SEMEAR was an evolution of BIPP's initial activity, focusing on

actively promoting the employability and socio-professional integration of young people and adults with intellectual and developmental difficulties.

All entrepreneurs benefited from support to start the SEs, both in terms of financial and other types of resources. Networks and partnerships were relevant, as well as instructional support from national and international organizations (CASES, IEFP, European Union).

In terms of impacts, the multidimensionality of the SEs is quite evident. As mentioned before, they are all targeting complex social problems and therefore, social impacts are central. This social value is combined with the creation of economic value. For instance, SEMEAR has the ambition that the commercial activity related to the sale of food baskets (from their organic farming activity and transformation activities of food from the circular economy) and other products (mainly ceramics produced by trainees) and from providing certified training programs would represent 80% of their revenues by the end of 2023 (the remaining 20% coming from donations and quotations of the members of the association). All SEs also have an environmental dimension. RuralVive and SEA incorporate the environmental aspect in projects to create new businesses they support. SEMEAR is involved in the promotion of organic farming and in the circular economy (use of food from other farms, combating food waste).

Table 2 provides a systematization of the results considering the analytical dimensions.

Table 2 – cases study analysis

Case/analytical dimensions	Case 1 RuralVive	Case 2 SEMEAR	Case 3 SEA
Context (territory, formal nature)	• Established in 2016 following the research work for a master's thesis • Cooperative • Operates in the Portuguese low-density territories • Depopulation, unemployment	• Established in 2014 as a social business of BIPP – a non-profit association • Non-profit association • Located in the Lisbon Metropolitan Area, its activity is extended to Portugal as a whole, Europe, and Africa • Social inclusion of disabled people	• Established in 2007 as a passion of its founder • Cooperative • Located in Cascais • Operates in continental Portugal • Promotion of inclusive entrepreneurship
Main drivers	• Addressing social and economic issues • Personal motivation (creating social impact through a non-profit organization) • Availability of resources (technical support from SEA and European funding)	• Finding a solution to a problem felt by the main founder • Addressing an unmet need (social inclusion, employability of people with disabilities) • Make a positive impact on the community • Support from Arqcoop and CASES • Small but financially sustainable business activities	• A desire to create a social project to help others • Leave a mark • Positively impact the community • Entrepreneurial skills (the main founder wanted to create his own job) • Youth support for the creation of cooperatives, financial and technical support from CASES and IEFP, self-funded
Main outcomes/impacts?	• Promotion and development of the endogenous potential of territories • Local and regional economic and social development of low-density territories • Developing income-generating activities (family agriculture, rural	• Social inclusion of young people and adults aged 18 to 45 with intellectual and developmental difficulties • Integration of disabled people into the labor market • Creation of a new brand based on three pillars: certified training, organic	• Economic integration of local communities and people at risk of social exclusion • Creation of local micro-businesses initiatives • Reintegration into the labor market of young people and adult, residents in Portugal who are involuntarily unemployed or underemployed

	tourism, crafts, and culture) • Providing individual training and developing entrepreneurial skills	agricultural production, and transformation • Revenues from business activities represented around half of the total revenue in 2022	• Community Revitalization

5. Conclusion

This study aimed to identify and understand how social entrepreneurship practices impact multiple dimensions of society. To achieve this goal, a qualitative research methodology was chosen, combining primary data to identify the actual context experienced and felt by social entrepreneurs in the implementation and development of their project, with secondary data retrieved from disclosure websites of case studies.

Social entrepreneurs highlighted how they were compelled to start a social business by their need to address a societal gap/problem that they themselves experienced. The SE they have built to provide social value has a positive effect on the community by providing goods and services not made available by the market economy while being concerned with preserving local and regional cultural habits and promoting sustainable production practices. The data obtained allowed us to confirm a central aspect addressed by the literature, that is, social value as the main driver of social entrepreneurship. It was also possible to note other aspects stressed by the literature on social entrepreneurship, such as resilience to risk. The three cases have multidimensional impacts on the territories and communities envisaged by their intervention. We can conclude that the concern with sustainability in its three pillars is at the core of the vision, objectives, and activities of the social enterprises addressed in the research.

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Technological Change and the Interplay of Strategic Innovation and Business Model Innovation

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Abstract: Technology-enabled innovation has increasingly puzzled and attracted strategists, since it offers opportunities to create new sources of value by challenging traditional approaches. To address this topic, research efforts have focused on the emerging construct of Business Model (BM), that describes how an enterprise creates and delivers value to customers, enticing them to pay and converting payments into profits. However, the relationship between Business Model Innovation (BMI) and Strategic Innovation (SI) is still unclear. This study investigates this relationship by examining the role of technological change in it. To this end, we propose a conceptual framework that classifies technological change according to three dimensions: trajectory, intent, and effect. Second, based on this framework, we conduct a multiple-case study with 16 companies to identify different innovation paths that arise from the interplay between SI, BMI, and technological change. Our findings reveal eight types of innovation paths that depend on the mediating or triggering role of the technological change faced. This result suggests a transitivity in the BM-Strategy and BMI-SI relationships. Change is the essence of BMI and SI, both their origin and outcome, and acts as the fil rouge that connects SI with its execution through BMI. Additionally, we shed light on the role of different actors (top, middle and low management and key employees) in SI and BMI, depending on their level of technological change empowerment. The study shows that BMI can survive without supervision and strategic commitment from top management, being primarily led by line managers and employees invested in experimentation at an operational level. This claim reveals the need to focus on the "technological change empowerment" given to line management and employees, balancing it with an ability to supervise and consolidate BMI. Overall, this study contributes to a better understanding of the relationship between SI and BMI and the role of technological change in it. Our findings provide insights for firms to strategically operate and govern technological change and leverage it to innovate their business models.

Keywords: Business Model, Business Model Innovation, Strategic Innovation, Technological Change, Lean Startup

1. Introduction

The quest for technology-enabled innovation has been influencing and permeating the very foundations of theory, research and practice in strategy (Hamel, 1998). As environmental complexity grows and become increasingly multifaceted, the role of technological change has alternatively puzzled and attracted strategists. While some scholars investigated the effects of volatility on industry structure and dynamics (Porter, 2001; Van Der Zande, 2001), others focused on internalizing the necessary resilience (Hamel and Valikangas, 2004), dynamic capabilities (Teece et al., 1997) and absorptive capacity (Cohen and Levithal, 1990) to accept and adapt to volatility, while still others aimed at stimulating and driving change to capture value as innovators or first movers (Christensen, 1997a; Christensen and Raynor, 2003; Kim and Mauborgne, 2005). In response to this urging issue, academics and practitioners lately seem unanimous in claiming that more research efforts should be directed towards an emerging field, to some extent transversal to the abovementioned approaches, that comprises both Business Model (BM) design and Business Model Innovation (BMI) (Schneider and Spieth, 2013). BMI research arose quite abruptly from the relatively fuzzy BM literature (Zott et al., 2011), and such unstructured rise led to two main issues. First, BMI inherited the relatively scarce theoretical foundation characterizing the body of knowledge on BM, together with the "original sin" of a still unstructured relationship with strategy. In fact, as shown by Schneider and Spieth (2013), BMI research is still concentrated mostly on the identification of prerequisites for and impacts of BMI and its constituting processes and dynamics, but a comprehensive theoretical background is still largely lacking. Second, BMI research has not yet been related to a prolific body of research that dealt with similar subjects of innovation and change in the last decades: that of Strategic Innovation (SI) (Markides, 1997; Tushman and Anderson, 1997; Govindarajan and Gupta, 2001; Govindarajan, 2005). It can be argued that BMI and SI are inherently related, and that this relationship is fundamentally influenced by the nature of change affecting the firm's strategy (e.g. see Chesbrough, 2010; Teece, 2010). However, a comprehensive understanding of how different characteristics of change impact SI and BMI is still lacking (Markides, 2006). To fill the existing gap and push the understanding of BMI forward, this

study hence investigates the role of technological change in the relationship between Strategic Innovation and Business Model Innovation. Firstly, we propose a conceptual framework that classifies the paramount dimensions of technological change. Based on this framework, we employ a multiple-case study approach to investigate 16 companies in order to identify different innovation paths, i.e. different features of the relationship among BMI, SI and technological change. As result, we present eight types of innovation paths that depend on the characteristics of the technological change faced.

2. Strategic Innovation and Business Model Innovation

To understand the relationship between strategic innovation and business model innovation, we need to investigate the relationship between BM and strategy. Initially, the two concepts were closely linked (Porter, 2001), but in recent years the distinction between them has been consolidated. In its essence, a BM describes how an enterprise creates and delivers value to customers, enticing them to pay and converting payments into profits (Teece, 2010). Casadesus-Masanell and Ricart (2010) argue that BM refers to the way the firm operates and creates value, while strategy refers to the choice of the BM to compete. BM, thus, becomes a valuable tool for developing and implementing strategy: a mechanism to both map the business in static conditions and describe the internal strategic context during change (Hacklin and Wallnöfer, 2012). If BM is a tool to develop and implement strategy, it is arguable that SI and business model innovation (BMI) are closely related. Kim and Mauborgne (1997), for instance, praised the benefits of value innovation, a new strategic logic which refers to fundamentally changing the basis of a business' dominant value proposition in order to create and dominate new competitive landscapes. Similarly, Hamel (1998) proclaimed that competitive advantage in the dynamic environment of the 21st century would reside in "changing the rules of the game", that is, performing a non-linear BMI. Both Kim and Mauborgne (1997) and Hamel (1998) were writing in the context of SI (Govindarajan and Gupta, 2001; Charitou and Markides, 2003), a research stream in management theory that aimed at developing firms' capabilities to continuously generate innovations as a competitive response in changing environments. Building on the nature of the relationship between BM and strategy, it can be posited that BMI serves as a means to operationalize SI endeavors. However, not every strategic innovation is the same. Ghezzi et al. (2014), for instance, found evidence that in some cases, BMI can lead to emergent SI rather than the other way around. Thus, it becomes important to investigate the role of technological change in the relationship between SI and BMI.

3. Technological Change

In strategy research, the nature and classification of technological change vary. As Drucker (1969) states, changes can take place in the form of technological environment uncertainties, due to the rise of new technologies (exogeneous "technological discontinuity") that affects the industry structure. However, technological change not only originates in the external environment. Instead, it can also be triggered inside the firm, by emerging phenomena within the internal environment (Ghezzi et al., 2015). Such endogenous discontinuities are often linked to gaps in the "work setting", "tasks" or "relations" (Watson-Manheim et al., 2002). Indeed, technological change within an enterprise can manifest itself as either a prominent or a local modification in processes, practices or routines, or a variation in products (by creating different outputs due to an innovation) (Anderson and Tushman, 1990). Interestingly, such internal phenomena may take place unintentionally, due to the risk component which resides in the planning processes of every enterprise and makes it impossible to achieve perfect forecasting (Schreyögg and Steinmann, 1987). Intent is indeed another key dimension that characterizes technological change and its influence on strategy and BM. The discussion on the explicit or implicit intention to change manifested by a company's top management can be borrowed from the literature on the strategy making process, which contrasts a deliberate approach to strategy making and strategic planning (e.g. see Armstrong, 1982; Lorange, 1980; Chermack et al., 2001) to an emergent (and possibly bottom-up) process made of a set of informal strategic decisions (Mintzberg, 1994; Christensen, 1997b). Considering that BMI is the operationalization of strategy making process (Shafer et al., 2005; Casadesus-Masanell and Ricart, 2010), BMI can therefore be indirectly influenced by technological change factors, which impact or modify the BM constituting building blocks or parameters (e.g. Ghezzi et al., 2015). Therefore, depending on its characteristics, change may have different forms of influence on Strategy Innovation and BMI. The way technological change phenomena manifest varies according to a set of key features and characteristics that we bring back to three dimensions: trajectory; intent; and effect (Table 1).

Table 1: Three classification dimensions of Technological Change.

Dimension	Alternatives	Description
Trajectory (e.g. Miller, 1985; Schreyögg and Steinmann, 1987; Watson-Manheim et al., 2002; Anderson and Tushman, 1990)	Endogenous	Change stems from inbound firm processes or dynamics.
	Exogenous	Change is triggered by outbound phenomena and events which are not directly or fully controllable by the single firm.
Intent (e.g. Lorange, 1980; Armstrong, 1982; Mintzberg, 1994; Christensen, 1997b)	Deliberate	Change is recognized and deliberately accepted by the top management, and strategy is modified accordingly.
	Emerging	Change arises informally and implicitly in a bottom-up, local or unstructured fashion, and is not formally included in the firm's strategy in the first place.
Effect (Drucker, 1969; Miller 1985; Ehrnberg, 1995; Bessant et al., 2005; Ghezzi et al., 2014)	Continuous	Change has a continuous trait and represents an evolution of the firm's existing strategy and related performance.
	Discontinuous	Change has a discontinuous trait and represents a revolution of the firm's existing strategy and related performance.

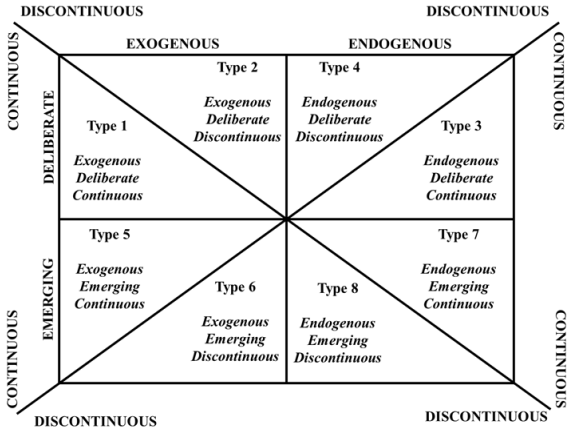

Figure 1: Technological Change Types Matrix

The three classifications dimensions can be presented in different combinations of their alternatives, resulting in a set of configurations. The different possible configurations are presented in the Technological Change Types Matrix (Figure 1), which shows eight "Change Types". Based on them, one research question (RQ1) rises up: how does the typology of technological change influence the relationship between SI and BMI? We argue that technological change may act as an influencer – either a mediator or a trigger – of the relationship between SI and BMI.

4. Methodology

For this study, we adopted an empirical qualitative multiple-case study research approach, which is helpful for theory building based on in-depth field investigation that seeks to understand how a certain phenomenon occurs. (Yin, 2009; Eisenhardt and Graebner, 2007). The cases were selected by means of theoretical sampling (Eisenhardt and Graebner, 2007), where the companies included in the theoretical sample were drawn from a cross-industry database created by researchers involved in a two-year international research project on firms undergoing technology-enabled BMI. Due to the explorative nature of the topic, the research favoured depth of analysis over width, and a final sample size of 16 companies has been selected. The final sample included two cases for each of the eight configurations. For data collection, we followed Yin (2009), employing a descriptive case study method based on 88 semi-structured interviews and documental analysis with 57 informants during a period of 14 months. The need for assessing SI and BMI processes, nature of technological change and the sequence of relationships linking them led to the adoption of an "embedded" case study (Yin, 2009), with multiple units of analysis, related to: (i) technological change (ii) strategic innovation; and (iii) BMI. The reference framework selected to assess BMI is that proposed by Osterwalder and Pigneur (2010). Such framework is widely

adopted and employed both by practitioners and academics (e.g., see Chesbrough, 2010). For data analysis, we used the Technological Change configurations and the details collected during the interviews about the sequence in which BMI occurs considering the SI process and the need or opportunity of change.

5. Results

Next, we discuss the cases and the observed innovation path that describes the relationship between strategy and BMI when considering the role of each type of technological change.

5.1 Type 1: Exogenous, Deliberate and Continuous Change

In both cases A and B, change had an outside-in thrust, originating from the external environment and influencing firms' strategy and BM. Notwithstanding its external origin, change was deliberately interiorized by top managers, and a SI process was hence triggered to include the features and outcome of change within firms' strategy. In turn, SI was concretized and executed through BMI, and drove a redesign of one or more dimensions in the current BM. In this type, the continuous trait of change determines incremental variations of those BM dimensions affected by innovation.

5.2 Type 2: Exogenous, Deliberate and Discontinuous Change

In both cases C and D, change had an outside-in thrust, originating from the external environment and influencing firms' strategy and BM. Notwithstanding its external origin, change was deliberately interiorized by top managers, and a SI process was triggered to include the features and outcome of change within the firms' strategy. In turn, SI was concretized and executed through BMI, and drove a redesign of several dimensions in the current BM. The discontinuous trait of change determined radical variations of those BM dimensions affected by innovation.

5.3 Type 3: Endogenous, Deliberate and Continuous Change

In these two cases E and F, the rise of internal resources, competencies and know-how was embraced within a deliberate and continuous strategic innovation and BMI represents the execution of such deliberate strategy. Consequently, change was the effect of a deliberate strategic decision made by the top management, who, by means of SI, aimed at modifying the current strategy, BM and performance. Therefore, change determined by SI followed an inside-out trajectory, stemming from inbound processes and dynamics and later reflecting on the firms' BM, and being executed through BMI. The continuous trait of change determined incremental variations of the performance of those BM dimensions affected by innovation.

5.4 Type 4: Endogenous, Deliberate and Discontinuous Change

In both cases G and H, change was the effect of a deliberate strategic decision made by top management, who, by means of SI, aimed at modifying the current strategy, BM and performance. Thus, SI generated change according to an inside-out trajectory, stemming from inbound processes and dynamics and later reflecting on the firms' BM, and being executed through BMI. The discontinuous trait of change determined radical variations of those BM dimensions affected by innovation.

5.5 Type 5: Exogenous, Emerging and Continuous Change

In these cases I and J, change had an outside-in thrust, originating from the external environment and influencing firms' strategy and BM. Change propagates and spreads in the firm in an emerging and unstructured fashion, not immediately reflected in a variation of the overall strategy, but rather being absorbed locally in one or more BM dimensions that represent the strategy's implementation. Emerging variations in the BM characterize a BMI. The continuous trait of change determined incremental variations of those BM dimensions affected by innovation. Following a bottom-up diffusion process, BMI is later caught up by and formalized within the overall strategy through SI.

5.6 Type 6: Exogenous, Emerging and Discontinuous Change

In these two cases K and L, change had an outside-in thrust, originating from the external environment and influencing firms' strategy and BM. Change propagated in the firm in an emerging and unstructured fashion, not immediately reflected in a variation of the overall strategy, but rather being absorbed locally in one or more BM

dimensions that represented the strategy implementation. The emerging variations in the BM caused a subsequent BMI, as the other BM dimensions must be adapted to cope with localized evolutions. The discontinuous trait of change determined radical variations of those BM dimensions affected by innovation. Following a bottom-up diffusion process, BMI was later caught up by and formalized within the overall strategy through SI.

5.7 Type 7: Endogenous, Emerging and Continuous Change

The type of change appearing in cases M and N had the effect of implicit, unstructured or local modification of the firms' current BM. Such change propagated and spread in an emerging and unstructured fashion, not immediately reflected in a variation of the overall strategy, but rather being absorbed locally in one or more BM dimensions. Emerging variations in the BM characterize a BMI. The continuous trait of change determined incremental variations of those localized BM dimensions affected by innovation. Following a bottom-up diffusion process, BMI was later caught up by and formalized within the overall strategy through SI.

5.8 Type 8: Endogenous, Emerging and Discontinuous Change

Change, in cases O and P, was the effect of an implicit, unstructured or local modification of the firms' current BM. Change propagated in an emerging and unstructured fashion, not immediately reflected in a variation of the overall strategy, but rather being absorbed locally in one or more BM dimensions. The emerging variations in the BM cause a subsequent BMI. The discontinuous trait of change determined radical variations of those BM dimensions affected by innovation. Following a bottom-up diffusion process, BMI is later caught up by and formalized within the overall strategy through SI.

6. Discussion and Conclusions

The proposals and findings presented in this study touch upon and relate two key themes in the research stream on BM, strategy and technology: (i) the relationship between SI and BMI and the nature of technological change's influence on it; and (ii) the actors and roles in technology-enabled BMI as a process.

First, this study focuses on clarifying the relationship existing between BMI and SI. The link between BM and technological change was already postulated in several works (Lindgardt et al., 2009; Teece, 2010; Chesbrough 2010; Casadesus-Masanell and Ricart, 2010). Although these studies pointed in the same direction, they showed a largely conceptual approach to the problem, and mostly focused on the dyadic relationships strategy-BM and BM-technological change only. We establish a more formal and systematic relationship between these concepts, thus confirming and extending the conceptual work from Teece (2010). More specifically, we extend the insightful proposals from Casadesus-Masanell and Ricart (2010) and Richardson (2008) to their natural (but still implicit) consequences: as the BM reflects the execution of business strategy, we claim that BMI is hence "Strategic Innovation in action". Indeed, as our cases show, SI choices affect one or more BM parameters, ultimately determining BMI – or conversely, BMI will eventually lead to SI.

In addition to consolidating and extending the BMI-SI relationship, our study makes one key step further, by finding that the nature and characteristics of technological change significantly matters in such relationship. Indeed, positioning the cases in the Technological Change Types Matrix shows that technological change acts as the fil rouge that connects SI with its execution through BMI, either as a mediator or as a trigger. The relationship between SI and BMI depends, in its direction (trajectory), causality (intent) and intensity (effect), on the type of technological change in place.

Our framework which classifies the 16 cases on the basis of eight change types gives rise to eight different "innovation paths" for the relationship between SI, BMI and technological change itself. We find that the classification dimension of change intent plays a fundamental role in shaping the causality of the SI-BMI relationship.

Two different streams of innovation in strategy seem to exist. The first stream (innovation paths 1 to 4) clearly refers to the traditional research stream on the strategy making process (Armstrong, 1982), with the addition that a change in strategy eventually reflects on a change in the BM (Casadesus-Masanell and Ricart, 2010; Johnson et al., 2008). The second stream (innovation paths 5 to 8) contributes to the discussion on "business model lifecycle" (Morris et al., 2005) and "experimentation" (Lindgardt et al. 2009; Chesbrough, 2010), particularly in the context of strategic experimentation (Govindarajan and Trimble, 2005). Thanks to effectuation

(Sarasvathy, 2008) they can create actions based on the initial results of experiments, generating new data which may point towards previously latent opportunity.

The four change types related to an emergent intent highlight the crucial role of managerial leadership for new and emerging BMI resulting from experimenting (Hamel, 1998). Chesbrough (2007) underlines the "business model innovation leadership gap" existing in many organizations: no one in the organization has both the authority and the capability to innovate business models. Thus, top managers could represent a barrier to innovation, as they are focused within the current business model (Chesbrough, 2007). An organization needs to identify internal leaders for business model change and give managers the resources and authority to define and launch business model experiments (Chesbrough, 2010).

Our study contends that it is true that technology-enabled innovation will not take place at a planned formal strategy level without a top-down deliberate approval, though it will survive and live at an operational strategy level, and may drive performance change even before the overarching strategy catches up. To different extents, this is the case for the eight companies who followed innovation paths 5 to 8, where innovation was led by middle/low management and employees with a strong grip on BM's operational execution, thanks to specific technological skills and know how. This is to some extent consistent with the recent notion of "big bang disruption" and "undisciplined strategy" posited by Downes and Nunes (2013) where technology-enabled innovations may not be led by a strategy and shared by a top manager, since change may not require a budget approval and may be based on experimenting and combining different resources and assets, either internal or external.

Our study shows that BMI may survive the lack of supervision and strategic commitment by the top management, being primarily led by line managers and employees invested in experimentation at operational level. This claim may attenuate the risk of encountering top managers that impair rather than enable BMI; also, it sheds light on the need to focus the attention of practitioners on the "technological change empowerment" or strategic independence they wish to vest the line management and employees with.

Value for practitioners is equally important, since this study provides a set of tools to: (i) categorize technological change; (ii) relate technological change types to SI and BMI, and map the "innovation path" a firm has – explicitly or implicitly – undertaken; and (iii) disclosing the strategic role of technological change empowerment assigned to different actors.

Like all studies attempting to frame reality in a model, this work is not without limitations, deriving from: any observer bias in the activities of case data gathering and analysis; and the possible information loss determined by case selection. Although sound methodologies and the use of a wide cross-industry sample attenuate such limitations, a validation of these findings through quantitative analyses on a larger sample should be the objective of future research. Other opportunities for future research could: relate to the investigation of how firm size can influence the SI-BMI relationship and the chance to actually trigger BMI without a deliberate strategic commitment; assess the opportunities and risks deriving from a distributed strategic independence allowing managers and employees to leverage their technological skills endowment, which could lead to local or contingent approaches possibly diverging from the institutional strategic intent.

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Venture Client Model: A Systematic Literature Review

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Abstract: Established companies are increasingly opening their innovation systems to stay ahead of the competition. In this context, collaboration with innovative and agile start-ups are gaining continuously more importance. In the past established companies often used common corporate venturing methods such as incubators, accelerators, or corporate venture capital for collaboration. Compared to these methods the venture client model is relatively new and was invented by BMW employees in 2014. Using the venture client model, established companies become early clients of the start-ups even it is still a venture to do so. Together they carry out a pilot project to develop a proof of concept and validate it under real conditions. If successful, they enter a long-term collaboration to integrate the start-up's solution into products, processes, or business models of the established company. The aim of this paper is to sum up the current literature and set a foundation for future research on this topic. Therefore, we conduct a systematic literature review. As a result, we provide a definition of the venture client model, describe characteristics, present advantages from the perspective of established companies and start-ups. In addition, we summarize the state of research regarding strategy, process, and organizational structure and for the venture client model. In terms of strategy, future research should elaborate defining elements of a strategy as well as ways to integrate the venture client model into the corporate innovation-ecosystem. Focusing on the process additional research is needed on a venture client reference process and its integration into the corporate's core processes. Referring to the organizational structure a reference architecture for a venture client unit as well as its positioning within the organization (e.g., innovation management or corporate strategy) should be further investigated.

Keywords: Venture Client Model, Start-up Supplier Program, Corporate Start-up Partnership, Corporate Venturing, Open Innovation

1. Introduction

As technology continues to advance and customer needs evolve, markets are becoming more dynamic and competitive than ever before. This increases the pressure on established companies (EC) to be more innovative and adapt faster to disruptive changes. To identify and realize innovation opportunities faster and more frequently companies are increasingly turning to open innovation paradigms (Gassmann *et al.*, 2010). They benefit from using external sources as a pathway to new ideas, technologies, business models, and markets (Vanhaverbeke *et al.*, 2012). One concrete way to leverage external innovation is to collaborate with start-ups, also known as corporate venturing (CV) (Kuratko *et al.*, 2009). Start-ups use emerging technologies, reinvent existing business models, and are more agile and flexible (Trimi & Berbegal-Mirabent, 2012). However, traditional CV methods, such as corporate venture capital and corporate accelerators, are not suitable for quickly integrating the start-up's technologies into the company (Gutmann, 2018). The Venture Client Model (VCLM) addresses this gap in the corporate venturing toolbox. Using the VCLM EC become early customers of start-ups and apply their technology to products, processes or business models in a joint pilot project (Prats *et al.*, 2017). In corporate practice, it is already being used by various companies (Gimmy *et al.,* 2017). In contrast, there is only fragmented knowledge about the VCLM in the literature. Therefore, the aim of this paper is to summarize the current literature and identify research gaps. The research questions focus on strategies (Which strategic questions need to be answered?), processes (Which process steps and activities need to be performed?) and organizational structure (How is an organizational unit designed?) for the VCLM. To answer these questions a systematic literature review (SLR) is conducted. The paper unfolds as follows: Section 2 places the VCLM in the CV-literature and explains it in more detail. Section 3 describes the research methodology. It is followed by the presentation of the results in section 4 and corresponding research agenda in section 5. The paper ends with discussion and limitations as well as an overall conclusion.

2. Background

2.1 Corporate Venturing

CV refers to the collaboration between EC and start-ups (Siota et al., 2020). EC are increasingly using various CV-methods and expanding their venturing repertoire to benefit from start-up collaborations (Prats *et al.*, 2017). Start-ups provide access to new ideas, the latest technologies, novel business models and talent (Prats *et al.*, 2017). The organizational agility and flexibility, speed in the innovation process and the niche knowledge of start-ups can complement internal R&D efforts, foster profitable growth, and put companies ahead in competition (Brigl *et al.*, 2016). The number of CV-methods has grown rapidly in recent years and continues to evolve.

Figure 1 provides an overview and comparison of the different CV-methods using three characteristics – time to get results, capital required and start-up development stage. While the traditional CV-methods require more capital to achieve quick results with mature startups, the VCLM breaks this logic. The required capital is significantly lower compared to CV methods that involve similar late stages and development phases, while results can be achieved in a shorter period. Therefore, it is a very good add-on for the CV of companies. However, since it is comparatively new, further investigation is needed as its one of the latest methods and there are different approaches for Venture Clienting which are still in development.

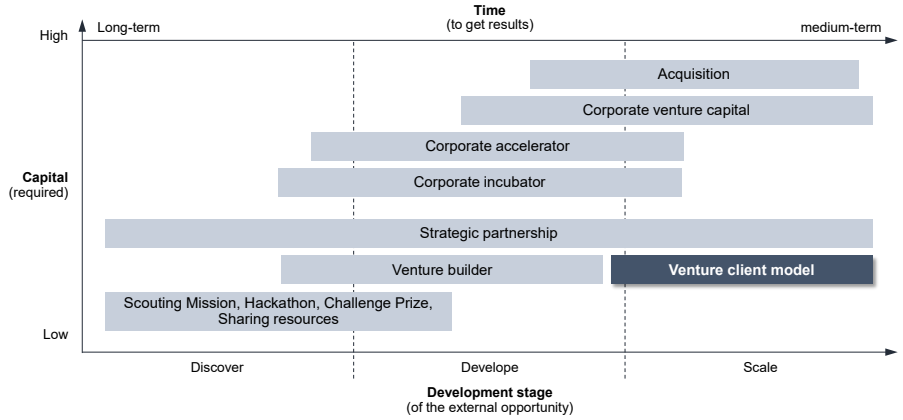

Figure 1: CV-methods in comparison – adapted from Siota *et al.*, 2020

2.2 Venture Client Model

The VCLM was coined by Gregor Gimmy and Matthias Meyer in their former roles as managers at BMW (Gimmy *et al.*, 2017), (Gutmann *et al.*, 2020). After receiving the approval from R&D executives in 2014 they launched the BMW Start-up Garage – the world's first Venture Client Unit (VCLU) – in 2015 (Gimmy *et al.*, 2017), (Siota *et al.*, 2020). Since then, the VCLM has been adopted by EC like Continental, Lafrage Holcim or Telefonica (Gimmy *et al.*, 2017), (Kurpjuweit & Wagner, 2020). Additionally, some EC joined forces to perform the model in VCL clusters. One example is the Stratosfare-initiative, which organizes the VCLM for the innovation cluster it's OWL and some large companies in the region OWL (OstWestfalenLippe) in Germany (Stratosfare, 2023). These EC use the VCLM to improve competitiveness by integrating the start-up's solution (technology, product or service) into their products, services, processes or business models (see *Figure 2*) (Gimmy *et al.*, 2017), (Kurpjuweit & Wagner, 2020). To validate integrability they purchase a small sample of the solution without taking equity or IP and test it under real conditions (Gimmy *et al.*, 2017). By doing this they become a paying client of the start-up even it is still a venture – a Venture Client (VCL) (Gimmy, 2022).

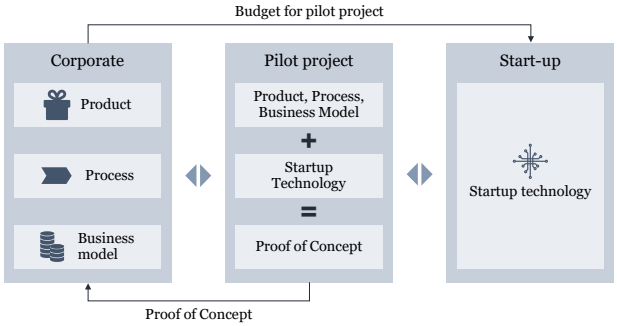

Figure 2: Functionality of the VCLM

Compared to other CV methods the VCLM offers different advantages for EC and start-ups. As the collaboration usually does not exceed a duration of six months, time to get results is relatively short (Kurpjuweit & Wagner, 2020), (van der Meer *et al.*, 2021), (Veit *et al.*, 2021). Low fix costs for running the model are also beneficial for EC (Gimmy *et al.*, 2017). Additionally, they profit from the model's scalability as the VCs (e.g. business units, production, human resources or IT) provide necessary resources, like budget or project staff, to conduct the pilot project (Gimmy *et al.*, 2017). Low risk and the possibility for customization are also advantages mentioned in the literature (Kurpjuweit *et al.*, 2020). By making start-ups their suppliers, EC provide them the resources "they need the most: […] customers and direct revenue […] to finance their product development"(Siota *et al.*, 2020). Receiving access to specific industry and technical knowledge as well as customer feedback also supports the product development (Gimmy *et al.*, 2017), (Enkel & Sagmeister, 2020), (Corvello *et al.*, 2021).

To unlock these benefits EC need a framework to set up the VCLM with their company. According to Peter strategy, process and organizational structure are important aspects, which needs to be considered when setting up a start-up collaboration (Peter, 2019). Therefore, we derive the following research question:

1. **Strategy:** Which strategic questions need to be answered when setting up the VCLM?
2. **Process:** Which process steps and activities need to be performed for the VCLM?
3. **Organizational structure:** How is an organizational unit designed which is responsible for performing the VCLM?

3. Research Design

The aim of the present paper is to summarize the current literature and derive gaps for further research. An SLR is particularly suitable for this as it "provide[s] a comprehensive [over]view of knowledge formed in existing literature" (Williams Jr. *et. al.*, 2021). Following a defined and transparent process replicability and the avoidance of different biases is ensured (Pati & Lorusso, 2018). To conduct the SLR we applied the process according to WEBSTER AND WATSON (Webster & Watson, 2002). We started the development of the search strategy through a trial search with the keywords "venture client" and "venture client model" and iteratively added synonyms out the information found in the trial search literature and prior research. The literature search was conducted with the following search string:

((“venture client*” OR “start-up supplier” OR “start-up supplier” OR “new venture supplier” OR “start-up program” OR “start-up program”) OR (“startup” OR “start-up” OR “new venture”) AND (“corporate*” OR “corporation*” OR “enterprise*” OR “business*” OR “organi?ation*” OR “incumbent*”) AND (“cooperation*” OR “co-creation*” OR “cocreation” OR “partnership*” OR “alliance*”) OR (“corporate ventur*”) OR (“corporate accelerator*” OR “company accelerator*”))

The following review phases were performed independently by the two main authors. The results were discussed in case of differences. For the literature search we entered the search string into the database "SCOPUS" and identified 888 papers. After filtering by year (2013-2023), document type (article, conference paper), subject area (Business, Management and Accounting, and Economics, Econometrics and Finance) and language (english), 267 papers remained. These papers were reviewed on title-basis. Papers whose title did not focus on the topic of Corporate Start-up Partnerships were excluded. Additionally, papers dealing with venture capital investments or inside-out CV programs where excluded, leaving 73 papers. The same procedure was performed on abstract basis, leaving 41 papers. In the next part, the remaining papers were read on full text-basis. Papers that did not cover the topic of VCLM were excluded. We identified 11 relevant papers covering the

VCLM. A forward and backward search on the remaining papers lead to a discovery of 5 new papers (see *Figure 3*).

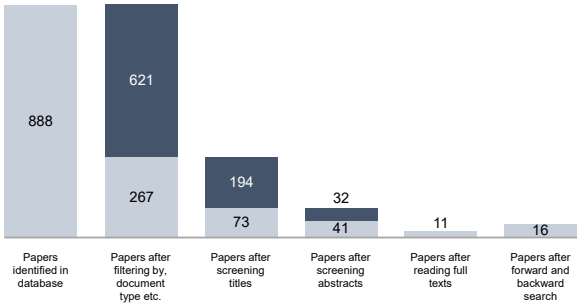

Figure 3: SLR scanning and selection process

For data analysis, all articles were read twice and all relevant information regarding the research question was loosely structured in a mind map and arranged into thematic clusters. These clusters were iteratively improved and further elaborated. For this purpose, they were critically examined and, if necessary, divided, or new clusters were made. As a result of this iterative process, we derived a definition of the VCLM, its advantages as well as insights about VCL strategy, process, and unit.

4. Results

From the SLR 16 papers were identified, which are related to the VCLM (see Figure 4). Three of these papers deal exclusively with the VCLM. Another three briefly describe the VCLM as part of a CV-taxonomy. Additional three papers provide insights about corporate-start-up-collaboration, which are also applicable for the VCLM. For instance, GUTMANN AND LANG describe a collaboration process for venture units "such as [...] venture client units" (Gutmann & Lang, 2022). The papers remaining implicitly mention the VCLM by describing crucial characteristics such as outside-in open innovation with start-ups, without investment and based on a paid pilot project to solve business challenges.

Category	Paper	Title
Venture Client Model (explicitly)	Faria et al., 2018	Venture client: Analysis of the mining lab program
	Gimmy et al., 2017	What BMW's corporate VC offers that regular investors can't
	Gutmann et al., 2020	Start-ups in a corporate accelerator: What is satisfying, what is relevant and what can corporates improve?
Corporate Venturing	Gutmann, 2018	Harmonizing corporate venturing modes: An integrative review and research agenda
	Siota et al., 2020	Corporate Venturing: Insights for European leaders in government, university and industry
	Veit et al., 2021	Revising the taxonomy of corporate accelerators: Moving towards an evolutionary perspective
Start-up-Collaboration	Corvello et al, 2021	Antecedents, processes and outcomes of collaboration between corporates and start-ups
	Gutmann & Lang, 2022	Unlocking the magic of corporate start-up collaboration
	Corvello et al., 2023	Start-up collaboration units as knowledge brokers in corporate innovation ecosystems: A study in the automotive industry
Venture Client Model (implicitly)	Enkel & Sagmeister, 2020	External corporate venturing modes as new way to develop dynamic capabilities
	Kurpjuweit, 2018	Partnering with new venture suppliers: A dynamic capabilities approach
	Kurpjuweit et al., 2020	Selecting startups as suppliers: A typology of supplier selection archetypes
	Kurpjuweit & Wagner, 2020	Startup supplier programs: A new model for managing corporate-startup-partnerships
	Moschner et al., 2019	Toward a better understanding of corporate accelerator models
	Onetti, 2021	Turning open innovation into practice: Trends in European corporates
	Van der Meer et al., 2021	Innovation Labs: A taxonomy of four different types

Figure 4: Publications identified by the SLR

4.1 Venture Client Strategy

In the literature, there is no definition of a venture client strategy (VCLS). Nevertheless, the literature names aspects that can be assigned to a strategy. GUTMANN AND LANG describe a vision as a critical success factor for working with start-ups (Gutmann & Lang, 2022). FARIA ET AL. name the overall objective of the VCLM as another important aspect (Faria *et al.*, 2018). For example, one of Nexa Resources objectives was to increase competitiveness of their plants by reducing production time and costs (Faria *et al.*, 2018). To align the VCLM to the vision and the overall objective several strategic questions need to be answered:

- **Type of innovation:** Do we want to use start-up solutions to innovate our products, processes or business models (Gutmann & Lang, 2022)?
- **Focus of innovation:** What are search fields for innovative start-up solutions (i.e. sustainability) (Gutmann & Lang, 2022)?
- **Business impact:** Do we want to solve problems with short-term impact for our core business or develop new business opportunities with long-term impact (Gutmann & Lang, 2022)?
- **Branding:** Should we establish a new brand for our VCLU to increase internal and external visibility (Kurpjuweit *et al.*, 2020)?
- **Pull or push:** Do we want to scout start-ups for known problems with a clear demand from a corporate division (pull) or introduce start-ups to corporate divisions to identify unknown problems (Moschner *et al.*, 2019)?
- **Batch or continuous process:** Should we work in batches or establish a continuous process (van der Meer *et al.*, 2021)?

Responsible for developing the VCLS are top-level executives and employees from the VCLU. (Gutmann & Lang, 2022)

4.2 Venture Client Process

To collaborate successfully with start-ups EC must implement a well-structured process (Gutmann & Lang, 2022). From the SLR six different processes were identified, which are related to the VCLM (see Figure 5).

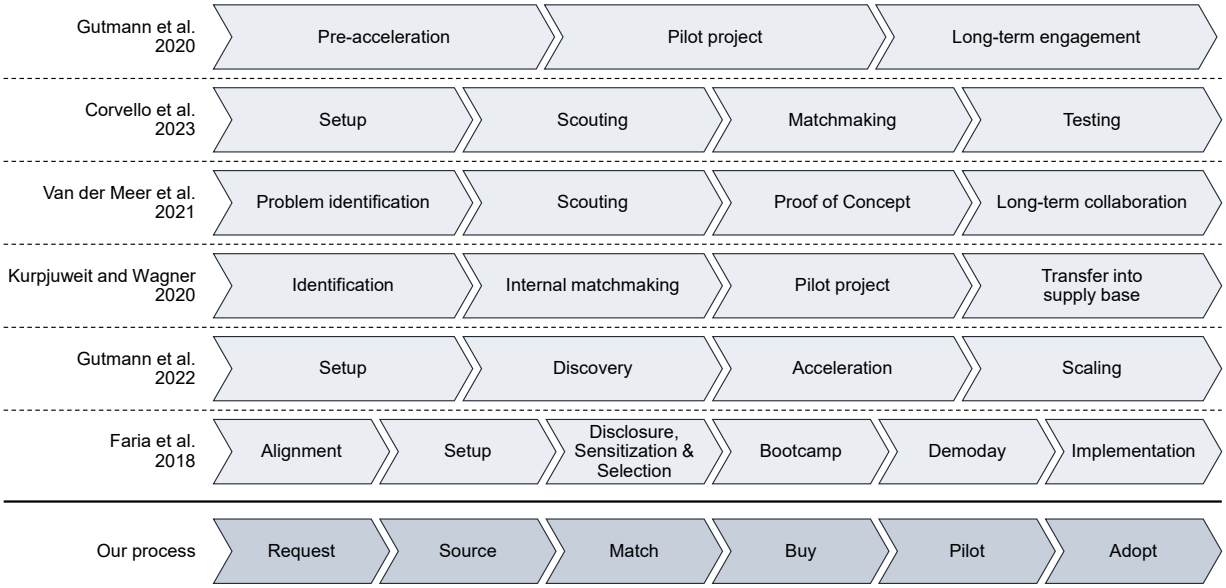

Figure 5: Different venture client processes

They differ regarding content and granularity. In terms of content most processes have need identification, start-up-scouting, matchmaking with the VC, conduction of the pilot project and long-term collaboration in its core. However, some of the authors exclude edge processes or include additional process steps like KURPJUWEIT AND WAGNER or CORVELLO ET AL. With respect to granularity, processes with three, four and six process steps are described. GUTMANN AND LANG even present a twelve-step process for venture units by dividing each of its four main process steps into three subprocess (Gutmann & Lang, 2022). Based on these findings we derive six-step venture client process (VCLP), which will be described in detail.

4.2.1 Request

The aim of this phase is to define a need for start-up technologies within the EC. Therefore, EC either use pull- or push-approach, or both. Using the pull-approach, the VCL is requesting a start-up solution for a known problem (Moschner *et al.*, 2019). Within dedicated meetings VCL and VCLU describe relevant problems. These descriptions is subject to a refinement process resulting in a well formulated problem statement (Corvello *et al.*, 2023), (Kurpjuweit & Wagner, 2020). Using the push-approach, the VCLU is introducing a start-up to the VC. If the start-up is relevant to the VC, a previously unknown technology need is identified.

4.2.2 Source

Providing start-ups for the technology needs is the aim of the scouting process. It is divided into two process steps – scouting and pre-assessment. The result is a long list of start-ups, meeting the previously defined technology needs and pre-assessment criteria (Gutmann & Lang, 2022).

EC have two options for scouting start-ups. They either scout actively or passively (Kurpjuweit & Wagner, 2020). Using the first approach EC actively identify and contact start-ups. Exemplary scouting-tools are desk research or external scouts (Gutmann & Lang, 2022). As these tools require substantial personnel and financial efforts, EC aim for implementing passive scouting (Kurpjuweit *et al.*, 2020). In this case start-ups initiate the contact. Therefore, clearly formulated technology needs serve as a foundation. They must be communicated directly or indirectly to the start-ups. The direct way of communication includes corporate-owned websites or social media channels (Gimmy *et al.*, 2017). Sharing information about the need for start-ups with external partners represents the indirect way of communication. These partners like accelerators or venture capitalists are intrinsically motivated to provide suitable start-ups as a reference customers for their start-ups are beneficial for them as well (Kurpjuweit & Wagner, 2020). In addition, the communication of technology needs is necessary to implement an application form to provide start-ups standardized access to the EC (Corvello *et al.*, 2023).

Criteria used to assess start-ups "differ substantially from evaluation used for established suppliers" (Kurpjuweit & Wagner, 2020). They are more similar to those applied by venture capitalists (Kurpjuweit *et al.*, 2020)**.** The number of criteria used for the start-up assessment differs. While some corporates use six criteria, others created lists of 30 criteria (Kurpjuweit & Wagner, 2020). However, GUTMANN AND LANG recommend to use a reduced number of criteria (Gutmann & Lang, 2022). Evaluation criteria can be divided into two dimensions. The first dimension addresses criteria to assess the maturity of the company itself (e.g. legal and financial situation or start-up team). The second dimension assess the technology-fit (e.g. resolution of a specific display) (Siota *et al.*, 2020). Whereas criteria for assessing company-maturity usually do not differ by scouting-requests, criteria for technology-fit are mostly individual.

Usually, the VCLU is responsible for the start-up-scouting. In case of active scouting this includes desk research and coordination of external partners like scouts. Realizing the passive approach activities like providing start-up needs to accelerators or venture capital fonds and setting up a digital application form for start-ups must be executed (Kurpjuweit & Wagner, 2020). Therefore, responsible employees need to be familiar with common scouting-tools, well connected within the start-up ecosystem and have experience assessing start-ups. (Kurpjuweit & Wagner, 2020)

4.2.3 Match

The objective of this process step is to match the VCL with the best fitting start-up for their challenge. Therefore, in the first step a shortlist of start-ups is created using predefined criteria (Gutmann & Lang, 2022). **Error! Reference source not found.** provides an overview of criteria and corresponding requirements mentioned by the literature.

Criteria	Requirement	Source
Start-up stage	Early stage; later Stage; mid/later-stage	(Gimmy *et al.*, 2017); (Onetti, 2021); (Kurpjuweit & Wagner, 2020)
Product or service maturity	Functional prototype; ready for pilot project; almost market-ready; high	(Gimmy *et al.*, 2017); (Veit et al., 2021); (Kurpjuweit & Wagner, 2020); (van der Meer *et al.*, 2021)
Business model maturity	Proven; scalable	(Enkel & Sagmeister, 2020); (Kurpjuweit & Wagner, 2020)
Track record	Received VC-Investment or completed accelerator	(Gutmann *et al.*, 2020)
Size of start-up team	Two to four; full-time management- and engineering-team	(Kurpjuweit & Wagner, 2020); (Siota *et al.*, 2020)
Team background	Serial entrepreneur	(Gimmy *et al.*, 2017)
Legal situation	Legal entity	(Siota *et al.*, 2020)
Financial situation	Financial resources for at least six months	(Kurpjuweit & Wagner, 2020)
Strategic-Fit	Existing	(Gutmann *et al.*, 2020)
Degree of innovation	Higher than established suppliers	(Faria *et al.*, 2018)

Figure 6: Evaluation criteria and corresponding requirements

The VCLU then holds bilateral meetings with the start-ups to obtain detailed information. Based on this, a decision is made which start-up will pitch its solution to the VC. This final pitch can be stand-alone or part of a larger pitch-event (Corvello *et al.*, 2023), (Kurpjuweit *et al.*, 2020). Throughout the process, different people are involved. The VCLU organizes meetings and pitches with the start-ups and evaluates them (Kurpjuweit *et al.*, 2020). The evaluation of the start-ups is also carried out by the need owner on the VC-side (Corvello *et al.*, 2023). During the final pitch a manager, who is responsible for the required budget, attends (Kurpjuweit & Wagner, 2020). Additionally, the evaluation committee may include people from purchasing, business development, R&D or top-management (Kurpjuweit & Wagner, 2020).

4.2.4 Buy

The objective of the buying process is to set the foundation for a successful pilot project. In general, this process should be fast, standardized and start-up-friendly to keep the complexity of established legal and purchasing processes away from the start-up (van der Meer *et al.*, 2021). It contains three separate process steps including setting up a non-disclosure agreement (NDA), defining the pilot project and creating a purchase order (Gimmy *et al.*, 2017). Starting with the NDA EC should use a standardized template to accelerate the process (Onetti, 2021). As start-ups lack required resources to understand commonly used NDA in detail, the template should be short and simple (Kurpjuweit, 2018). After both parties have signed the NDA, they continue defining the pilot project. At first start-up and VCL agree on the scope of the pilot project defining objective, result and corresponding key performance indicators (Gutmann & Lang, 2022). As there is still an information asymmetry between the VCL and the start-up regarding its solution, larger pilot projects are divided into multiple subprojects. Thereby the VCL reduces risks as continuation of the pilot project is evaluated after each subproject (milestone). Start-ups get paid separately and up-front for every subproject (Kurpjuweit, 2018). GUTMANN ET AL. describe that Telefonica's VCLU pays its start-up-collaborators 25.000 € for a pilot project (Gutmann *et al.*, 2020). However, as the price of the pilot project depends on the start-up's efforts developing and testing the proof of concept (PoC), it is highly individual. To finance the pilot project EC can rely on different options. Usually, it gets financed by the VCL (Kurpjuweit *et al.*, 2020). In other cases the VCLU provides additional budget or even bears all costs to motivate the VCL to start the collaboration (Kurpjuweit, 2018). Just like the price the duration of the pilot project is highly individual. It lasts from a few weeks up to four months. Additionally, the project definition includes defining the project team and assigning roles and responsibilities (Gutmann & Lang, 2022). The final step includes placement of the purchase order. Therefore, the EC sends a request for proposal (RfP) to the start-up. Ideally, this happens based on a RfP-Template to accelerate the process. Afterwards, the start-up creates a proposal, which gets accepted by the EC. Lastly, the EC places a purchase order using a pre-formulated template (Corvello *et al.*, 2023). The start-up gets an official supplier number (Gimmy *et al.*, 2017).

Besides the VCL and the VCLU, purchasing-, and legal-department are involved in this process step. The VCLU accompanies the whole process, taking care of the NDA and supporting the VCL with the project definition

(Corvello *et al.*, 2023). While the legal-team is involved in contractual issues, purchasing managers handle the process of placing the purchase order (Onetti, 2021), (Kurpjuweit & Wagner, 2020).

4.2.5 Pilot

The objective of the pilot project is to validate the potential of a long-term partnership between the start-up and the EC (Siota *et al.*, 2020). Therefore, pilot projects contain two essential elements: PoC development and testing (Kurpjuweit & Wagner, 2020). The PoC development focusses on customizing the start-up technology and integrating it into the VCL's product, process or business model (Kurpjuweit & Wagner, 2020) (Corvello *et al.*, 2023). Thereby the EC can provide different resources to the start-up. This includes specific industry-knowledge access to production- and test-facilities or IT-systems (Kurpjuweit & Wagner, 2020). The PoC gets tested under real conditions (Kurpjuweit & Wagner, 2020). Its aim is to validate the PoC for technical feasibility and desirability (Corvello *et al.*, 2023), (Siota *et al.*, 2020). Additionally, business cases can be created to ensure viability (Kurpjuweit & Wagner, 2020). After developing and testing the PoC it gets evaluated by a pre-defined committee to decide whether and how the collaboration should be continued (van der Meer *et al.*, 2021) As pilot projects are highly individual evaluation criteria are project-specific. However, evaluating "the prototype's maturity and the applicability of the [solution]" as well as the quality of the collaboration is commonly used. (Kurpjuweit & Wagner, 2020)

The VCL is responsible for conducting the pilot project (Gimmy *et al.*, 2017). The core team usually involves people from the VCL, the start-up and the VCLU (Corvello *et al.*, 2023). Team members from the VCL are often experts (e.g. engineers or supply chain specialists), responsible for the product, process or business model the start-up solution is applied to (Veit *et al.*, 2021). In some cases, it can be necessary to extend the core team by e.g., IT-experts. Integrating these experts spontaneously into the project is one responsibility of the VCLU. Furthermore, its employees organize other kinds of resources like test-infrastructure and manage the pilot project by preparing kick-off-, milestone- and conclusion meetings. The committee evaluating the pilot's success is company specific. While in some cases senior managers from the VCL evaluate the PoC other EC extend the committee by the head of the VCLU or R&D- and purchasing-managers (Kurpjuweit & Wagner, 2020).

4.2.6 Adopt

In case of a successful pilot project EC and start-ups aim for a long-term collaboration. Therefore, they have different options, which can be structured using three categories (see Figure 7).

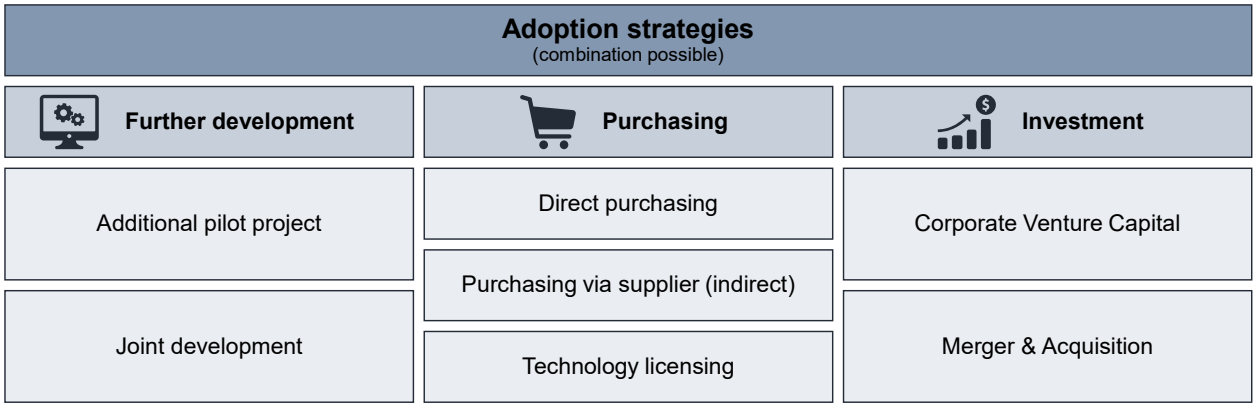

Figure 7: Adoption strategies within the VCLM

Further development: If the start-up solution is not mature enough to be purchased, EC can either conduct an additional pilot project or work together with the start-up in a joint development project. In comparison to the pilot project, the joint development project does not focus purely on validating the technical feasibility but aims to develop a market-ready solution. (Kurpjuweit & Wagner, 2020)

Purchasing: If the start-ups solution is ready to buy EC have different options to integrate it into their products, processes, or business models. They can either buy the solution directly from the start-up or purchase it indirectly, when the start-up delivers its solution to one of the established company's suppliers (Enkel &

Sagmeister, 2020), (Corvello *et al.*, 2021). Additionally EC have the opportunity to just purchase the right to use the start-ups IP (Kurpjuweit & Wagner, 2020).

Investment: If the start-up solution and its IP is strategically relevant to the EC it also has the possibility to invest into the start-up (Corporate Venture Capital) or acquire it (Merger & Acquisition) (Siota *et al.*, 2020), (Veit *et al.*, 2021). In some cases, corporate venture capital investments can be combined with further development or purchasing activities.

According to the different adoption strategies the process of adoption is highly individual. The literature does not provide a step-by-step process for each strategy. However, GUTMANN & LANG provide a three-step process that structures the adoption phase. Transferring the responsibility for the project from the VCLU to the VCL is the starting point of this process. Followed by the "scale" phase the VCL has to assign a team with corresponding "resources […], scaling goals and performance measures" to ensure that the project "stays a fixed part of the corporates business" in the third phase (Gutmann & Lang, 2022). The responsibilities for the adoption differ according to the different adoption strategies.

4.3 Venture Client Unit

Setting up and running the VCLM involves a wide range of strategic and operational tasks within the organization. These tasks can be carried out by staff from existing departments in addition to their day-to-day work, or by start-up managers from a dedicated VCLU (Kurpjuweit *et al.*, 2020). This depends on the number of pilots per year and the importance of the model within the company. If more than one person is responsible for executing the VCLM, the corresponding tasks must be divided between them. Therefore, different approaches are described in the literature. VAN DER MEER ET AL. distinguish two roles (van der Meer *et al.*, 2021). The first person has an excellent internal network as well as comprehensive industry knowledge and is responsible for identifying internal problems. The second person is scouting for start-ups and monitoring the pilot projects. In contrast, KURPJUWEIT AND WAGNER describe a relationship manager who is responsible for the entire process excluding the adoption process (Kurpjuweit & Wagner, 2020). Where the VCLU is connected to the organization varies (Gutmann & Lang, 2022). Examples include research and development, business development or technology management & forecasting (Kurpjuweit, 2018), (Kurpjuweit *et al.*, 2020), (Enkel & Sagmeister, 2020). The literature also provides further recommendations for the design of a VCLU. To work successfully with start-ups, the VCLU must be as agile as the start-ups themselves (Corvello *et al.*, 2023). Flat hierarchies and decoupling from the core organization help to speed up business and decision-making processes (Kurpjuweit, 2018), (Enkel & Sagmeister, 2020). At the same time, however, it is important to ensure that a strong network is established with the core organization to identify problems and transfer start-up solutions to the company (van der Meer *et al.*, 2021).

5. Research agenda

Based on the SLR-results, various potentials for future research arise. On the one hand, these potentials are directly related to the research questions addressed in the SLR. On the other hand, further potentials are highlighted that result from challenges associated with the VCLM.

Strategy: The literature describes different strategic questions that need to be answered when designing a company-specific VCL-approach. However, there is no definition of a VCLS or the design elements it covers. In addition, further research should investigate how the VCLM can be integrated in the corporate innovation-ecosystem (e.g. corporate venture capital) (Kurpjuweit & Wagner, 2020).

Process: Based on the literature, a six-step VCLP was derived, explained, and assigned with corresponding responsibilities. Nevertheless, there is still potential to further detail the process and explore its integration into the corporate's existing process, especially when it comes to the adoption.

Organisational structure: The SLR reveals different possibilities to embed the VCLU within the organisation (e.g. R&D). Furthermore, the tasks and roles within the VCLU can be divided differently. Therefore, it is necessary to examine how EC can build the optimal organizational structure for their objectives.

Culture: Employees of EC often refuse to work with start-ups. They do not see start-ups as serious collaborators and external innovations (not-invented-here) (Gutmann & Lang, 2022). If both parties collaborate in a pilot project different cultures lead to several challenges (Onetti, 2021). Overcoming these cultural differences offers potential for further research.

Start-up-intelligence: To increase the efficiency of the VCLP, companies need supporting software. In practice, dedicated software-solutions for start-up-collaboration or CRM-tools are used. They function as a start-up-database and support evaluation and general project management. Requirements for such software solutions for VCL do not exist.

Implementation of the VCLM: FARIA ET AL. and GUTMANN AND LANG describe the process of setting up the VCLM in a company in a rudimentary way (Faria et al., 2018), (Gutmann & Lang, 2022). To enable companies to implement the VCLM, there is a need for a systematic process model.

VCL cluster: Initiatives such as "Stratosfare" organize the VCLM for a group of EC. This phenomenon has not been investigated yet. It is necessary to study how these VCL clusters work and can be built up.

6. Discussion and limitations

This paper summarizes the state of research with a special focus on strategies, processes, and organizational structures for the VCLM. Comparable work does not exist in the literature. However, there are three publications that show mentionable intersections with the present work. GIMMY ET AL. describe main characteristics of the VCLM, but neglect corresponding strategy, processes, and structure (Gimmy et al., 2017). GUTMANN AND LANG address this gap by providing insights on start-up-collaboration-process and the implementation of venture units (Gutmann & Lang, 2022). Unfortunately, it lacks in-dept analysis of the process and VCLM-specific aspects. KURPJUWEIT AND WAGNER contribute more detailed process-knowledge by explaining the process of the "startup supplier program" (Kurpjuweit & Wagner, 2020). Exceptions count for the process steps "Request" and "Buy".

The analysis has two limitations. First, the research field "VCLM" is still very new. Few publications shed light on the subject resulting in a limited data base. Secondly, there is no common understanding of the term "VCLM". Some authors describe incubators, start-up supplier programs or start-up procurement, with characteristics similar to those of the VCLM. It is therefore possible that other publications describe the VCLM and have not been included in this analysis.

7. Conclusion

In this paper, we conducted an SLR. The aim was to summarize the state of research regarding strategies, processes, and organizational structures for the VCLM to derive directions for future research. The SLR identified 16 papers, of which only three exclusively focused on the VCLM. As a result, relevant aspects of a VCS were identified, an overarching VCLP was described and detailed, and differences in the organization structures for the VCLM were highlighted. There is potential for future research not only in relation to strategy, process, and organizational structure, but also in relation to culture, start-up-intelligence, and building VCLU and VCL clusters.

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Social Entrepreneurship in the UAE: An Exploration of Undergraduates' Attitudes, Motivations and Intentions

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Abstract: This exploratory study examines the attitudes towards social entrepreneurship amongst a group of students in an early cohort mandated by the government to undertake entrepreneurship education. As such, the study collects responses from students across a range of disciplines, focusing on their interpretation of the impact and importance of the education they have received and how it relates to (and motivates) them to pursue entrepreneurship, and social entrepreneurship in particular, themselves. As a 'first step', this initial study highlights areas which should be examined in detail through qualitative methods and suggests early indications for elements which would be useful in a framework to support policy and community interest in social entrepreneurship endeavours.

Key Words: Social Entrepreneurship, Mindset, Impact, Social Innovation, Undergraduates

1. Introduction

There is an increasing role for entrepreneurship in a complex world of community development, with the ongoing and changing needs of a very diverse population with complex issues due to changes in society, technology and the economy. Bhowmick (2011) maintains social entrepreneurship differs fundamentally from commercial entrepreneurship, and proposes it is better considered as 'social cause venturing' with the social issue the central element, rather than entrepreneurial activities. In this point of view, social entrepreneurship is not perceived as embedded in entrepreneurship – but rather as an activity in which people engage for different reasons.

The UAE is a recognised regional and global leader in supporting innovation and entrepreneurship. While impact-driven enterprises are gaining traction, greater support from the governments and investors is needed to boost the work of entrepreneurs using business for social good (Forbes, 2016). More recently, it has been suggested that the UAE could be the place where Social Enterprise 'skyrockets in the Middle East' (Johnsen, 2016), and it has been highlighted that Social Entrepreneurship will play a significant role in the future development in the UAE playing a crucial role in the advancement of social and environmental changes (GEM UAE, 2021). Furthermore, a study conducted by Reuters Foundation in 2016 shows that social entrepreneurship is gaining momentum in the UAE and that social entrepreneurs are well received amongst the UAE community. The aim of this study is to explore the perceptions of students towards social entrepreneurship. In particular, their understanding, attitudes, experience, motivations and intentions towards social entrepreneurship. The findings are based on a survey of a range of final year students across disciplines at UAEU (United Arab Emirates University). The paper provides an insight into the social entrepreneurial mindset of students and, as such, can inform the development of an appropriate framework to support the development of government initiatives to support and drive forward the social entrepreneurship agenda in the UAE.

1.1 Social Entrepreneurship as a key part of Entrepreneurship Education

Entrepreneurship plays a key role in tackling important societal challenges (Rae, 2010, European Commission, 2020). More recently, and in order to drive this agenda, entrepreneurial education is increasingly seen as a response to the globalized, uncertain and complex world we live in, requiring all people and organizations in society to be equipped with entrepreneurial competencies (Gibb, 2002; Korzhov and Pasko, 2020; Mwasiaji, 2020). The connection that social enterprise offers was seen by many governments around the world to have the potential to galvanize economic growth after the global financial crisis of 2008 and, more recently, post-pandemic. It is necessary to cultivate college students with social entrepreneurship awareness and abilities in the new era because social entrepreneurship can reshape the social morality of students, promote the innovative thinking of students in the new era, and cultivate their consciousness of "sustainable development economy" (Li and Yuan, 2019; Huang et al., 2020).

Entrepreneurial education has been positioned as a means of empowering people and organisations to create social value for the public good (Volkmann et al., 2009; Austin et al., 2006). Social enterprise is becoming an

ever-more important aspect of research, teaching and learning, especially in the higher education sector (Reye-Marti et al., 2016; Ratten, 2020, Ratten and Jones, 2020). In response to this, more and more universities are understanding the need to embrace social objectives while developing their presence in the marketplace and they recognize the need to have an impact on communities in which they operate. According to the Global Entrepreneurship Monitor (GEM) Report on Social Entrepreneurship (Bosma et al., 2015), this type of entrepreneurship is closely associated with young change-makers, who are idealistic in nature. In fact, the results of the GEM report show there is a greater representation of incipient social entrepreneurs than commercial entrepreneurs among young people between 18 and 34 years old. More specifically, according to Capella-Peris et al., (2020), higher education students are one of the most relevant populations for the development of social and/or environmental projects.

It would be valuable to train university students in the ability to identify business opportunities despite possible situations of economic and social crises. This effort must be accompanied by public policies focused on facilitating the implementation of this type of initiative, showing that social entrepreneurial intention decreases in times of deep socioeconomic crises and high uncertainty, such as that caused by Covid-19 (Ruiz-Rosa et al., 2020). While entrepreneurship education has an essential role for future entrepreneurs, it now has an increasingly significant role to prepare and create entrepreneurial graduates who can respond in the post-covid world. As a result, higher education can be expected to be a key player in the development of students who are able to develop creative approaches and be innovative in the conditions of a constantly changing environment.

In order to further differentiate social entrepreneurship education, Pache and Chowdhury (2012) proposed teaching the skills needed to connect the core areas of social welfare, commercial and the public sector. It was suggested that programs which help students develop communications, creativity, critical thinking, leadership, problem-solving and social networking skills (Kirby, 2004; Garcia-Gonzalez and Ramirez-Montoya, 2021) are all crucial transferrable skills that both the business and the community sector can benefit from. Through the process of experiential learning as part of social entrepreneurship education students' propensity to launch social enterprises is increased (Hockerts, 2018).

Social Entrepreneurship is also embedded in social domain and students must learn about society to understand how to evaluate appropriate change mechanisms in each context in which they work (Douglas, 2015). Central to social entrepreneurship practice is a robust understanding of the nature, causes and consequences of social issues, and how society operates. Only when students have an understanding of how society works and how and why situations of disadvantage and disempowerment exist, can they identify and develop ideas which are appropriate to respond to such problems and situations. Given the social, political, economic and cultural differences between countries, educators must design their lectures in order to launch discussions on country specific differences of social entrepreneurial activities. For example, according to the GEM 2015 report (Bosma et al., 2015) some developed countries – for example, the USA and Australia, reported 11% and 11.1% involvement in social entrepreneurial activities respectively.

1.2 Social Entrepreneurship in the UAE

The UAE has emphasised the importance of developing a strong entrepreneurial ecosystem for innovation, and this is a vital cornerstone to its UAE Vision for 2021 where "Innovation, research, science and technology will form the pillars of a knowledge-based, highly productive and competitive economy, driven by entrepreneurs in a business-friendly environment where public and private sectors form effective partnerships". Over the last two decades, the UAE government has introduced various measures evidencing its firm commitment to attracting overseas entrepreneurs and 'investorpreneurs', whilst also proactively encouraging local residents and Emirati nationals to pursue entrepreneurship (Sikdar and Prakash, 2011). As Reuters (2016) above note, and consistent with Islamic teaching, entrepreneurship is considered a positive contribution to the community in the UAE. Further emphasising the context and rationale for the development of social enterprise and social entrepreneurship, an article published by Dutt D'Cunha (2016) in Forbes mentions the increasing appetite for support mechanisms that are offered by the local government and private investors to encourage entrepreneurs to contribute to the social good of society. One of these initiatives is the Emirates Foundation which targets Emirati residents to address social issues, in order to develop models that are underpinned by market-based approaches and philanthropic considerations. More recently, Abu Dhabi has launched the third sector development strategy along with accreditation of social enterprises which will serve as an innovative enabling tool for the growth and development of socially driven enterprises. This is the UAE'S first recognition scheme for organisations that seek to address a social and or environmental challenge.

1.3 Social Entrepreneurship in Higher Education

Entrepreneurship education increases the propensity of students to engage in the launching of social enterprises through a process of social learning (Douglas, 2015; Muhammad et al,. 2020). Another content area that could be further developed within entrepreneurship education is that of social and non-profit enterprise. This topic has been attracting considerable attention in the field of entrepreneurship generally, both from a research and a teaching perspective. This is because it is now generally acknowledged that new ventures should have some social dimension incorporated into their mission statement. Consequently, social and non-profit enterprise could well predominate in future Entrepreneurship Education programmes, as the concept of 'doing well by doing good' becomes embedded in entrepreneurship teaching (Henry, 2020) and has become a key element in responses to rebuilding the post-covid economy (Bonnici, 2020).

In order for the students to appreciate the significant role they can play in improving the lives for people living in their communities, they need to understand the potential skill set that they have already acquired and the value they can potential create through the development of projects. Social entrepreneurial self-efficacy describes an individual's perceptions of his or her ability to contribute to societal change through small-scale social entrepreneurial behaviour. There is a link between levels of self-efficacy and intentions to reach and drive social change and impact. Mair and Noboa (2006) suggest that high self-efficacy allows a person to perceive the creation of a social venture as feasible, which positively affects the formation of behavioural intention. Hockerts (2015) argues that social entrepreneurial self-efficacy has a particularly pronounced function because societal problems tend to be perceived as so immense that people may doubt their ability to have any impact at all. By allowing students to identify problems that they fully understand and are familiar with and allowing them to engage in experiential social entrepreneurship education, they gain experience and confidence to enable them to approach similar issues in the community inside a work setting.

1.4 Methodology

As the exposure to entrepreneurship across the university was newly introduced, this study decided to employ an exploratory perspective. An exploratory research approach was used to identify and investigate new insights suggested by the results of the study. An exploratory study is a valuable means of 'what is happening; to seek new insights; to ask questions and to assess phenomenon in a new light' (Robinson, 2002, p.59). The objective of the research is to firstly establish the perceptions, attitudes and interest of this cohort and also to explore their experience of engaging with social enterprise. The entrepreneurship context at UAEU reflects the governments priorities as it is a government institution. In 2016, the UAE government mandated entrepreneurship education for all tertiary students across the country, resulting in cross-disciplinary courses being developed. At UAEU, the compulsory General Education offering, Innovation and Entrepreneurship, started in 2021. This course was an addition to courses already offered in the College of Business and Economics in entrepreneurship both as options and as a concentration in the Bachelor of Business Administration degree.

The study method was developed in two related but distinct phases. The first phase involved a review of new trends in entrepreneurship education and in particular social entrepreneurship in higher education and thus, as a literature review, focused on published reports, articles, conference proceedings and government reports in order to develop a body of knowledge, with a specific focus on the UAE. The second phase involved primary research designed to gain a perspective from undergraduates across disciplines ***at UAEU.*** The intention was to consider entrepreneurship education from a demand-side perspective (both the attitudes towards and interest in social entrepreneurship and their experience of social entrepreneurship).

Surveys were used to collect data from a self-selected sample of third level students in the United Arab Emirates University (UAEU). A survey provides an efficient tool for collecting background, quantifiable data from a specific sample, as well as gathering qualitative information from respondents in the form of experiences and views (Saunders et al., 2012). The surveys were anonymous and were distributed through faculty in the university to their classes via a Qualtrics link. The survey was broad in its application and was designed to collect both quantitative and qualitative information. The survey was structured into sections:

1. Basic demographic data and general ideas of what entrepreneurship is/how relevant it is to their study/life, and how much prior exposure they have had to entrepreneurship in general.
2. Student perceptions of skills, skills development, future application/use of learned skills in entrepreneurship.
3. Their understanding and perception of social entrepreneurship and their experience and engagement with social enterprise.

4. Their attitudes and motivations towards social entrepreneurship, family involvement and their interest in social entrepreneurship as a viable career option going forward.
5. Students' perceptions of the role of social entrepreneurship in the development of the UAE.

The value added of this research is to present original insights into this cohort from a vibrant Middle Eastern context, namely, the UAE, a country that has attracted and witnessed increasing attention in recent years in the context of globalization. In view of the Western-centric nature of academic publication on the topic, there is a real need for fresh theoretical and empirical insights stemming from an Arab-Middle Eastern context to advance knowledge and scholarship in this area**.**

1.5 Findings and Discussion

1.6 Profile of Respondents

The total sample was 170 students. The majority of respondents (92%) were female undergraduate students (72.2%) – reflecting the dominance of female student numbers across the university - and in the 17-22 age group (72.8%); while just 20% were male, and 20% aged 22-26. Overall, 48% of students were from Business/Economics/Accounting (the dominance of business students could be expected as business students are more likely to be exposed to entrepreneurship courses), 17% from Humanities (Arts, Education, Social Science, Psychology) and 14% from Entrepreneurship. Over half (63.9%) of respondents come from a family with business background (reflecting the make-up of the economy).

Table 1. Demographic Profile of Students

Gender	**Number**	**Percentage**
Male	35	20.7
Female	122	72.2
Total	157	92.9
Age groups	**Number**	**Percentage**
17-22	123	72.8
22-26	33	19.5
30+	4	2.4
Total	160	94.7
Level of study	**Number**	**Percentage**
Undergraduate	156	92.3
Post Graduate	5	3
Total	161	95.3
Area of study	**Number**	**Percentage**
Business/Economics/Accounting	82	48.0
Entrepreneurship	24	14.0
Science	18	10.5
Engineering	16	9.4
Information Technology	2	1.2
Humanities (Arts, Education, Social Science, Psychology)	29	17.0
Total	171	100.0
Family Business Background	**Number**	**Percentage**
No	108	63.9
Yes	53	31.4
Total	161	95.3

1.7 Understanding and Perception of Social Entrepreneurship

Respondents were asked to select the entrepreneurship courses they have taken. Half (50%) have completed the Innovation and Entrepreneurship (compulsory General Education) course, followed by 17.6% completing 'other' entrepreneurship courses, and 15.5% were students who had finished the Creativity and Innovation course (a specialist entrepreneurship course at 300-level). Throughout the sample, a particular difference between male and female respondents was noted with more females who had completed the Innovation and Entrepreneurship course being more interested (44.44%) or somewhat interested (61%) in Social Entrepreneurship, than any of the males. Similarly, respondents who showed either 'high' or 'some' interest in social entrepreneurship across all the course options had finished courses such as Creativity and Innovation and Launching a New Entrepreneurial Venture (both specialised, higher level course offerings). However, of

significance for this question is that 22% of those who completed the Creativity and Innovation and other entrepreneurship courses (33%) showed 'no interest at all' in social entrepreneurship.

Respondents were asked to show their understanding of the main objective of social entrepreneurship. According to the majority (37.3%) and, notably 75% of female students, their perspective on the objective of social entrepreneurship is to help society and/or the environment. Of the 20.7% that indicated that the objective of social entrepreneurship is to make a lot of money and be ssuccessful, 94% are females. Interestingly, both male and female students (50%) consider that social entrepreneurship is a means for meeting people. The inclusion of meeting people featured as a key consideration for our respondents is very important and hints at socio-cultural perspectives that could be investigated further in our on-going study. Arab populations are known for the value they place on personal relationships and longevity of relationships – something reflected in both the shared culture of the Arabs and also the Islamic teaching.

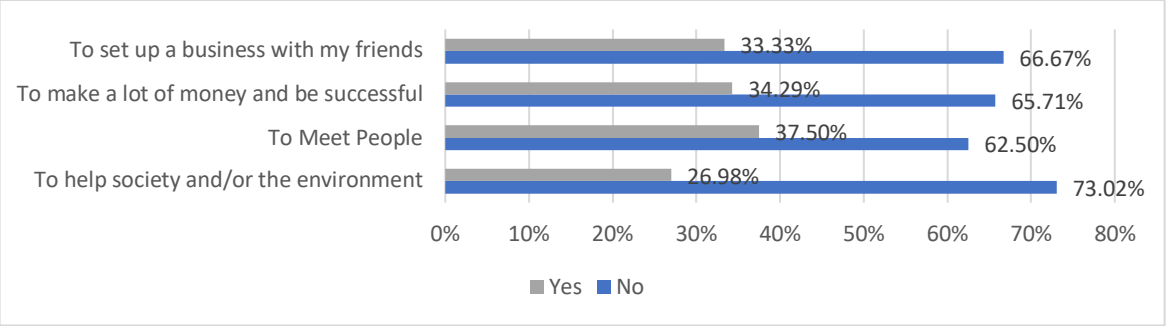

Figure 1. Students' Understanding of the Main Objective of Social Entrepreneurship by family business background (yes/no)

The majority of respondents' families do not have a business background and they consider social entrepreneurship's purpose as helping society and making money, however, 66.7% consider it to be 'setting up a business with friends'. The majority of respondents (37.5%) coming from a family business background consider the objective of social entrepreneurship to be 'to meet people', followed by 'making money' (34%), then 'setting up business with friends' (33%). Different influences are reported by respondents that impact their understanding of social entrepreneurship. Almost 23% of students consider peer-presentations of social enterprise projects as a main influence, followed by 21% who think social entrepreneurs' stories presented in social media have an important impact. This finding links to the literature, particularly relevant for female respondents, of having role models as a key motivator for engaging in entrepreneurship. Young people, as reflected here, and implying potential for social media relationships to be understood as 'real' relationships by 'digital natives' give great value to social media as a source of information and influence. The combination of peer presentations and (peer) social media postings as influences is a very interesting finding for our pilot.

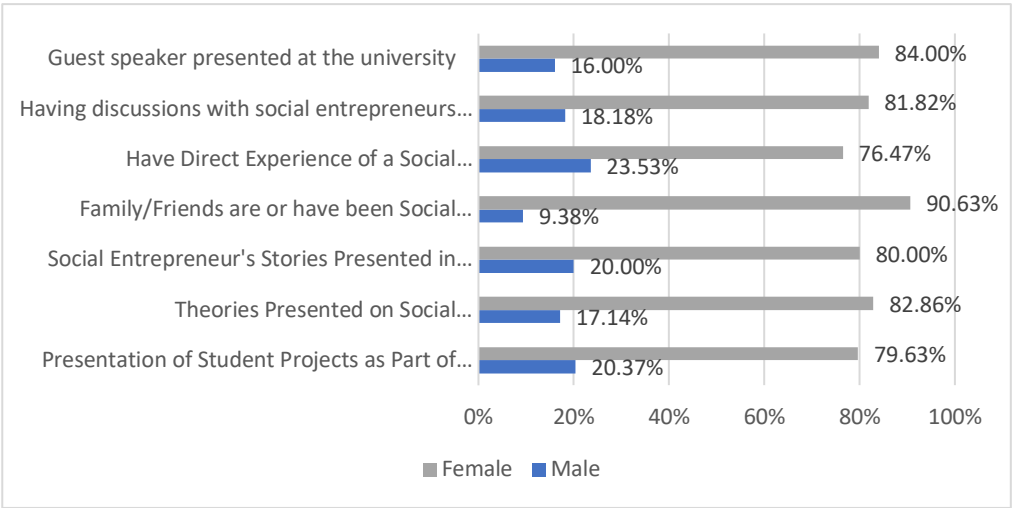

Figure 2. Main Influence of Students' Understanding of Social Entrepreneurship by Gender (male/female)

Comparing female and male respondents, the findings are different in terms of understanding the main impact. The majority of female respondents (90.6%) consider family and friends who are or have been social entrepreneurs impact their understanding about social entrepreneurship most strongly. In contrast 23.5% of male respondents believe that having direct experience of a social entrepreneurship and understanding what they do can have major influence on their understanding. Moreover, both 80% of women and 20% of men reported that social entrepreneurs' stories presented in social media and student projects within entrepreneurship courses play key roles as influences. This finding further underscores the role social media plays in young people's lives, perceptions and opinion formation. These findings were also analyzed based on the basis of family business background. The majority of respondents (46%) from a family business background consider that the main influence on their understanding of social entrepreneurship is guest speaker presentations at the university, followed by 43% who highlighted that discussion with social entrepreneurs they meet during events, and social entrepreneurs' stories presented on social media are key influences.

1.8 Experience and Engagement with Social Enterprise

Respondents were asked to indicate the key focus of the social entrepreneurship projects they developed as part of their courses. Over a quarter (27%) of student projects in the university-wide introductory entrepreneurship offering were focused on helping protect the environment. It is interesting to note that only males indicated that their projects focused on helping to support people with addictions. Whereas only female-led projects were focused on helping to support women and to give intergenerational benefits. Islamic teaching is committed to environmental sustainability and so this finding is consistent with what one might expect in a committed Muslim society. These findings are also notable and hint towards a socio-cultural basis. In the UAE there is quite a distinct gender separation between men and women in terms of 'realms of responsibility', where roles/spaces viewed as women's spaces and those viewed as men's are quite distinct. In this way, issues of support/care for women and children would likely be more relevant to female society than men's.

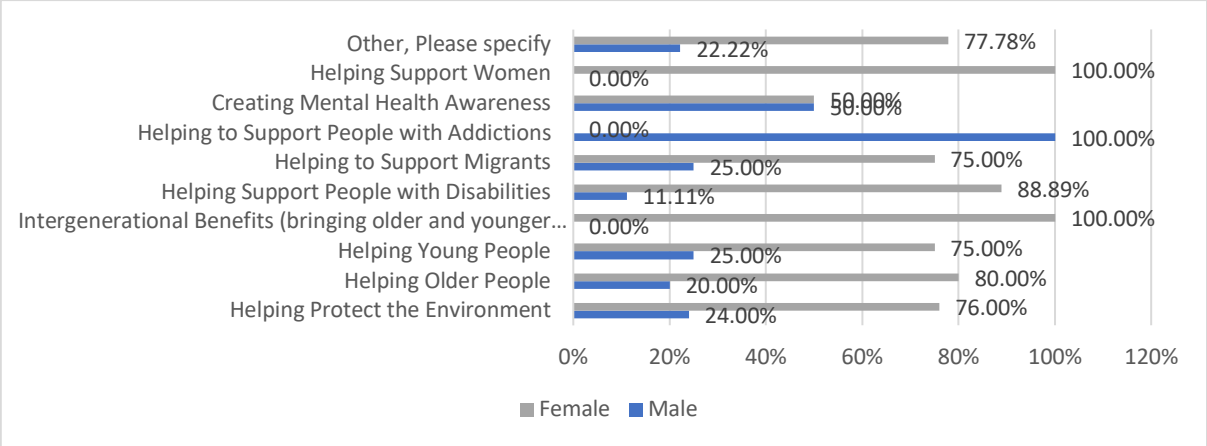

Figure 3. Focus of Social Enterprise Project developed by Students as part of Entrepreneurship Course by Gender (male/female)

1.9 Motivation Towards Social Entrepreneurship

There seems to be a relationship reflected between family business background and the impact of entrepreneurship education on respondents' attitudes towards social entrepreneurship. The majority of respondents (80%) without a family business background, felt their entrepreneurship education has had no impact. However, significant numbers of respondents without a business background are more aware of social entrepreneurship in their country and surrounding areas (68%) and are now seeking out social entrepreneurship opportunities locally and online to buy products and services (64%). Additionally, there is a significant gender difference in how entrepreneurship education is impacting respondent's attitudes towards social entrepreneurship. Significantly more female respondents (78%) are interested in setting up their own social enterprise (in comparison to only 22% of males) and also are currently working for a social enterprise (85%). This finding may link to several context-based norms. For example, social entrepreneurship activities are regulated by the government quite carefully and require detailed compliance. Many social enterprise offerings in the UAE are government-based. Many young people are registered for the available options such as at volunteers.ae.

Also, related to socio-cultural norms mentioned across the literature, young women sometimes have issues with being able to travel to workplaces far from their homes, working at night and in mixed workplaces. This would perhaps combine with female socialization norms to reflect this finding – that young women can work within their 'realm' and perform work (also likely with only other women) making a difference to society/community. Young men, having more mobility and options for work choices may, as a result, be less interested in the social entrepreneurship sector.

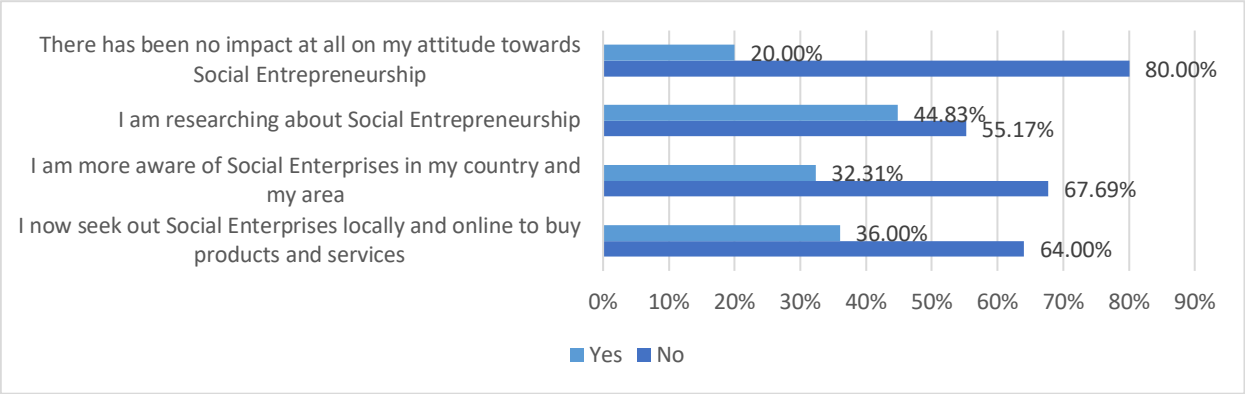

Figure 4. Impact of Entrepreneurship Education on Attitude Towards Social Entrepreneurship by family business background (yes/no)

1.10 Conclusion

Entrepreneurship education increases the propensity of students to engage in the launching of social enterprises through a process of social learning (Douglas, 2015). Social entrepreneurship in higher education institutions world-wide is an area of enormous potential and has not received enough attention until now (British Council, 2017). Given the capacity of social entrepreneurship education practice to mobilise potential resources (Desa, 2012) and create sustainable social and economic benefits with potentially significant changes to societal institutions (Leadbeater, 2007), it is somewhat surprising that social entrepreneurship education has not received thoughtful consideration and become more widespread in higher education. Social entrepreneurship as a topic of interest in business schools is a rather recent phenomenon (Bacq, Hartog, & Hoogendoorn, 2013; Choi & Majumdar, 2014; Dufays & Huybrechts, 2014; Hjorth & Holt, 2016; Short, Moss, & Lumpkin, 2009). It is only over the past few years that more and more business schools have begun to launch social entrepreneurship courses (Brock and Kim, 2011; Douglas, 2015).

In our case, the UAE Vision documents articulate the top-down policy approach to providing entrepreneurial education to students and, as such, UAEU offers two specific courses across the gamut of university specializations at an introductory level (Innovation and Entrepreneurship – General Education) and as a senior student minor (Developing an Entrepreneurial Venture). In addition, a concentration in entrepreneurship is available under the Bachelor of Business Administration degree. All of these offerings come under the remit of the business school. Bucking international trends, UAEU has offered a dedicated social entrepreneurship paper since 2010. Considering our low numbers of male students university wide, and college/concentration specifically, the aspects of social entrepreneurship interest and intentions that resonate with female students may reflect social class/female socialization norms in the UAE society. This point is a very interesting one for further investigation, with implications for sustainability (longevity/success of entrepreneurs), social sustainability and policy planning.

In undertaking this pilot, a number of literature-related considerations must be respected, interrogated and investigated. For example, in earlier work, we have written on the hegemony of terminology used in business and entrepreneurship writing, which is both western/euro-centric, and also often irrelevant – at least in part – to contexts outside of this geographical and cultural region (Wood et al., 2021). This work, and others like it, suggest that the starting point for developing educational programmes, policy documents and research priorities which are imported without cultural nuance and also imbued with (foreign) cultural bias. This means that research designs may be inherently weak and, therefore, give unreliable findings (Boulanouar et al, 2017). This is particularly the case when writing in English on Muslim women and their experiences and this issue matches wider calls in the women's entrepreneurship literature for women to speak for themselves, attribute

meaning to their own experiences, and to educate the canon by providing perspectives framed differently to the hegemonic conceptualizations of entrepreneurship we all currently read and, often, reproduce.

1.11 Limitations and Recommendations for Future Research

Despite the comprehensiveness of the methodology employed there are limitations that should be recognised. Firstly, the limited sample size indicates that the results are only a representation of the demand side perspective of students who have participated in similar programmes, at the same university, over a short period and are included via self-selection. Similarly, UAEU is predominantly a "women's university" with 80% of students being female. As such, reporting using this population is necessarily skewed. Following up on this exploratory/pilot study, we intend to undertake a round of focus groups to check both the themes that have emerged and also our interpretation of their importance and meaning. More survey data collection will follow that, as we attempt to uncover what is important and motivational to students so we can provide useful measurable and contributory data and theory to this field and context and support policy considerations and decisions with our work.

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Innovative Digital Marketing Strategies to Increase Demand in a Hotel Company

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Abstract: In recent years, there are still companies which have not opted yet to diversify, boost or develop the promotion of their range of services in the hotel industry, focusing the vitality of their sales in seasons of high tourist flow, but their level of demand is declining in regular periods. This is due to among other factors, to changes in the behavior of today's customers, who place their trust in verified and licensed channels which are part of digital marketing. Therefore, digital marketing has gained great relevance in business, which is originated by the technological advance of media, positioning digital marketing as a strategic and a necessary tool to publicize a service and significantly increase customer demand. In this case, the objective of this research is to determine the digital marketing strategies to increase demand in a hotel company in a country with an emerging economy. The methodology used in the research is a mixed type, because the information was collected through a qualitative and quantitative approach, the sample is non-probabilistic and intentional, a questionnaire was applied to customers and also interviews to administrative staff. The data was processed through Ms Excel software and presented in frequency tables and figures for interpretation. The results show the great importance of the use of digital marketing strategies such as Search Engine Optimization (SEO), Social Media Marketing (SMM) and Pay per Click, which present applications with great flexibility to acquire services, a great scope of visibility in search engines and all web content updates. Finally, it is concluded that the digital marketing strategies identified were decisive in increasing demand in the hotel industry.

Key words: Hotel Service, Demand Growth, Social Networks, Services, Peru.

1. Introduction:

For a long time, telecommunications have been playing a very important role in forging an upstream perspective of a service or product. Indeed, if development were to be established in a progressive manner of human capabilities, "knowledge is one of the main ones and ICTs a privileged means for the production and dissemination of this" (Rivoir, 2019, p.300). The problematic reality is the impact of social networks in terms of

the message that is disseminated which can immediately take on a positive or negative relevance. The presence of companies in social networks has meant that, if they used correctly, they have greater opportunities for positioning in relation to such brand identity. In fact, Cotrina (2018) specifies that the purchase of a good or the acquisition of a service is not an action that can be performed immediately, because it is a process that depends on several factors which influence the consumer to make a decision.

Digital dissemination as a tool, is vital for progress in a hotel business, since it is the main pillar to actively maintain demand; thus, through the great history of effectiveness, popularity and innovation, there are different ways to be carried out. Vargas (2017), for example, expresses that as a consequence of this globalized and digital age, it becomes almost essential to use new media which adapt to new communications, and it is almost mandatory to carry out other marketing strategies which have the help of technological tools, for such reason digital marketing is beginning to be mentioned. Thence, this research seeks to solve the following general problem: What digital marketing strategies will allow the increase of demand in a company of hotel industry located in the south of Lima?

Méndez (2018) argues that social networks are environments, links and meeting places, where people gather to share information of any kind. Along the same lines, Abuín (2014) indicates that consumers are immersed in a digitalized market; therefore, they require advertising strategies applied in social networks which help the search for information, since companies define them with the sole purpose of generating sales and making a

profit.

Valarezo (2020), at that time, mentioned that the third outstanding block of analysis refers to the visibility that the companies under study have considering a SEO search engine positioning level, it can be highlighted that the companies studied (essentially the four companies that have a presence in social networks), manage their content considering those keywords and hashtags that allow them to be classified correctly among the online search results, causing consumers to find their profiles in a quick way. What the author mentioned is related to the determination of the services offered in the hotel where it appears in search engines and all web content updates through applications such as booking, which, despite its increase in commissions when compared to profits, the use of strategies with Search Engine Optimization (SEO) is beneficial to the company.

On the other hand, López (2018) states that the use of electronic banking and use of financial services in medium and small enterprises is wide, at 78.2% and 68.5%, respectively, but among microenterprises its use is intermediate, as only 51.1% of those ones use it. There is little use in staff training and internal and external contracting. However, for sending or receiving mail, it is widely used by an average of 99.1% in the three types of institutions.

Finally, Oñate (2020) monitored the social networks of Hotel Roka Plaza Boutique, and found that the Instagram fanpage has a better level of interaction compared to Facebook and Twitter, with a weekly evolution of 6.12% and an interaction of 6.02% with only 13 publishing, therefore, Instagram is a purely visual social network which attracts young audiences and generates a digital community related to the tourist services offered.

This research is academically justified as it will allow as a methodological basis for future research on digital marketing strategies in the hotel sector, it is also justified in a practical way as digital marketing is recommended as a tool of vital importance in the decisions of entrepreneurs in the tourism sector, and is that digital marketing can solve various problems that any company of emerging economy, regardless of the item, currently due to technological advances companies especially those in the hospitality industry use digital media as the main marketing mechanism that allows them to interact with customers.

The general objective is to determine the digital marketing strategies to increase demand in a hotel company in an emerging economy country. The digital marketing strategies of the hotel industry post-pandemic managed to improve sales rates and reactivate the development of operations; however, it has not yet achieved the expected results at the pre-pandemic level of Covid-19 despite the reactivation in the tourism sector. Therefore, we are going to propose improvements in the digital marketing strategies that the hotel industry already has in order to increase the demand for its services.

2. Literature Review

Digital marketing refers to the use of electronic media carried out by marketers to make their services recognized in the market with the purpose of attracting customers and consenting the interaction with the brand through digital technologies (Yasmin et al., 2015; Cordova-Buiza et al., 2022). Similarly, it refers to targeted and interactive marketing that employ digital technologies, in order to advertise brands, create preferences and boost sales, so that they can reach potential users and thus convert and retain them into customers (Todor, 2016). Consequently, the digital marketing approach is based on how to use digital resources, such as competitive advantage, resources from which value can be derived and customers can be attracted (Herhausen et al., 2020). To sum up, these authors consolidated that digital marketing refers to varied promotional techniques which are executed to acquire customers through digital technologies that mainly use the Internet. Companies can create competitive advantages by managing internet platforms.

On their behalf, Mkwizu (2019) noted that digital marketing encompasses on the use of electronic mechanisms for products to be perceived in the desired market, and thus, to attract new customers and consent that they know the brand and interact through digital media. The opportunities presented in digital marketing exist in terms of social media marketing, content and mobile marketing that are driven by citizens, Internet and mobile users, as well as the ability of social networks such as Facebook subscribers. Therefore, Melović (2020) expressed that social networks are the digital marketing media that companies use regularly, which encompasses that digital marketing, social media marketing, creative content and mobile advertising work as trends to develop the number of customers. Also, social and digital networks contribute to achieving business objectives at low cost, which makes them an essential factor in digital marketing plans (Dwivedi, 2020; Rocha-Vallejos et al., 2022; Riofrio-Carbajal et al., 2023).

There are several precedents on the topic under study. For example, Fernández (2020) in his research on digital

tourism marketing for the reinvention of museums in Lima, Peru, at the Covid-19 impact, the study is based on the threat to the survival of museums in the face of the crisis generated by Covid-19 in Peru. In a more digitized market, these cultural institutions have to produce a certain interaction and digital interest to remain relevant to their visitors. Through the qualitative approach, information was collected through the interview technique, i.e., surveys were conducted with the users of digital media and an observation of the selected museums. All of this, in order to identify how the use of Digital Tourism Marketing can achieve the reinvention of museums before the impact caused by the Covid 19 that caused the closure of its doors, concluding that museums could achieve a full experience in each visit, if they are properly focused with tourism marketing strategies that grant their loyalty and produce a greater number of visitors to their facilities.

Diaz and Rivas (2018) in their study on hotel digital marketing strategies that affect the choice of accommodation by foreign tourists in Cusco, Peru, in this research it was determined how tourists in Cusco are influenced by digital marketing campaigns to achieve this end, a descriptive-correlational methodology was designed, in addition, 384 tourists were surveyed, finding that there are 3 types of tourists, and that a type of strategy should be designed for each tourist profile.

Valarezo et al. (2020) conducted a research with the purpose of analyzing the level of influence of social networks on business success, it has been developed through two research tools. The research approach, the sample was composed of 114 individuals, the instrument applied was the survey. The results derived were that the third outstanding block of analysis refers to the visibility of the companies under study considering a level of positioning in search engines SEO, it can be highlighted that the companies studied (essentially the four companies that have a presence in social networks), manage their content considering those keywords and hashtags that allow them to be classified correctly among the online search results, causing consumers to find their profiles in a fast way. Finally, they concluded that the management of social networks in a company does not have a significant influence on profits; there is a low frequency of publications in companies with higher profits.

Finally, Oñate et al. (2020) investigated with the main objective of proposing the online reputation as an ethical digital marketing strategy for the hotel sector Tungurahua-Ecuador, the methodology was descriptive - exploratory, the technique used was the survey and the instrument was the questionnaire. The results show that the social networks of the Hotel Roka Plaza Boutique were monitored, and it was found that the Instagram fanpage has a better level of interaction compared to Facebook and Twitter, with a weekly evolution of 6.12% and an interaction of 6.02% with only 13 publishing, therefore, Instagram is being a purely visual social network which attracts young audiences and generates a digital community related to the tourist services offered.

3. Methodology

The present research is of a mixed transversal type, because the information was collected through a qualitative and quantitative approach. Also, a descriptive cross-sectional methodological design was applied because variables were observed and measured in a hotel company in the south of Lima, the capital of Peru. Likewise, after having collected this information, we established the actions to be taken to improve the digital marketing strategies that the establishment already has, in order to increase the demand for its products and services. We consider that both the type and the design of this research are optimally suited and this will allow us to achieve the objectives previously outlined.

In order to carry out the present investigation, there were two populations: regular clients and the management and administration of a hotel company in Ica, 6 executives of the hotel company. There is no exclusion criterion. For the qualitative section, the technique was the interview and the instrument was an interview form where 5 open questions were applied for the section.

The hotel company during the year 2020 has obtained a total demand for hotel guests of 1428, obtaining an average of 119 per month, which will be used as the objective population in this research. For our sampling, we chose to use the non-probabilistic-intentional type: non-probabilistic because we are going to define the variable number of people, who will go according to our population; and intentional.

The partial sample obtained to carry out the present research is 52 people to whom we have applied the data collection instrument.

4. Data collection

In order to determine the technique and instrument to be used, an analysis of the scientific literature was carried out. As a result, we selected the most suitable one for the quantitative study, which in turn allows us to determine the ideal digital marketing strategies in order to develop a design proposal for the implementation of SEO, Pay Per Click, Email Marketing and Social Media Marketing strategies in a company in the hotel industry.

In this research, the survey was used as a data collection technique. It was carried out thanks to the information provided by the general management and administration of a company in the hotel industry. These sessions were carried out by means of zoom conferences or in some cases in person.

The questionnaire was used to find out whether digital marketing strategies are currently used in the establishment, and the survey had a simple structure with 90% closed questions on an attitude scale and 10% open questions, applied to the sample, to find out their tastes, preferences, opinions, attitudes and some additional suggestions that may increase demand.

The data (dispersed and individual) extracted from the population under study were processed through the application of the instrument, resulting in grouped and sorted data; after that, the analysis was carried out taking into account the purpose of this research. For the process or requirement of data, the inn's own software, called ERP, was used. Alternatively, descriptive statistics were used to process the data. Finally, the ethical aspects that we handled for the elaboration of the work were the APA norms, scientific articles, respect, trust and confidentiality.

5. Results and discussion

In order to carry out this research, two populations were used: regular customers and the manager and administrator of a company in the hotel industry, located in the south of Lima. Therefore, there is no exclusion criterion.

5.1 Quantitative results

5.1.1 SEO dimension results

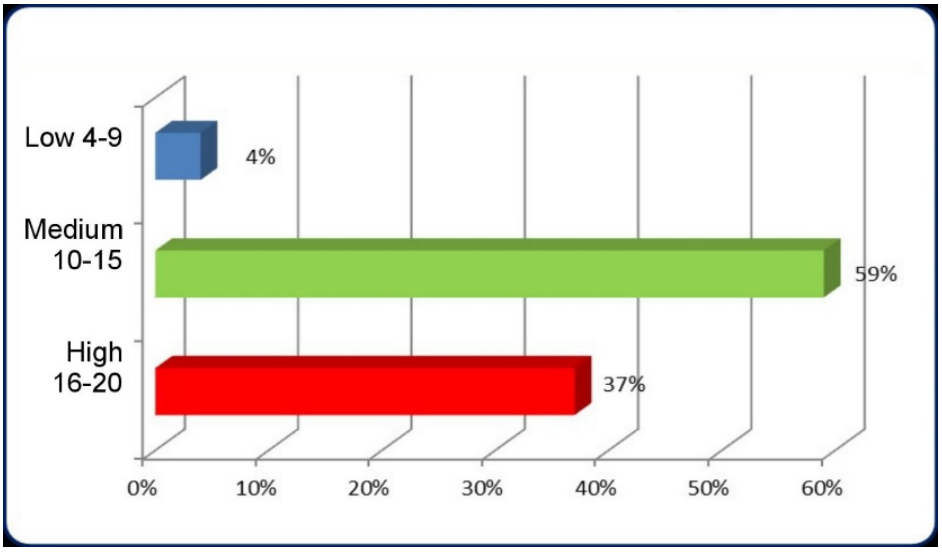

Figure 1: Results of the Search Engine Optimization (SEO) dimension

Figure 1 shows that 37% of the respondents' state that the Search Engine Optimization (SEO) dimension is at a "high level". While 59% of respondents stated "Medium level" and 4% stated "Low level". Therefore, it is deduced the presence of the Search Engine Optimization strategy in the company, in addition to the services offered appear in search engines and all web content updates through applications such as Booking.

5.1.2 Results of the Pay Per Click dimension

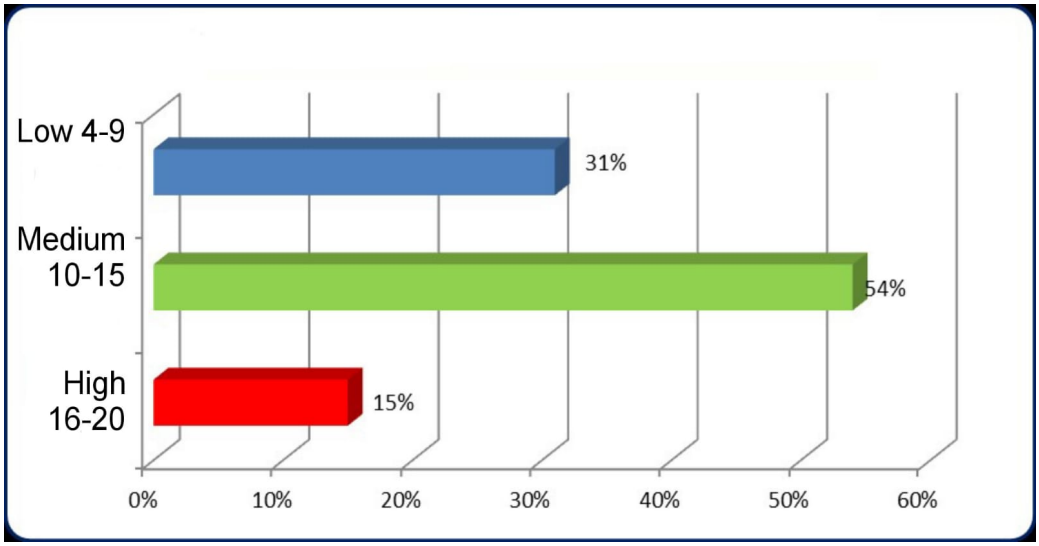

Figure 2: Pay Per Click dimension results

Figure 2 shows that 15% of the respondents believe that the Pay Per Click dimension is at a "high level". While 54% of those surveyed considered it to be at a "medium level" and 31% at a "low level". Therefore, the presence of the Pay Per Click strategy is inferred, the company does not have a specialized department, but it does carry out constant training.

5.1.3 Results of the Email marketing dimension

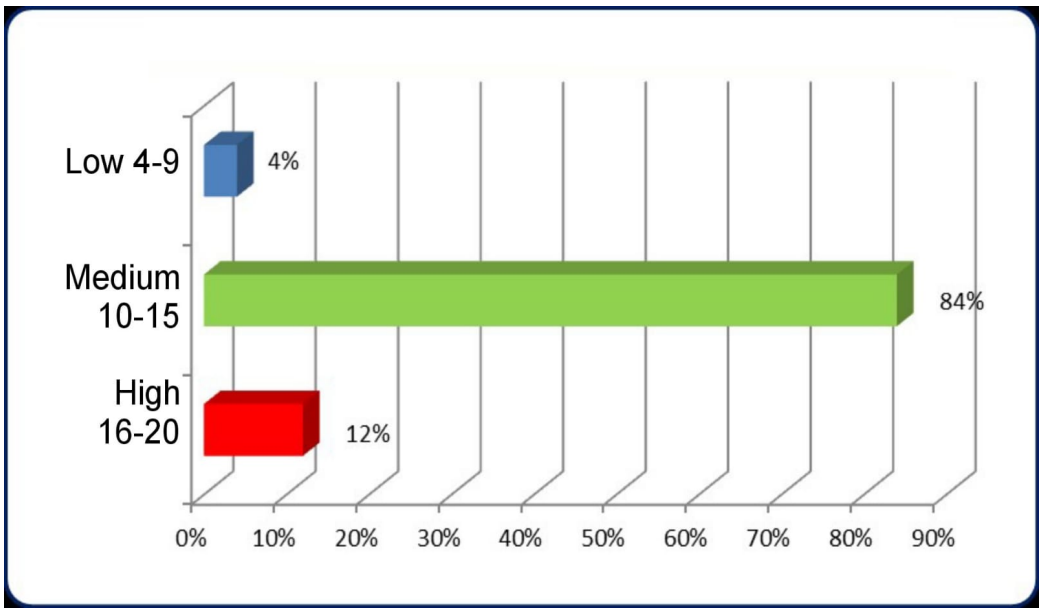

Figure 3: Results of the Email marketing dimension

Figure 3 shows that 12% of the respondents' state that the Email Marketing dimension is at a "high level". While 84% declared "Medium level" and 4% declared "Low level". Therefore, it is deduced the existence of the Email Marketing strategy in the company and the use of applications such as Google Business, the application that is the most important showcase.

5.1.4 Results of the Social Media Marketing dimension

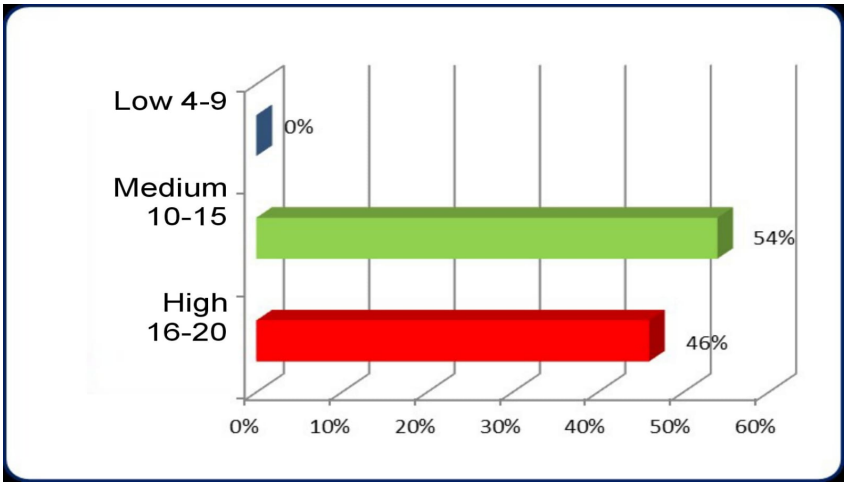

Figure 4: Results of the Social Media Marketing dimension

Figure 4 shows that 46% of respondents believe that the Social Media Marketing dimension is at a "high level" and 54% believe it is at a "medium level". In effect, the presence of the Social Media Marketing strategy in the company is shown, it should be emphasized that it is the strategy that generates the greatest demand due to the campaigns in Google Adwords, Facebook and WhatsApp Business.

5.1.5 Comparative results by dimensions

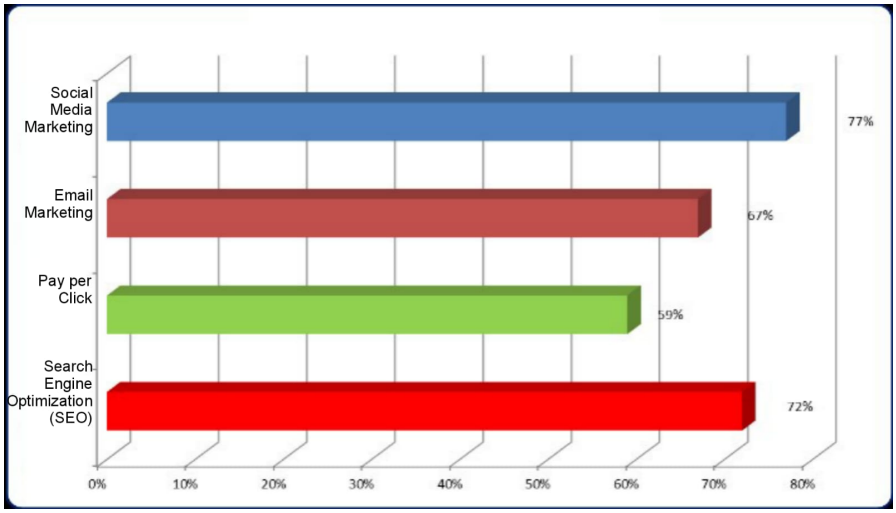

Figure 5 : Comparative results by dimensions

It is observed that 72% of the "Search Engine Optimization" dimension is a determining factor at the digital marketing level. While in 59% the dimension "Pay Per Click", in 67% the dimension "Email Marketing" and in 77% the dimension "Social Media Marketing". It should be noted that the most influential strategy is Social Media Marketing, since, as the general manager of the hotel company, located in the south of Lima, says, it is a very fundamental strategy because many customers are obtained through applications such as Google Adwords, Facebook and WhatsApp Business, thus generating greater demand for the company. In this way, it has been determined which are the digital marketing strategies in the hotel industry.

5.2 Qualitative results

In order to obtain the results of the interview about the lodging establishment, the management and administrative staff of this company were interviewed, obtaining the following results: According to the general manager's statements, the services offered by the company, appear in search engines and all web content updates through applications such as Booking, which, despite its increased commissions when compared to

profits, proves to be beneficial to the company. The administrative staff assured that they do not have a specialized department for the development of advertising (Pay Per Click), but they have trained the company's receptionists in digital marketing. The management staff assured that they use e-mails only in the use of applications such as Google Business, an application that is the most important showcase, since it has a reputation above the competition and that sells more than other marketing options, especially for corporate clients, where customers are loyalized through Gmail e-mails.

According to the administrative staff; the digital marketing strategies that allowed the increase in demand were Search Engine Optimization (SEO), Pay Per Click, Email Marketing and Social Media Marketing. Therefore, it has been demonstrated through the figures and tables presented in previous paragraphs that social networks play an important role in increasing demand, because many customers are obtained through applications such as Google Adwords, Facebook and WhatsApp Business.

5.3 Discussion

This thesis has determined which are the most used strategies in digital marketing to increase demand in a hotel company, in the south of Lima, the capital of Peru between 2020 - 2021. This article is related to the results derived from the research, as the hotel company has traditional and digital marketing; however, it has been determined that the digital marketing strategies Search Engine Optimization (SEO), Pay Per Click, Email Marketing and social, and Social Media Marketing, have been transcendental in increasing demand.

It was obtained as a result that in 59% the "Pay Per Click" dimension is a conclusive factor in digital marketing level; this coincides with Villa (2018), since, in his study on the feasibility of investment in business hotels and travelers in Medellin, Colombia, this first type of digital technology is fundamental for the hotel operation, especially for the management distribution channels, including central reservations, hotel websites, OTAs (Online Travel Agencies), GDS (Global Distribution System) and Third Party Agencies. Traditionally, bookings were made directly through the hotel or through a physical agency. However, the trend in the sector points to digital platforms, and the use of Big Data together with an effective CRM (Customer Relationship Management), which can provide a personalized experience for travelers (e.g. PPC - Pay Per Click, Private Offers, Remarketing, Geo-Targeting, among others). In the present study, it has been shown that there is a lack of more diffusion in the use of Pay Per Click, this can be explained by the fact that the company does not have a specialized department for the development of this advertising, however, it has trained and has trained the company's receptionists in digital marketing.

Regarding of the use of Social Media Marketing, it was found that 77% of the "Social Media Marketing" dimension is an important factor in digital marketing. This coincides with the study of social media marketing conducted by Polo (2015), which takes a more integrated, holistic view of marketing, oriented to put the customer at the center of the organization. Also, the result coincides with Damnjanoviæ (2020), who in his study expresses the digital marketing strategy for different target segments of Accor Hotels, which has as a result that Accor hotels has as a traditional marketing strategy channel, combined with digital marketing, brand sponsorship search engine marketing and partnership with metasearch engines. The most important strategy for this hotel is personalized email campaigns because they are popular and drives the hotel company to a better growth, in addition to obtaining customer data that are a very fundamental aspect in your company.

Regarding of the use of Email Marketing, it was obtained as a result that 67% of the "Email Marketing" dimension is an essential factor in digital marketing; that is, the strategies in the use of Email Marketing do allow to increase demand in a company in the hotel industry and allow customer loyalty through Gmail emails. This coincides with Dodson (2016) considers Email Marketing as one of the most successful digital channels to send personalized messages to subscribers.

It was obtained as a result that 72% of the "Search Engine Optimization" dimension is a determining factor in digital marketing level, this coincides with Valarezo (2020) since in his research he mentioned that the third outstanding block of analysis concerns the visibility that the companies under study have considering a SEO search engine positioning level, in which it can be highlighted that the studied companies manage their content considering those keywords and hashtag, causing their profiles to be found in a fast way.

It has not been possible to interview people to answer the questionnaire in person for reasons of covid-19 prevention protocols, since they were carried out between 2020 and 2021. On the other hand, an additional limitation has been that some people agreed to answer the questionnaire only if there were additional facilities in the service of the hotel company. For future research it is proposed to study on new forms of digital marketing

in the hotel sector. Likewise, it is considered that this research methodology can be applied to other business areas within the service sector such as travel agencies, casinos and restaurants.

6. Conclusions

The overall objective of this research has been to determine the digital marketing strategies to increase demand in the hotel industry, in the south of Lima, the capital of Peru. Therefore, it has been corroborated that digital marketing strategies do allow to increase demand in a company in the hotel industry. Finally, we conclude that the strategies in the use of Search Engine Optimization (SEO) do allow to increase demand in a hotel company, since it is a determining factor in increasing demand by 72%; Likewise, strategies in the use of Pay Per Click also increase demand in a hotel company, since it is a determining factor in the increase of demand by 59% ; in addition from above, strategies in the use of Email Marketing also increase demand , because it is a determining factor in the increase of demand by 67%. In addition, the strategies in the use of Social Media Marketing generate an increase in demand, since it is a determining factor in the increase of demand by 77%.

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Start-up Incubators for Refugees: Applying Psychological Methods to Increase Chances of Entrepreneurial Success

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Abstract: An increasing number of start-up incubators offer programmes designed specifically for refugees. They provide entrepreneurship training and access to a closely-knit community for start-up development. Beyond that, they also support refugees in overcoming typical challenges, including a lack of language skills and required qualifications, an uncertain residence status, discrimination and psychological distress on various levels. While these incubators have already contributed to refugees' social and economic integration, the number of successful participants is still relatively low. The question remains about what can be done to multiply the potential so that more significant numbers of refugees can benefit. To support incubators in achieving more significant numbers, this work presents a framework of methods and tools based on health and organisational psychology literature. More specifically, this work focuses on methods and tools to be applied during two critical phases of the incubation cycle, namely the selection process and the actual programme. First, suitable candidates may be overlooked and/or less suitable candidates admit-ted during selection. This work proposes approaches to improve the accuracy of assessment methods so that more significant numbers of candidates with good chances of success are admit-ted. In addition, these methods can help identify those candidates who may appear unsuitable at first sight but could likely get ready with a preparatory course before joining the programme. Second, participants may have difficulty keeping up during the programme for various reasons (often related to the mentioned challenges) and therefore drop out early. This work proposes science-based approaches which help to adapt and improve existing programme elements and/or implement new elements to increase the chances of successful programme completion. Overall, this work seeks to contribute to the academic discussion on innovative approaches to upscale the work of incubators for refugees. Further research will involve co-developing practical approaches with incubators for refugees, cooperating on the implementation, and measuring impact. The goal of providing incubators with relevant practical insights is to deploy more significant numbers of refugees as entrepreneurs and contribute to broader social and economic impact.

Keywords: Start-up incubators for refugees, health and organisational psychology, candidate selection and guidance, psychological assessment.

1. Introduction

Many refugees encounter challenges that hinder their social and economic integration in host countries. Five challenges in particular are discussed in the literature: Qualification, language skills, residence status, discrimination and psychological distress (Dustmann et al, 2017; Brücker, Rother and Schupp, 2018; Spadarotto et al, 2014). Integration is an indispensable success factor from the perspective of both refugees and host countries, with a major impact on economic and social realities (Harima and Freudenberg, 2020; Harima, Freudenberg and Halberstadt, 2019; Meister and Mauer, 2018).

For those refugees who wish to become entrepreneurs, dedicated start-up incubators offer pro-grammes that help them to overcome these challenges and assist them on their entrepreneurial path (Harima, 2022; Harima, Freudenberg and Halberstadt, 2019; Nijhoff, 2021; Shneikat and Alrawadieh, 2019). Typical measures of such incubator programmes include access to professional support (e.g., relevant training), resources (e.g., co-working spaces) and the local network (e.g., contacts from mentors and coaches) (Bajaba et al, 2021; Harima, Freudenberg and Halberstadt, 2019; Nijhoff, 2021; Chliova, Farny and Salmivaara, 2018; Harima, 2022). More specifically, they offer entrepreneurship and language training to develop skills such as business modelling, prototyping and communication (Bajaba et al, 2021; Harima, Freudenberg and Halberstadt, 2019; Nijhoff, 2021). Moreover, they provide coaching and mentoring to support refugees in addressing personal problems and in building local networks to gain access to resources (Chliova, Farny and Salmivaara, 2018; Harima, 2022; Harima, Freudenberg and Halberstadt, 2019; Nijhoff, 2021).

These measures create social and economic impact as they support and empower refugees to become more competent and confident, interact more proactively, take more responsibility and invest more effort in shaping a better future for themselves and the people around them (Harima, Freudenberg and Halberstadt, 2019; Chliova, Farny and Salmivaara, 2018; Degler, Liebig and Senner, 2017; Meister and Mauer, 2018; Nijhoff, 2021; Shneikat and Alrawadieh, 2019). While incubator programmes for refugees represent a key driver for social and

economic integration, the question remains how the potential for upscaling can be realised. This work focuses on psychological tools to address issues during two phases to improve programme participants chances of success. participants (Hell and Gatzka, 2018):

- Phase 1 – Selection process: Various approaches are used to select suitable participants. However, such processes may have shortcomings. On the one hand, candidates may be admitted who turn out to be less suitable than anticipated, are not sufficiently engaged and may even drop out early. On the other hand, suitable candidates may be overlooked who would benefit greatly from an incubator programme.
- Phase 2 - Successful programme completion: While these programmes generally offer relevant training and support, they may not address specific individual needs and therefore fail to support struggling participants. The mentioned challenges can hold them back and make it more difficult to keep up with programme tasks, thus making a dropout more likely.

The scope of this work focuses on the first two phases of the entrepreneurial process: ideation and incubation. Although the subsequent phase of implementing what graduates have learned and building their start-up is critical to overall success, it is typically not covered in incubator pro-grammes. Therefore, this research focuses on the following question: Which psychological tools can be applied by incubators to increase the probability of success during (a) the selection pro-cess so that more suitable participants gain access and (b) the programme itself so that more participants graduate successfully?

The paper is structured as follows: First, the conceptual research methodology is briefly outlined. Second, the relevant literature is summarised. Third, potential measures to increase the chances of success are discussed. Fourth, concluding remarks are made, including limitations and further research.

2. Methodology

This work is conceptual in nature, based on a review of the relevant literature, with the goal of supporting start-up incubators for refugees to improve their processes and approaches. First, the literature on typical challenges refugees encounter is examined, with a particular focus on psycho-logical distress. Second, methods and tools discussed in the health and organisational psychology literature are reviewed to propose approaches for incubators to address psychological stressors among programme participants. Based on the literature, a framework of psychological methods and tools is proposed to inform further research in the context of start-up incubators for refugees. With special emphasis on phases 1 (selection process) and 2 (successful programme completion) of the incubation cycle, proposed methods and tools can be directly implemented and tested in collaboration with incubators to measure impact and assess ways for continuous improvement.

3. Literature Review

Five key challenges are identified as reasons for the slow integration of refugees, which are briefly described below: Qualification, language skills, residence status, discrimination and psychological distress (Lyon, Sepulveda and Syrett, 2007; Dustmann et al, 2017; Brücker, Rother and Schupp, 2018; Spadarotto et al, 2014).

Qualification: In many cases, unsuccessful integration is due to the qualifications required in the labour market. While refugees may have obtained qualifications in their home countries, these may be regarded as inferior and not recognised in host countries (Bucken-Knapp, Fakih and Spehar, 2019; Spadarotto et al, 2014; Degler, Liebig and Senner, 2017; Gnesa, 2018). This makes them less attractive to employers and puts them at a major disadvantage (Ruedin et al, 2020; Bucken-Knapp, Fakih and Spehar, 2019; Spadarotto et al, 2014).

Language skills: Proficiency in the local language is particularly important in addition to technical qualifications, as a lack of language skills makes sustainable integration in the labour market more difficult (Bucken-Knapp, Fakih and Spehar, 2019; Gnesa, 2018). Language skills are also required for unskilled jobs. In addition to job search, other integration measures also become difficult if access to and participation in language programmes is not possible at an early stage (Degler, Liebig and Senner, 2017).

Residence status: Temporarily admitted persons are uncertain about how long they will be al-lowed to stay, which undermines their job search efforts and discourages employers (Ruedin et al, 2020; Efionayi-Mäder and Ruedin, 2014; Karlsdóttir et al, 2017). What adds to these challenges is that depending on the type of residence status, refugees may not be allowed to enter employment legally (Marbach, Hainmueller and Hangartner, 2018).

Discrimination: Many refugees have experienced discrimination in socio-economic situations and social interactions. Discrimination is a significant stressor for refugees and can lead to increased identification with

their group, which complicates the lack of access to local networks in the destination country (Martiny and Nikitin 2019). Even if they get a job through their network, they are usually less qualified, underpaid, and have worse working conditions (Ruedin et al, 2020; Söhn and Marquardsen, 2017). That discrimination also harms mental and physical health has been shown many times (Schunck et al, 2015). Discrimination and negative stereotyping can have a negative impact on academic/vocational performance. This can be explained through the "self-fulfilling prophecy" (Rosenthal, 1974) and has been confirmed several times in studies (among students with a migration background (Martiny et al, 2013).

Psychological distress: In addition to the challenges mentioned above, individuals may experience psychological distress. For instance, this may originate from experiences before and during their flight which may trigger behaviours that can lead to reservations on the part of employers (Degler, Liebig and Senner, 2017). Studies on unemployment and long-term unemployment show that a prolonged interruption of employment can significantly impact mental health (e.g., depression), which increases with the duration of unemployment (Elkeles, 1999). Prevalence rates of mental disorders among refugees vary widely depending on the study. Data show that around 30% of refugees and conflict-affected individuals suffer from post-traumatic stress disorder (PTSD), de-pressive disorders and other psychological problems (Schuler et al, 2020; Steel et al, 2009). These figures can be explained by the fact that many migrated people are/were exposed to various objective stress factors that trigger stress and can have a detrimental effect on physical and mental health (Porter and Haslam, 2005; Tribe, 2022).

By examining relevant stressors as illustrated in Figure 1, this work focuses on reducing psycho-logical distress as an effective leverage point to increase the probability of success of refugees going through dedicated incubator programmes.

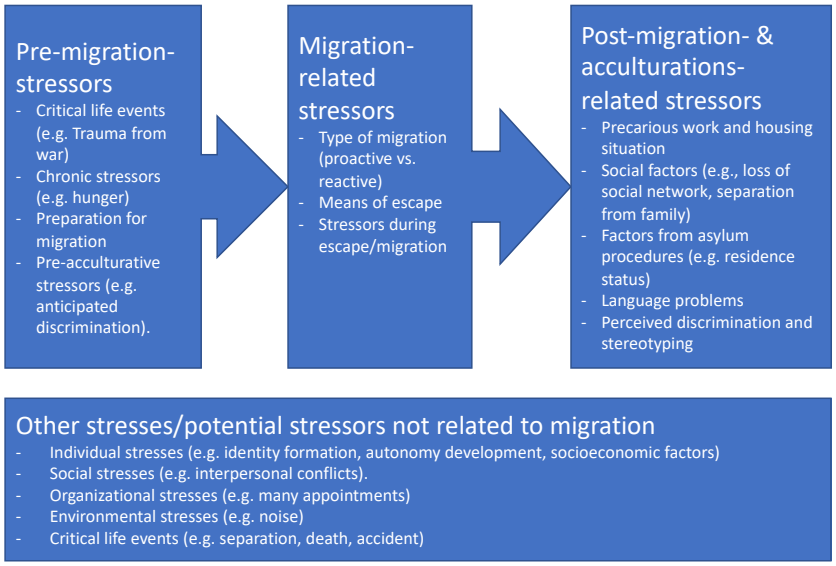

Figure 1: Examples of stressors with/without reference to migration and acculturation over time (adapted from Braig, Schmees and Eschenbeck, 2021, p. 249).

According to the transactional stress model (Lazarus and Folkman, 1984), subjectively perceived stress has a detrimental effect on mental and physical health when there is a lack of resources and when individual coping capabilities are unfavourable. However, migration-associated stress does not necessarily lead to mental health problems (Kizilhan and Klett, 2021). The development of a mental illness depends not only on the extent of the stress, the development of a mental illness also depends on the personal resources of the refugees, their resilience and coping capacities (Fazel et al, 2005).

Refugees may bring specific resources such as multilingualism or increased flexibility in thinking and acting, as they have learned to adapt their behavioural repertoire (Marley and Mauki, 2019). In terms of salutogenesis (Antonovsky, 1997), these resources help to cushion or reduce migration-specific stress. In this context, the "healthy migrant effect" is also mentioned, according to which particularly healthy people migrate due to self-selection processes (Razum et al, 2000). However, the high prevalence rates of mental disorders among refugees show the importance of identifying stressors and resources in the context of migration in order to recognise risk

groups of stressed persons at an early stage and to develop targeted interventions for particularly stressed persons.

There is consensus in the literature that the aforementioned challenges must be overcome in order to increase the success of integration programmes (Ruedin et al, 2020; Bucken-Knapp, Fakih and Spehar, 2019). This work addresses an aspect that is often neglected in standardised integration programmes: Refugees have specific needs and stressful experiences depending on their country of origin, educational background and experiences, which reduces or nullifies the likelihood of success of standardised state integration programmes (Ruedin et al, 2020; Degler, Liebig and Senner, 2017).

Consequently, the integration process needs to be effectively complemented by voluntary engagement of non-governmental and non-profit organisations at the local level. This is important because it enables personal encounters between refugees and locals that go far beyond professional or financial support (Nijhoff, 2021; Meister and Mauer, 2018). In the intercultural context, reference can be made to Allport's (1954) contact hypothesis, which states that contact between members of different (ethical) groups reduces prejudice and hostility. Contact without cooperation for a common goal does not reduce prejudice, and in some cases even exacerbates it (Pettigrew and Tropp, 2006).

Face-to-face contact sharing a common goal can be ensured by forming a "community" in the sense of a professional learning community. These have been shown to lead to more sustained learning (meta-analysis by Stoll et. al, 2006). Professional learning communities are groups of people who work together to critically examine the way they work in a reflective, collaborative, inclusive, learning and growth-oriented manner (Mitchell and Sackney, 2000).

4. Discussion of framework

While start-up incubators for refugees address the abovementioned challenges, the true potential often is not realised (Bucken-Knapp, Fakih and Spehar, 2019; Spadarotto et al, 2014; Degler, Liebig and Senner, 2017; Meister and Mauer, 2018; Kloosterman, 2010; Harima, Freudenberg and Halberstadt, 2019; Nijhoff, 2021). A disciplined application of psychological tools is proposed to ensure that more suitable participants gain access to such programmes (phase 1) and complete them successfully (phase 2).

4.1 Phase 1 – Selection process

This work is based on the latest scientific findings in differential psychology, personality psychology, culturally sensitive aptitude diagnostics, health psychology and psychology for working with refugees.

Improvement potential: To assess candidates, start-up incubators for refugees often apply typical selection tools like individual interviews and case studies as well as group exercises. This is meant to assess motivation as well as well as communication and entrepreneurial skills. While this appears to be a viable approach, around 50% of candidates are admitted to incubator pro-grammes on average and of those only about 70% graduate successfully (SINGA, 2020). Culturally sensitive aptitude diagnostic procedures adapted to the situation of refugees are needed, which increase the probability of programme completion as well as the number of successful business start-ups (Zacher, 2019). Based on the literature, an in-depth consideration of criteria on personality traits and personal suitability as entrepreneurs is required for a more precise estimation of entrepreneurial success (DeGeest, Seibert and O'Boyle, 2018; Brandstätter, 2011).

Measures for improvement: In principle, the methods listed in Table 1 can be considered for clarifying the suitability of entrepreneurs. The validity (informative value), acceptance by the target group, and cultural fairness of the procedures must be weighed (Leenen, Stumpf and Höft, 2021).

Table 1: Recommended assessment methods

Method	Validity	Acceptance by target group	Cultural fairness
Structured Interviews (Schuler, Höft and Hell, 2014, p.162)	.51	high	high
Work sample tests (Schuler, Höft and Hell, 2014, p.162)	.48	medium	low
Personality tests specifically adapted to entrepreneurship diagnostics (Hell and Gatzka, 2018)	.47	high	high
General mental ability tests (DeGeest, Seibert and Boyle, 2018)	.36	medium	low
Assessment center (Schuler, Höft and Hell, 2014, p.162)	.28	high	high
Value tests (Kristof-Brown, Zimmerman and Johnson, 2005)	.20	high	low

Often generic assessment methods which are not specifically designed for the situation of refugees are used (e.g., personality tests, general mental ability tests). Therefore, this work aims to use proven procedures with high cultural fairness and to complement them with new elements. Based on the literature, three successive elements are particularly useful for assessing entrepreneurial potential:

- Entrepreneurial personality tests should be used specifically for assessing entrepreneurial potential. Such tests operationalise different success-relevant characteristics in the context of different phases of start-ups (Hell and Gatzka, 2018). For personality traits, differences across cultures are regularly reported (Schmitt et al, 2007), but these are very small compared to differences in expertise and ability tests (Lynn, Fuerst and Kirkegaard, 2018).
- As a new element, the handling of migration-specific stress and health/well-being will also be surveyed in the future. For this, existing tests, such as "Healthy and efficient at work" (Berset, Krause and Weibel, 2018), could be completely revised for the group of refugees. Such a newly developed test aims to assess migration-specific stresses and resources as well as the state of health. Based on the results, refugees can be supported in staying focused on their psychological health despite all the challenges of independence.
- Structured interview: After successfully completing the tests, an interview follows with all candidates who are not excluded from discussing the results of the tests and collect motivation. Interviews have excellent validity and good acceptance and can be designed to be culturally fair. The previous interviews are partially standardised, so that each case can still be dealt with individually.

With these three elements, participants with a high potential for successful programme completion can be selected according to the decision matrix illustrated in Figure 2.

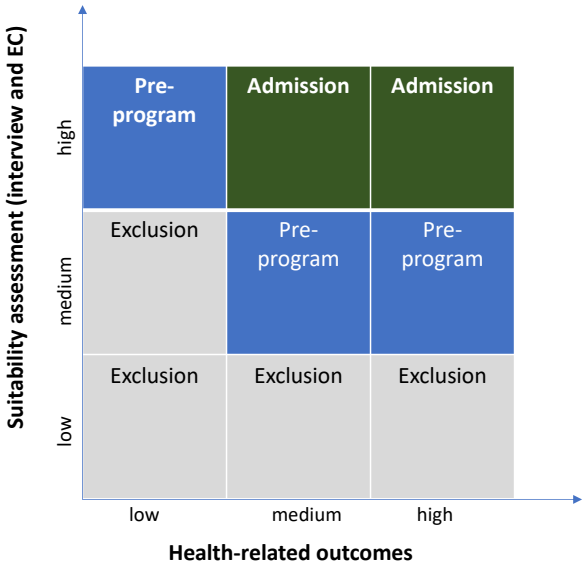

Figure 2: Decision matrix for programme admission

In addition to those who are accepted, those individuals can be identified who have the personal characteristics of entrepreneurs but do not make it into the programme, e.g., due to psychological stress. These individual challenges are addressed in a pre-programme with trained coaches/mentors to include these individuals in the following programme cycle. The pre-programme includes stress management training (Kaluza, 2018), coaching and mentoring (Sullivan, 2000), and group therapy elements. Experts working with refugees emphasise the importance of collective resources and the importance of group processes (Kizilhan, 2010). This does not require therapeutic training but a good knowledge of group processes (Kizilhan and Klett, 2021).

4.2 Phase 2 – Successful programme completion

Existing integration programmes for refugees focus on qualifications (entrepreneurial competencies and skills) and language skills. Because building formally recognised qualifications is difficult and time-consuming, such programmes hold a key advantage for rapid economic integration through preparation for entrepreneurship. Close to 90% of participants agree that such pro-grammes have helped them build important professional skills

(SINGA, 2020). This has helped many participants to find a job in the first year following programme completion (SINGA, 2020. In addition to language courses, such programmes also provide a safe space where participants can practice the local language with their peers, trainers, coaches and mentors. Although the professional goals of such programmes are largely achieved, there may also be reasons that lead to programme termination.

Improvement potential: While such programmes often have personalised elements such as coaching and mentoring, up to 30% programme dropouts indicate a potential for improvement (SINGA, 2020). A plausible explanation may be that such programmes often do not sufficiently address the challenges of psychological stress and discrimination (sources). Correlations of psychological stress and programme dropouts need to be better understood in order to define and implement effective countermeasures.

Measures for improvement: In addition to the selection process and the mentioned pre-programme, further action should be taken to improve mental health during the programme. It is important that in addition to evaluating the programme elements based on the evaluation model of Kirkpatrick (1959) or the framework model for training effectiveness (Tannenbaum et al, 1991), changes in behaviour are also surveyed. Regular feedback cycles are essential. A stress barometer could measure how individual well-being is developing during the programme. Problems identified can be addressed with the coaches/mentors and candidates with high stress levels are given access to further stress management training as in the pre-programme. Further improvements should include training programmes for coaches/mentors to improve their awareness of psychological stress related to migration. A method toolbox to help reduce such stress could be developed, which can be used by the coaches/mentors. Starting points for successful coaching and mentoring can be derived from the literature (Sullivan, 2000). Insights into the optimal design of professional learning communities, including common events, shared values, vision and collaboration are expected to add value to incubator programmes for refugees (Mitchell and Sackney, 2000).

5. Conclusion

Based on the literature on health and organisational psychology, this work proposes approaches to help start-up incubators for refugees to address challenges related to psychological distress. The overall goal of this work is to improve the chances of entrepreneurial success among pro-gramme participants and empower them to create social and economic impact for themselves as well as the wider ecosystem. Special emphasis is placed on two critical phases of the incubation cycle: the selection process and the actual programme to graduation. A conceptual framework of psychological methods and tools is presented that shall have academic and practical relevance. First, this paper aims to contribute to the academic discussion on how to better exploit the potential of refugee incubators so that more suitable refugees can benefit. Second, this work is de-signed with practical considerations of start-up incubators for refugees in mind. Discussed methods and tools can be directly implemented and tested in practice.

In terms of limitations, this paper primarily focuses on psychological methods and tools that are relevant from candidate selection to graduation. While the phase upon graduation, when refugees implement and build on what they have learned, is also important, it goes beyond the scope of this paper. This phase is generally separate from the core curriculum of refugee incubator pro-grammes. However, it represents a promising avenue for further research on suitable psychological methods and tools. Because programme graduates may feel lost and intimidated without the structure and daily support of the incubator programme, a phase-out programme can be a viable option. For instance, this could be continued coaching and mentoring, stress management training and graduate meetups with peers. Another direction for further research relates to the above-mentioned practical relevance of this work. In cooperation with start-up incubators for refugees, proposed psychological methods and tools can easily be applied and the impact on entrepreneurial success rates can subsequently be measured. These insights can then be the basis for fine-tuning and further improvements of applied methods and tools.

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How applying the Lean Start-up Methodology can affect Business Model Innovation

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Abstract: Start-ups often apply entrepreneurial approaches like the Lean Start-up Method (LSM) and Business Model Innovation (BMI). LSM emphasises experimentation during product development and testing in close interactions with potential customers to get first-hand feedback. Lessons learned are implemented so that improved product variants go through further feedback loops and so on. Products are developed by rapidly getting closer to what customers really want. BMI focuses on altering existing or developing new business models to enable differentiation from competitors. Typical elements of business models include target customer segments, value propositions, value chains and revenue mechanisms. BMI is assumed to take place when at least two of these elements are innovated in conjunction. Going beyond typical product or process innovation in isolation, BMI suggests to holistically consider interdependencies within the entire business model. The need for a better understanding on connections between LSM and BMI is expressed in the literature and this work's goal is to contribute to this discussion. More specifically, this work seeks to address the question of how the application of LSM can affect BMI. In search of answers, business plans of 25 finalist start-ups in the 2022 edition of an annual innovation competition in Switzerland are reviewed. While the evidence on the connection between LSM and BMI is not entirely convincing, reviewed business plans reveal insights into LSM-related factors at play that can support business model changes and trigger BMI.

Keywords: Lean Start-Up Method, Business Model Innovation, Business Model Change, Interdependencies, Competitive Advantage.

1. Introduction

The Lean Start-up Method (LSM) and Business Model Innovation (BMI) are popular approaches among entrepreneurs and widely discussed in the literature (Blank and Eckhardt, 2023; Burnell, Stevenson and Fisher, 2023; Faria et al, 2021; Ghezzi and Cavallo, 2020; Jodlbauer, 2020; Lizarelli et al, 2022; Ries, 2011, 2017; Silva et al, 2020). LSM supports validated learning through experimentation to get customer feedback in order to test assumptions about the business model and inform adjustments (Balocco et al, 2019; Blank, 2013; Ghezzi, 2018; Ries, 2011). This is performed by going through the Build-Measure-Learn (BML) cycle which requires a Minimal Viable Product (MVP), a rudimentary version of the envisaged product, to be tested and given feedback on by close customers (Blank and Eckhardt, 2023; Burnell, Stevenson and Fisher, 2023; Ghezzi and Cavallo, 2020; Lizarelli et al, 2022; Ries, 2011, 2017; Silva et al, 2020).

BMI focuses on innovative adjustments to specific elements of a business model to allow for different or new ways to create value (Faria et al, 2021; Jodlbauer, 2020; Philippi, Hinz and Kabous, 2022). This work follows the notion that for BMI to hold, at least two elements such as value proposition, value chain, revenue logic and customer segment need to be innovated (Lang, 2020; Philippi and von Büren, 2021; Schallmo, 2013).

While LSM and BMI are academically and practically relevant, this work focuses on connections between the two. The need for deeper insights on LSM as an enabler for BMI is expressed in the literature with theoretical and practical relevance in mind (Foss and Saebi, 2018; Ghezzi and Cavallo, 2020; Rummel, Hüsig and Steinhauser, 2022; Silva et al, 2020; Trimi and Berbegal-Mirabent, 2012). The goal of this work is to provide some insights by addressing the research question of how the application of LSM can affect BMI among start-ups.

The paper is structured as follows: First, the relevant literature on connections between LSM and BMI is reviewed and hypotheses are derived. Second, the methodological approach is presented. Third, research results are presented and discussed. Fourth, concluding remarks are made including limitations and directions for further research.

2. Literature review

The literature on LSM as well as BMI is reviewed with emphasis on how the application of LSM can affect elements of business models and BMI. LSM and other lean approaches are proposed to help entrepreneurs in

the continuing development of business models and BMI (Balocco et al, 2019: Bortolini et al, 2021; de Aguiar et al, 2019; Frederiksen and Brem, 2017; Ghezzi, 2018; Ghezzi and Cavallo, 2020; Kesting and Günzel-Jensen, 2015; Mollick, 2019; Silva et al, 2020). A deeper exploration of this combination is recommended in the literature: First, in the context of academic relevance, the need for further research on LSM as a supporting tool for BMI is expressed to improve understanding of the matter (Rummel, Hüsig and Steinhauser, 2022; Silva et al, 2020). Second, in the context of practical relevance, the need for relevant entrepreneurial methods to assist BMI is mentioned (Foss and Saebi, 2018; Ghezzi and Cavallo, 2020; Trimi and Berbegal-Mirabent, 2012). Based on the literature on the connection between LSM and BMI, hypotheses are derived to assist further research.

2.1 LSM

BML as a core component of LSM enables start-ups to engage in validated learning through experimentation such as, for instance, letting potential customers test a new product variant or changed feature (Blank and Dorf, 2012; Blank and Eckhardt, 2023; Burnell, Stevenson and Fisher, 2023; Ghezzi and Cavallo, 2020; Ries, 2011, 2017; Silva et al, 2020). For validated learning to take place, business hypotheses are formulated and tested in order to measure the impact of any change and to validate assumptions about the business model (Bortolini et al, 2021; Ghezzi and Cavallo, 2020; Blank and Dorf, 2012). For BML to be applied in practice, an MVP and close customer interactions are required. An MVP is a basic and early version of the envisaged product or service that is tested by customers to give feedback (Ghezzi and Cavallo, 2020; Hinz and Eisenbart, 2019; Ries, 2011, 2017; Silva et al, 2020). For this feedback process to work repeatedly in order to improve the offering, close customer interactions are necessary (Balocco et al, 2019; Ghezzi and Cavallo, 2020; Ries, 2011, 2017).

2.2 BMI

Changes to the business model represent an innovative alteration of how value is created and appropriated (Balocco et al, 2019; Chesbrough, 2007, 2010; Zott and Amit, 2007; Zott, Amit and Massa, 2011; Osiyevskyy and Dewald, 2015). While this is a broad notion of change, BMI is more rigidly defined as innovation of specific elements of the business model such as value proposition, value chain, revenue logic and customer segment (Augsten et al, 2017; Casadesus-Masanell and Zhu, 2013; Chesbrough, 2010; Gassmann et al, 2017; Jodlbauer, 2020; Philippi, Hinz and Kabous, 2022; Rayna and Striukova, 2016). This work follows the notion that at least two of these elements of the business model need to be innovated for BMI to hold (Lang, 2020; Philippi, Hinz and Kabous, 2022; Philippi and von Büren, 2021; Schallmo, 2013).

2.3 Impact of LSM on BMI

To account for LSM holistically, this work focuses specifically on the effect BML has on elements of business models and BMI. LSM as a powerful entrepreneurial approach typically focuses on innovating the value proposition of the product or service, however, it can go beyond that to affect other elements of a business model (Bortolini et al, 2021; Ghezzi and Cavallo, 2020; Silva et al, 2020).

A disciplined BML process with experimentation and hypothesis testing that supports validated learning can facilitate BMI, which is especially relevant in highly dynamic digital industries (Bortolini et al, 2021; Burmeister et al, 2016; Ghezzi and Cavallo, 2020; Mcgrath, 2010; Ries, 2011; Rummel, Hüsig and Steinhauser, 2022). When a hypothesis is rejected based on experiment results, fundamental changes of the business model may be necessary. This is referred to as pivoting when a new hypothesis is defined and tested again with experiments (Blank and Dorf, 2012; Bortolini et al, 2021; Silva et al, 2020; Ries, 2011). Pivots represent course corrections when entrepreneurs respond to fundamentally changing customer preferences or newly available technologies, for instance (Silva et al, 2020; Ries, 2011). Major corrections can help entrepreneurs to improve their business model along various dimensions (Bohn and Kundisch, 2018; Bosch et al, 2013). In instances of minor changes, iterating allows entrepreneurs to rapidly adjust the business model further and conduct more experiments to test hypotheses (Blank and Dorf, 2012; Bortolini et al, 2021; Ries, 2011). Iterating also enables entrepreneurs to finetune their business model and align it with strategy in case fundamental changes from pivoting have caused misalignment (Bohn and Kundisch, 2018; Foss and Saebi, 2017; Teece, 2010). Based on the reviewed literature, Hypothesis H1 is derived: *The more validated learning takes place through BML, the more likely pivoting / iterating is triggered.*

On the matter of pivoting and iterating, Bortolini et al (2021) note that LSM can support start-ups in innovating and improving their product or service offering and related value proposition. Beyond that, LSM can trigger changes and innovation of other elements of business models including value chain, revenue streams and

(access to) customer segments (Balocco et al, 2019; Bohn and Kundisch, 2018; Bortolini et al, 2021; Eisemann et al, 2011; Silva et al, 2020). Experimentation through BML can lead entrepreneurs to adjust one or more elements of their business model rapidly (Balocco et al, 2019; Bortolini et al, 2021; Blank, 2013; Ghezzi and Cavallo, 2020; Rummel, Hüsig and Steinhauser; 2022; Silva et al, 2020; Tesch, Brillinger and Bilgeri, 2017; Yang et al, 2019).

For instance, Balocco et al (2019) present evidence that regular communication and interactions with customers may trigger changes to how the value proposition is delivered (i.e., value chain / architecture / network) as well as how financial transactions are handled (i.e., financial mechanisms). Balocco et al (2019) note that a disciplined change process (i.e., identification of required changes, preparation for and execution of change) can affect multiple elements of the business model simultaneously. Examples for changes along the value chain include acquiring new knowledge, hiring additional (human) resources, establishing new partnerships (e.g., suppliers, distributors) and introducing new corporate functions and activities (Balocco et al, 2019). Changes regarding financial mechanisms include developing new revenue models (e.g., payments, debt collection) and introducing alternative cost structures (e.g., removal of expensive operations, automation of processes, focus on scalability), to name a few (Balocco et al, 2019). Hypothesis H2 is derived from the reviewed literature: *The more pivoting / iterating is triggered, the more likely multiple business model elements are changed and BMI occurs.*

3. Methodology

This work seeks to examine how LSM can affect elements of business models and BMI. The relevant literature on the matter was reviewed with particular emphasis on linkages between LSM and BMI and hypotheses were derived. In search for evidence, business plans of 25 start-ups participating in the Swiss Innovation Challenge in 2022 were examined. Among 100 start-up teams admitted to the competition, they have passed two selection rounds based on their business plans and pitches and have successfully qualified as the 25 finalists.

For the purpose of this work, the competition allows for a consistent sample selection and represents a reliable source of innovative start-ups for research. Following almost 10 years of successful annual operation and continuous improvements, sample selection of the competition follows a proven process based on consistent and relevant evaluation criteria. For instance, these include innovativeness, feasibility and strength of the team. An experienced and accomplished jury uses these criteria to carefully assess business plans and pitches. This disciplined and elaborate process seeks to ensure that the cohort of 25 finalists consists of start-ups that meet high standards and are likely to succeed.

The research procedure for this work consisted of a review of business plans done independently by three researchers. Based on a defined set of criteria and following definitions of the relevant literature, business plans were examined for evidence of LSM in the form of close customer relationships, MVP and BML. Likewise, business plans were screened for evidence of innovation on different elements of business models. With the evidence for LSM and BMI identified, business plans were checked for any connections between the application of LSM and BMI. Finally, results of the involved three researchers were aggregated and analysed.

Business plans were chosen as the unit of analysis for this work because they are frequently used in practice as a selection tool. For instance, most start-up competition juries, business angel clubs and professional investors require start-ups to deliver a convincing business plan. Because of the sheer number of start-ups seeking admission to competitions and access to venture funding, business plans are often used for the initial screening before interacting personally with a considerably smaller cohort of selected start-ups.

This approach was meant to assess if business plans are a useful source of evidence for widely used entrepreneurial approaches like LSM and BMI as well as connections between them. However, as mentioned in the conclusion, further research with other methodological approaches like in-depth interviews with start-up teams shall be done for deeper insights.

4. Results and discussion

The importance of a better understanding of causal relationships between LSM and BMI has been discussed in the literature (Foss and Saebi, 2018; Ghezzi and Cavallo, 2020; Rummel, Hüsig and Steinhauser, 2022; Silva et al, 2020; Trimi and Berbegal-Mirabent, 2012). More specifically, this work examines the effect that the application of LSM can have on BMI by referring to evidence from reviewing the mentioned business plans. Such evidence can usually be found in sections describing the business model in general, products or services (development), customer segments, operations, financial and implementation plans. In line with the literature review, results are presented and discussed on three clusters: LSM, BMI and impact of LSM on BMI.

4.1 LSM

As illustrated in Figure 1, results obtained from the review of business plans suggest that most start-ups entertain close customer relationships, however, evidence for MVP and BML is considerably weaker.

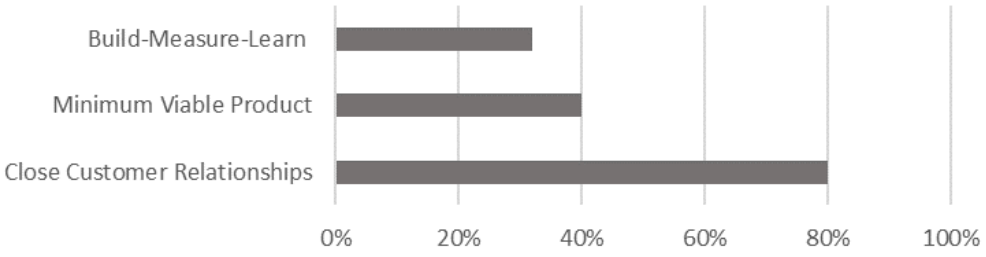

Figure 1: Components of LSM applied by start-ups

Close customer relationships appear to be evident in 80% of cases in this sample. While these interactions are important for start-ups in general and an integral component of LSM (Balocco et al, 2019; Ghezzi and Cavallo, 2020; Ries, 2011, 2017), such evidence cannot be found for the remaining cases. In the review of business plans, differentiation was made based on the degree of customer relationships, i.e., some customer interaction (which, by definition, every start-up has) versus truly close and regular interactions (in the form of workshops, co-development and feedback sessions).

When screening for the use of an MVP, the evidence is weaker with 40% of reviewed business plans containing explicit references. In these cases, an MVP is explicitly mentioned in the implementation plan which also contains background information such as development stages and testing (Ghezzi and Cavallo, 2020; Ries, 2011, 2017; Silva et al, 2020). When BML is concerned, evidence is weaker still with only 32% of start-ups explicitly applying it. Two reasons in particular appear plausible for the weaker evidence for MVP and BML. First, a disciplined, consistent and continuous application of BML and MVP development as defined by Ries (2011) tend to be rare. Many start-ups may just go through some stages of BML or even complete one cycle but then stop experimenting and testing. However, they would need to go through the cycle multiple times in the strict sense suggested by LSM (Ghezzi and Cavallo, 2020; Ries, 2011, 2017; Silva et al, 2020). Second, this is explained by the strict review approach undertaken in this work. When various activities of BML are not explicitly mentioned, the case is not counted. For instance, such activities include defining assumptions, running experiments to test them, collecting and evaluating data, making changes, illustrating a roadmap, working towards milestones, etc. (Blank and Dorf, 2012; Ghezzi and Cavallo, 2020; Ries, 2011, 2017; Silva et al, 2020). In many of these cases, the implementation plan refers to an MVP that is given to potential customers for feedback. Based on reviewed business plans, however, an improved MVP tends to be described as the end point of BML which does not account for further testing, feedback rounds, measurements and adjustments.

4.2 BMI

Figure 2 illustrates the results from the review of business plans with innovation on the value chain found in 24%, on the revenue / financial model in 16% and on customer segments in 12% of cases.

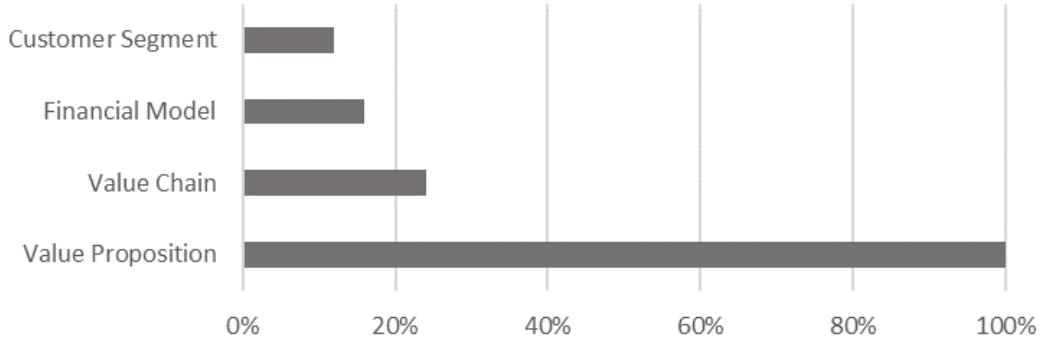

Figure 2: Elements of business model innovated by start-ups

The results also suggest that in all reviewed cases, innovation focuses on the value proposition of products and services which is in line with the literature (Foss and Saebi, 2017; Hock-Doepgen et al, 2021; Philippi, Hinz and Kabous, 2022). This is true for all reviewed business plans in this work because concerned start-ups were admitted to the mentioned competition for their innovative value proposition. The findings also suggest that innovations on other elements of business plans are relatively rare. Overall, BMI is evident in 40% of concerned start-ups with innovation of at least two elements of their business model (Lang, 2020; Philippi, Hinz and Kabous, 2022; Philippi and von Büren, 2021; Schallmo, 2013). In most of these BMI cases, innovation of the value proposition is combined with either the value chain or the revenue / financial model. In rare BMI cases, innovation of three elements of the business model can be identified.

4.3 Impact of LSM on BMI

The question remains what evidence can be found in reviewed business plans for an impact of LSM on BMI. As explained before, this impact is observed by focusing on the application of BML as the all-encompassing aspect of LSM (Blank and Dorf, 2012; Ghezzi and Cavallo, 2020; Ries, 2011, 2017; Silva et al, 2020). Results shown in Figure 3 suggest that out of those 32% reviewed business plans with evidence for BML (as per Figure 1), all concerned start-ups innovate their value proposition, 25% each their value chain or revenue model and 13% their customer segment.

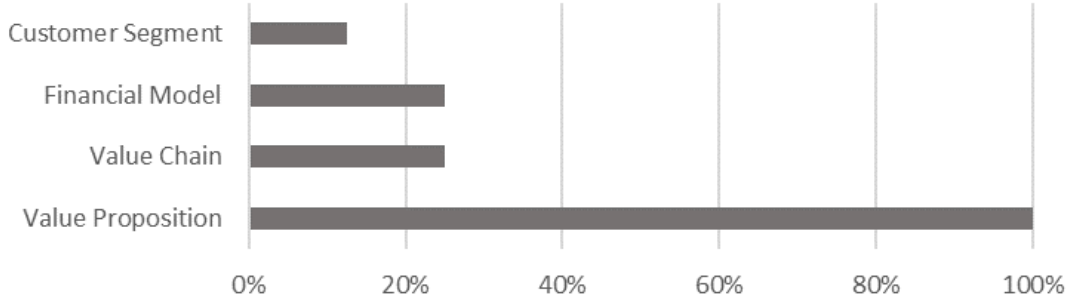

Figure 3: Elements of business model innovated by start-ups that pursue BML

In total, 38% of those BML cases can be classified to engage in BMI by innovating at least two elements of their business model (Lang, 2020; Philippi and von Büren, 2021). Based on the results, the evidence for an impact of LSM on BMI appears to be weak and insights are limited in the context of Hypothesis H1 and H2. As mentioned above, H1 suggests that more validated learning through BML makes pivoting / iterating more likely. However, while BML by definition involves validated learning that can inform pivoting and iterating, the degree and likelihood of that cannot be examined on the basis of available results. H2 in turn suggests that more pivoting / iterating makes it more likely that multiple business model elements are changed and BMI occurs. As noted above, the results indicate that 38% of identified cases with evidence of BML pursue BMI. As with H1, however, the results do not provide an indication on the degree and likelihood of that happening on a case-by-case basis. In summary, further research shall be done to provide a better understanding on the matter.

4.4 Further insights on impact of LSM on BMI

It is important to note that findings regarding the impact of LSM on BMI are based on reviews of business plans following strict definitions. This raises the question if other factors can be found that are relevant for the connection between BML and BMI that can lead to innovation and trigger BMI (Balocco et al, 2019; Saebi et al, 2017). Indeed, screening the sample of business plans based on a more flexible notion of business model change (Balocco et al, 2019) reveals stronger evidence for a connection. As illustrated in Figure 4, results obtained from the review of business plans reveal evidence of supporting factors like digital business models, support from coaches / mentors, secured funding from professional investors, participation in start-up competitions and intellectual property.

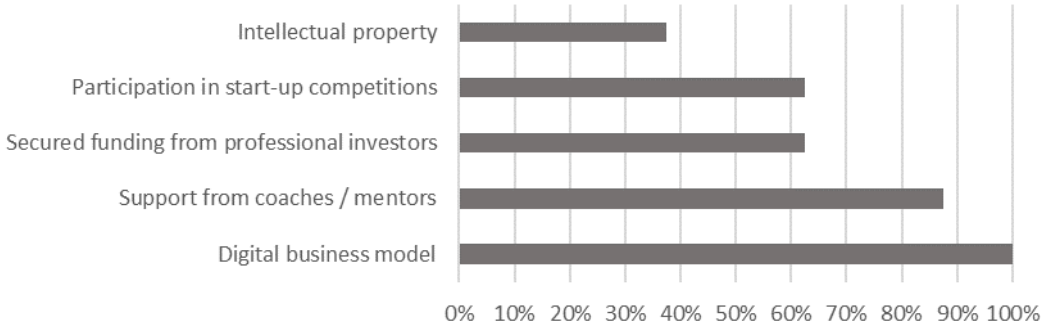

Figure 4: Identified factors supporting business model change among start-ups that pursue BML

Digital business models: All reviewed start-ups that pursue BML have a business model with a digital product or service offering. This can be explained by the fact that the application of BML is considerably easier in the digital context. For instance, experiments and customer testing can be set-up and conducted faster and cheaper when concerning a digital offering like software or application (Balocco et al, 2019; Bohn and Kundisch, 2018; Ghezzi and Cavallo, 2020). A digital business model can therefore be supportive of innovation and business model change (Balocco et al, 2019; Ghezzi and Cavallo, 2020).

Support from coaches / mentors: 88% of start-ups that pursue BML receive professional coaching and / or mentoring. Advice from more experienced individuals who provide an outside view and constructive feedback is especially important for younger companies. Their business models are relatively flexible and can be innovated and changed to account for a highly dynamic market (Bouwman et al, 2019; Klewitz and Hansen, 2014). Advisors can be a great support when navigating through challenges of early start-up stages when the innovation focus takes shape to build competitive advantage (Minsch and Can, 2020).

Secured funding from professional investors: 63% of those start-ups pursuing BML have gone through various funding rounds and have at least secured series A funding. To reach that stage, they have pitched to various professional investors. To have success in this highly competitive process, founders are required to critically evaluate, adjust and innovate elements of their business model which can go beyond the value proposition (Balocco et al, 2019; Bohn and Kundisch, 2018). To convince investors of financial feasibility, founders tend to put increasing emphasis on the financial / revenue model as well.

Participation in start-up competitions: 63% of those start-ups pursuing BML have participated in at least two competitions. As with pitches to professional investors, founders are expected to describe their business model and convince jury members and audience of its feasibility. In return, they get constructive feedback which represents an opportunity to change and innovate elements of their business model (Balocco et al, 2019; Ghezzi and Cavallo, 2020). It is not uncommon for founders to pitch at competitions regularly to gain traction and speed up innovation and development processes.

Intellectual property: 38% of those start-ups pursuing BML have successfully registered patents. Founders will have carefully analysed their offering in detail and gone through feedback loops to be able to explain how they can meet patenting requirements. This demanding process represents an opportunity for founders to consider implications this may have on business model change (Balocco et al, 2019).

In summary, it appears that these supporting factors observed in business plans of start-ups pursuing BML provide some insights into the connection between LSM and business model changes which may trigger BMI (Balocco et al, 2019; Saebi et al, 2017).

5. Conclusion

This work has various implications. On the theoretical level, it seeks to contribute to a better understanding on how the application of LSM can affect BMI among start-ups is expressed in the relevant literature (Ghezzi and Cavallo, 2020; Rummel, Hüsig and Steinhauser, 2022; Silva et al, 2020). In search for evidence, business plans of 25 start-ups participating as finalists in the noted competition in 2022 were reviewed.

On the practical level, a better theoretical understanding of discussed entrepreneurial concepts may uncover findings that are relevant in practice, especially when more conscious linkages between LSM and BMI are

concerned (Foss and Saebi, 2018; Ghezzi and Cavallo, 2020; Trimi and Berbegal-Mirabent, 2012). While LSM and BMI are frequently applied in practice, linkages between them, combinations of approaches and other related or unrelated supporting factors may boost their practical relevance and potential.

On the methodological level, it becomes apparent that the chosen approach of reviewing business plans alone does not provide the desired insights. While some evidence was found for the application of LSM and BMI, findings on the connection between these two approaches are less convincing.

Because the review of business plans is based on written and rigid documents, important details may not have been described explicitly enough or may have been omitted. In other words, some start-ups may apply BML and pursue BMI in line with definitions, but simply missed to explain that in their business plan. Given these limitations, further research shall be done in the form of semi-structured interviews with concerned start-up teams. Personal conversations will likely uncover details on how entrepreneurs apply LSM in general and BML specifically and what the impact on BMI is. This shall also provide a better basis to test derived hypotheses. In-depth interactions with founding teams may also uncover insights on other factors at play between LSM and BMI that support business model changes in general.

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Circular Economy in SMEs: The Role of Commitment to Sustainability and Digitalization

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Abstract: Small and medium-sized enterprises (SMEs) are a decisive part of the efforts against climate change. However, they are late in terms of sustainability and circular economy (CE). Little is known about the factors that facilitate the implementation of CE practices in SMEs. Due to CE leading to cost savings, new business models or reputation gains, companies can achieve a competitive advantage. To realize this competitive advantage the strategic orientation of a firm is pointed out. Various theoretical papers have shown how CE can be enabled and how it can be inhibited. However, empirical studies that support the existing literature are lacking. The goal of this paper is to investigate the influence of two mechanisms, namely commitment to sustainability (CtS) and digitalization as strategic orientations on CE implementation. Therefore, we conduct a study with a self-developed sample of 754 German SMEs. Using multiple linear regression analyses, the results show that digitalization and CtS positively influence CE implementation in SMEs. Interestingly, the complementary effect of pursuing a dual strategy toward digitalization and sustainability is not significant for CE implementation. Our study contributes to the CE literature by giving a nuanced understanding of various antecedents of CE implementation. This study provides several approaches for managers of SMEs to improve their CE practices. First, digitalization is indeed an effective tool for implementing CE practices. Therefore, practitioners should strengthen their digitalization efforts when considering increased CE implementation. Second, a general focus on sustainability increases the implementation of CE practices. Therefore, practitioners should raise awareness of sustainability throughout the organization. Third, the combined focus on CtS and digitalization needs to be carefully considered. To implement CE, digitalization should be embedded in the sustainability strategy. Due to the liability of smallness, SMEs should seek their resources for digitalization and sustainability commitment not only within but also outside the company boundaries.

Keywords: Circular Economy, Strategic Orientation, Digitalization, Commitment to Sustainability, Small and Medium-Sized Enterprises

1. Introduction

Circular Economy (CE) plays an important role in reducing resource consumption and providing significant economic potential (Bressanelli et al., 2018). However, great efforts are needed from various parties especially small and medium-sized enterprises (SMEs). SMEs play an important role in the world's economy. Not only their economic but also their environmental and social impact is significant (Revell, Stokes, & Chen, 2010). However, research points out that SMEs lack behind in terms of sustainability in general (Revell et al., 2010). Most SMEs struggle to include CE practices in their operations (Ormazabal et al., 2018). Therefore, it should be of interest to investigate what factors influence the adoption of CE practices in SMEs.

To realize CE the strategic orientation of a firm is pointed out (Ferasso et al., 2020). Even though the particularity of SMEs regarding the strategic orientation has been shown (Ardito et al., 2021; Eller et al., 2020), the strategic orientation applied by SMEs have received less attention than those by large enterprises (Aragón-Correa et al., 2008). While Schmidt et al. (2021) have shown that strategic orientation positively relate to CE practices, Ardito et al. (2021) have found that digital and environmental orientations positively relates to innovation performance in SMEs. To complement the existing research, this study focuses on two mechanisms, namely commitment to sustainability (CtS) and digitalization as strategic orientations.

Even though the strategic orientations CtS and digitalization are pointed out to be interconnected, research studies them independently of each other (Isensee et al., 2020). A better understanding of digitalization and CtS in relation to CE implementation is needed (Chauhan, Parida, & Dhir, 2022; Kristoffersen et al., 2020).

This paper contributes to the literature by answering the following research questions: *Can CtS and digitalization facilitate CE implementation in SMEs? Does the dual strategic commitment to digitalization and sustainability affect the CE implementation of SMEs?*

2. Theoretical background and hypotheses

The concept of CE is being used in a wide range of contexts and many definitions address and conceptualize different aspects of CE (Kirchherr, Reike, & Hekkert, 2017). CE promotes better resource use thereby avoiding waste and supporting the regeneration of the natural system (Kirchherr et al., 2017). Studies point to slowing (extended useful life of products), narrowing (fewer resources), and closing the loop (reused resources) as important strategies of CE (Bocken et al., 2016).

Especially SMEs offer adequate conditions to establish CE activities. SMEs are characterized by a strong and dominant, and far-reaching top management (Willard, Krueger, & Feeser, 1992) supported by flat hierarchies and closer communication between different parts of the organization (Aragón-Correa et al., 2008). It is thus easier for a smaller company to implement a certain strategy. Furthermore, SMEs often have a simple capital structure that increases their flexibility (Aragón-Correa et al., 2008). However, the lack of resources and the environment of SMEs are identified as reasons for falling behind (Jansson et al., 2017). Hence, it is important to identify success factors for the establishment of CE in SMEs. Investigating the strategic orientation, particularly CtS, as well as digitalization, can advance CE implementation.

2.1 Digitalization and CE

Many companies have begun to use digital technologies to manage their innovation processes (Urbinati et al., 2020) and are using digital technologies in a variety of processes in their organizations (Hanelt et al., 2021). Digitalization is pointed out as a key enabler of the CE (Chauhan et al., 2022; Kristoffersen et al., 2020). However, there is a gap between the potential shown in theory (Bressanelli et al., 2018) and practical implementation (Ingemarsdotter, Jamsin, & Balkenende, 2020). Digitalization can address several prerequisites of the CE, such as cooperation of different companies (Holzer et al., 2021), bringing transparency to supply chains and products (Agrawal et al., 2022), enabling new business models that decouple economic growth from resource consumption (Lüdeke-Freund, Gold, & Bocken, 2019), and improving production (Chauhan et al., 2022).

The mentioned aspects point towards a positive relationship between digitalization and CE implementation in SMEs. Hence, we argue the following:

Hypothesis 1. Digitalization positively relates to CE implementation of SMEs.

2.2 CtS and CE

CtS is pointed out to be a potential source of sustained competitive advantage (Banerjee, 2002; Roxas, Ashill, & Chadee, 2017). CtS builds upon the premise of integrating an environmental focus into the strategic orientation of the firm (Linnenluecke & Griffiths, 2010). CtS "reflects the deliberate strategy of the firm to reconfigure its organizational system, structure, processes, and activities to mitigate the negative impact of its practices on the natural environment" (Roxas et al., 2017, p. 164). Hence, CtS requires a company to recognize that its activities can harm the environment and to strive to limit this impact (Banerjee, 2002). However, there is a lack of research on CtS in SMEs.

The companies' policies and strategies are a key aspect in the implementation of CE (Ferasso et al., 2020). Management values are important in SMEs for implementing sustainability practices (Jansson et al., 2017) because the business leader often owns the business and has a strong influence on proactive environmental management. SMEs that have a CtS, in the sense that the management focuses on sustainability in its decisions and strategic planning, should tend to have more CE practices established. Hence, we conclude the following:

Hypothesis 2. CtS positively relates to CE implementation of SMEs.

2.3 The complementary effect of digitalization and CtS

Existing research calls for a closer look at the interaction between sustainability and digitalization (Isensee et al., 2020). We argue that digital and sustainable orientations lead SMEs to develop a mindset that commits the company to adopt digital technologies that protect the natural environment. This results in SMEs acquiring new knowledge and capabilities, building relationships with other organizations, and in turn linking the digital world or the natural environment to new products and processes, leading to improved innovation performance in products and processes (Ardito et al., 2021) and thus to the implementation of CE activities.

Digitalization is a key enabler for CE implementation (Chauhan et al., 2022) and CE is a major component of sustainability (Bocken et al., 2016). Therefore, companies that are committed to sustainability and are digitally positioned can more easily implement CE activities. Hence, we hypothesize the following:

Hypothesis 3. The interaction between digitalization and CtS has a positive effect on CE implementation of SMEs.

Figure 1 shows the research model.

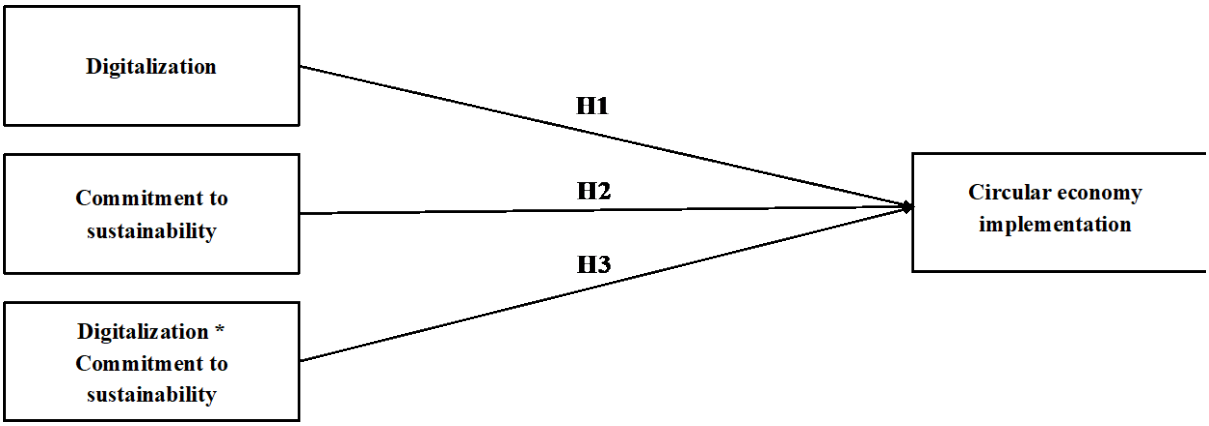

Figure 1: Research model

3. Methodology

3.1 Sample and data collection

We focus on German SMEs since they are well suited for the investigation of CE as pointed out by Schmidt et al. (2021). Consumers and other stakeholders in Germany have high expectations towards companies in terms of sustainable business practices due to a long tradition of sustainability-oriented legislation (Patel et al., 2000).

Overall, we contacted 15,034 SMEs via email including a self-administered online survey. The data collection including a reminder took place over eight weeks from August to September 2022. Overall, 1,058 emails were undeliverable and 34 companies were permanently closed. A total of 754 questionnaires were filled out completely and correctly, i.e. the questionnaire was completed and there are no missing answers in the construct items. This results in a response rate of 5,4 % and represents a comparable response rate for this research field (Ardito et al., 2021; Eller et al., 2020; Khan, Daddi, & Iraldo, 2021). Table 1 contains descriptive statistics of the sample.

Table 1: Descriptive statistics

Firm size	Frequency	%	Firm age	Frequency	%
1	126	16.71	<= 5 years	108	14.32
2-4	208	27.59	6-20	280	37.14
5-9	216	28.65	21-35	324	42.97
10-19	110	14.59	>= 36	41	5.44
20-49	53	7.03	n/a	1	0.13
50-250	14	1.86			
n/a	27	3.58			

3.2 Measurement

The research model builds upon established indicators, which were all applied in the context of SMEs. The measures were translated into German and adapted to the specific circumstances of the sample with the feedback of academics and industry experts. In the following, the variables are introduced. Table 2 presents the study's measures and factor loading.

Table 2: Factor loadings after varimax rotation

Variable	Item	Factor loadings
CE		
	Do you design and develop products that can be easily repaired? (Spare parts and repair possibilities available, economic efficiency of repair given).	0.91
	Do you design and develop products that are easy to maintain (e.g., easy monitoring and control of functionality)?	0.91
	Do you design and develop products that are recyclable (e.g. easily separable)?	0.81
	Do you use products (not packaging) made from recycled material?	
	Do you design and develop products that are biodegradable (e.g. no hazardous substances, fast decomposition)?	0.73
	Do you use products (not packaging) that are biodegradable?	0.83
	Do you use packaging that is biodegradable and/or reusable?	0.61
	Are there closed loops in production (e.g. return/recycling of product residues into production, waste as raw material)?	0.64
	Do you increase the material and energy efficiency of your business by achieving the same result with less material and energy input?	0.55
	Do you reduce your waste by passing on by-products (e.g. products resulting from a manufacturing process whose main purpose is to produce another product; production residues)?	0.65
	Do you procure by-products from other companies/organizations?	0.61
	Do you provide repair services for customers?	0.78
	Do you provide maintenance services for customers? (e.g. monitoring and control of product functionality)	0.74
	Do you use materials that have been used before (e.g. old products)?	
	Do you rent and share tools, machines, or facilities/rooms?	0.55
Digitalization		
	How do you rate digitalization in your business compared to other businesses in your industry?	0.69
	How do you rate the use of information and communication technologies in your company?	0.84
	How do you rate your own use of information and communication technologies?	0.82
	How pronounced is the use of sensor technology (e.g. RFID or QR codes) for measurement and control in your operation?	0.59
	How pronounced is the collection and analysis of data in your operation?	0.54
	How pronounced is the digitalization and automation of service/operating processes in your company (e.g. ordering processes)?	0.62
	How pronounced is the digitalization and automation of production processes in your company (e.g. computer-aided manufacturing processes)?	0.84
	How pronounced is the use of (innovative) digital tools in product design and manufacturing (e.g. 3D printing, robotics, AI) in your company?	0.79
	How pronounced is the use of “smart“ devices in your operation (e.g. smartphones, tablets, etc.)?	0.75
	How pronounced is the use of social media and technologies that support collaboration in your business?	0.63
	How pronounced is the use of e-commerce (e.g. an online store) for buying and selling goods on the Internet?	0.84
	How pronounced is the use of digital trading platforms for the marketing of (quality-assured) secondary materials (e.g. recyclates, already used materials) in your company?	0.78

Variable	Item	Factor loadings
CtS		
	In strategic decisions involving a product/service, the environmental friendliness of the product/service is an important factor.	0.83
	Environmental friendliness is an important aspect in planning the competitive focus for our key products, services and markets.	0.84
	Environmental friendliness and social compatibility are important in the purchase and manufacture of products and services.	0.82
	Sustainability is an important part of our company's values and philosophy.	0.84
	Sustainability is a prioritized area for the management in the firm.	0.84
	Sustainability considerations have an impact on the strategic planning in the firm.	0.84

Note. Blanks represent loadings < 0.5.

Dependent variable – CE. We assess the dependent variable CE with the scale established by Khan et al. (2021). The scale covers all different phases of CE implementation. To address the specific circumstances of the German SMEs we added 6 items to the existing items. Thus, a total of 15 items were included. The items are measured on a 5-point Likert scale (1= currently not planned, 5 = successfully implemented). We added the option "not possible in my company" as some CE practices are not feasible due to resource constraints or the nature of the respective business model in SMEs.

Independent – Digitalization. We assess digitalization with the scale by Eller et al. (2020). We complement this scale by items addressing specific technologies whose absence was identified by Rajput and Singh (2021) to hinder CE implementation. The complemented scale consists of 12 items. The items are measured on a 4-point Likert scale (1 = very low, 4 = very high) because feedback from practitioners indicated that too many points could reduce the response rate. As it was shown that Likert scales with 7, 5, or 4 points do not show different results with regards to mean, SD, correlations, or factor analysis the scale was reduced accordingly (Leung, 2011). For the items assessing the use of a certain technology, we added the option "not possible in my company".

Independent – CtS. The independent variable CtS is assessed with the scale by Jansson et al. (2017) which is partly based on Kärnä, Hansen, and Juslin (2003). The scale consists of 6 items. The items are measured on a 4-point Likert scale (1 = completely disagree, 4 = completely agree).

Control variables. Following earlier research in the field of SMEs, we control for turnover, industry, firm age, segment, and the number of employees (Ardito et al., 2021; Eller et al., 2020; Schmidt et al., 2021). Larger firms might have more resources at their disposal and therefore implement more CE practices (Longoni, Luzzini, & Guerci, 2018). Additionally, older firms have been shown to innovate less (Gopalakrishnan & Bierly, 2006). Depending on the industry and whether a firm produces products or provides services, different CE practices can be implemented.

4. Analysis and results

4.1 Construct validity and reliability

In line with other researchers (Schmidt et al., 2021), we confirmed measurement reliability and validity before estimating the hypotheses. To build the constructs, we calculated the mean of the items for every scale. We computed Cronbach's alpha (Cronbach, 1951), average variance extracted (AVE), and composite reliability (CR) to assess the inter-item reliability of the scales (see Table 3).

Table 3: Validity and reliability indicators

Variable	Number of Items	Cronbach's alpha	AVE	CR
1 CE	15	0.79	0.21	0.75
2 Digitalization	12	0.81	0.36	0.87
3 CtS	6	0.91	0.63	0.91

Note: AVE = Average variance extracted; CR = Composite reliability.

Cronbach's alpha above 0.70 is commonly assumed to be acceptable (Taber, 2018). A threshold of 0.50 for AVE (Bagozzi & Yi, 1988) and a threshold of 0.60 for CR (Fornell & Larcker, 1981) is applied. All constructs fulfill the threshold for Cronbach's alpha and CR. Since AVE is a more conservative measure and if the threshold for CR is fulfilled, internal reliability can still be assumed (Lam, 2012).

The discriminant validity is assessed by comparing the square root of AVE with the pairwise correlation of the constructs (Fornell & Larcker, 1981). As in each case the square root of AVE exceeds the correlation the discriminant validity can be confirmed (see Table 4).

Table 4: Correlation table and discriminant validity

Variable	M	SD	1	2	3	4	5	6	7
1 CE	3.2	1.0	0.46						
2 Digitalization	2.6	0.6	0.22**	0.60					
3 CtS	2.9	0.7	0.37**	0.20**	0.79				
4 Firm age	38.8	40.6	-0.03	-0.02	0.01	-[a]			
5 Employees	9.0	19.8	-0.03	0.19**	0.05	0.23**	-[a]		
6 Segment	2.1	0.7	-0.21**	0.01	0.07*	-0.05	-0.00	-[a]	
7 Sales	4.7	1.7	-0.08*	0.28**	-0.06	0.25**	0.43**	-0.04	-[a]

Note. *p < .05 **p < .01. In the diagonal in bold is the square root of AVE for CE, digitalization, and CtS. [a]Not applicable.

4.2 Regression analysis

To test our research model, we use multiple linear regression analysis. We tested and confirmed the Gauss-Markov assumptions (Hallin, 2014). Furthermore, variance inflation factor (VIF) statistic was performed to rule out multicollinearity. None of the VIF score of each variable were above the threshold of 3.3 (Hair, Ringle, & Sarstedt, 2011). Hence, multicollinearity is not a problem in our study.

Model 1 includes control variables and CE and reveals that company age ($\beta = -0.00$, $p < 0.05$) and the number of employees ($\beta = -0.00$, $p > 0.10$) nearly have no effect on CE implementation. The segment shows statistically significant effects on CE implementation. On one hand, companies that offer only services have on average a lower level of CE practices ($\beta = -0.64$, $p < 0.01$). On other hand, being a company that offers both services and products increases the level of CE ($\beta = 0.43$, $p < 0.01$). The sales volume does not have an influence on CE implementation.

Model 2 includes control variables, digitalization, and CE (hypothesis 1). Digitalization has a positive statistically significant effect on CE implementation ($\beta = 0.46$, $p < 0.01$). Hence, hypothesis 1 is supported. Model 3 includes control variables, CtS, and CE implementation (hypothesis 2). CtS has a positive statistically significant effect on CE implementation ($\beta = 0.46$, $p < 0.01$). Thus, hypothesis 2 is supported.

Model 4 includes all summarized constructs as well as the interaction effect of digitalization and CtS. Digitalization ($\beta = 0.52$, $p < 0.05$) and CtS ($\beta = 0.55$, $p < 0.05$) have a positive statistically significant effect on CE. The interaction effect is slightly negative but not significant ($\beta = -0.06$, $p > 0.10$). Hence, hypothesis 3 is not supported. All models (1-4) are statistically significant. Table 5 reports the results.

Table 5: Results of regression analysis

CE (dependent variable)	Model 1	Model 2	Model 3	Model 4
Controls	β	β	β	β
Firm age	-0.00**	-0.00	-0.00**	-0.01
Employees	-0.00	-0.00**	-0.01**	-0.01***

Segment (production as base)				
Services	-0.64***	-0.64***	-0.60***	-0.61***
Both (services & production)	0.43***	0.43***	0.38***	0.38***
Sales (< 22 T. € as base)				
22 T. - < 50 T. €	-0.09	-0.16	-0.13	-0.18
50 T. - < 125 T. €	-0.07	-0.17	-0.10	-0.17
125 T. - < 250 T. €	-0.07	-0.25	-0.13	-0.25
250 T. - < 500 T. €	-0.19	-0.37	-0.15	-0.29
500 T. - < 2,5 Mio. €	-0.15	-0.38**	-0.11	-0.29
2,5 Mio. - < 5 Mio. €	-0.15	-0.43**	-0.09	-0.31
> 5. Mio. €	-0.06	-0.46	0.11	-0.21
Independent variables				
Digitalization		0.46***		0.52**
CtS			0.46***	0.55**
Digitalization * CtS				-0.06
R^2	0.21	0.27	0.31	0.34
F	18.29***	25.54***	28.49***	27.69***

Note. *p < 0.10 **p < 0.05 ***p < 0.01; N = 740.

5. Discussion and conclusion

In this paper, we focus on the relationship between digitalization, CtS, and CE implementation in SMEs. Digitalization and CtS are positively related to CE implementation (hypotheses 1-2) while their interaction is not significantly related to CE implementation (hypothesis 3).

5.1 Theoretical implications

5.1.1 Influence of digitalization on CE

Various theoretical papers have shown how digital technologies enable CE and how their absence hinders it (e.g. Chauhan et al., 2022). However, empirical studies that support the existing literature are lacking (Rosa et al., 2020). This paper empirically support the hypothesized relationship between digitalization and CE in SMEs.

The higher the level of digitalization, the more CE practices are implemented. Companies with a high degree of digitalization are enabled to implement CE practices in different phases of the product lifecycle. Innovative digital tools such as 3D printing can be used to increase the development of products that are easily repaired in the design and production stage (Ingemarsdotter et al., 2020). The digitalization and automation of production processes enable increased material and energy efficiency. Sensor technology allows for the collection of end-of-life products in the consumption and collection stage (Agrawal et al., 2022). Digital trading platforms facilitate the reusing of bi-products or recycled materials from other organizations in the recycling and resourcing stage (Kristoffersen et al., 2020). In this respect, this paper answers the call for empirical studies supporting the existing literature (Rosa et al., 2020).

5.1.2 Influence of CtS on CE

The far-reaching influence of the management in SMEs points towards the link between a CtS of the management and the implementation of CE practices. The results of this paper support the hypothesized relationship between CtS and CE in SMEs. The higher the CtS, the more CE practices are implemented. CtS measures the extent to which companies prioritize sustainability. CE is a very effective way of increasing the sustainability of a company. If a company decides to increase the environmental friendliness of its products in its strategic product decisions, the actions that implement CE, such as the 10 R-strategies (refuse, rethink, reduce etc.), can contribute to achieve that goal (Lüdeke-Freund et al., 2019). When environmental friendliness plays a

role in purchasing decisions, used or recycled materials could be preferred, or their products could be remanufactured, which again increases the degree of CE. Therefore, CE is one of several potential manifestations of CtS. In line with prior research (e.g. Bocken et al., 2016), this paper empirically supports the connection between CtS and the implementation of CE practices.

5.1.3 Influence of digitalization and CtS on CE

When considering the full model, both CtS and digitalization simultaneously decrease CE implementation. However, this effect is insignificant and small. The results do not support the assumption that pursuing digital and sustainable orientations simultaneously does improve CE implementation. According to Ardito et al. (2021), the reasons for this slightly negative effect may be due to the complexity of managing the different types of resources underlying digital and sustainable orientation, as well as the commitment of these resources to unrelated goals. As a result of the liability of smallness that SMEs often face, SMEs are not able to meet resource-intensive strategic commitments. Managers and employees of SMEs are thus more likely to have attention allocation problems (Ocasio, 2010).

Our study contributes to a better understanding of the relationship between sustainability and CE implementation and shows that, in addition to economic considerations, environmental and strategic aspects are important contributors to a move from linear to CE. This study thus builds on previous work (e.g. Ardito et al., 2021; Neligan et al., 2022) and extends it to include the complementarity of digital and sustainable orientation in relation to CE implementation in an SME context, an area that remains under-researched.

5.2 Managerial and practical implications

Our results contribute to the understanding of the interrelationship of digitalization, CtS, and CE in the context of SMEs. First, digital technologies are effective tools to implement CE practices. Therefore, practitioners should increase their digitalization efforts when considering increasing or facilitating CE practices. Two digital technologies which might be particularly helpful in this context are the digitization and automation of production processes and the use of innovative digital tools for product design and manufacturing.

Second, a general focus on sustainability increases the implementation of CE practices. Therefore, practitioners should increase awareness throughout the company for sustainability. This could lead to employees also incorporating sustainability aspects into their daily activities and decision-making, thus increasing the circularity of the whole business.

Third, the combined focus on CtS and digitalization must be carefully considered. As the transition to CE can only be mastered if strategic orientations can be linked, SMEs need to be shown how to connect their digital and sustainable strategies without inhibiting CE implementation. Awareness must be created in SMEs that resources for digitalization and sustainability engagement are not only available within the company but also outside its boundaries (Ardito et al., 2021). Therefore, SMEs need to consider not only their own commitment to digitalization and sustainability but also that of their stakeholders, as they can be a source of relevant resources. The exchange of tangible and intangible resources will become increasingly important with regard to CE in order to close, narrow, and slow material loops with the help of digital and sustainable orientation. Therefore, practitioners should build an environment and network that focuses not only on digital but also on sustainable innovation (Isensee et al., 2020). SMEs should adopt green digitalization tools to improve their sustainable performance and integrate digitalization into their sustainability strategy.

6. Limitations and future research

Some limitations must be considered. First, this paper focuses on German SMEs. These companies are particularly suitable for CE implementation as they have a high intensity of processing and treatment of materials and have the potential for efficiency increases and material savings. Further research could apply the research model in larger companies and other regions outside Germany to assess whether the results are reproducible and generalizable to other contexts. Second, we used a cross-sectional design. However, the mutual influence of the different constructs often happens over time. In this respect, a longitudinal study could provide further insights. Third, future research could address the question of why digitalization is rather low in SMEs and specialize on the interdependencies between CtS and digitalization. Overall, the degree of digitalization in SMEs is low to very low. Therefore, digitalization seems to provide a high potential to increase CE implementation by

synergizing resources. Future research that applies case studies in SMEs might extend the understanding of our findings.

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Entrepreneurial Hospitality Businesses: Application to a New Consumer Purpose Model

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Abstract: This paper applies a proposed concept of underlying consumer purpose and psychological bonding to the entrepreneurial hospitality industry, including hotels, restaurants, and bed and breakfast establishments. Since the worldwide COVID-19 pandemic, the industry has seen a huge surge in pent-up demand. Event planners' expectations have risen. Students are flocking to the industry where there is almost a guaranteed employment upon graduation. The hospitality industry, being one of the largest industries worldwide, faces intense market competition. To succeed, it relies on various factors, including customer satisfaction, loyalty, trust, affective commitment, and share of wallet The model applied in the paper has recently been published in the *Journal of Asia-Pacific Management*. The model synthesizes multiple theories, that includes need fulfilment theory, goal theory, and congruency theory. The purpose of this paper is to illustrate that a comprehensive understanding of consumers' needs, goals, values, and self-image is crucial for marketers to enhance service experiences, achieve sustainable success, and help consumers attain their desired psychological outcomes. To combat this somewhat sceptical view of service mix development benefitting the hotel firm primarily, we propose the need to broaden hotel marketing and innovation strategies to include recognition of purposeful fulfilment of consumers' psychological needs/tasks, goals, values, and self-concept. Doing so will strengthen the organizational commitment to hotel consumers, leading to sustainable success for the hotel firm and other hospitality-related businesses. To exemplify further the usefulness of consumers' underlying purpose, we have supplied a variety of hotel examples in figures that demonstrate how hotels can create innovative products or services by utilizing a single meaningful purpose to communicate distinct competencies in meeting consumers' psychological needs and goals and asserting values congruence and self-image congruity. These easy-to-understand models can be applied to the hospitality industry. The paper includes examples and illustrations throughout. Implications for future research and further applications are discussed.

Keywords: Hospitality, Innovation, Consumer Purpose, Psychological Bonding

1. Introduction

Hsieh et al.'s (2023) recent article published in the *Journal of Asia-Pacific Business* introduces a new model of consumer purpose. The authors emphasize the importance for marketers and innovators to identify customers' underlying purpose by developing psychological bonds with them. This involves synthesizing multiple theories, including the need fulfillment theory, goal theory, and congruency theory. According to the authors, such an approach enables the maximization of customer experiences and the refinement of marketing messages, leading to the retention of competitive advantages and the achievement of sustainable success. Figure 1 presents Hsieh et al.'s (2023) proposed concept of consumer purpose and psychological bonding.

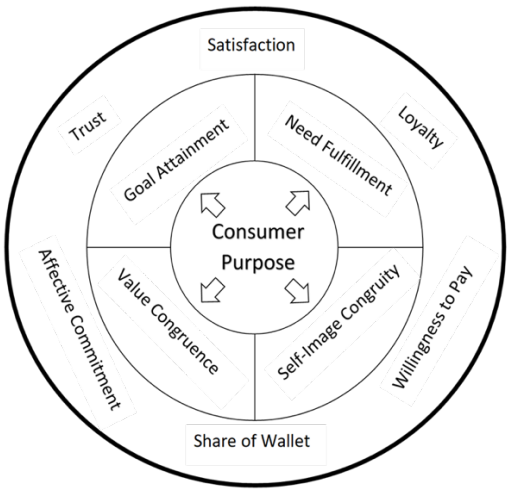

Figure 1: Theoretical Model (Hsieh, Canziani, & Welsh, 2023).

1.1 Purpose of the Study

The hospitality industry, being one of the largest industries worldwide, faces intense market competition. To succeed, it relies on various factors, including customer satisfaction, loyalty, trust, affective commitment, and share of wallet. Asatryan and Oh (2008) argue for the incorporation of consumer psychology in studying customer-organization relationships within the hospitality sector. While much of the existing literature on hotel services focuses on aspects of quality and satisfaction (e.g., Lai et al., 2018; Tsang et al., 2015), there are still unanswered questions regarding the factors that drive customer loyalty and willingness to spend beyond what can be explained by satisfaction with service quality, price/value perceptions, and rewards membership programs (McCall & Voorhees, 2010). Limited insights are available regarding the additional benefits that can be gained through target marketing, personalized services, or other organizational tactics beyond quality enhancement, such as sustainable development or corporate social responsibility. Hotels have extensively employed differentiation strategies and market segmentation to combat fierce competition in the market (Taylor, 1997).

Differentiation has proven to be an effective approach, particularly in saturated markets (Kasimoglu & Hamarat, 2003; Taylor, 1997). However, Samuelson (1976) argued that much of the differentiation is artificial and heavily reliant on advertising or push cues, rather than being a genuine response to the diverse needs of consumers for building long-term customer relationships. Hotel firms do differentiate or target specific markets for practical reasons. Enz et al. (1999) demonstrated that hotels that narrow their customer base (and customize their services) enjoy lower costs compared to hotels serving a mass market. Furthermore, "a strategy of differentiation through high levels of congruency between customer needs and hotel product-and-service offerings enables operators to command somewhat higher prices" (Enz et al., 1999, p.55).

To combat this somewhat sceptical view of service mix development benefitting the hotel firm primarily, we propose the need to broaden hotel marketing and innovation strategies to include recognition of purposeful fulfilment of consumers' psychological needs/tasks, goals, values, and self-concept. Doing so will strengthen the organizational commitment to hotel consumers, leading to sustainable success for the hotel firm. Building upon Hsieh et al.'s consumer purpose (2023), this paper takes a comprehensive approach to understanding customer purpose in the hospitality industry, considering theories such as the need fulfilment theory, goal theory, and congruency theory.

2. Literature Review

2.1 Synthesis of Theories in the Hospitality Industry

2.1.1 Needs fulfilment

Hotels understand their core technology—that they ought to provide safe, reliable accommodations and consistent service amenities, thus satisfying consumers' lower-level needs of the hierarchy. For example, a hotel providing secure rooms and reliable food service delivery speaks to a consumer's basic physiological or safety needs. Hotels can also provide services that permit task completion in the jobs-to-be-done sense, for example, a business center with printing and mailing services that facilitate efficiently completing a professional's work duties while away from the office. However, hotels can apply Maslow's (1943, 1970) hierarchy to augment their services and products to appeal to consumers more directly regarding a higher sense of purpose than finding a clean room for the night, i.e., higher-order needs. Becker et al. (2020) advocate for a customer journey approach. Interacting personally with the consumer can facilitate a feeling of belongingness and meet social needs, and admiring a guest's wine knowledge or upgrading a guest to a high-end club floor can foster guest awareness of self-esteem and enhance guest self-actualization.

Hotels can nudge customers to create psychological bonds with the business based on (a) identifying customers' needs at multiple levels, (b) helping consumers to meet those needs, and (c) directly affirming the shared purpose that led to realized needs fulfillment or problem solutions. Services offered by hotels should be congruent with the guests' needs (McIntoch & Siggs, 2005). A guest with small children needs a hotel that will be family-friendly with activities and experiences to keep small children entertained during the hotel stay. Services that meet this expectation might include game rooms/play areas, gift backpacks, toys, crafts, and child-focused room furnishings. Solutions to childcare task requirements include day-care and nanny services. Considering customers' underlying purposes, we envision the hotel overtly addressing these needs in all

communications and interactions with guests and family. Disney Park's family resorts do this already and have proven to be a model for other fields seeking to shine in service to families and children (Sze et al., 2019).

2.1.2 Goal fulfilment

Goal fulfilment is another answer to "why" customers choose a specific hotel or lodging brand. Consumers seek service experiences to achieve objectives beyond needing a hotel room or core lodging services. Goals are about wanting to do, be, or feel. Goal statements for hotel customers may include "to spend time with family," "to feel relaxed and rested," "to be pampered by service staff," or "to engage in a favorite activity or sport." This suggests that guests tend to select hotels that partner with them in their goal fulfillment when making a purchase decision. Hotels benefit from targeting customers whose goals they can serve since they can be better satisfied, assuming goals are correctly identified, and acceptable service performance levels are achieved. Hotel firms should communicate their ability to facilitate goal attainment and draw upon consumer feedback to understand how well the hotel helped its guests achieve their personal objectives.

For example, customers may select a hotel that provides targeted services to meet their desire for pampering and relaxation (the goals), the purpose being an overall mental and physical rejuvenation of self. Deploying the underlying purpose in this instance requires not only the identification of the goal and provision of relevant services but direct messaging that communicates the hotel's commitment to pampering the guest and its role in helping the guest to achieve a relaxed or improved mental and physical state.

Examples of relevant service experiences include a serene environment and staff, free yoga or fitness classes, health assessments, lifestyle consultants, energy healing sessions, personal tea services, a variety of pillow options, or meditation classes.

2.1.3 Values congruence

Hotel firms must adopt a values-focused thinking approach to marketing by identifying their customers' values and articulating an organizational values statement that projects meaningful values congruence between the hotel firm and its customers. Personal values in expressing ones' values (Huang, 2022); have been studied in the hotel field: Aesthetics (Gallarza et al., 2016), Fairness and Equity (Banki et al., 2017), Hedonism (Hosany & Gilbert, 2010; Io, 2016; Ozturk et al., 2016), Security and Risk Taking (Chan & Lam, 2013; Feickert et al., 2006; Gerald & Hein, 1994), Sustainability (Lee et al., 2010; Martinez et al., 2014) and Tradition (Bates, 2003; Sheperd-Lanier, 1996; Withiam, 1991). These items are only part of the values that can be shared between hotel customers and brands. However, the list permits good insights into how matching consumer/firm values may be deployed via communications to connect hotel guests more tightly to the organization or brand.

Hotels create positive value congruence by aligning values in marketing communications and during service transactions. For example, global warming and environmental issues have become pressing concerns of environment-conscious consumers. Hotels can express sustainability values by minimizing water usage and inviting guests to limit the washing of linens during a guest stay. However, when a firm's values-driven behaviors are challenging for consumers to identify or are hidden from plain view—for example, sustainable construction or HVAC system improvements—the hotel must use overt communication tactics, such as storytelling or symbols such as eco-labels and certification awards, to enhance consumer perceptions of company achievements in this arena.

The customers' underlying purpose can address values congruence as a measurable outcome that matters to the hotel firm and the customer. The key is to select values carefully to make sure that they are meaningful to the consumer and achievable in an authentic way by the hotel. Some values have already been used to characterize (segment) hotel properties (e.g., green hotels) (Martinez et al., 2014). Green hotels rely more on direct marketing of congruent values and self-images than other types of hotels (Lee et al., 2010). This further suggests that the underlying purpose is, and will be, helpful in differentiating one hotel from another.

3. Propositions

The best example in the lodging field is Ritz Carlton's employee training campaign of "We are Ladies and Gentlemen serving Ladies and Gentlemen" (Saranow, 2006). The clear message is one of congruence between staff and guest images and is meant to dictate behavioral expectations on both sides of the firm/consumer relationship.

To exemplify further the usefulness of consumers' underlying purpose, we have proposed a variety of hotel actions in Figures 2 to 6 that demonstrate how hotels can create innovative products or services by utilizing a single meaningful purpose to communicate distinct competencies in meeting consumers' psychological needs and goals and asserting values congruence and self-image congruity. Each of these four theoretical concepts (needs, goals, values, and self-images) contributes to defining the overall construct of purpose in using a hotel.

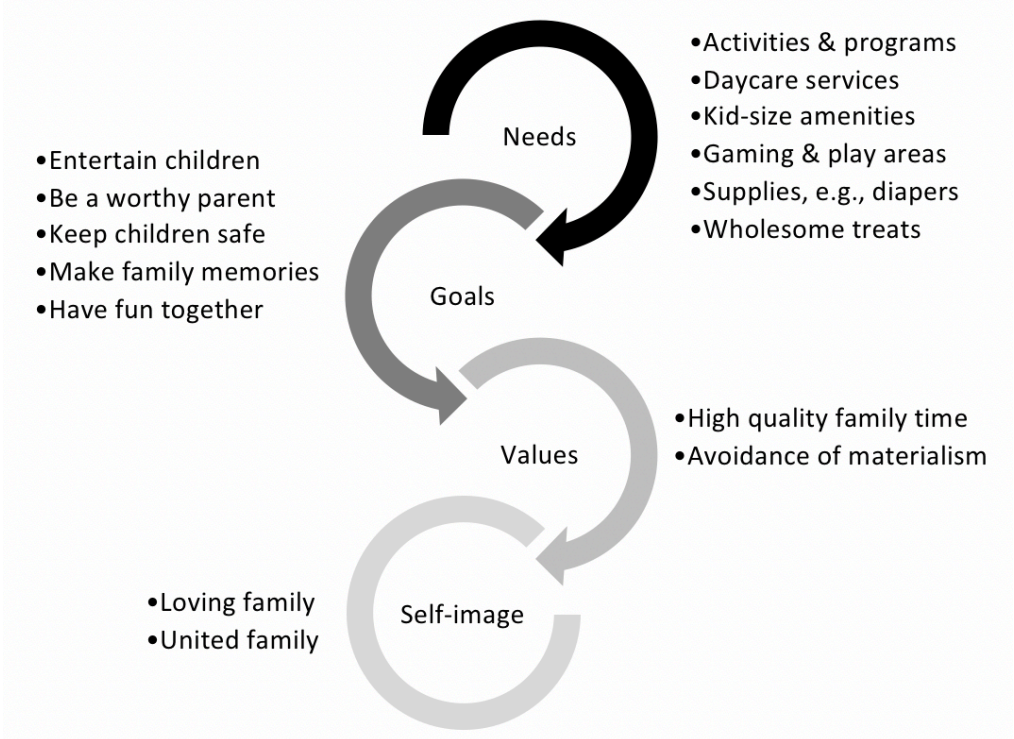

Figure 2: Proposed model purpose is "to experience stress-free and delightful family travel"

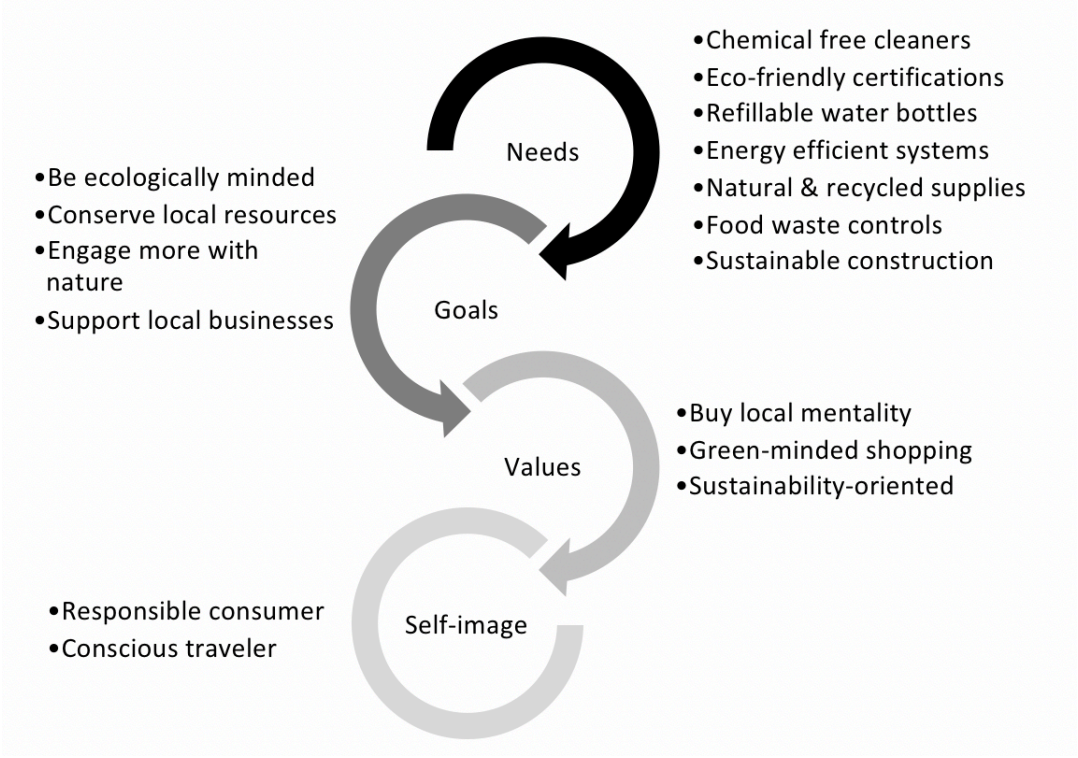

Figure 3: Proposed model purpose is "to unite with others to protect world resources

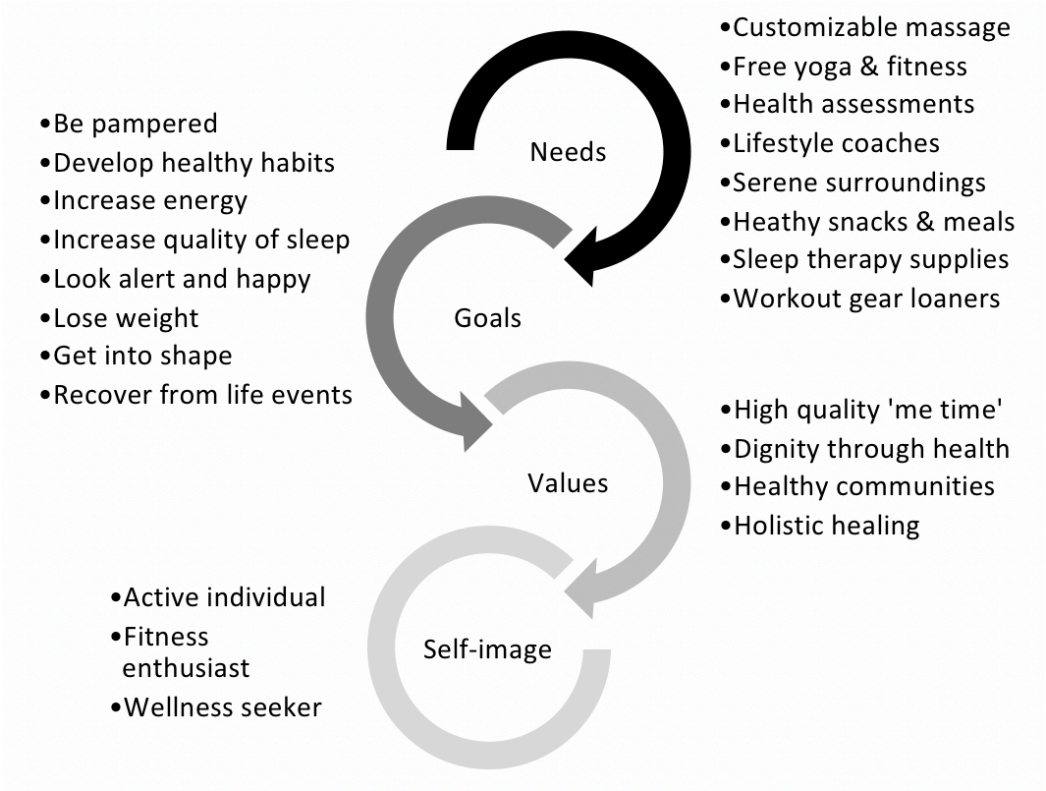

Figure 4: Proposed model purpose is "to rejuvenate oneself physically and mentally"

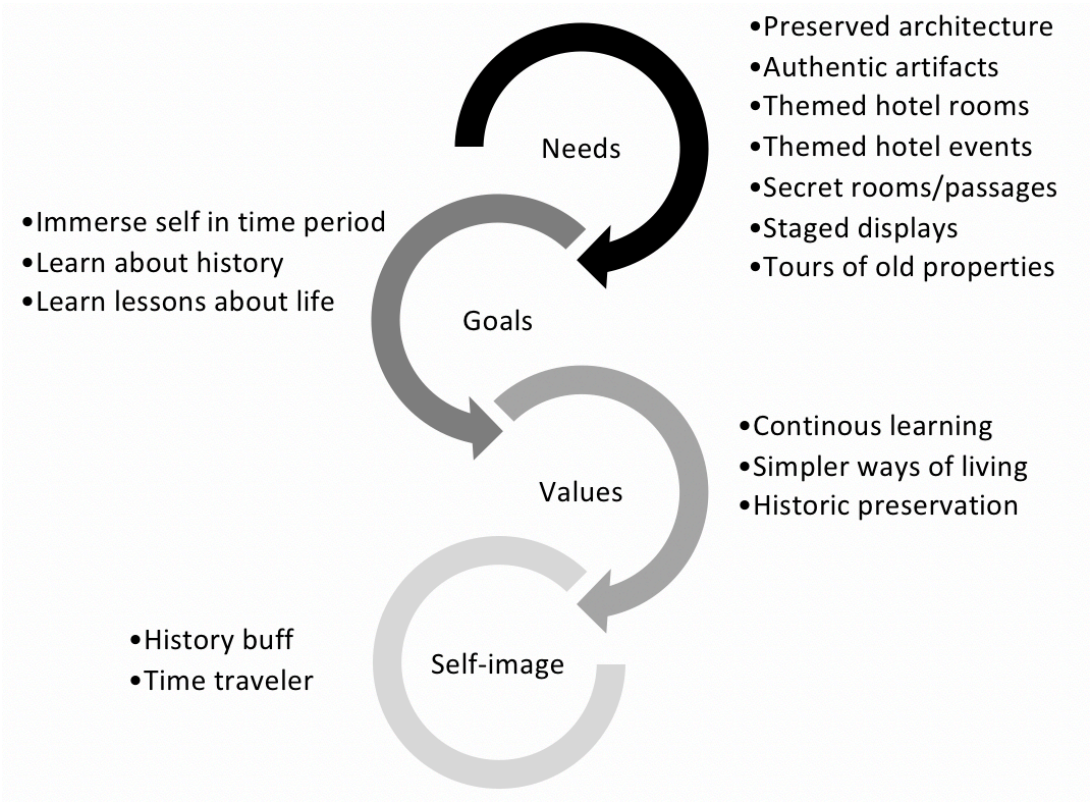

Figure 5: Proposed model purpose is "to improve oneself through exposure to history"

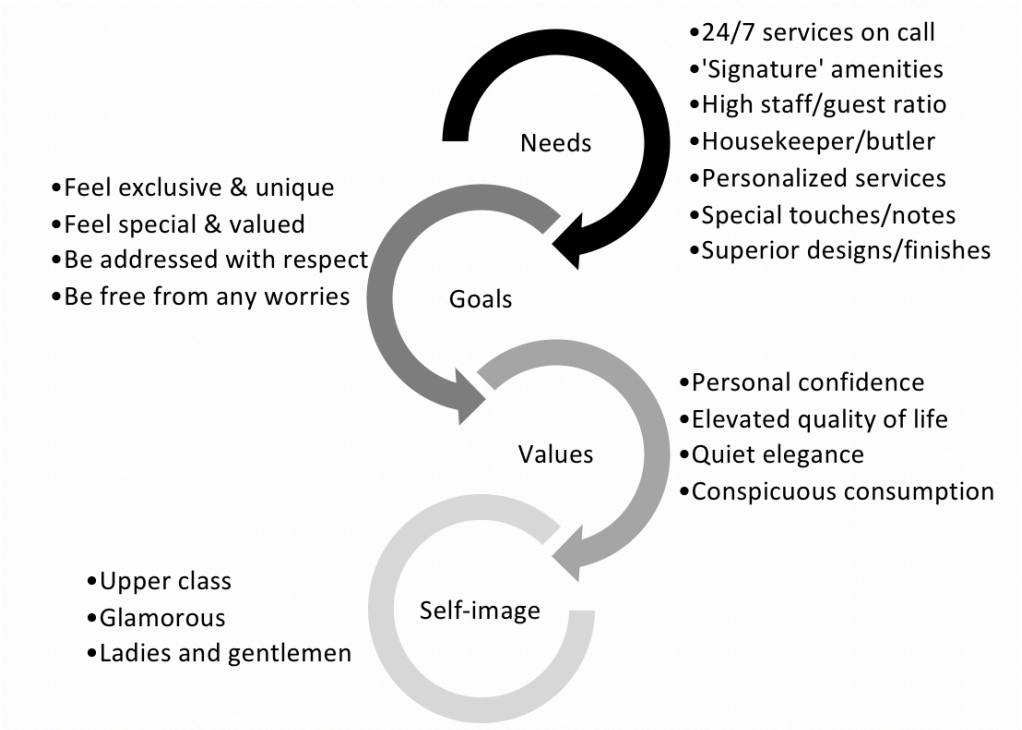

Figure 6: Proposed model purpose is "to heighten self-esteem through luxury purchases"

4. Conclusions

This paper emphasizes the significance of delving into customers' underlying purposes during hotel stays, as it greatly assists hotel marketers and operators in crafting innovative products and services that authentically satisfy their guests' higher-level psychological needs. Such an approach fosters the creation of distinctive experiences and fosters the development of strong connections with guests. While needs are primarily articulated through tangible product features or task solutions, the notions of goals, values, and images progressively assume more abstract forms of expression.

5. Future Research

This paper proposes five models with distinct purposes that need tested in the hospitality marketplace. Observational techniques could be combined with real performance data to test the propositions and the impact on profitability, human resource management, customer experience, and sustainability. Which model or models have the most sustainability for the hospitality industry and what techniques to maintain sustainability could be further explored. Future research could also test the propositions on the tourism and recreation industries, which is closely aligned to hospitality and are customer focused.

6. Practical Implications

The primary implication of this paper is that hotel marketers and operators can weave together a more robust campaign by addressing these four components collectively in a coherent and holistic statement explaining "why" consumers should select their hotel, brand, and products. This valuable information can also be utilized by hotels to maintain and strengthen their ongoing service and product innovation initiatives.

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Developing a National Research and Evidence Base for the Health and Wellbeing Chapter of the Welsh Government's 2023 Innovation Strategy for Wales: A Case Study

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Abstract: This paper presents research informing the Welsh Government's (WG) Health and Wellbeing chapter of the new Innovation Strategy for Wales (ISW). WG recognises the need for a cross portfolio Innovation Strategy to bring greater coherence and alignment to our existing Welsh health and social care innovation ecosystem, particularly in a post EU environment. This approach aims to support greater collaboration between healthcare, industry, academia and the third sector to deliver greater impact and value (Davies *et al*, 2021) by developing, sharing and adopting innovative practice, leadership and skills development and supporting new technology development (WG, 2018). As part of the development process, key stakeholders were identified as part of an innovation 'push' and innovation 'pull' nexus (Chesbrough, 2003) approach. Organisations were categorised into domains of health and social care providers, innovation infrastructure, technology platforms, innovation centres, and partnerships across Wales's health and life sciences ecosystem. A qualitative, action research led approach was used to derive the key themes supporting development of the ISW health chapter. Multi-sector consultations were conducted with experts from various fields, including health, social, care, research, and technology. Our analysis of qualitative data collected through an extensive consultation process led to the emergence of areas of prioritisation for the ISW. Three areas of prioritisation were identified in the analysis: Creating coherency across the innovation ecosystem, where every partner understands their role. Focusing innovation activity on NHS Wales organisational needs/priorities, generating 'Innovation Pull'. Creating an 'adoption ready' pipeline of innovation externally into health and social care at scale, creating an 'Innovation Push' offer. The ISW aims to create the optimal conditions for an innovation ecosystem underpinned by clear infrastructure and a robust policy framework, which has the full support from health and social care leadership, to create a culture of innovation at all levels of the health and social care system. The ISW was launched on 27th February 2023, with full political support from the Welsh Government Cabinet; a majority Labour party government supported by the Plaid Cymru party, as part of the Welsh Government's 2021 election cooperation agreement. (344 words)

Keywords: Innovation; Innovation Ecosystem; Wales; Healthcare Innovation; Innovation Strategy; Innovation management

1. Introduction

1.1 Background and context of the Innovation Strategy for Wales (ISW)

Over the past few decades, Wales has been transitioning into a knowledge-based economy from its industrial roots. The Welsh Government has been collaborating with academia and industry to facilitate this transition by focusing on innovation, especially in targeted sectors (WG, 2018). As is the case in the wider UK, Wales has been addressing public health challenges, including pre-existing health disparities (Brunt *et al*., 2017), which have been further exacerbated by the Covid-19 pandemic. Throughout its transition to a knowledge-based economy, Wales has leveraged EU Structural and Investment Funds (ESIF) for Research, Development and Innovation (RD&I) initiatives post-industrial era, making it a hotbed for EU RD&I programmes driving cross-sector RD&I opportunities for socio-economic development. As such, Wales is rich in collaborative efforts between world-leading research centres, multi-national corporations, SMEs and public sector organisations like Welsh Government and NHS Wales.

To ensure coherency and a more integrated approach to innovation across Welsh Government portfolios, Welsh Government Cabinet Ministers signed up to develop a new Innovation Strategy for Wales (ISW) following the 2021 elections, of which health and wellbeing occupies a main chapter.

Wales is now in a new era post Brexit, where ESIF funds are no longer available, so brings greater focus for the Welsh Government's ISW to be responsive to the needs of the population and consider alignment with the UK Government's plans for the UK Shared Prosperity Fund (UKSPF). It is the UKSPF which aims to replace the European Regional Development Fund (ERDF) and European Social Fund (ESF) (UK Gov 2023). The UKSPF represents a cut in the overall funding equating to approximately £10 million shortfall per year for Wales, representing £450,000 per local authority. These challenging circumstances coincide with a period of managing a path towards recovery from the COVID-19 pandemic (WG, 2021).

These circumstances have accelerated Welsh Government's plans to develop and implement the ISW in alignment with Wales's priority areas which include supporting innovation across education, the economy, health and wellbeing, and in climate and nature (WG, 2023).

1.2 Importance of a cross-portfolio approach to innovation in health and social care in Wales

The decline of ESIF to support RD&I across all sectors has necessitated the development of a new Health and Wellbeing chapter of the ISW to meet challenges and demands posed by rising public expectations, demographic and epidemiology changes, limitations of workforce capacity for education and training, and healthcare system performance. Figure 1 illustrates the extent of the problem, as Wales and the rest of the UK no longer have access to those funds. This leaves Wales in a precarious position going forward with the prospect of a substantial decrease in funding.

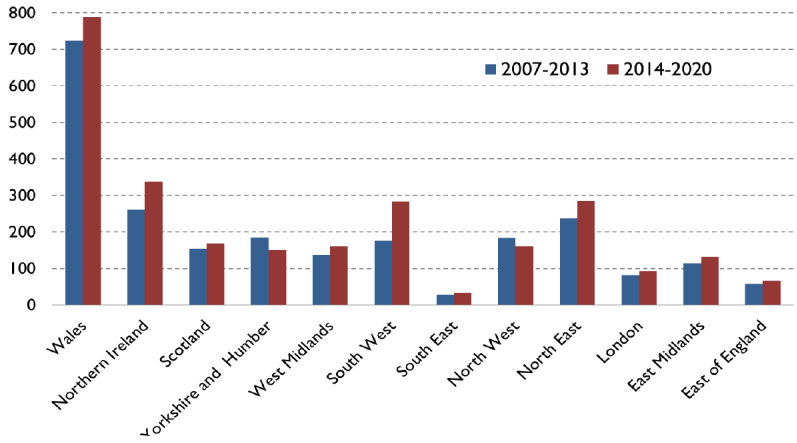

Figure 1: Regional draw down of ESIF by EU Capita 2007 – 2020

(Source: Welsh Government, Economy Innovation team)

Both UK and Welsh Government strategies (UK Gov 2021 & WG, 2018) support greater collaboration between health and social care, industry, academia and the third sector to deliver greater impact and value (Davies *et a*l, 2021) by developing, sharing and adopting innovative practice, leadership and skills development and supporting new technology development (WG, 2018). The Welsh health and social care innovation ecosystem has previously drawn significantly from ERDF and Welsh Government supported life sciences sector innovation accelerators, such as Accelerate and AGOR-IP. It has also provided both collaborative platforms for managing life sciences sector innovation in Wales and relationship brokerage of key public and private sector ecosystem stakeholders locally, nationally, and internationally (Donne *et al* 2021). In an era of receding EU funds, Welsh Government seeks to develop a chapter of the ISW which serves the current and emerging complexities of health and social care by creating an environment in Wales which stimulates job creation, skills and training provision, RD&I and commercialisation activities.

1.3 Purpose of the research paper

This paper describes the arrangement of Welsh innovation ecosystem actors into 'innovation push' and 'innovation pull' categories and explores the development of Welsh Government's three overarching areas of prioritisation for the Health and Wellbeing chapter of the ISW. The paper describes the qualitative, action research led approach adopted for the study and the results of analysis undertaken to derive the key themes that support the development of the Health and Wellbeing chapter of the ISW. The paper then describes the implications of the research findings on the chapter's development and the importance of a clear infrastructure and policy framework to support innovation.

2. Literature Review

2.1 Innovation in health and social care

The pursuit of innovation in health and social care at the national level has been a longstanding goal (Mossialos *et al.*, 2018, Flessa & Huebner, 2018), with key stakeholders constantly facing challenges in overcoming the inertia and complexity of existing structures (Greenhalgh *et al*., 2017), limited opportunities for experimentation (Fleuren *et al.*, 2004), and difficulties in disseminating successful ideas (Malcarney *et al.*, 2017, Yusof *et al*., 2008).

The Welsh Government has made a significant investment in the innovation landscape to achieve the goals outlined in *A Healthier Wales* (WG, 2018). This includes the creation of Research, Innovation, and Improvement Coordination (RIIC) Hubs in each of the Regional Public Board areas, ongoing investment in the Small Business Research Initiative (SBRI) and the Bevan Commission, and the Life Sciences Hub Wales. Health Boards have also invested in employing Innovation Leads and numerous transformation projects. The innovation landscape is crucial in supporting the necessary cultural and activity changes required to activate essential innovative practices (Wilson, 2021).

These challenges have led to the development of various strategies and frameworks to promote innovation in health and social care, including the use of networking and collaboration among stakeholders (Fleuren *et al.,* 2004), the identification of human, organisational, and technology-fit factors (Yusof *et al*., 2008), and the application of the NASSS framework to analyse the role of complexity in technology programs (Greenhalgh *et al*., 2017). To address these challenges, WG has attempted changes and sustained effort to support an environment and ecosystem which is receptive to adapt and adopt successful innovations in health and social care.

Effective management, improvement and innovation are key components of successful organisations in health and social care. However, gaps between evidence and decision-making can occur at all levels of health and social care, making effective decision-making difficult. To address this issue, knowledge translation through a framework provides a strategic approach to promote the application of research and facilitate the process of decision-making, particularly for policymakers (Straus *et al.,* 2009). An ecosystem approach which emphasizes the importance of building networks based on shared objectives can serve as a powerful driver of innovation in health and social care and the wider community in sustaining and developing innovation and providing better health outcomes (Wilson, 2021; Summers *et al.*, 2018).

2.2 Innovation ecosystems and their importance

The idea of innovation systems has been used routinely in the field of innovation studies and it is commonly accompanied by various descriptors, such as national innovation systems (Lundvall, 1992) or sectoral innovation systems (Breschi & Malerba, 1997). There has been much debate surrounding the consensus for definition of an 'Innovation Ecosystem' following the publication of a definition by Adner (2006) in a Harvard Business Review article, defining an innovation ecosystem as "the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution" (Adner, 2006, p. 2). An historical review case study by Granstrand & Holgersson (2020), investigated Apple's mobile telecommunication and video cassette recorder (VCR) innovation ecosystems and came to the following definition:

> "An innovation ecosystem is the evolving set of actors, activities and artifacts,
>
> and the institutions and relations, including complementary and substitute relations,
>
> that are important for the innovative performance of an actor or a population of actors."
>
> (Granstrand & Holgersson, 2020, p1),

The models describing innovation push and innovation pull dynamics between organisations have been studied for decades (Godin & Lane, 2013). More recent studies explore the dynamics of innovation push and innovation pull in the context of innovation ecosystems. These studies provide insight into the specific features of an innovation ecosystem, such as the diversity of actors, the type of collaborations and relationships between those actors and how the actors integrate with the ecosystem across the innovation 'pull'–'push' nexus (Boyer & Kokosy, 2022).

2.3 Welsh 'Push' and 'Pull' innovation nexus approach.

Wales is home to a rich life sciences innovation ecosystem which boasts a wealth of diverse organisations, including small and medium-sized enterprises (SMEs), multinational enterprises (MNEs), academic institutions, research centres, healthcare providers, social care providers, third-sector organisations and others (WG, 2018). Each of these entities contributes to the multifaceted innovation ecosystem in its unique way. To better understand the dynamics at play within the push-and-pull organisational nexus, the relevant organisations and actors can be characterised according to their role in either an innovation "push" or an innovation "pull" approach.

The push and pull innovation nexus of the system need both push and pull dynamics between actors (i.e., individuals and organisations) in the innovation ecosystem. Understanding the landscape of the innovation ecosystem helps to explain how the complex interactions among actors can stimulate creative ideas and implement both new technology-push and market-pull strategies (Boyer & Kokosy, 2022). In this paper, organisations and actors across the Welsh innovation ecosystem including NHS Wales, universities, research institutes, Life Sciences Hub Wales, technology platforms, infrastructure centres and partnerships were categorised, and their stated innovation priorities and aggregated national needs were identified through a mixed methodology approach.

3. Research Methodology

3.1 Mixed Methodological Approach

Embedded within a wider research programme, an action research approach was taken to develop the national evidence base for the development of the Health and Wellbeing chapter of ISW. This research identified and characterised organisations in the Welsh Life Sciences Innovation Ecosystem prior to deployment of a mixed methods approach to developing an understanding of organisational priorities for the development of the Health and Wellbeing chapter of ISW.

> "Action research is about taking action, for improving practices……." (McNiff, 2017, p18)

Categorising Innovation Ecosystem Organisations: Life sciences and public sector organisations in Wales were identified and assigned to 'Innovation Push' or 'Innovation Pull' categories based on traditional innovation literature. Traditional literature describes organisations associated with supply-side factors related to advances in science and technology as 'Innovation Push' organisations. Those associated with demand-side factors (e.g. NHS Wales and Social Care) are described as 'Innovation Pull' organisations (Clausen et al, 2020).

Data Collection: This study employed a multi-faceted approach to data collection to ensure a comprehensive understanding of the factors driving innovation in public sector organisations. To capture diverse perspectives, the study utilised semi-structured interviews, questionnaires, ministerial reports, official documents, and minutes of relevant meetings and consultations. Participants for the interviews were selected using purposive sampling to ensure a range of perspectives and experiences, while a combination of convenience and snowball sampling techniques were used to recruit participants for the questionnaire. Additionally, the study conducted workshops, focus groups, and other forms of engagement with relevant stakeholders to further enhance its holistic understanding of the topic and develop consensus on areas for prioritisation in the ISW. This approach to data collection was chosen to provide a comprehensive overview of the subject matter from different perspectives and to ensure that a range of voices and experiences were included in the analysis.

Transcription Process: To maintain the integrity and accuracy of the information collected from a range of sources, all the collected data were transcribed verbatim. This included interview recordings, questionnaire responses and consultation minutes. The transcripts were reviewed to ensure proper contextual understanding and consistency across different data sources and their alignment with development of priorities and themes to support the development of the new strategy.

Thematic Analysis: The collected data were subjected to thematic analysis to identify patterns and trends in responses across data sources. The inductive approach involved five steps:

1. Familiarisation.
2. Coding.
3. Theme Generation.
4. Theme Review.
5. Theme Definition & Naming.

The coding framework was developed based on the research objectives and relevant literature. The transcripts were systematically coded to assign meaningful labels to sections of the data. Similar codes were then clustered together to form overarching themes and areas of priority. The emerging themes were critically examined to ensure coherence and consistency and refined or merged as necessary throughout a consultation process. Final themes and areas of prioritisation for the new ISW were identified. This comprehensive thematic analysis allowed for a deeper understanding of the relationships and patterns within the data, providing valuable insights that informed the study's conclusions and recommendations towards developing areas for prioritisation for the ISW.

Public Reporting and Consultation: As a result of the research activities, multiple reports were developed or commissioned to summarize the findings and insights. These reports provided findings and offer recommendations for policymakers and practitioners. The reports served as a resource to inform strategy development and were made available to the public for use and dissemination.

3.2 Data capture from push and pull organisations as stakeholders.

This section presents the three key sources of data capture and evidence generation from push and pull organisations. These data were used to inform areas of prioritisation for the ISW. These include (i) NHS Wales COVID-19 Innovation Study, (ii) the Cardiff Business School Key Opinion Leader Study and (iii) Formal Welsh Government Public Consultations. The wider body of key evidence generated to inform the ISW through the COVID19 is illustrated in Figure 2.

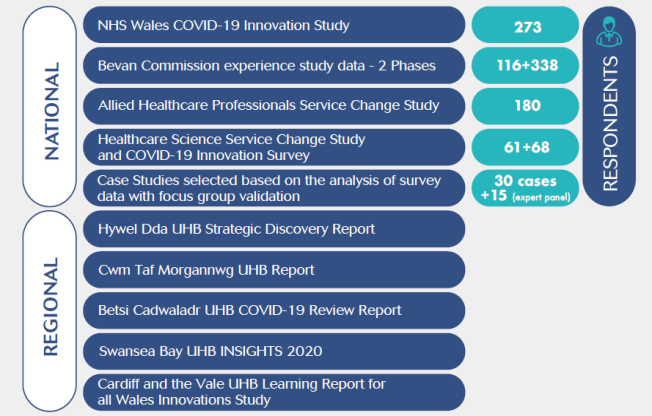

Figure 2: Body of Evidence Sources Forming the NHS Wales COVID-19 Innovation Study

(i) The NHS Wales COVID-19 Innovation and Transformation Study: This study was led by Swansea University's School of Management I-Lab Research Centre. The study represents the first of its kind to explore research and innovation approaches developed and adopted within the healthcare sector during the Covid-19 pandemic in Wales. The Study was co-funded and supported by a consortium of key stakeholders, including all 11 NHS Wales organisations, WG, Health Education Improvement Wales, Bevan Commission, Swansea University, ARCH partnership and the Welsh NHS Confederation. This diverse range of funding partners provided not only financial support, but also access to a wide range of organisational investment and individual expertise. Drawing on a primary data set of over 1,000 health and care practitioners from every NHS Wales organisation, the study employed a range of qualitative and quantitative research methods, including individual staff studies, executive team reports, experience studies, innovation stakeholder fora, and regional consultations.

To further enhance the study's impact, the researchers selected thirty-five case studies highlighting real-world examples of NHS Wales practitioners adapting to the pandemic, from A&E consultants to healthcare scientists to physiotherapists. The report generated significant national interest and media coverage and was presented at the NHS Wales Chief Executives' meeting in March 2021 at the request of the then NHS Wales Chief Executive, Dr Andrew Goodall. The report was widely accepted and endorsed by NHS Wales Chief Executives, with the lead Chief Executive for Innovation and others committing to adopting the recommendations within their own Health Boards.

(ii) Cardiff Business School Key Opinion Leader Study: This study developed and captured a range of primary qualitative data through semi-structured interviews with 30 key opinion leaders across the health and social care innovation ecosystem in NHS Wales. Interviewees included clinical academics, Innovation directors and

leads, heads of innovation, senior Welsh Government officials, leading academic and senior industry professionals. The interviews were conducted on a one-to-one basis and took up to one-and-a-half hours.

The evidence and comments collected were analysed thematically to identify key themes related to the health and social care innovation landscape in Wales. Specifically, the analysis focused on strengths, weaknesses, opportunities and threats, policy framework, support for innovation, targeted investment, promoting and rewarding innovation, skills and capacity, and working in partnership. In spring 2022, thirteen evidence submissions were received from all 11 NHS Wales organisations, Bevan Commission and Health Technology Wales. The submissions provided additional insights and perspectives on the health and social care innovation landscape in Wales.

(iii) Formal Welsh Government Public Consultation: From the period of 20th July 2022 until 28th September 2022, this public consultation sought views on the Welsh Government's development of a new ISW. The consultation asked the public their views on what would be needed for Wales to innovate, and for more people in Wales to benefit from innovation. The 153 responses from the public consultation were independently analysed by a third-party research organisation, Miller Research, and summarised to form the basis of this consultation report, which set out a range of themes across all devolved policy areas in Wales.

4. Analysis and Results

4.1 Ecosystem and prioritisation areas

Based on analysis of the evidence sources above, three priorities (set out on page 1) were presented to the NHS Wales Chief Executives at their Leadership Board session in October 2022. In November 2022, Judith Paget, Director General and CEO of NHS Wales wrote to all NHS Wales executive leads for innovation, and Innovation, Technology and Partnership (ITP) programme delivery leads from across the health and social care innovation ecosystem.

This letter confirmed the three priorities to drive a new innovation system for health and care, focused on a model of coordinating 'Innovation Pull' (system need) from NHS Wales with an 'Innovation Push' (system offer) from the ITP programme and wider external ecosystem. This model for the ecosystem is set out in figure 3 below.

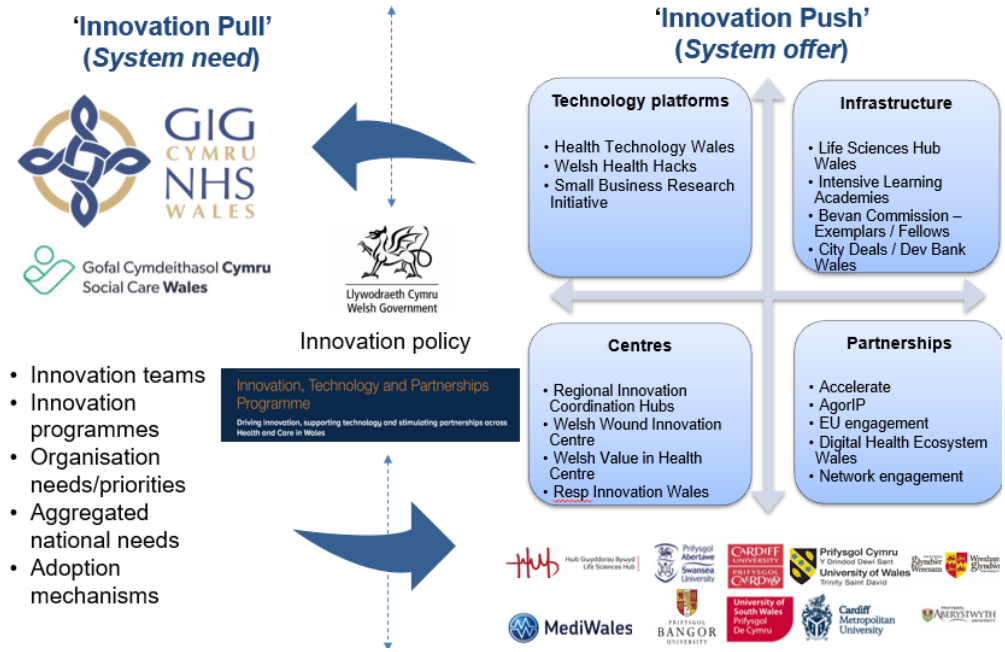

Figure 3: Welsh Innovation Ecosystem 'push' and 'pull' organisations. (WG, 2023)

In response, NHS Wales innovation executive leads responded, setting out their innovation team structures, their current innovation infrastructure, and set out the 'innovation pull' priority areas.

ITP programme delivery leads described their 'innovation push' system offer to Health and Social Care, with some details of adoption-ready innovation projects.

4.2 Innovation action plan workshops

Innovation action plan workshops were undertaken with NHS innovation leads ('Pull community') and external innovation delivery leads ('Push community'). Findings and recommendations generated through the research activities resulted in recognition that an Innovation Action Plan (IAP) for the ISW is required. From January to March 2023, the innovation executive leads and ITP programme delivery leads were brought together as a network to discuss the implementation of the three priority areas outlined by the NHS Wales Leadership Board and to co-design an innovation action plan to implement the ISW. The goal was to convene the innovation ecosystem, set out a revised vision for health and social care innovation and secure collective ownership of the action plan.

4.3 Implications of the ISW research findings

Building on three priority areas, the Health and Wellbeing chapter of the ISW contains specific commitments to:

- Enhance the existing innovation infrastructure.
- Scale innovation across the system.
- Adopt a more strategic approach to funding.
- The development of an innovation policy framework with underpinning tools and resources
- A single funding portal.
- A clear commercial direction.
- A common training programme for innovation.

These recommendations would support more consistent innovative activity and build capacity for innovation at all levels. Implementation of these recommendations will require a collective effort and ongoing collaboration among all stakeholders involved in the health and social care innovation ecosystem in Wales.

4.4 Potential challenges and limitations to ISW implementation

Challenges and limitations to the implementation of the ISW were identified though iterative engagement with push and pull organisations. The challenges and limitations identified included:

- Integrating health and social care in a coherent and manageable way presents infrastructure and communication challenges as expected when aligning two large complex organisations.
- Funding needs to be more strategic and focused on impact.
- Limitations to funding will slow-down the industry and university engagement, reducing capacity across health and social care.

5. Conclusion

This paper has explored the background for developing an ISW, with 3 defined priority areas.

1. Create coherency across the innovation ecosystem, where every partner understands their role.
2. Focus innovation activity on organisational needs and priorities, generating 'Innovation Pull' from NHS Wales.
3. Creating an 'adoption ready' pipeline of innovation from the wider system into health and social care at scale, creating an 'Innovation Push' offer.

Integral to the roll out and implementation of the ISW is an innovation action plan. The study has identified a significant ecosystem working across health and social care innovation in Wales offering a foundation for an ISW. This places health and social care as a component within the broader Wales innovation ecosystem, making the H&W chapter an integral element of an integrated cross-sector strategy. The unique context of Wales, with a particularly challenged funding outlook and political dynamics to resolve, makes for a greater contribution to knowledge in subsequent phases of strategy development.

Future direction for this research will

- Build on current innovation strategy and the development of the future action plan.

- Roll out and scale up priorities across the health and social care innovation ecosystem in Wales.
- The ISW will continue to develop and evolve with time.
- Research should continue to explore enhanced communication and relationships between key organisations and stakeholders.
- Ensure clear and coherent orchestration of activities across the 'pull' and 'push' innovation nexus.
- Further investigation on mechanisms to integrate other innovation programmes and interventions such as skills and training programmes.

To this end we would recommend a longitudinal study on the development and impact of the WG commissioned Intensive Learning Academies (ILAs) on push and pull organisations on the Welsh Innovation Ecosystem. The ILAs demonstrate a coherent and cohesive effort between Welsh Government and research institutions (universities) to upskill the workforce in health, social care, third sector and wider life sciences sector. These skills development academies focus on key areas of need identified by the NHS: (1) Innovation & Transformation, (2) Preventative Health, (3) Digital Transformation, and (4) Value-Based Healthcare. The area of research might also consider mapping the current and emerging partnerships and funding opportunities such as Innovate UK and UKSPF to sustain progress in the wider RD&I activities nationally and internationally.

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Transforming the Network of Co-Working Spaces for Start-Ups into an Open Knowledge Ecosystem

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Abstract: The paper focuses on the issues of transforming the geographically spread co-working spaces of start-up firms into the open knowledge ecosystems, i.e. hubs of growth-focused organizations characterised by sharing and generating new industrial knowledge. The presented insights are based on the combination of theoretical review and empirical survey of 92 managers of start-ups and SMEs in Lithuania. This is an emergent community of regional start-up firms with rudimentary linkages and elements of knowledge sharing. The paper looks into the key issues that could contribute to strengthening the knowledge-based collaborations and synergies in such community, while assessing both the current situation and the evolutionary potential of such collaborations. We present the critical discussion in the light of ecosystem-as-structure vs. ecosystem-as-affiliation (Adner, 2017) approaches. Ecosystem-as-affiliation approach stresses the affiliation of ecosystem actors (to the network or focal actor), while ecosystem-as-structure views ecosystem through the lense of value proposition that network actors are co-creating. The first view has a more open-ended network perspective where spontaneous collaborations may lead to different outcomes and the network welcome different members with no prior objective in sight. The second view is more focused on aligning the resources and activities of multilateral set of partners for materialising specific value propositions, and members are invited to join based on these specific needs. The research has shown that, on one hand, the emergent start-up community relies on institutional coordination while retaining the element of openness. On the other hand, there is an explicit need for leadership in building the shared vision and designing the knowledge partnerships for delivering the shared value propositions. One should stress the importance of focal organizations and boundary spanners - both in terms of the organizational and knowledge boundaries. The shared business interests, network leadership and trust have been identified as the key cornerstones for further development of network into an open knowledge ecosystem, yet they are also associated with the greatest challenges to sustained knowledge sharing in the network.

Keywords: Knowledge ecosystem, entrepreneurial ecosystem, complex adaptive systems, innovation ecosystem, entrepreneurial network

1. Introduction

The development of effectively functioning entrepreneurial networks has been on the agenda of national and regional competitiveness policy actors for more than a few decades. It is widely agreed that joining into partnership activities with other firms allows start-ups to access valuable resources, specialised knowledge and information, gain market access and share risk. However, not all entrepreneurial networks evolve into fully-fledged ecosystems characterised by effective self-organization of actors, spontaneous learning and adaptation to the changing environment, free flow and exchange of information among actors, or manage to overcome the limitations of closed corporate hierarchies. It is even less common for the emergent networks of young entrepreneurial firms to form knowledge ecosystems, where „diverse actors bound together by a joint search for valuable knowledge while having independent agency also beyond the knowledge ecosystem“ (Järvi, Almpanopoulou, Ritala, 2018). Young firms face not only the resource constraints, but also limited absorptive capacity, which often prevents them from effectively capturing and generating new knowledge.

The aim of this paper is to discuss the potential of transforming the geographically spread co-working spaces of start-up firms into the open knowledge ecosystems.

The paper adds to the academic discussion in the field of entrepreneurial networks by adding the dimension of knowledge ecosystem, which is usually underexplored in research on entrepreneurship. Any discussion focused on ecosystems should consider their key parameters as complex adaptive systems (CAS), such as self-organization, emergence and non-linearity, autonomous decision making on the basis of local information, the importance of simple rules, the issues of system openness and its boundaries, etc. It is also important to note that research on social ecosystems (e.g. business ecosystems, innovation ecosystems, etc.) rarely include the above-mentioned CAS characteristics into their discourse (Jucevicius et al, 2021).

First, we discuss the concept of knowledge ecosystem and its key parameters that enable the effective generation of new knowledge in the loosely coupled networks of diverse knowledge actors.

Secondly, we present the key findings of study conducted in the emergent network of start-up coordinated through the regional hubs of co-working spaces by the national innovation agency of Lithuania. Survey covered 92 managers of firms participating in the network activities. The survey provides us with background understanding of the potential for the young network of entrepreneurial firms to evolve gradually into a more mature ecosystem where new industrial and technological knowledge is being generated. The key conditions for such emergence are presented at the end of the paper.

2. From network of entrepreneurial firms towards knowledge ecosystem

Over the past few decades, the concept of ecosystem has been extended from its traditional position in natural sciences into the realm of social research and the "ecosystems" of its actors (Winterhalder, 1984; Rothschild, 1990; Moore, 1993; 1996). Researchers analyse the conceptual similarities and differences of various ecosystems along their key parameters (Klimas and Czakon, 2020; Almpanopoulou, 2019; Jucevicius et al, 2021; Oh et al, 2016; Aarikka-Stenroos and Ritala, 2017). In the context of our discussion regarding the networks of entrepreneurial firms, three types of organizational ecosystems stand out: business ecosystem (Moore, 1993; 1996), innovation ecosystem (Adner, 2006) and knowledge ecosystem (Valkokari, 2015; Järvi, Almpanopoulou and Ritala, 2018). The first two can be regarded as already established perspectives, even if often criticised for still insufficient conceptual rigor and boundaries (Oh et al, 2016). *Business ecosystem* perspective stresses the co-creation of value among cross-functional and cross-disciplinary actors with their co-evolving capabilities (Moore, 1993). *Innovation ecosystem* perspective stresses the collaborative arrangements of firms that lead to coherent solution to the customer (Adner, 2006) and function as dynamically organized meta-networks (Carayannis and Campbell, 2009) that integrate research and commercial actors (Frenkel, Maital, 2014).

We can observe the general transition over the years in knowledge management (KM) research from its focus on improving the organizational KM processes towards developing the dynamic organizational knowledge ecosystems, which cross the organizational boundaries and enable innovative recombination of knowledge (Järvi et al, 2018; Almanopoulu, 2019). *Knowledge ecosystem* perspective stresses the development of new knowledge from the interactions of diverse actors of business and research community (Dattée, Alexy and Autio, 2018; Järvi, Almpanopoulou and Ritala, 2018). Clarysse et al (2014) the different parameters of knowledge and business ecosystem and that they do not easily translate into one another. Powell et al (2010) studied the leading regional knowledge ecosystems to identify their common success parameters, which led to the description of three key factors of success: 1) *diversity of organizational forms*, which means greater variety of knowledge combinations and improved adaptive capacity of knowledge ecosystem; 2) *presence of anchor tenant*, which means providing private sector actors with public coordination and non-competitive interventions, and 3) the *mechanism for cross-realm transposition,* or *cross-network alignment,* which helps connect and align the diverse cultures, knowledge and professional networks. Networks of entrepreneurial firms should pay particular attention to these three parameters if they are to evolve into community that not only shares, but also creates new knowledge. The knowledge ecosystems can also be employed in the collective search for the solutions to complex problems that no single actor is capable of resolving on an individual basis (Jucevicius, 2022).

Adner (2017) makes a distinction between two different conceptualizations of ecosystems: *ecosystem-as-affiliation* and *ecosystem-as-structure*. The *ecosystem-as-affiliation* view emphasises the affiliation of members to the network or its central actor and has more open-ended perspective to collaborations where the boundary of ecosystem is defined by the spontaneous relationships. The *ecosystem-as-structure* view regards the network actors as purposefully assembled knowledge subjects (by their profiles) for achieving specific shared value proposition, which defines the boundary of ecosystem. Jucevicius et al (2021) argued that ecosystem-as-affiliation view is more comfortable with accommodating the parameters of complex adaptive systems. The CAS parameters include autonomy, localised decision making, endogenous or exogenous co-evolution of system actors (Mitleton-Kelly, 2003), self-organization and emergence (Lichtenstein, 2016), sense of identity (Mason, 2007), inter-actor trust (Carapiet and Harris, 2007) and openness to the external environment (Anderson, 1999) that enable continuous adaptation and learning (Parsons, 2007). In this paper, we also approach the emergent network by adopting ecosystem-as-affiliation rather than ecosystem-as-structure view.

3. Presentation and discussion of research findings in the context of emergent knowledge ecosystem

The research presented in this paper was conducted in the emergent network of diverse young firms that is coordinated through the regional hubs of co-working spaces established by the national innovation agency of

Lithuania. The network under study includes various start-up companies at different stages of development (yet established not more than 5 years ago). The coordinators of the network seek to improve the rate of start-up survival and support their growth through activities of knowledge exchange and learning. Firms also receive practical assistance through programmes of business acceleration, mentorship and e-commerce development. Coordinators also organize different business community events where valuable information, knowledge and experiences can be shared. The network members are also provided with practical tools for business diagnostics and e-guide platforms. They can use the infrastructure of regional hubs and co-working spaces for their business needs, such as meetings and workshops. The community-building events and training sessions are also taking place on a regular basis on the regional and national levels, which help build and maintain contacts among the members. At the moment, there are 13 regional hubs centred around the country integrating over 200 firms from diverse fields, such as ICT, creative industries, textiles and clothing, real estate services, foodstuffs, publishing and advertising, tourism, transport and logistics.

3.1 Methods of research

The empirical research primarily relied on the method of survey, which in the form of questionnaire was presented to all members of regional hubs. The questionnaire consists of 23 questions, most of them based on the Likkert scale (1-5). The ***aim*** of the study was to understand the key drivers and barriers behind the inter-firm collaboration in the emergent network, with a particular focus on dynamics of knowledge and information inside the network (knowledge sources, flows, partnerships). Therefore, the key questions were related to finding out the main catalysts of knowledge sharing among partners, the sources of new knowledge generation, the roles of different actors, as well as the level of intensity of various processes, including those of knowledge sharing and co-development in the activities of the network. Answers to such questions allow us to assess the potential of the network to evolve from a set of regional hubs of young enterprises into more open and dynamic ecosystem of diverse actors that not only share, but also generate new knowledge. 92 managers answered the online questionnaire, making it a sufficient respondent pool for generalizations (from the general pool of around 200 firms).

3.2 Presentation of findings and discussion

Survey has shown that partnerships differ by their purpose, durability, object of exchange, and level of parties' interdependence (Öberg, Alexander, 2019). The different aspects of partnerships are also included in our research instrument (i.e. not exclusively focused on knowledge exchange). We can structure the research findings into three major conceptual blocks that represent three stages of knowledge management process: 1) partnership motives, 2) knowledge sharing: barriers and solutions; 3) assessment of knowledge-based outcomes of the network activities.

Study has shown that participation in the network enabled its actors to attract valuable intangible resources and support, finding new partners for business development. However, only 4 percent of firms under study managed to attract external investment into their business while participating in the network activities. When asked to identify their key business challenge the respondents emphasised the inconsistency in revenue streams (17 percent), lack of customers (14 percent), new product development (14 percent), lack of knowledge and competence (12 percent), and limited access to finance (12 percent). Network enabled firms to access the new business partners (1-3 partners – 49 percent, 4-6 partners – 21 percent, 7 and more – 12 percent).

The majority of firms under study can be referred to as fully or partly involved in innovative activities – as innovators or adopters of innovation: 28 percent of the respondents claimed that they are developing various innovative solutions in their business, while 50 percent tended to regard themselves as adopters of innovative solutions developed outside the firm. When asked about the nature of innovative activities, they stressed the adaptation of new technologies (42 percent), the creation of new products or services (23 percent), finding innovative channels or business models (9 percent), and development of new technologies (9 percent).

When asked to identify the key sources of new knowledge (by importance, from 1 to 5), managers stressed the role of customers (4,3), partners of network under study (4,1), trainings (4,0), and own employees (3,8). Observation of competitors (3,4) and market research data (3,5) were slightly less pronounced.

The motives to share own knowledge are clearly based on the expectations of reciprocity and business interests. The motives for the organizations to share their own knowledge are mainly reflected by the need to attract new knowledge (4,2), to adapt to the changing business environment (4,1), to provide better solutions to the

customers (4,1), and improve the functioning of business processes (4,0). Sharing of the risk (3,3) and resisting competitive pressures while strengthening the market power (3,2) are of relatively less importance.

Talking about other actors of the ecosystem that firms would primarily be eager to collaborate with in the network under study, the majority of respondents stressed research institutions (4,4) and sales partners (4,3), to a slightly lesser extent – investors (4,0). The interest in collaborating with other start-ups (3,6), business consultants (3,1) and training companies (3,1) was way less emphasised.

The managers were also asked to identify what knowledge was the most important to their firm. They stressed knowledge about the new technologies (4,0), human resource management (3,9), process optimization (3,9), new product development (3,8), and trends in the external environment (3,8). On the other hand, they found knowledge related to marketing (3,5) and sales (3,5) as relatively less important. However, as far as the knowledge and information accessed through their current network were concerned, the respondents stressed that they received mostly marketing (4,4) and sales-related (4,6) knowledge. The already existing access to such knowledge probably explains why their current needs in these areas of competence were less pronounced. Probably the greatest gap between the desired knowledge and received through their current network concerns knowledge about new product development (3,1) and process optimization (3,0). There is a good overall balance between desired and received knowledge in the fields of new technologies (4,0), trends in the external environment (4,1) and change management (4,0). Moreover, the absolute majority of respondents (74 percent) have agreed that their interactions in the network led to the creation of new knowledge.

It was important to understand what factors would be most effective at promoting the sharing of knowledge among the network members. Getting together the groups of members with similar business interests was considered as being of utmost importance (4,8), followed by the key role of leadership, i.e. identifying the leaders with strong social competences promoting trust and knowledge sharing (4,2) as well as leaders with strong professional competences to act as network coordinator (4,1). Although it is possible to expect a degree of self-organization among the members with shared business interests (3,9), the network leadership is regarded as relatively more important than relations emerging on the *ad hoc* basis.

Firms have chance to communicate with each other during regular network events (21 percent), joints training sessions and conferences (24 percent), less so while collaborating on the new product development (12 percent) or innovative activities (9 percent). On the other hand, when asked about the main motivators to join community under study, the respondents stressed the need to improve their capabilities in new product / service development (4,4). Thus, in this respect, we can see some mismatch in the practices of network members and their expectations from the network. The firms also want to discover opportunities to access and make use of new specialised information or equipment (4,2), improve the firm's reputation in the market and among partners (4,0).

It was also important to identify the key barriers to the sharing of knowledge in order to achieve innovative combinations for the development of new knowledge and products. Respondents stressed the following key barriers: lack of leadership among partners (4,4), diverging goals and interests of partners (4,2), and lack of trust among partners (4,1).

In Figure 1 below, we structure our findings along three aspects of knowledge partnerships in the network: 1) partnership motives; 2) barriers and solutions to sharing valuable knowledge and experience, and 3) assessment of knowledge partnership outcomes.

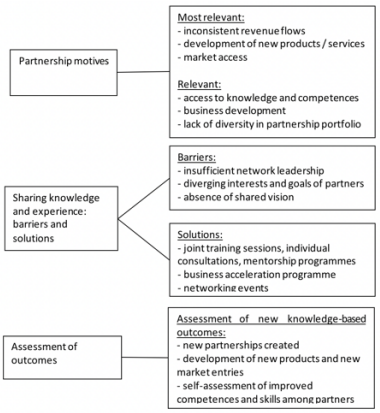

Figure 1: The key catalysts and obstacles of the inter-firm collaboration in an emergent knowledge network

Research has shown that at the moment the network can only be characterised as being at the early stage of development. One must consider that most of the start-ups in this emergent network have been established less than 5 years ago, thus they had little time to establish the mature and lasting linkages. The processes of inter-organizational learning and knowledge transfer are taking place in certain nuclei of firms that share business interests and build the initial trust. However, for wider scale collaborations and knowledge sharing to take place a stronger presence of network leadership that would foster trust and help coordinate relationships of diverse (yet complementary) business actors.

In order the for current network of small businesses centred around regional co-working spaces to evolve into open knowledge ecosystems several conditions have to be fulfilled. It makes sense revisiting and having a discussion around the key success parameters of regional knowledge ecosystems as identified by Powell et al (2010): *diversity of organizational forms, presence of anchor tenant,* and the *mechanism for cross-realm transposition.*

First of all, the *diversity* of network actors as possessors of valuable industrial and technological knowledge should be increased. In its current form, the network is dominated by the SMEs and public support organizations. Although it has some potential for sharing valuable business knowledge, it also needs to include research organizations if it is to evolve into knowledge ecosystem with greater potential for generating new knowledge as well as new industrial solutions that are based on such knowledge. Firms also stressed the importance of collaborating with research institutions for the development of new products and services, which so far did not receive enough attention in the current network activities.

Secondly, the processes of self-organization in the emergent network can be achieved, but they call for the *presence of anchor tenant* that would provide coordination and organizational / institutional leadership at all stages of the network formation. The role of network coordinator should be that of dynamic leadership sensitive to the evolving context of cooperation, i.e. it should be gradually changing over time as network evolves. Initially, it should be focused on establishing the shared business interests and knowledge bases of the potential network actors, and building the rudimentary trust. At later stages of more mature relations, the network leaders should act as facilitators of interactions that create communication spaces and maintain the level of openness of the network to the new actors. These are important preconditions for continuous upgrading and evolution of the knowledge ecosystem. At the moment, the network coordination mainly rests on public innovation agency, which may not be sustainable due to potentially unpredictable changes in policy and funding priorities. Therefore, it would be helpful to the durability of emerging network relations if other anchor tenants also emerge in the process. The role of anchor tenant can be performed both by research organization and by private enterprise with leadership dispositions.

Finally, the nature and type of institutional / organizational leadership has effect on the *mechanisms for cross-realm transposition*. In its current shape, despite some elements of knowledge sharing, the network under study is more an *ad hoc* selection of young businesses without prior experience of collaboration or knowledge transfer activities. They represent a variety of fields and types of knowledge, yet without pronounced leadership (outside the coordination efforts by public innovation agency), insufficient level of inter-organizational trust and potentially diverging business interests – all factors mentioned as the key barriers to knowledge sharing. The mechanisms for connecting the actors with their different knowledge bases may depend not only on the role leadership, the quality of trust building and coordination. It depends also on the presence of actors in the network who has potential to act as boundary spanners, i.e. those that are on the edge of different cultures, backgrounds, disciplines and knowledge fields. They can act as horizontal connectors rather than central coordinators.

The transformation of entrepreneurial network of firms into open and dynamic community of firms that is capable of generating new knowledge is a complex undertaking. It involves not only ensuring the quality of ecosystem actors (i.e. *diversity* of their profiles, competences, compatible knowledge bases), but also and in particular – the quality of their relationships. This quality is determined both by the presence of strong coordinating entities (*anchor tenants*), which act as standard setters, catalysts of trust and leaders by example, and by the adequate mechanisms of collective learning across the organizational, functional and disciplinary boundaries (*cross-realm transposition*).

The ecosystem-as-affiliation view suggests that it is important that the emerging ecosystem remains open to the new members, while at the same time maintains its sense of identity. The presence of network identity and shared value system that emerges over numerous iterations of meetings and discussions plays positive role in building trust, which in turn leads to more effective knowledge collaborations. Therefore, in order to perform

successful transformation into effectively functioning knowledge ecosystem, the network actors should not expect that the emergence of anchor tenant (e.g. strong public research organization or leading company) will automatically lead to easier coordination, more smooth knowledge transfer and spill-overs. The ecosystem may even become more vulnerable if it becomes too dependent on one or few dominating actors. The dominating "predators" (to use the analogy with natural ecosystems) not only define the boundaries of ecosystem, but in certain instances can reduce its internal diversity and hinder continuous self-renewal. Therefore, to ensure the CAS qualities of the knowledge ecosystem one always has to balance proximity with openness, coordination and control with autonomy and learning, complex interactions with simple rules, visionary perspective with the 'small wins' approach.

4. Concluding remarks

The presented research of one specific networking initiative of entrepreneurial firms has revealed an overall good potential of gradually transforming the regional hubs of co-working spaces of start-ups into the open knowledge ecosystem. On the other hand, the opportunities are also accompanied with certain challenges. The firms under study are engaged in innovative activities either as innovators or adopters of innovations, which also involves sharing and generation of new knowledge. The knowledge sharing is based on a strong sense and expectation of reciprocity as partners, together with customers, are viewed as important sources of new valuable knowledge. Customers are regarded both as sources of knowledge, and as they key targets where the new knowledge has to be applied for better servicing the market needs. Therefore, one can state that knowledge sharing among partners has a degree with openness with regard to the market processes. The firms are also willing to collaborate with actors that are currently outside the existing network, such as research institutions. The shared business interests, network leadership and trust have been identified as the key cornerstones for further development of network into an open knowledge ecosystem. Paradoxically, the insufficiency in these three elements is also associated with the greatest barriers to a more intense knowledge sharing. The network leadership can take the shape of public or private anchor tenant that works towards ensuring the diverse yet compatible profiles of network members and their knowledge bases.

Research presented in this paper has been carried out in a specific sample of young business organizations that are part of public initiative in business networking, which is a limitation with regard to universalization of the findings. Our research was more focused on catalysts and barriers of knowledge partnerships in the emergent network, yet it would be instructive to adopt a more longitudinal approach to the dynamics – both growth and failure - of such network initiatives. We encourage adopting such an approach in future studies.

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Design Thinking Driven Innovations in Organisations as a Result of the Groundswell Effect

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Abstract: According to the OECD, soft skills and abilities such as analytical and creative thinking, the ability to organize time and manage a stressful situation, working in teams, working with information, critical thinking, communication skills, initiative, programming and technological design, complex problem solving are currently important for employment on the labor market. The need to secure and implement new techniques and methods leading to innovation are becoming a necessity for every organization. It is Design Thinking that provides an approach towards the creation of innovations, and its use and application can be beneficial in the search for effective solutions to problems occurring across different organizations. The contribution focuses on the interpretation of the Design Thinking application in the field of innovation in the university environment as a result of the groundswell effect from the labor market and consumer environment. The interest of every organization is prosperity and offering services and products that best meet the needs of customers. If the organization does not succeed, its reputation and prosperity are at risk. It is the innovations driven by Design Thinking that make it possible to create better solutions that can repair, maintain and continuously improve the reputation of the organization. The first part of the paper focuses on the explanation of the groundswell effect and the Design Thinking concept, its process and phases from problem identification, idea generation, prototyping and testing to the final implementation of the solution, as well as its tools and techniques.The second part of the paper will focus on the concrete examples presentation of the Design Thinking usage in the field of improving university education, as the forms and methods that students use in university education are just as important as the content they acquire through their studies. The paper also presents inspiring examples of innovations in the university environment that arose as a result of design thinking workshops.

Key words: Design Thinking, Innovations, Groundswell, User Experience.

1. Introduction

Nowadays, more and more emphasis is being placed on creative and innovative solutions to the problems that surround us. As technology advances and society evolves, the ability to effectively tackle complex challenges becomes increasingly vital for success. In this regard, the application of Design Thinking is gaining prominence. This approach focuses on creating innovative solutions that prioritize the end user and aim for continuous improvement of the user experience. The method follows a systematic and iterative process that involves understanding user needs, generating ideas, prototyping, and testing. What sets Design Thinking apart from traditional methods is its emphasis on rapid prototyping and addressing specific user requirements. Design Thinking extends beyond corporations and businesses; it is a versatile tool with the potential to be utilized in various domains, including universities, nonprofit organizations, and public administration. In universities, Design Thinking plays a pivotal role in nurturing students' creative thinking and problem-solving abilities. It offers them opportunities to collaborate in teams and enhance their skills through tackling real-world challenges.

This paper delves into the theoretical foundations of Design Thinking and highlights the significance of the groundswell effect within the context of Design Thinking and innovation creation. It also explores the process and tools that can be employed in each phase. In the latter part of the paper, we delve into the advantages of implementing Design Thinking in universities for fostering innovation. Specifically, we focus on its effectiveness in problem-solving and the development of impactful projects that benefit students, educators, and the institution itself. Through the examination of successful workshops at the Faculty of Mass Media Communication, University of St. Cyril and Method in Trnava, we showcase how Design Thinking facilitates the creation of viable prototypes and innovative ventures. The findings of this study offer fresh insights for universities seeking to enhance teaching and promote creative thinking among students. Simultaneously, they shed light on the advantages and challenges associated with implementing Design Thinking on campus.

2. Groundswell Effect and Design Thinking Concept

In the dynamic and competitive business landscape of today, organizations are increasingly becoming aware of the importance of innovation as a driving force for success. Design Thinking has emerged as a powerful methodology that fosters user-centric innovation and enables the development of creative solutions. However,

it is essential to acknowledge that innovation cannot solely rely on internal knowledge and insights. The groundswell effect, which originates and evolves in the external environment of an organization, plays a pivotal role in shaping and catalyzing innovation.

As stated by renowned authors Li and Bernoff (2008), groundswell embodies the convergence of users who come together to exchange experiences, opinions, and acquire what they seek, such as information, support, ideas, and even products. The groundswell effect encapsulates a collective intelligence, ideas, and knowledge that originate from external stakeholders, including customers, consumers, employees, industry experts, and the general public. In the realm of innovation, it signifies a bottom-up approach where the perspectives and attitudes of diverse individuals and communities contribute to the generation of novel solutions. Organizations must proactively engage with users and foster an innovative mindset, as the ideas originating from this environment can enhance the efficiency and creativity of the resulting solutions (Sahaym et al., 2021). According to Murár and Kubovics (2022), the groundswell embodies a fundamental paradigm that often influences sales fluctuations and even impacts the scope of organizations. Therefore, harnessing the power of the groundswell effect becomes crucial for organizations striving to tackle diverse challenges and adapt to dynamic market conditions. Considering its significance as a source of innovation within the context of Design Thinking, the following characterization emerges:

- Facilitates diverse insights: The groundswell effect fosters the integration of diverse perspectives from various stakeholders. It is widely acknowledged that diverse teams are more inclined to generate innovative ideas and solutions. Similarly, the groundswell effect broadens the spectrum of viewpoints beyond the organization, allowing for a more diverse exchange of ideas and a deeper comprehension of the core challenge at hand.
- Focuses on user-centric outcomes: Design Thinking strengthens the user-centric approach to innovation. In a similar vein, the groundswell effect acts as a valuable resource of knowledge regarding customer preferences, limitations, and emerging trends. By incorporating the outcomes of the bottom wave effect from users into subsequent Design Thinking processes, organizations can create solutions that better cater to customer needs, leading to heightened customer satisfaction and loyalty.
- Facilitates iterative feedback: The groundswell effect allows for ongoing feedback and iterative refinement. By engaging external stakeholders in the prototyping and testing stages of the Design Thinking process, organizations can obtain valuable feedback early on in the solution and innovation creation process. This iterative approach helps enhance and optimize solutions based on user feedback, resulting in more efficient and user-centric outcomes.

3. Theoretical Background of Design Thinking and Design Thinking Process

The pioneers of Design Thinking can be traced back to the 1960s, with John E. Arnold's "Creative Engineering" and L. Bruce Archer's "Systematic Method for Designers." However, it was Tim Brown, the CEO of IDEO, a prominent consulting company, who played a key role in popularizing this method. Today, Design Thinking is not only embraced by companies and universities worldwide but also by individuals in their everyday lives.

According to Koh et al. (2015) Design Thinking is an activity that is implicit in the process of design. Lookwood (2009) defines Design Thinking as: “applying a designer's sensibility and methods to problems solving, no matter what the problem is. It is not a substitute for professional design or the art and craft of designing but rather a methodology for innovation and enablement."

With a user-centric approach, Design Thinking is a dynamic methodology that fosters creative problem-solving and strives for continuous enhancement of the user experience. By immersing ourselves in the user's perspective and understanding their needs, we embark on a journey to discover effective solutions. Through iterative ideation, prototyping, and real-world validation, Design Thinking ensures that the end result consistently improves the user experience.

What sets Design Thinking apart from other methods is its focus on rapid prototyping and real-world testing, bypassing lengthy research and development phases. Its primary objective is to gauge how well the designed solution aligns with the user's and target group's ideas, emphasizing the importance of practical implementation.

In Brown's (2021) perspective, Design Thinking is an innovation method that revolves around human-centeredness. It harnesses the resources available to designers to integrate people's needs, technological possibilities, and business success requirements. Design Thinking is commonly employed to tackle complex

problems, which can vary greatly in complexity and challenge depending on the organization, customer, or technology involved. Each individual customer or user approaches situations uniquely, influenced by their personal experiences and perspectives. However, a shared preference among users, especially those who are not technologically proficient, is for simple, elegant, and intuitive solutions.

Pinheiro (2014) emphasizes that design methodologies prioritize the customer. The foundation of every challenge lies in understanding the customer. By engaging in conversations and gaining insights into their challenges, goals, pains, gains, and tasks, we gain a deeper understanding of their lives and perspectives. This understanding allows us to develop solutions that are tailored to their specific context. Unfortunately, many companies mistakenly believe that their product is at the center of a customer's life, disregarding the true customer-centric approach.

Design Thinking eludes a singular definition, for it represents a novel way of perceiving the world and the problems it poses. It can be conceptualized as an idea, a method, or a strategy. Its influence transcends individuals, reaching into the realm of companies and organizations, whether they belong to the private or public sector. Adopting a Design Thinking approach can revolutionize these entities by merging human desirability, technological feasibility, and economic viability.

Lewrick M. (2020) presents an overview of the six distinct phases of Design Thinking: Understand, Observe, Define Point of View, Ideate, Develop Prototype, and Test. These phases align with the double diamond model introduced by the British Design Council, which delves into both problem space and solution space. The initial three stages emphasize gaining a deep understanding of the problem, while the subsequent three concentrate on generating and refining solutions. Finally, a reflection phase follows these six stages.

- Understand: During the initial phase, the primary objective is to develop a thorough comprehension of the potential user, their needs, and the tasks they need to accomplish. By asking thought-provoking "WHY" and "HOW" questions, we expand the design challenge and establish a clear creative framework. Employing the 5W+H approach enables us to gather comprehensive information about our potential users.
- Observe: The reality itself holds the key to confirming or challenging our assumptions. That is why it is crucial to venture into the environments where our potential customers reside. We actively seek them out and explore the places where they are present. The insights gained from this phase serve as valuable inputs for the subsequent stages, aiding in the development or refinement of the persona and the point of view. When engaging with potential customers or users, it is essential to follow a predetermined script for interviews, employing open-ended questions as much as possible. This approach allows our potential users or customers to freely express their needs and jobs-to-be-done. During the interview, it is important to create a comfortable atmosphere, enabling the respondent to openly discuss their challenges and requirements, as the questions may touch upon personal matters.
- Define Point of View: During this phase, our attention turns to evaluating and synthesizing the information we have gathered. The goal is to distill our findings into descriptive statements, utilizing techniques such as storytelling or mapping. These statements should address key questions about the user, their needs, and the triggers that prompt those needs. By crafting a clear and concise point of view, we lay the foundation for generating innovative solutions that directly address the identified user needs.
- Ideate: This phase is dedicated to generating a multitude of potential solutions for the identified problem. Utilizing tools such as brainstorming and analogies, we explore diverse avenues and unlock a wide range of ideas. During this creative process, it is common to group and cluster these ideas, allowing for further exploration and refinement. Techniques like dot voting can be employed to facilitate the selection and prioritization of the most promising concepts.
- Prototype - The creation of prototypes plays a crucial role in the testing phase, allowing us to evaluate and validate our proposed solutions. To effectively conduct these tests, it is important to develop prototypes that are clear and understandable to our potential users or customers. For instance, digital solutions can be prototyped using simple paper models or mock-ups. It is essential to view ideation, prototype development, and testing as interconnected stages within the design process, collectively addressing the solution space we previously discussed.
- Test - Following the development of each prototype, this phase involves engaging with potential users and recording the outcomes. Interacting with users and gathering feedback becomes a

crucial aspect of this phase, as it informs future improvements and iterations of our solutions. Learning from previous phases is imperative in this process. Modern digital solutions offer opportunities like A/B testing, enabling us to test functionalities quickly with a large user base. These valuable insights guide further development until we achieve an optimal product or service for our customers. In cases where our idea falls short, it is important to consider discarding or modifying it.

- Reflection - Although not explicitly identified as one of the primary phases in the Design Thinking micro-cycle or double diamond model, continuous reflection is an ever-present companion throughout the process as it forms the basis for our learning. This phase is characterized by the use of tools and feedback mechanisms that facilitate our mindset of constant reflection, enabling us to gain valuable insights and make continuous improvements.

Another author, Müller-Roterberg (2020), outlines the following stages of the Design Thinking process: empathy, observation, and problem understanding; problem definition; ideation and idea development; prototyping; and testing.

- Empathy - During this phase, it is crucial to gain a deep understanding of the user, customer, or consumer by viewing the problem from their perspective and examining their mindset and needs with empathy. This can be achieved through various methods such as focus groups, questionnaires, feedback, studies, and surveys, although these methods can be costly. Sometimes, a simple empathic conversation with the customer can provide valuable insights.
- Defining the problem - In this phase, the insights gathered from the empathic phase are evaluated. Based on observations and surveys, the focus is narrowed down to selected user groups, and their problems and needs are summarized in a clearly defined question or problem statement. This phase may also involve creating personas, which are fictitious representations of different types of users. Accurately defining the problems is crucial for the next phase of the process.
- Search and development of ideas - Following the problem definition, the next phase involves generating ideas for potential solutions. This is done through the application of various creative techniques such as brainstorming or brainwriting. All ideas and thoughts that emerge from these techniques should be visually represented using drawings, mind maps, mood boards, or various diagrams. This visual representation helps to capture and explore the breadth of possibilities for the solution.
- Prototyping - In this crucial phase, the focus is on transforming the selected idea into a tangible representation that can be visually and physically experienced. The aim is to create a prototype, which may involve designing, modeling, or simulating the solution. The prototype serves as a means to convey the essence of the idea to potential customers, allowing them to understand and interact with it. It is important to note that the prototype is not the final product but rather the initial version of the solution. Through prototyping, the feasibility of the solution can be explored and evaluated.
- Testing - The final stage of the process involves conducting tests to gather user feedback on the design of the prototype. The main objective of testing is to assess the user's interaction with the product or service, evaluate the performance of the prototype in a digital environment, and obtain valuable insights. It is crucial to carefully observe the user's experience, collect data, and gather feedback to inform further iterations and improvements.

4. Selected Design Thinking Tools

During the different phases of the Design Thinking process, there are numerous techniques and tools at your disposal that assist in tackling problems and resolving challenge. Tools and techniques for the Understand phase: To gain deeper insights and understanding in the Understand phase, practitioners commonly rely on techniques and tools such as formulating a problem statement, conducting empathetic interviews, engaging in exploratory interviews, using the 5x why method, employing the 5 WH questions approach, conducting jobs-to-be-done analysis, exploring extreme or lead users, creating stakeholder maps, and utilizing emotional response cards. During the ideation phase, commonly employed methods include brainstorming, 2x2 matrix analysis, dot voting, brainwriting, and drawing inspiration from analogies and benchmarking. Additional techniques such as choice ideas, the blue ocean tool, and the buyer utility map are often used to facilitate the generation of innovative concepts. During the testing phase, common methods employed include testing with users, using testing sheets,

utilizing feedback capture grids, asking powerful questions for experience testing, conducting solution interviews, performing structured usability testing, and conducting A/B testing. (Lewrick , 2020).

In our paper, we will describe selected Design Thinking tools. The most commonly employed methods in Design Thinking are: Brainstorming, Persona, Who – What – Where – When – Why – How (Filo et al., 2017).

4.1 Brainstorming

Brainstorming is a widely utilized technique for group decision-making, particularly for generating ideas and solutions collectively. It encourages a free flow of ideas and associations related to the problem at hand. The key to successful brainstorming lies in the synergy of the team, where inspiration sparks from one another, resulting in a multitude of creative concepts. Even seemingly non-feasible ideas can act as a springboard for generating further innovative solutions (Seeber , I., 2017).

The essential principles of brainstorming underscore the importance of generating a large number of ideas, prioritizing quantity over immediate assessment of their quality. It is essential to create a separation between idea generation and critical evaluation. Consequently, brainstorming typically consists of two phases: an initial creative phase, fostering inventive and spontaneous ideas, and a subsequent phase that engages more logical and rational thinking. Several brainstorming variations, such as written, picture, or ping pong brainstorming, the Hobo method, Gordon's method, and Right Braining, are widely utilized to facilitate the process.

4.2 Persona

The characters known as personas are hypothetical representations of potential customers, crafted based on surveys and collected data. This data encompasses specific details such as goals, purchasing preferences, work background, decision-making processes, and thought patterns in both professional and personal spheres (Sirichareon, WV 2021). Despite their fictitious nature, personas are founded on real data and are enriched with attributes like names, photos, age, gender, marital status, education, employment, hobbies, and location. Utilizing these created personas, organizations can better grasp the needs of their customers or users during the ideation phase. Visualizing personas offers insights into the target audience's goals, interests, preferences, purchasing behavior, and intricate priorities.

4.3 5W 1H

Among the different analytical methods, one of the notable ones is the 5W 1H method (who, what, where, when, why, how). This method is often applied when dealing with linear problem-solving situations where a singular root cause of the selected problem needs to be determined. The primary advantage of using this tool is its simplicity. In conjunction with the 5W 1H method, brainstorming is also employed to explore a wide array of potential answers to the fundamental questions (who, what, where, when, why, how). These ideas are systematically grouped and labeled for each question (5W+1H). Subsequently, after generating a comprehensive set of ideas for all the basic questions, the most suitable idea is chosen to represent the root cause of the identified problem.

This tool or technique can also be connected with the method of mind maps, where a word or phrase representing the root cause (the problem) is positioned in the center of the paper. The questions (5W1H) are placed around it, and the answers extend outward. The key is to establish the connections between them and identify their levels of importance (Colombo, S. et al., 2017). The 5W 1H tool allows for the use of verbal expressions, pictures, numbers, or a combination of these elements. By combining these tools, it becomes easier to link information concerning the primary problem and identify their interconnections. Implementing the 5W 1H tool effectively fosters the development of creative thinking, provides a broader perspective on context and connections, aids in planning, and enhances the organization of thoughts and ideas within a Design Thinking problem-solving team.

5. University Education through Design Thinking vs. Traditional Education

The methods and formats used in university education are as crucial as the knowledge students gain from their studies. In the contemporary era, various technologies present several opportunities to enhance interactive learning and foster the development of essential soft skills and problem-solving abilities. Innovative educational approaches, like Design Thinking, play a significant role in achieving these goals. Shifting away from passive teaching methods hinges on the preparation, motivation, and adaptability of educators in tailoring their

approach to meet students' requirements, ensuring their readiness for the professional world and successful integration into the job market. At the Faculty of Mass Media Communication, University of St. Cyril and Methodius in Trnava, we have embraced Design Thinking tools and processes across various subjects within the program. Our primary objective is to nurture students' creative talents and their ability to apply these skills in different domains of marketing communication, such as digital marketing, graphic design, branding, web design, photography, and others.

Design Thinking is founded on a problem-centered and solution-oriented approach. Contrasting traditional education, its utilization in teaching involves students working collaboratively in teams, emphasizing problem-solving, and cultivating their innovative and critical thinking skills. The role of the teacher transforms into that of a mentor and partner, encouraging discussions and providing pertinent feedback to propel students forward. Unlike memorization-focused learning, this method encourages students to generate fresh ideas and solutions. Filo et al. (2017) highlight several distinctions between classical education and contemporary teaching approaches like Design Thinking:

- In the traditional form of teaching, the student is passive, listens to the explanation and takes notes, learns more slowly and uses mechanical reproduction; in Design Thinking the student is active, solves problems, learns faster based on his own experiences and decisions.
- In the conventional approach to teaching, a hierarchical dynamic prevails, with the teacher assuming an authoritative position over the student. Conversely, Design Thinking fosters an equitable relationship between teacher and student, with the teacher serving as a mentor to the student.
- In the traditional form of teaching, the teacher fulfills his duties, relying on certainty and habit, while in Design Thinking the teacher is creative, brings ideas and looks for solutions.
- The conventional education system often falls short in preparing students for the job market, as it neglects to address the market's specific needs. As a consequence, students may lack confidence in applying their knowledge practically and face challenges in securing employment. Additionally, student attitudes may remain unchanged throughout their educational journey. In contrast, Design Thinking empowers students to actively navigate the job market. It bolsters their self-confidence, facilitates the application of knowledge in real-world scenarios, and brings about positive shifts in student attitudes during the learning process.
- In the traditional teaching setup, the teacher tends to adopt a directive stance, and the student's interaction primarily revolves around understanding the teacher. In contrast, Design Thinking fosters an empathetic teacher-student dynamic, encouraging the student to explore their own identity, uncovering their strengths and areas for improvement.

6. Benefits of Design Thinking Driven Innovations at University

Beyond its application in education, Design Thinking takes on a pivotal role in fostering innovations within universities. The noteworthy impact of bottom-up innovations generated by employees and students significantly contributes to the university's growth and advancement:

- User- Centric Approach: Design Thinking puts the user at the center of the innovation process. By empathizing with users, understanding their needs, and observing their experiences, universities can develop solutions that truly address their pain points. This approach ensures that innovations are human-centered, resulting in products, services, or systems that better meet the needs and preferences of users.
- Iterative and Collaborative Process: Design Thinking encourages an iterative and collaborative approach to innovation. It involves rapid prototyping, testing, and feedback loops, allowing for continuous improvement and refinement. By involving misc stakeholders, such as students, faculty, researchers, and external partners, universities can harness collective intelligence and diversity prospects to drive innovation forward.
- Multidisciplinary Collaboration: Design Thinking promote collaboration across disciplines and departments. Universities are rich ecosystems with experts in various fields. By bringing together professionals from different backgrounds, such as design, engineering, social sciences, business, and more, universities can foster interdisciplinary collaborations that lead to innovation solutions. This multidisciplinary approach can tackle complex challenges that require misc expertise.

- A problem Solving and Creative Thinking: Design Thinking nurtures a mindset of problem-solving and creativity thinking. It encourages individuals to challenge assumptions, explore unconventional ideas, and so on risks. This mindset is particularly valuable in an academic setting, as it promotes a culture of innovation and encourages students and faculty to approach problems from fresh perspectives, leading to breakthrough innovations.
- Entrepreneurial Mindset: Design Thinking encourages an entrepreneurial mindset, fostering an environment where new ideas can flourish and potentially be transformed into viable ventures. By combining Design Thinking with entrepreneurship education, universities can equip students with the skills and mindset needed to identify opportunities, prototype innovative solutions, and launch new ventures.
- Real Application: Design Thinking emphasizes the practical application of ideas and solutions. Universities can leverage Design Thinking to bridge the gap between academia and the real world. By encouraging students to work on real challenges, engage with industries partners, and create tangible prototypes or projects, universities enable students to gain hands -on experience and development skills that are highly valued in the job market.

7. Good Practices - University Innovations as a result of Design Thinking Workshops

To catalyze innovations in the university environment, it is imperative to offer continuous education to teachers in Design Thinking. Notably, the Faculty of Mass Media Communication at the University of St. Cyril and Methodius in Trnava orchestrated a series of workshops centered around the step-by-step approach to Design Thinking. These workshops encompassed diverse aspects, including challenge definition, customer segmentation, persona creation, customer journey mapping, empathic interviews, data interpretation, and ideation.

The workshops took place in purpose-built team work laboratories, the educators actively participated in the entire Design Thinking process, a practice accessible to students throughout the semester. These workshops were mentored by experienced service designers from the professional innovation studio and were divided into six parts, reflecting on the different parts of the design thinking process, which are empathising, defining, ideating, prototyping, testing and implementing. Thus, educators were taken through all phases of the design thinking process in the workshops. A separate day was set aside for each part of the workshop, i.e., it was six separate sessions organized at intervals of several weeks so that the participants, who worked in teams, had enough time to process the ideas and tasks arising from each session. During the empathy workshop, two target groups with opposing characteristics were defined – extremely motivated and extremely demotivated students. Subsequently, the different working teams divided these groups and subjected them to a deeper investigation in order to obtain relevant information for the problem definition phase. This exploration took the form of empathic interviews with a number of respondents who represented the target group. The qualitative research was then further supported by quantitative research in the form of a questionnaire. The data collected was then subjected to analysis, first in a single-team setting and later in a group setting. Interpretation of these findings allowed a thorough understanding of the target groups and thus to define their problem. Subsequently, the working teams started with an ideation phase during which they generated ideas for solutions. For the prototyping phase, the most relevant solutions that had the potential to solve the defined problem were selected.The workshops yielded two prototypes that were put to the test by both educators and students. The first one, the "Ad Agency Safari" project, enables students to visit advertising and digital agencies. The second prototype, the "Handbook for Young Teachers," is a valuable resource intended to aid new colleagues in their work and adjustment to the university setting.



Figure 1: Design Thinking Workshops

Source: Linda Barborková Photo, 2022

The "Agency Safari" project enables marketing communication students to gain a deeper understanding of the working atmosphere within Slovak advertising agencies affiliated with ADMA, ADC, and KRAS. By participating in this project, students gain valuable insights into agency dynamics. The idea for this endeavor arose from the students' desire to be better equipped for practical endeavors, appreciating the power of direct observation.

With a decreasing number of professionals joining the advertising industry each year, agencies encounter challenges in filling open positions. The "Agency Safari" aims to provide students with a comprehensive understanding of the alluring opportunities in the advertising sector. The concept for the safari was crafted by FMK teachers during workshops that focused on Design Thinking.

Developed in partnership with the Association of Digital and Marketing Agencies and Art Directors Club Slovakia, the project introduces a one-day "Agency Safari" for students. This unique opportunity allows them to visit approximately three agencies, offering a firsthand understanding of how these agencies function. During the visits, students can tour agency premises, engage in brainstorming activities, and observe the process of filming advertising spots. The event also proves advantageous for advertising agencies, as it enables them to identify and engage with the top talents from our universities.

In May 2023, a group of eight students from the marketing communication study program embarked on an exciting journey into the advertising world. They visited prominent agencies like This is Locco, MUW Saatchi & Saatchi,and Zaraguza, where they were warmly welcomed by some of the biggest names in Slovak advertising, including many graduates from our own faculty. During their visit, the students had the unique opportunity to step into the workspaces of creative professionals. Each agency hosted an inspiring talk, sharing insights into successful campaigns and the creative process.

Starting from September 2023, the Ad Agency Safari project will be in full swing, offering students a fascinating opportunity to explore the vibrant creative world of advertising agencies. Participants can choose from various editions, including PR safari, UX safari, Media safari, and Safari in game studios. The project's positive impact is evident in the field of employment, as advertising agencies often struggle to fill vacant positions. The agency safari aims to provide students with valuable information and hands-on experience, potentially alleviating this

challenge and making the advertising industry more appealing. Notably, four students who took part in the initial safari year were directly employed by the three aforementioned agencies.



Figure 2: Ad Agency Safari

Source: Linda Barborková Photography, 2023

8. Conclusion

Thinking is a powerful method employed for creative problem-solving, prioritizing the needs of end users and continuously enhancing their experience. This process involves comprehending user requirements, brainstorming ideas, building prototypes, and conducting thorough testing. What sets Design Thinking apart from conventional approaches is its emphasis on rapid prototyping, iterative testing, and addressing specific user needs. It's a versatile method applicable not only in businesses but also within non-profit organizations and educational institutions.

Implementing Design Thinking in university education is vital, as it nurtures students' creative thinking, problem-solving abilities, and teamwork capabilities. This approach encourages cross-disciplinary collaboration, ignites innovation, and enhances students' readiness to navigate the labor market effectively. Through Design Thinking, students actively participate in the creation of innovations, enabling them to experiment with fresh ideas and solutions while gaining hands-on experience.

Design Thinking presents several advantages within the university context, particularly concerning innovation development. Prioritizing user needs ensures the creation of solutions and innovations that cater to them effectively. The adoption of Design Thinking at universities fosters the generation of innovative solutions and projects. For instance, the workshops conducted at the Faculty of Mass Media Communication of the University of St. Cyril and Method in Trnava showcased how Design Thinking can lead to the development of practical prototypes and innovative projects. These initiatives, like the Safari Agency and the Young Educator's Handbook, positively impact both students and educators by equipping them with practical experience and valuable tools for their future careers. By implementing Design Thinking, universities can uncover viable ideas and innovations that might not have emerged through conventional approaches.

Acknowledgment

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Linking Effectuation Logic with Business Model Innovation: An Investigation in the Context of Swiss Startups

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Abstract: Over the last decades, business model innovation and effectuation have been widely discussed in the literature. While effectuation represents a behavioural approach for entrepreneurs using available means for founding a start-up, business model innovation represents an approach to creating a business model with long-term competitive advantages. Designing a business model requires to focus on four dimensions: customer, value proposition, value chain and revenue mechanism. A business model innovation is referred to when an innovative characteristic can be attributed to two of the four dimensions. Both effectuation and business model innovation are valuable for entrepreneurs who are pursuing growth in dynamic and uncertain business environments. This paper elaborates on effectuation and its potential effects on business model innovation. The addressed research questions are: Is the effectuation logic a facilitating aspect of business model innovation? And to what extent do entrepreneurs apply effectuation logic and design innovative business models? The underlying data consists of business plans of 25 finalists of a Swiss innovation competition with more than 100 startups from different business sectors every year. First, the chosen sample is reviewed on the extent of the application of effectuation based on selected behavioural criteria. Second, the sample is analysed for evidence of business model innovation based on the above-mentioned business model dimensions and their innovative potential. Third, the link between the two approaches is highlighted to gain insights into the potential influence of the applied decision logic to develop innovative business models, thus providing an understanding of how entrepreneurs could leverage the advantages of effectuation in the context of innovating the business model. Further research will focus on examining critical success factors of entrepreneurial behaviour in the applied business model types and their correlations with business performance.

Keywords: Effectuation logic, business model innovation, relationships between entrepreneurial approaches, entrepreneurial behaviour.

1. Introduction

Effectuation and Business model innovation (BMI) have been frequently discussed research topics in the literature. While effectuation is described as entrepreneurial behaviour with a strong emphasis on using currently available means, interacting with the environment and building partnerships and alliances (Read et al, 2009; Sarasvathy, 2001), BMI is considered as a way of creating a business model with long-term competitive advantages (Zott, Amit and Massa, 2011; Spieth, Schneckenberger and Ricart, 2014; Foss et al, 2017; Csik, 2014; Gassmann et al, 2020), and often described as sustainable measure for competitive differentiation (Affenzeller, 2014; Bouwman, Nikou and de Reuver, 2019; Clauss, 2017; Filser et al, 2021; Foss and Saebi, 2018, 2017; Gassmann and Frankenberger, 2016; Schwarz, Krajger and Holzmann, 2016; Sjödin et al, 2020) and key to improve business performance (Chesbrough, 2007; Lindgardt et al, 2009; Freisinger et al, 2021; García-Gutiérrez and Martínez-Borreguero, 2016; Kim, Ku and Lee, 2020; Loon and Quan, 2021; Montemari et al, 2022). Consensus exists among academics and practitioners concerning dimensions of effectual behaviours (e.g., building partnerships and alliances) and dimensions of BMI (e.g., value proposition, value chain). Thus, entrepreneurs often rely on their ecosystems, to gather required resources, design new activities, and create value from an internal as well as external perspective enabling a BMI (Spieth et al, 2021; Berends et al, 2016; Xu, Morrison, de Domenici, 2022). Numerous studies describe effectuation as a decision logic to achieve BMI (Futterer, Schmidt and Heidenreich, 2018; Pati et al, 2021; Berends et al, 2014), which may have a positive impact on BMI (Reymen et al, 2017; Sitoh, Pan and Yu, 2014; Andries et al, 2013) to help start-ups navigating in uncertain environments. This work seeks to examine the extent to which effectuation logic is a facilitating aspect of innovating the business model and investigate the link between these two entrepreneurial approaches. The research investigation has been performed in the context of Swiss start-ups. The paper is structured as follows: First, the relevant literature on effectuation and BMI and the link between them is reviewed. Second, the methodological approach is presented. Third, research results are presented and discussed. Fourth, concluding remarks are made including limitations and avenues for further research are addressed.

2. Literature review

The literature on effectuation as well as BMI is reviewed with emphasis on how the application of effectuation can affect elements of business models and BMI.

2.1 Effectuation

Research on entrepreneurial behaviour discusses effectuation and causation (Sarvasvathy, 2001, 2009) as opposing behavioural logics which entrepreneurs can rely on in making decisions and reacting to business environment changes. Effectuation is considered as a form of entrepreneurial behaviour and effective procedure for founding a start-up with special emphasis on using currently available means. Sarasvathy (2001) defines effectuation as "processes that take a set of means as given and focus on selecting between possible effects that can be created with that set of means". Causation logic in contrast is defined as "processes that take a particular effect as given and focus on selecting between means to create that effect" (Sarasvathy, 2001). Relying on effectuation, entrepreneurs themselves create and/or co-create business opportunities, recognise, and exploit them (Dew et al, 2008; Read, Song and Smit, 2009; Sarasvathy and Venkataraman, 2011) and implement basically the following main steps (Sarasvathy, 2001, 2004):

- Step 1: Finding "Who am I?", "What do I know?" and "Whom do I know?" - entrepreneurs use available means, which can be grouped into three main categories: "Who I am" (personality), "What I know" (expertise) and "Whom I know" (social network).
- Step 2: Deciding "What can I do?" and "Affordable loss" - entrepreneurs focus on the downside risk by defining what they can afford to lose at each step, focusing on cost control rather than expected incomes. This basically relates to experimentation in that it represents a criterion upon which entrepreneurs make decisions (Chandler et al, 2011; Chandler, DeTienne and Mumford, 2007; Sarasvathy, 2001).
- Step 3: Interactions with other people - entrepreneurs interact with the external environment and can, to a certain degree, exercise control over the future, making the need to predict it less relevant (Chandler et al, 2011; Sarasvathy, 2001).
- Step 4: Stakeholder commitment - entrepreneurs build partnerships and alliances with self-selecting stakeholders (e.g., customers, suppliers, other companies from the entrepreneur's network) enabling them to minimize uncertainty and co-create complementary assets (Chandler et al, 2011; Chandler, DeTienne and Mumford, 2007) – thus accessing means and going beyond competitive thinking (Perry, Chandler and Markova, 2012; Read, Song and Smit, 2009).

2.2 Business model innovation

BMI has become the focus of business research and is considered a way of creating a business model with long-term competitive advantages (Zott, Amit and Massa, 2011; Spieth, Schneckenberger and Ricart, 2014; Foss et al, 2017; Csik, 2014; Gassmann et al, 2020). It is often seen as key to differentiating from the competition (Affenzeller, 2014; Bouwman, Nikou and de Reuver, 2019; Clauss, 2017; Filser et al, 2021; Foss and Saebi, 2018, 2017; Gassmann and Frankenberger, 2016; Schwarz, Krajger and Holzmann, 2016; Sjödin et al, 2020) as well as to improve business performance (Chesbrough, 2007; Lindgardt et al, 2009; Freisinger et al, 2021; García-Gutiérrez and Martínez-Borreguero, 2016; Kim, Ku and Lee, 2020; Loon and Quan, 2021; Montemari et al, 2022). The business model as the core of BMI has been a major focus of research for several decades (Asemokha et al, 2021; Baber, Ojala and Martinez, 2019; Belussi, Orsi and Savarese, 2019; Lambert and Davidson, 2013) and attracted attention from both academics and practitioners' side, thus providing a platform for multiple research streams. Despite this, no consensus exists on how a business model can be exactly defined. It has been characterized as "a statement, description, a representation, an architecture, a conceptual tool, a structural template, a pattern, and a set" (Zott, Amit and Massa, 2011) that abstracts the logic of how a company operates to create value for its stakeholders (Casadesus-Masanell and Ricart, 2010; Amit and Zott, 2012; Zott, Amit and Massa, 2011). Creating value can be achieved through three (Filser et al, 2021; Hock-Doepgen et al, 2021; Trapp, 2014) or four dimensions, including value proposition, customer, value chain, and revenue mechanism (Csik, 2014; Gassmann et al, 2020; Gassmann and Frankenberger, 2016; Lang, 2020). BMI is basically about finding new ways for companies to generate value. According to Foss and Saebi (2017), BMI represents "designed, novel, nontrivial changes to the key elements of a firm's business model and/or architecture linking these elements". Consequently, BMI occurs if an innovative characteristic can be attributed to the dimensions of a business model (Spieth and Schneider, 2016; Csik, 2014). BMI might be more challenging than product or process innovation,

but could result in higher returns (Chesbrough, 2007; Lindgardt et al, 2009; Chesbrough, 2010). This, in turn, can provide start-ups with a way to break through, especially in a business environment where competition is intense and sustain competitive advantages.

2.3 Effectuation and BMI

Designing innovative business models requires innovating on at least two dimensions on which a business model is built (Csik, 2014; Gassman et al, 2020). First, innovating the dimension of value proposition aims to meet the currently unsatisfied needs of clearly defined customers/customer groups by offering products and services that fulfill those needs. Second, innovating the value chain consists of creating new value through the company's partner network, its available resources as well as its supplier and distribution network. And third, innovating the revenue mechanism refers to the way a company generates value and creates new ways of capturing value through new revenue and profit-generating streams (Spieth and Schneider, 2016). Futterer, Schmidt and Heidenreich (2018) differentiate between internal and external dimensions in creating value. Internal value creation comprises activities performed within the organization, while external value creation comprises activities in collaboration with external partners, enabling entrepreneurs to overcome resource scarcity and reduce uncertainty (Hollebeek et al, 2022; Yi, Chi and Li, 2022; Xu et al, 2022; Deligianni et al, 2022). Consequently, value creation (in particular the external value) can be affected by applied entrepreneurial behavioural logic such as effectuation. Previous academic research put a strong emphasis on the "causation-effectuation-BMI" interface and focused on the effects of both logics on BMI (Futterer, Schmidt and Heidenreich, 2018; Reymen et al, 2017; Sitoh, Pan and Yu, 2014; Andries, Debackere and Van Looy, 2013). These studies agree that both effectuation and causation have a positive impact on BMI. Other studies emphasize the role of entrepreneurial behaviour on BMI and argue that effectuation is a decision logic to achieve BMI (Berends et al, 2014; Pati et al, 2022; Sha et al, 2022; Deligianni et al, 2022). Xu et al (2022) argue that effectuation has a mediating role in the relationship between the entrepreneurial network and BMI, but do not differentiate between the innovated dimensions of BMI. Other studies (Harms et al, 2021; Reymen et al, 2017) refer to effectuation as a critical predecessor of BMI. Accordingly, it is adequate to infer that effectuation has an impact on BMI. Furthermore, it is necessary to investigate the influence of entrepreneurial behaviour such as effectuation in innovating a business model through empirical research.

3. Methodology

The objective of this research is to elaborate on effectuation logic and its enabling potential on BMI. The relevant literature was reviewed with particular emphasis on the link between effectuation and BMI. In search for evidence, an analysis of the potential link between these two entrepreneurial approaches has been examined in the context of Swiss start-ups. The selected cases stem from a startup support programme, Swiss Innovation Challenge (SIC). The underlying primary data of this research consist of 25 business plans of the finalists who participated in the SIC in 2022. Among the 100 start-up teams admitted to the SIC, the selected cases have gone through two selection rounds based on their business plans and assessments thereof to qualify as the 25 finalists.

For the aim of this research, SIC represents a reliable source of innovative start-ups and enables for a consistent data selection for research following a proven process based on consistent evaluation criteria (e.g., grade of innovation, feasibility, qualification of the startup team). Submitted business plans and startup pitches are evaluated by an experienced jury. The process applied by SIC seeks to ensure that the top 25 finalists consist of innovative start-ups with high quality standards. In this work, business plans were chosen because they are frequently used as a selection and initial screening tool in practice, for example in start-up competition juries, investment groups and business angel clubs.

The research procedure for this work consisted of reviewing business plans of the 25 finalists independently by three researchers. The framework (Figure 1) served as a basis to investigate the above-mentioned objective and potential link between the two entrepreneurial approaches.

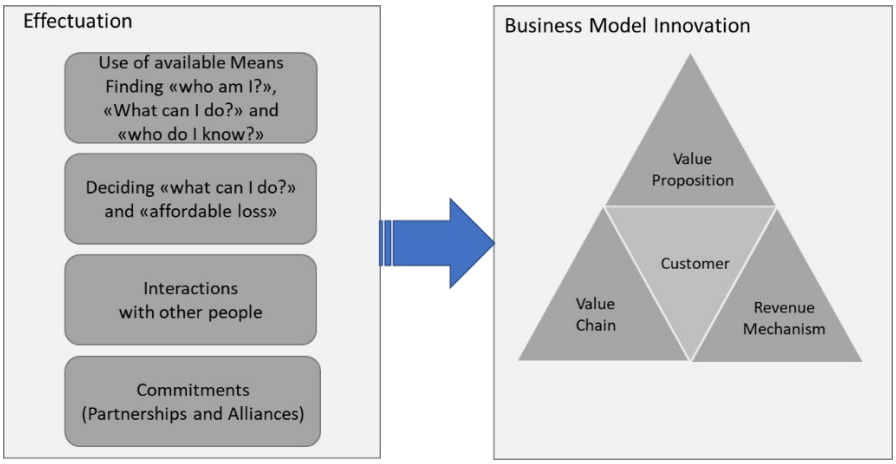

Figure 1: Framework linking effectuation logic and BMI
(authors' own representation – right-hand diagram adapted from Csik, 2014)

The data sample has been reviewed on the extent of applying effectuation - despite business plan development and implied causation logic - and how startups deal with BMI and innovation of the business model. Based on a pre-defined set of criteria and following definitions of the relevant literature on effectuation and BMI, business plans were examined for evidence of effectuation in the form of use of available means, interactions with other people, and commitments (partnerships and alliances). The construct "affordable loss" has been neglected in this study since the necessary information was partly lacking for that end in the chosen data sample. In a similar manner, business plans were analysed for evidence of BMI based on the above-mentioned four business model dimensions and their innovative potential. Innovation in a business model has been evaluated based on its novelty degree compared to industry standards including combinations of innovated business model dimensions. With the evidence for effectuation and BMI identified, business plans were analysed for any connections between the application of effectuation and BMI. Finally, results of the three researchers were aggregated and analysed. Thus, enabling an increase in the validity of the analysis results. In the final analysis, we evaluated whether the selected data sample provide useful evidence for widely used entrepreneurial approaches such as effectuation and BMI, as well as connections between them. However, as mentioned in the following sections, for deeper insights further research with other methodological approaches, such as in-depth interviews with start-up teams, should be carried out.

4. Results and discussion

Several studies have discussed the importance of the entrepreneurial behaviour and applied logic on BMI (Futterer, Schmidt and Heidenreich, 2018; Reymen et al, 2017; Sitoh, Pan and Yu, 2014; Andries, Debackere and Van Looy, 2013; Berends et al, 2014; Pati et al, 2022; Sha et al, 2022; Deligianni et al, 2022; Xu et al, 2022, Harms et al, 2021; Reymen et al, 2017). This research employs evidence from business plan reviews to assess the applied logic, BMI and potential link between them. In general, this type of evidence can be extracted from sections of the business plan that describe the business model in general, products or services, market and customers, market entry, financial statements, operational processes, team, and implementation plans. Following the literature review and based on the framework (Figure 1), results are presented and discussed pertaining to three clusters: effectuation, BMI, and impact of effectuation on BMI.

4.1 Effectuation

Based on the framework shown in Figure 1, the application of effectuation has been investigated as part of the first analysis step. Effectuation has been considered evident in the investigated sample if at least three pre-defined conditions are fulfilled. First, if there are indications that action was taken by the entrepreneurs based on the use of available means (e.g., competencies, contacts). Second, if there are indications that an open approach was taken to interact with other people (e.g., co-working space, competitions, coaching, external support). Third, if there are indications that a cooperative approach (commitments) was taken to build partnerships and alliances with stakeholders (e.g., customers, suppliers, and other companies from the entrepreneur's network). The data sample shows evidence of using available means, interacting with other people and commitments through partnerships and alliances in 90% of the investigated cases (Figure 2). 20% of

the examined cases show evidence for defining an affordable loss. However, the necessary information on this criterion was partly lacking in the chosen data sample and was therefore neglected in this study.

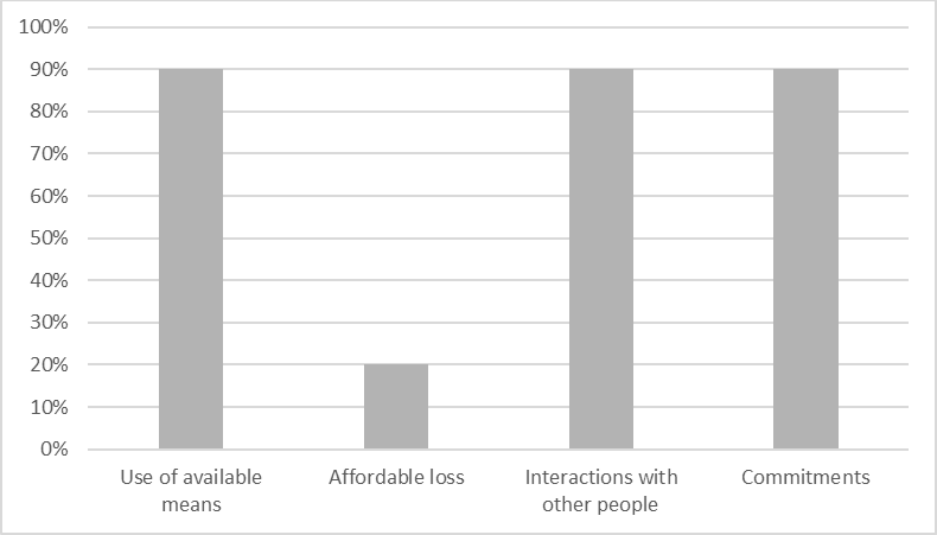

Figure 2: Application of effectuation in the chosen data sample

The fulfilment of the three pre-defined conditions as mentioned earlier indicates the evident application of effectuation in the data sample.

4.2 BMI

Investigating BMI evidence in the chosen data sample was the second step of the analysis. Figure 3 shows that 40% of the data sample shows evidence of BMI. Whereas 52% show evidence of product innovation and 4% of other types of innovation (such as service innovation and process innovation).

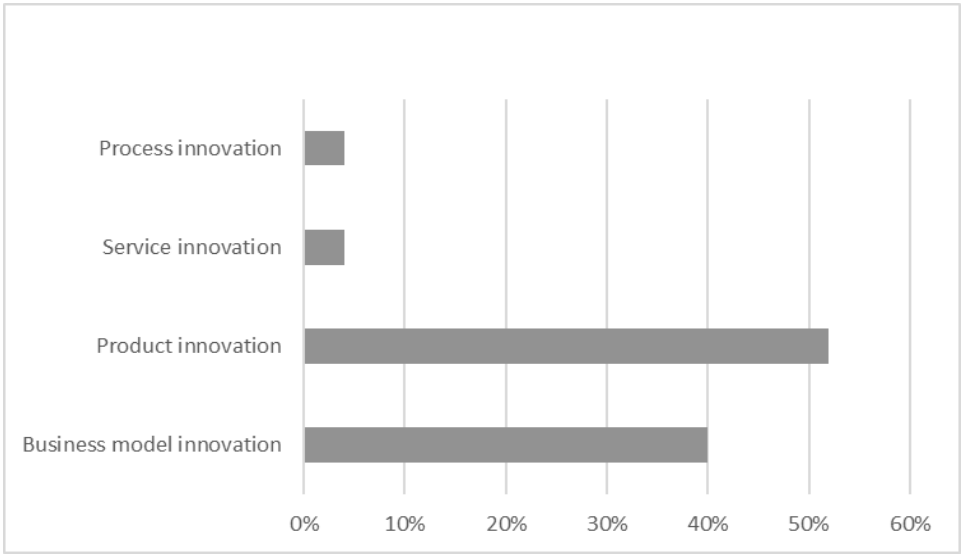

Figure 3: Types of innovation in the research sample

With a focus on BMI, the dimensions of each innovated business model in the data sample have been analysed. If an innovative characteristic has been attributed to at least two of the four dimensions of a business model (Csik, 2014), this has been categorized as BMI in the research sample. Figure 4 shows that value proposition has been the most innovated dimension (40%). The results also suggest that in all reviewed cases, innovation focuses on the value proposition of products and services which is in line with the literature (Foss and Saebi, 2017; Hock-Doepgen et al, 2021; Philippi, Hinz and Kabous, 2022). This is not surprising as participating startups in the SIC, must have an innovative offering. The second innovated dimension is value chain (24%), followed by revenue mechanism (16%) and customer segment (12%).

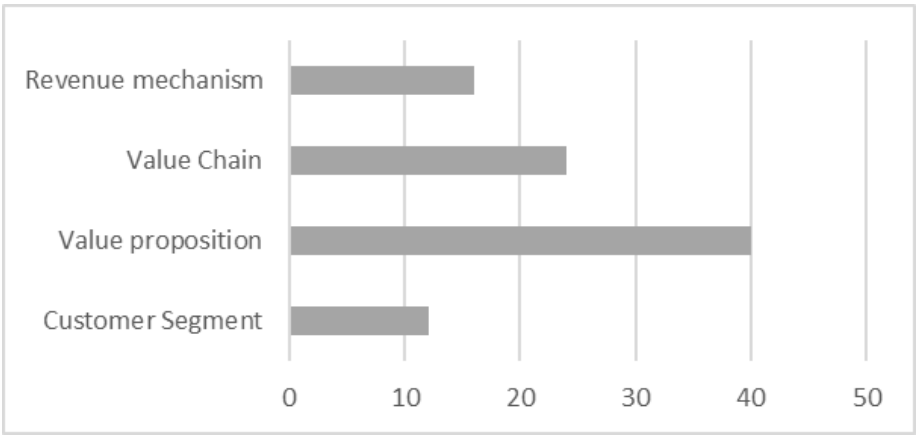

Figure 4: BMI and Innovated dimensions of the business model

Previous studies show that over the last few years startups, who have participated in SIC, are focussing on innovation and BMI (Philippi and Hinz, 2018; Kabous, Loosli and Philippi, 2019; Philippi and von Büren, 2021; Philippi, Hinz and Kabous, 2022). This is mainly triggered by the need to gain a competitive advantage and compensate for the limited resources in early stages (Philippi, Hinz and Kabous, 2022).

4.3 Impact of effectuation on BMI

The question is whether there is evidence in the analysed data set that links effectuation and BMI. In total, 40% of sample data show evidence of BMI by innovating at least two dimensions of the business model and where entrepreneurs have applied effectuation - meaning acting based on the available means, interacting with their environment, building partnerships and alliances, and creating new value through network (incl. supplier and distribution). Results as shown in Figure 5 suggests 71% have innovated the dimensions “value proposition/value chain”, 42% have innovated the dimensions “value proposition/revenue mechanism”, 28% innovated the dimensions “value proposition/customer segment” and 14% innovated the dimensions “value proposition/value chain/revenue mechanism”. The results show that innovation on all four dimensions of a business model in combination with effectuation did not take place.

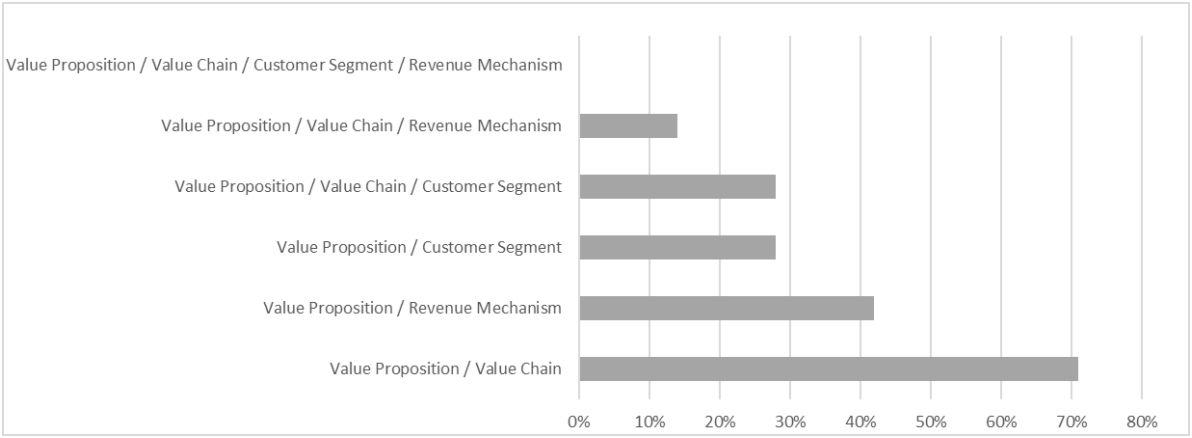

Figure 5: BMI and innovated dimensions of the business model by type and application of effectuation

As the results show, entrepreneurs use available means, shape new opportunities, collaborate with external partners to create value which in turn lead to optimize business ideas, innovate business model, and thus promote BMI (Read et al, 2009; Guo, 2019). Based on these results, effectuation can be seen as a facilitating aspect, particularly in the creation of external value (e.g., innovating the value proposition and value chain). In this case, the decision logic of entrepreneurs can be considered as pivotal in leveraging available means, connecting them with external resources and thus innovating the business model (Spieth and Schneider, 2016; Futterer, Schmidt and Heidenreich, 2018). The results of the investigated data sample provide an indication of the link between effectuation and BMI but should be supported by conducting further research through in-depth interviews with start-up teams.

5. Conclusion

This research seeks to contribute to a better understanding on the facilitating aspect of effectuation in designing innovative business models. In search of evidence, 25 business plans of Swiss startups participating in the noted competition have been investigated using empirical research. Three main conclusions were reached. First, effectuation has been applied by 90% of the investigated Swiss startups, where entrepreneurs took actions using available means, interacting with their environment and taking a cooperative approach to build partnerships and alliances. Effectuation has been adopted due to limited resources and enables to manage those effectively (Reymen et al, 2017; Yang, Wie and Zhao, 2020; Guo, Cail and Zhang, 2016). Second, there is clear evidence of BMI among the investigated startups. 40% of the investigated Swiss startups from SIC 2022 have innovated their business models where at least two dimensions have been adapted and innovated. These results are compliant with studies from previous years (Philippi and Hinz, 2018; Kabous, Loosli and Philippi, 2019; Philippi and von Büren, 2021; Philippi and von Büren, 2021; Philippi, Hinz and Kabous, 2022). The most innovated dimensions are "value proposition/value chain" offering innovative products and creating new value through the entrepreneur's network. The innovated business models are a key differentiating factor (Affenzeller, 2014; Bouwman, Nikou and de Reuver, 2019; Clauss, 2017; Filser et al, 2021; Foss and Saebi, 2018, 2017; Gassmann et al, 2020; Schwarz, Krajger and Holzmann, 2016; Sjödin et al, 2020). Third, the results show that the application of effectuation can have a positive impact on innovating the business model dimensions especially those relating to value proposition and creation comprising activities in collaboration with external partners to overcome resource scarcity and reduce uncertainty (Hollebeek et al, 2022; Yi, Chi and Li, 2022; Xu et al, 2022; Deligianni et al, 2022). The findings show that effectuation can be considered as facilitating logic for designing innovative business models based on the investigated data sample. However, as the review of investigated sample is based on strict pre-defined criteria and insights with respect to affordable loss are not explicitly described in the business plans, it becomes obvious that the chosen methodology does not provide insights to full extent. For deeper insights further research with other methodological approaches, such as in-depth interviews with start-up teams, should be carried out. The available data from the annually held SIC offer an opportunity to shed more light on this.

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Venture Capital as a New Approach to Developing Early-stage Firms in Emerging Countries: Experience of South Africa & Kenya

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Abstract: This study aims to extend our knowledge of the new approaches to entrepreneurial finance that inspire the development of early-stage firms in developing countries. The role of entrepreneurship is well understood internationally owing to its substantial influence on new employment creation, and productivity, and a seedbed for the emergence of innovative young firms. The survival and prosperity of the HGFs are unswervingly linked to access to sustained financing during their early-stage growth, nonetheless, access to funding remains the topmost worry for young firms. Yet VC financing has a competitive edge over banks burrowing, which cannot easily substitute for VC in its absence. We developed a multi-regression model to measure the results using survey data of 61 VC companies dealing with over 327 investment rounds from 2015-2021. The study confirms that VC investment has a dramatically flourishing prominence in nurturing early-stage firms with potential growth. Our study makes three major contributions to advancing this debate: First, our finding is expected to benefit the policymakers and civil society in the practice of creating new VC policies or altering existing ones to attract increased foreign VC investment in active countries and beyond. The government's increased funding to the VC companies might lead to higher survival rates for new innovative industries as observed in the developed. Moreover, we discover that this research arena is recognized by a paucity of theoretical and empirical research underpinning VC's proficiency in nurturing high-growth firms and innovative entrepreneurship.

Keywords: Venture capital, high-growth entrepreneurship, emerging countries, South Africa, Kenya, early-stage firms.

1. Introduction

Over the years, high-growth firms (HGFs) have drawn considerable interest from several academics and policymakers due to their central role in economic development across all countries. The survival and success of the HGFs are unswervingly linked to access to sustained financing during their early-stage growth (Alperovych, Groh & Quas, 2020). Over the past two decades, VC has been an important source of financing for innovative companies (Lerner, 2010; Devigne et al., 2018). Venture capitalists offer not only capital but also support entrepreneurs in the decision-making process to build successful companies (Brusche, 2016; Gompers et al., 2020). In this line of reasoning, many of the global technological game-changer industries, like Amazon, Apple, Facebook, Microsoft, Google, and others, raised VC funds in their early years. They have been instrumental to the economic development of the United States (US) and the global economy (Ahlstrom & Garry, 2006; Gompers et al., 2020). Most of these early studies advocate for increased external financing for HGFs to uphold the crucial role these firms play in assuring vibrant productivity and employment growth in the economic system (Ahlstrom & Garry, 2006). VC-funded companies demonstrate higher growth rates when matched to non-VC-funded firms (Lerner, 2010; Sipola, 2021). Notwithstanding the efforts made in previous studies on this subject, they still do not show a suitable funding source for high-growth entrepreneurship, and the question of whether VC investment positively impacts HGFs' progress remains unanswered.

Moreover, the prior body of literature on firm-level performance and regional development still presents mixed conclusions about this subject. Gompers (1994) concludes that promoting an efficient VC industry should be the goal of any administration. Conversely, Brander, Du, & Hellmann, 2010) provide evidence that extensive government support does not maximize value creation and innovation benefits. Equally, Grilli, 2014) contends that little is known about VC's impact on investee companies. Many of these studies focus on high-technology sectors, and they remain unmatched in the literature in supporting VC as the main generator of potential HGFs. Earlier scholars posit that much of the productivity and market internationalization of novel economic data is more linked to high-techno firms, such as Silicon Valley in California, the Cambridge area in the UK, and the Montpellier area in France. This demonstrates a discriminatory funding approach to HGFs with less focus on the manufacturing and service sectors, which constitute the largest segment of SMEs. Moreover, this methodological concept fails to admit the opportunities for rapid entrepreneurial growth in other sectors of the economy (Samila & Sorenson, 2011). Conceivably one of the bare minimum understood facts connected with the HGFs is a flourishing move in the comparative advantage of high-growth entrepreneurship across countries (Alperovych et al., 2020). While the critical demand for HGFs is evident, stimulating their survival and success

has long remained a major mystery to policymakers, regardless of their significant contribution to economic growth and employment creation.

A growing stream of surveys confirms that HGFs depend on sustained financing and strong regulatory policies for their survival and growth (Sazvar & Yahyazadehfar,2019; Samila & Sorenson, 2011). The literature also suggests that start-ups need dynamic VC investor skills to transform their present business practices and help them adapt to the innovative business environment. Although some scholars have made considerable progress in offering internationally comparable data about the VC market industry, its standing in East and Southern Africa is yet to be recognized. These academic attempts are generic in confronting the unmatched questions of emerging economies (Cullen & De Angelis, 2021). As a result, substantial data gaps still exist in terms of geographical reporting and biased focus on technological industries. Hence, this is creating complexity in understanding the speed of improvement toward the consciousness of VC growth in Africa.

This study was motivated by the lack of a comprehensive analysis of the impact of VC on HGFs' development. Several scholars have attempted to engage in a comprehensive analysis but have generally offered broad-brush conclusions that take little or no practical value to encourage HGFs' growth. The main objective of this paper is to address the primary research questions: How does VC as a new approach to financing impact HGF in the context of emerging economies? To address this question, we surveyed 61 VC firms comprising 327 VC deals from 2015 to 2021 residents in South Africa and Kenya. In various fields, the accessible acumen information, and support are incomplete. We consequently underline areas where more interest could enhance new knowledge about the VC arena. This research makes two significant contributions. First, it extends our understanding of the role of VC investment in boosting HGFs' survival and success between various VC markets in South Africa and Kenya which have been understudied. Second, the study addresses the critical question of whether VC impacts HGFs' development in the context of a developed country.

The paper is arranged as follows. In Section 2, we construct the existing literature to build the theoretical context of this study. In Section 3, we describe the research design and data utilized in our analysis, while Section 4 presents the different inferences. Section 5 examines the primary findings and strengths. Section 6 concludes the paper in which we abridge our primary findings and debate the study's impact on the VC literature, the drawbacks, directions for future research, and policy implications.

2. Literature Review and Hypothesis

2.1 Role of venture capitalists on entrepreneurship and economic growth

Several empirical and theoretical studies have long highlighted the positive effect of VC on the growth of new ventures, exclusively in new HGFs (Samila & Sorenson, 2011; Devigne et al., 2018). Sazva & Yahyazadehfar, (2019) suggest VCs can convey several managerial benefits to VC-funded enterprises, including the development of entrepreneurial ethos, which can foster VC markets internationalization, formation of supportive rules, and business superior skills. Standaert, Knockaert, & and Manigart (2022) also support earlier scholarships that VCs' superior skills and management's strong aspirations are desirable for the firm's growth. However, none of these studies explain evidently how VC can contribute to generating new HGFs in emerging economies. Even the limited accessible studies in Africa tend to focus largely on firm-level performance rather than a regional perspective.

In light of these concerns, earlier surveys unveil the growing necessity of government policy that evidently focuses on innovative entrepreneurship and creating HGFs. Gompers et al., 2020 disclosed that investors and government stakeholders should only invest in new firms with high-growth potential because ''a few rapidly growing firms generate a disproportionately large share of all new net jobs" compared with nonhigh-growth firms. Unfortunately, such initiatives are recent because this concept of HGFs is new in the entrepreneurship and finance literature. Whereas some academics support the government's positive role in the success of the VC market (Lerner, 2010; Devigne et al., 2018). Tykvová (2018) exposes that government-funded firms have reported inferior performance due to a lack of experienced VC investors. Kato and Tsoka (2022) disclosed that not all VC-backed firms are successful because 20% of VC-funded firms completely fail, 50% achieve average returns and 30% gain exceedingly high returns that compensate for the losses made in other failed ventures.

Thus, we pursue hypothesis one; *Ho1; The Role of venture capitalists positively impacts entrepreneurship and economic growth*

2.2 Venture Capital Leads to Firm Growth and Financial Performance

Despite the growing consensus that HGFs contribute disproportionately to economic growth and prosperity, relatively few countries have policies that specifically promote such firms (Lerner, 2010; Long, Wood & Bennett, 2022). Moreover, the conclusion of a positive relationship between VC, entrepreneurship, and economic growth rests on two potentially inaccurate assumptions; VC-funded firms would not come into existence without VC, and the employees of VC-funded firms create more value for the economy than in firms not funded by VC. Conversely, Samila and Sorenson (2011) argue that there has been little empirical research investigating the validity of the widespread claims of VC as a stimulus for economic growth, confined to the success of the US Silicon Valley and the Yozma model in Israel.

While our efforts to match the influence of VC in Southern and East Africa exposed interesting results over the previous years, the VC market is still young and constrained. Besides, it does not play its due role when equated to mature markets in developed countries (Ahlstrom et al. 2006; Ernst & Young 2022). Equally, Manigart, Baeyens & Hyfte (2002 contend that the presence of VC in the capital structure of a company does not necessarily have a positive impact on the survival rate of that company. In the same line of discussion, Standaert et al., (2022) exposed that there has been a large variation in the growth of firms backed by VCs. In specific terms, emerging markets are associated with rigorous regulatory policy systems that are far from flawless and cannot completely encounter growth demands for example, fundraising is still wanted (Zhao et al., 2015). Also, Brushe (2016) identified critical gaps in the academic literature about decision-making on funding for early-high-tech ventures in Europe. While this study holds great substance, it was conducted six years ago, and it was directed in North America, leaving a gap for future research in Africa. These undesirable results of government and regional programs offer an opening to resolve the paradox of HGFs by explaining how they influence socioeconomic-specific country-level performance. We aim to deliver much more considerable empirical evidence to sustain the VC philosophy which is utterly adopted by VC investors.

Thus, this leads to hypothesis two; Ho2; *Venture capital leads to firm growth and financial performance*

3. Material and Methods

3.1 Sample and populations

The study utilized multiple sources of datasets compiled by the different stakeholders in the VC industry, including Southern Africa Venture Capital and Private Equity Association [SAVCA], South African Revenue Services [SARS], and African Venture Capital Association [AfVCA], which maintain records on the performance of VC firms in these regions. Moreover, data on VC firms were cross-checked for consistency by comparing the three databases. These professional bodies are mandated to gather data through yearly surveys that have been used extensively in VC research (Shane, 2009). We also collected annual supplementary data from the websites of the private VC firms from 2015 to 2022, with a footprint in South Africa and Kenya.

We used a lime survey administered to a population of 257 PVC firms domiciled in the two countries. However, out of 257 PVC firms, 98 (38%) reported failed email deliveries due to invalid and obsolete email accounts. Yet, 11% (29) indicated that their company policies prohibit them from clicking anonymous links due to security concerns, and then, seven (7) questionnaires were found to be inappropriate. The study received a response rate of 50% (61 out of 123) returned questionnaires. A response rate of 50% is acceptable compared with the earlier lime surveys. According to Fenton-O'Creevy (1996), a response rate (RR) of 33% involving organizational CEOs and senior management staff is suitable. He also argues that online surveys are associated with low responses, 25% were found too busy, 14% had invalid email accounts and 22% had company policies prohibiting participation in anonymous surveys. Similarly, Watube &Yamugushi, (1995) distributed 1,150 online survey questionnaires, but only 396 were completed and returned, of which 365 were considered for data analysis, thus reporting a response of 31.7%. Considering the above, while we encountered several challenges, the response of 50% was much higher; thus, our data is reliable and dependable when compared to comparable previous studies

3.2 Variables

Table 1: Research variables (independent and dependent variables)

Research questions/hypotheses	Research hypothesis (H^1) Do VC investors contribute to entrepreneurial firms' development and economic growth?	Research hypothesis (H^2) Does increasing Venture capital investment lead to firms' growth and financial performance of the investee companies?
Independent variables	• VC's experience • VC's presence on the BOD • Private Venture capital	• Government and regional programs • investment • Private venture capital
Dependent variables	• Creation of new employment opportunities • Number of firms generated •	• Survival rate and success of the HGFs • Productivity of the VC-funded firms • Innovation capacity of the HGFs
Control variables	• Geographical Location • Number of years in business • Government VC & entrepreneurship policy	• Geographical Location • No years in business • Government VC & entrepreneurship policy
The method used to test hypotheses	Multiple regression (ANOVA)	Multiple regression (ANOVA)

Source: Primary data, 2022

To capture causal interactions between the dependent and independent variables, we empirically surveyed 61 active VC firms with over seven years of lifespan in business operations. This approach allowed the gathering of dependable and extensive contextual data from South Africa and Kenya. We relied on VC's experience, VC's presence on the BOD, and VC as our independent variables to measure the hypotheses. Alternatively, the creation of new HGFs, the survival rate and success of the HGFs, and the productivity and innovation capacity of the HGFs, were represented as our dependable variables. However, our study moves beyond the ordinary measure of growth using sales and employment growth. We defined a regression model to measure the effect of the predictor variables on the outcome variable. SPSS data analytics was applied for processing the data.

Quantitative data were augmented with 12 hybrid structured interviews, conducted purposively with talented VC participants. The interviews offered the researcher an opportunity to extensively explore matters that were unique to the experiences of the interviewees which facilitated a rich and detailed account at the heart of the study. The concept of saturation guided the direction of the interview process. Saturation occurs whenever the researcher begins to hear the same comments again and again' (Starks and Trinidad, 2007). The verbatim approach was adopted in generating the interview transcripts. To ensure the quality of the interview data, we returned the transcribed data to the participants for quality assurance and agreement (Creswell 2013).

4. Results and Discussion

4.1 Data Analysis

We use tables to compare the key study results concerning our first hypothesis (H1). We modeled a three-way ANOVA to determine if there is any interaction effect between the three independent variables (VC investment, VCs' superior skills, and role in the BOD) on a continuous dependent variable (entrepreneurship development and economic growth). In measuring entrepreneurship development and economic growth.

Table 2: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson
					F Change	df1	df2	Sig. F Change	
1	.589[a]	.346	.303	.295	7.950	3	45	<.001	2.680

a. Predictors: (Constant), 15. Venture capital investment
8. VCs' superior skills represent distinctive capabilities.
11. VCs' role (BOD seat) on the Board.

b. Dependent Variable: 9: Entrepreneurial dev't and economic growth

Table 3: A 3-Way ANALYSIS oF VARIANCE (ANOVA ANOVA)[A]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.078	3	.693	7.950	<.001[b]
	Residual	3.922	45	.087		
	Total	6.000	48			

a. Dependent Variable: 9. Entrepreneurial dev't and economic growth

b. Predictors: (Constant), 15. Venture capital investment.

8. VCs' superior skills

11. VCs' role (BOD seat) on the Board

Source: Primary data (2022)

As shown in Table 2, three-way ANOVA was run on a sample of 49 participants to examine the effect of the predictor variables on the dependent variables. We are offered the statistical significance level factorial interaction, which is *F (2, 48) = 7.950, p =.001*. From this result, we can conclude that VC investment, VC's superior skills, and VC's presence on the BOD confirm a significant amount of variation in entrepreneurship development and economic growth (*p values <.001*). These results are less than *p <.05,* which implies that there is a statistically significant difference among group means (H_0) of ANOVA. Overall, this evidence supports hypothesis H1 because VC investments, VC's superior skills, and VCs' presence in the BOD of VC-backed firms demonstrate greater efficiency levels and improvements in entrepreneurial development and economic growth. We also discover a positive correlation between the VC firm's geographical proximity connected with high-growth entrepreneurship and economic growth. Our findings are consistent with the prior study (Amornsiripanitch, Gompers & Xuan, 2016; Lerner 2020; Gompers et al., 2020), which argues that the role of VCs is fundamental to the success of HGFs. Nonetheless, the role that VCs play on the board in emerging economies in Africa, has just started to be understood.

While these results are encouraging, the causal relationship between VC investment and entrepreneurship development is an open question. Hence, we apply the variance inflation factor (VIF) to detect multicollinearity to estimate the strength of the correlation between the predictor variables in a regression model (Table 4). This permitted us to confirm that our predictor variables are not overly correlated.

Table 4: Coefficient output for collinearity.

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.560	.604		2.584	.013		
	8. VCs' superior skills represent distinctive capabilities.	.258	.111	.298	2.334	.024	.890	**1.124**
	11. VCs' role (BOD seat) on the Board	.363	.117	.418	3.093	.003	.797	**1.255**
	15. Venture capital investment.	-.007	.092	-.010	-.075	.941	.888	**1.126**

Source: Primary data, (2022)

As can be observed from Table 4, we test the coefficients of variables to confirm that it does not violate the coefficient principles. In this case, the regression coefficients indicate VIF (1.124) and tolerance (0.890) for VCs' superior skills, VCs' role (BOD seat) represents VIF (1.255) and tolerance (0.797), while VC presents VIF (1.126) and tolerance (0.888). VIF below 10 for all the independent variables and tolerance below 2. Therefore, when VIF or tolerance is equal to 1, the independent variable is not correlated with the remaining variables, which means multicollinearity does not exist in this regression model. Prior studies state that the VIF output below 10

and tolerance scores above 0.2 confirm no multicollinearity of data. Therefore, considering that all the VIF results for the predictor variables were below 10 and tolerance was below 0.2, we can declare that our results were consistent and strongly correlated. Considering these results, it can be concluded that the high-growth firms that received VC investment with the support of experienced VC investors on the BOD contributed to the generation of new HGFs, productivity, and the increased survival rate of these firms.

In the second hypothesis (H^2), we examined if VC had any significant statistical effect on the HGFs by using the linear regression model.

Table 5: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.592[a]	.351	.304	.417	2.384

a. Predictors: (Constant), 15. PVC funding for start-ups, 16. Government and regional programmes, 9. VC investment, 11. VCs' role on the board

b. Dependent Variable: 24. Firms' growth & financial performance.

Table 6: Table 2: Regression A ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.169	4	1.292	7.430	<.001[b]
	Residual	9.565	55	.174		
	Total	14.733	59			

a. Dependent Variable: 24. Firms' growth & financial performance.

b. Predictors: (Constant), 15. PVC funding for start-ups, 16. Government and regional

, 9. VC investment, 11. Vcs role on the board

Source: Primary data, (2022)

As can be observed in the table of the model summary, the R-value represents the simple correlation and is 0.592, which indicates a high degree of correlation. However, the R square value of 0.351 indicates that a 35.1% variability in the growth of VC-funded companies can be explained by PVC funds dispensed by VCs while playing a vital on BOD including government support programs These results garner support from the prior study of Sipola, (2021), as it confirmed the rewarding benefit of VC in escalating entrepreneurship growth in developed economies.

To ensure that the statistical model is not subject to autocorrelation in the residuals, we further use the Durbin-Watson statistic to test the assumption that our residuals are independent (or uncorrelated). This statistic can vary from 0 to 4, but we set our model to 2 to comply with this assumption. Values from 0 to less than 2 points indicate positive autocorrelation and values from 2 to 4 indicate negative autocorrelation. In this case, the value is 2.384, so we can say that this assumption has been met. Values outside this range could, however, be a cause for concern. Although the Durbin-Watson statistic is displayed by many regression analyses, it may not be applicable in certain situations. In such settings, we use an ANOVA table, which reports how well the regression model predicts the dependent variable significantly. This indicates the statistical significance of the regression model that was run. Here, $p < 0.001$, which is less than 0.05, indicates that, overall, the regression model statistically significantly predicts the outcome variable. These results get support from previous literature that exposes the successful VC and entrepreneurship models globally, for instance, Silicon Valley in the US, Yozma fund in Telvaviv, Singapore, and Canada, received full government support, and experienced VC investors were at the forefront (Lerner, 2020; Gompers et al., 2020; Crunchbase, 2022). Therefore, VC financing to HGFs without support from experienced VCs, may not impact HGFs' prosperity. This approach to enhancing entrepreneurship and VC development resonates with the RBV theory of the firm (Barneys, 1994). VC firms seemingly select firms with growth potential, and they not only provide capital but only offer superior skills by getting involved in their operations at the BOD level. This technique subsequently underwrites the HGFs' competitive advantage and sustained growth. In this context, to promote the prosperity of HGFs in the Southern and East African regions, it is incumbent upon the government and the VC investors to offer adequate support to these fast-growing firms in a way to contributes to economic development.

4.2 Interview analysis results

We interviewed 12 VC investors purposely selected from South Africa and Kenya to obtain in-depth insight into the statistical data collected from the lime-survey questionnaires. We interrogated the VC investors about how the VC-backed companies have contributed to national economic growth and innovation from a regional perspective. All the VC investors (100%) acknowledged the crucial role of VC-funded companies in job creation, commercialization of firms, and government taxes. It was reported that portfolio companies offer approximately 5 new jobs. Nevertheless, it was not only VC that accounted for this positive result, but sound macroeconomic policy, political stability, and the nation's entrepreneurship initiatives partially played an increasingly important role in stimulating growth. Our findings were like those of previous studies (Lerner, 2010; Ahlstrom et al., 2006; Brusche, 2016; Wentao & Qian, 2018; Standaert et al., 2022). These results support the statistical figures underpinning the contribution of VC-funded companies to entrepreneurship development in emerging economies.

We also asked the VCs whether VC leads to firms' growth and financial performance of the portfolio companies they support. Approximately 75% (9 of 12) of VC investors revealed promising results for their VC-funded companies. VCs provided VC and PE findings that would never have been accessed from traditional financial institutions and technological knowledge transfer to HGFs. Such factors have been very instrumental in facilitating high-growth entrepreneurship and small business development in East and Southern Africa. While this sounds true, 70% of the selected sample was from Southern Africa, contrary to the East African region. However, in terms of total VC investment in these two regions, they are equally competitive. Previous studies have acknowledged the robust connection between increasing access to VC investment and entrepreneurial activities across nations over time. Similarly, our study adds to the current literature by partially closing the existing gaps in the VC industry. The prosperity of entrepreneurship and HGFs are frequently hampered by the dearth of financing abilities. We found similar funding challenges encountered by the HGF firms in the South and Kenya attributed to the few VC firms. In developed economies, national governments have taken a leading role in adding financial resources in the form of GVC and equity, or combinations thereof. This observation is supported by numerous examples of government intervention that has triggered the growth of the VC market. For instance, the Small Business Investment Company (SBIC) program in the USA and the Yozma fund model in Israel led to the creation of the foundation for much of the current VC industry. Similarly, in South Africa and Kenya, we have witnessed replication of the US Silicon Valley; for example, in South Africa, Silicon Cape was developed, while in East Africa, Silicon Savannah emerged in Nairobi. All these convey prosperity in the VC industry in East and Southern Africa, although it is still at an early stage compared to the US, Canada, Israel, and China.

5. Conclusion

The study aimed to measure the impact of VC investment on HGFs' development and economic growth. The primary results are fourfold fold. First, the results confirm a significant positive impact of VC investment on the survival and success of HGFs. We found tremendous expansion of VC-funded companies in terms of productivity, employment creation, and market internationalization. However, the performance was more popular with HGFs located in the southern region than with HGFs located in the East African region. VC investors contribute to the levels of productivity in the country that emanates from higher levels of innovation. Accordingly, encouraging VC investment into new HGFs/early-stage entrepreneurial firms is crucial to economic growth (Cumming et al., 2018). Second, our results also confirmed that VC investors are instrumental to portfolio companies during periods of financial distress because they increase access to external equity finance for potentially lucrative new business and expansion firms to enhance their productivity and competitive advantage. In this context, to promote the prosperity of HGFs in the Southern and East African regions, it is incumbent upon the government and the VC investors to offer adequate support to these fast-growing firms in a way to contributes to economic development. Third, we discovered that disrupting government and regional programs deplorably influences the success and survival of HGFs. This was evident in the government's reluctance to create supportive regulatory reforms that encourage high-growth entrepreneurship in these regions. Whereas South Africa and Kenya have made efforts to design friendly policies aimed at attracting foreign investors, they are still inadequate compared to the US, Canada, and the UK. We, therefore, trust that if the VC industry in Southern and East Africa receives adequate support from the regime, it may enhance the entrepreneurship growth, employment creation, and economic growth of these regions at large.

Finally, the study confirms that enhancing access to VC investment can facilitate entrepreneurship development and ensuing firms' survival and growth, which in turn can contribute to employment opportunities and the economic development of emerging economies. Nonetheless, the situation of VC development in emerging economies in Africa is seemingly not encouraging, as the concept is still unknown. Investment activities appear to be scarce because of a few well-trained entrepreneurs and the resistance of family-owned enterprises to engage in partnerships with VC investors. This negative entrepreneurial spirit contravenes the RBV theory of the firm. Given that the VCs are denied a chance to exhibit their superior skills. Theoretically, it is difficult to conclude that the presence of VCs in the BOD of VC-funded firms encourages firms' growth and financial performance.

6. Theoretical Contributions and Future Research Directions

This research delivers three major contributions. First, we learn that VC financing has a competitive edge over alternative forms of financing, such as banks, which cannot easily substitute for VC in its absence (Lerner, (2020; Kato & Germinah, 2022). This would assist government and VC practitioners in engaging in effective interventions that will encourage foreign VC investments, job creation, increased productivity, and the creation of new entrepreneurial firms. The survey is additionally expected to agitate for the integration of VC as a key component of entrepreneurship development. We also trust that government intervention in the VC industry is inevitable to create a conducive climate for VC by cultivating the macroeconomic atmosphere and entrepreneurship and promoting the availability of VC funds (Sipola, (2021). Therefore, future research that examines how such contingency conditions influence high VC-backed firm growth should prove fruitful.

Second, because IPOs of VC-funded companies are unpopular compared to the leading VC-developed economies, capital gains are assumed to be less significant and attractive. For this reason, many VC investors have expressed doubts about VC applicability in emerging economies, hence negatively impacting VC updates in Africa at large. That said, we discover that the lack of well-developed VC markets, ineffective entrepreneurial incentives, and the entrepreneurial attitudes of the family-owned enterprises all combined stand to explain the poor performance of the VC industry in Africa. On the one hand, the successful development of the VC market certainly demands recognition of high firms for their significant contribution to employment creation and new technological and economic development. Several studies offer plentiful anecdotal evidence from the US and Europe, suggesting that increasing VC investment stimulates entrepreneurship development and that the externalities of this encourage more entrepreneurs to start a business (Ahlstrom & Bruton, 2006; Ernst & Young, 2022). Finally, it is important to recognize the limits of our analysis because of the limited research in the arena of emerging economies in Africa. We trust that it will serve as a stimulus for future research to improve our results concerning the role of VC investment in entrepreneurship and the survival of the HGFs.

This study makes the following contributions to the literature: Recent studies have focused mainly on analyzing the various factors influencing entrepreneurship in developed countries, but they have seldom considered emerging and immature financial markets (Sipola, 2021; Standaert et al., 2022). Our study fills this gap by identifying, through an empirical study, whether VC fosters entrepreneurship in emerging markets. This study provides an interesting addition to the current debate on high-growth entrepreneurship. The study delivers vital knowledge to policymakers and entrepreneurs in need of alternative financing to promote the survival and expansion of HGFs. Therefore, there is an increasing demand for strong regulatory policies that can support and promote innovative entrepreneurship and access to VC investment for early-stage firms**.**

Conflicts of interest; The authors declare no conflict of interest

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The Innovation Impact on Marketing Performance: The Case of SMEs in Developing Countries

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Abstract: Despite the growing body of literature on social media adoption in marketing, there appears to be a lack of research on the specifics and ramifications for small and medium-sized enterprises (SMEs), which are an important segment of the business world. This study aims to address this gap by investigating the use of Facebook and Instagram in marketing among fast-food SMEs in Pakistan, a developing country. To achieve this goal, the study employs the technology-organisation-environment (TOE) framework and a multiple case study approach to analyse the antecedents of Facebook and Instagram adoption and their impact on marketing performance. Data was collected through semi-structured interviews with thirty fast-food SMEs in Pakistan and analysed using thematic analysis. The study reveals that several antecedents influence the adoption of Facebook and Instagram in marketing among SMEs, including interactivity, cost-effectiveness, owner support, customer pressure, and market scope. Furthermore, the adoption of these social media platforms impacted marketing performance, as it enhances brand awareness and customer buying interest. The study's findings offer a conceptual framework on the antecedents of Facebook and Instagram adoption in marketing among fast-food SMEs in Pakistan, with implications for their marketing performance. The study's conceptual framework can serve as a foundation for future research exploring social media adoption in other SMEs and industries. This study has both practical and theoretical contributions. At the practical level, it provides suggestions for fast-food SMEs in Pakistan on how to adopt social media platforms effectively for marketing purposes. At the theoretical level, it enriches the existing literature on social media adoption in SMEs.

Keywords: Small and Medium-sized Enterprises; Social media adoption; Marketing performance; technology-organisation-environment (TOE) framework; Developing Economies

1. Introduction

Small and Medium-sized Enterprises (SMEs) are crucial in driving the economies of developing countries, and adopting technological innovation is key to achieving marketing success of SMEs (U.N. Conference on Trade and Development, 2022). However, the adoption of Facebook and Instagram by SMEs and its impact on marketing performance remain largely unexplored (Wadhwa, et al., 2023). To address this gap, we utilise the technology-organisation-environment (TOE) framework (Izaak, Khristi & Kusumawardhani, 2022) to investigate how fast-food SMEs in Pakistan, a developing country, adopt Facebook and Instagram for marketing. Specifically, we evaluate the antecedents in their adoption, including elements of technology, organisation, and environment, and evaluate the implications on their marketing performance.

SMEs in developing countries struggle due to limited resources, poor information systems management, volatile market demand, and high marketing costs (Wadhwa et al., 2023). Facebook and Instagram offer an affordable marketing opportunity for these businesses (Chipambwa et al., 2023; Khan & Zhang, 2022; Riaz, Ahmed, & Akhtar, 2019). Fast-food SMEs are among those utilising Facebook and Instagram for marketing (Small & Medium Enterprises Development Authority, 2021). However, the antecedents influencing adoption and impact on marketing performance in developing countries are unknown (Kwon et al., 2021). Our study addresses this gap in literature (Alzougool, 2019; Kwon et al., 2021; Qalati et al., 2021).

This study provides novel insights to assist developing economy SMEs in comprehending the adoption of Facebook and Instagram for marketing and enhancing their marketing performance. The utilisation of the TOE framework in the study can be extended to other SME types in developing countries, and the study's discoveries on the determinants of Facebook and Instagram adoption can contribute to a more comprehensive understanding of SMEs' social media adoption in developing economies.

2. Literature Review

The adoption of ICT based innovations led to frequent changes in SME business models (Henao-García & Montoya, 2023). Mariani, Machado & Nambisan (2023) asserted that SMEs found themselves in a technologically changing world, ICT based innovation adoptions became a catalyst for organisational change. In a similar vein, the adoption of social media among SMEs for marketing purposes was a growing phenomenon (Dwivedi &

Pawsey, 2023). As social media platforms like Facebook and Instagram became increasingly popular among customers, SMEs in developing countries began to adopt these for marketing purposes (Cahyono, 2023).

Prior research has produced varying results regarding the antecedents and impact of Facebook and Instagram adoption on business performance, leaving significant gaps in the social media adoption literature (Kanth & Prasad, 2023). While some research has examined Facebook and Instagram adoption among SMEs, more focused investigations are required to determine the antecedents that influence the adoption of Facebook and Instagram in marketing and their impact on marketing performance of SMEs in developing countries (Khan & Zhang, 2022).

The Public Authority for SMEs Development in Pakistan, Small and Medium Enterprise Development Authority (SMEDA) defines SMEs as business entities that employ up to 250 employees (SMEDA, 2021). Social media platforms are characterised as a group of internet-based applications that enable the creation and exchange of user-generated content and built on the technological and ideological foundations of Web 2.0 (Kaplan & Haenlein, 2010). Cesaroni & Consol (2015) and Michaelidou, Siamagka, & Christodoulides (2011), argue that Facebook and Instagram are cost-effective marketing tools. Borah, Iqbal, & Akhtar (2022) and Tajvidi & Karami (2021) believe that the adoption of Facebook and Instagram helps SMEs to better understand their customer needs. Dahnil (2021) and Nyamboli (2021) assert that Facebook and Instagram enhance SME performance.

3. Conceptual Framework

To understand the antecedents in the adoption of Facebook and Instagram in marketing among SMEs, we examine existing theories in ICT based innovation adoption, including the TOE framework, Diffusion of Innovation (DOI) Theory, Dynamic Capabilities View (DCV), Technology Advancement Model (TAM), Resource Based View (RBV), Institutional Theory, Social Network Theory (SNT), Social Presence Theory (SPT), and Actor-Network Theory (ANT). The TOE framework is widely used to comprehend the antecedents in ICT based innovation adoption in SMEs (Raj & Jeyaraj, 2023).

We use the TOE framework (Eze, Chinedu-Eze, & Awa, 2022; Pradifera et al., 2022),to examine the antecedents of Facebook and Instagram adoption, including technology, organisation, and environment. The framework includes technology context elements such as interactivity (Alsoud, Al-Muani, & Alkhazali, 2022) and cost-effectiveness (Nair et al., 2022); organisation context elements such as firm size (Dirgiatmo, Abdullah, & Ali, 2020) and owners' support (Ramdani, Raja, & Kayumova, 2022); and environment context elements such as customer pressure (Maroufkhani et al., 2020) and market scope (Ramdani, Raja, & Kayumova, 2022). Figure 1 represents the conceptual framework for this study.

3.1 Technology Context

Martínez-Caro, Cegarra-Navarro, & Alfonso-Ruiz (2020) argue that technological elements impact SMEs' adoption of technological innovations, implying that interactivity (Lew & Stohl, 2022) and cost-effectiveness (Shauri, Magaria & Masanyiwa, 2023) affects the adoption of Facebook and Instagram by fast-food SMEs in Pakistan.

3.1.1 Interactivity

The term 'interactivity' refers to the level of engagement between SMEs and potential customers on Facebook and Instagram (Kim, Chung & Fiore, 2023). Ainin et al. (2015) suggest that the interactive nature of Facebook and Instagram allows businesses to establish new connections with their customers (Ciuchita et al., 2022; Jevremovic et al., 2022).

3.1.2 Cost-Effectiveness

The concept of cost-effectiveness is associated with the costs of adoption (Shauri, Magaria & Masanyiwa, 2023). According to Wibawa et al. (2022), Facebook and Instagram have been considered cost-effective for SME marketing as creating an account is free, quick, and provides a cheaper way to advertise. Pradifera et al. (2022) noted that Facebook and Instagram enables SMEs to market their products at a low cost.

3.2 Organisation Context

Organisational resources and characteristics play a crucial role in the adoption of technological innovation (Hashmi & Siddiqui, 2020). Firm size (Bharati, Zhang, & Chaudhury, 2015; Borgi, 2023) and owner support (Wamba & Carter, 2016) are among the key organisational elements that are expected to influence the adoption of Facebook and Instagram among fast-food SMEs in Pakistan.

3.2.1 Firm Size

Borgi (2023) opines that the flexible nature of SMEs enables them to adopt technological innovations regardless of their size. Mohammed et al. (2023) suggest that firm size does not act as a barrier in Facebook and Instagram adoption among businesses. Dirgiatmo et al. (2020) assert that SMEs adopt Facebook and Instagram regardless of their size.

3.2.2 Owners Support

Creating a supportive environment and providing resources for the adoption of technological innovations in businesses requires the crucial support of owners (Lawal & Adejuwon, 2023). In Thailand, Rhee, Park & Shin (2020) find that owner support is important for the adoption of technological innovations in businesses. Effendi et al. (2020) discover that owner support influences the adoption of web 2.0 technologies in businesses. Tajudeen, Jaafar, & Ainin (2018) report that owner support influences the adoption of Facebook and Instagram in SMEs.

3.3 Environment Context

External circumstances in which businesses operate influence the adoption of technological innovations (Srivastava et al., 2022). Environment elements, including customer pressure (Tajudeen, Jaafar, & Ainin, 2018) and market scope (Ramdani, Raja, & Kayumova, 2022), are suggested to affect the adoption of Facebook and Instagram among SMEs.

3.3.1 Customer Pressure

Customer pressure continues to influence SMEs in adopting technological innovations to meet customer demands (Ur Rahman et al., 2020). Al-Qirim (2007) found that customer pressure drove SMEs in New Zealand to adopt e-commerce. Maroufkhani et al. (2020) suggest that customer pressure affects the adoption of Facebook and Instagram, as most SMEs adopt these platforms to satisfy their customers.

3.3.2 Market Scope

The proportion of an enterprise's operational scope that has been local, regional, and/or international has been referred to as market scope (Ramdani, Raja, & Kayumova, 2022). Erind (2015) found that SMEs market scope has been enhanced with the adoption of technological innovations.

3.4 Marketing Performance

Ali Abbasi et al. (2022) argue that adopting Facebook and Instagram in marketing enhances SMEs' marketing performance. It is expected that the adoption of Facebook and Instagram enhances brand awareness (Hermina, Rahma & Gusnia, 2021) and customer buying interest (Curana et al., 2022).

3.4.1 Brand Awareness

Ananda & Wisudawati (2022) assert that the adoption of Facebook and Instagram by businesses enhances brand awareness among customers. Khanam, Al-Zadid & Ullah (2023) opine that Facebook and Instagram strengthens a brand reputation. Kalkautsar & Listiani (2022) assert that SMEs enhance their brand awareness through the adoption of Facebook and Instagram in marketing.

3.4.2 Customer Buying Interest.

Adopting social media in marketing positively influences interest in purchasing business products (Eman, 2022; Erdiyana, 2022). Ananda & Wisudawati (2022) opine that adopting Facebook and Instagram in marketing

enhances customer buying interest. Asi & Hasbi (2021) assert that Facebook and Instagram increase customers' interest in buying products.

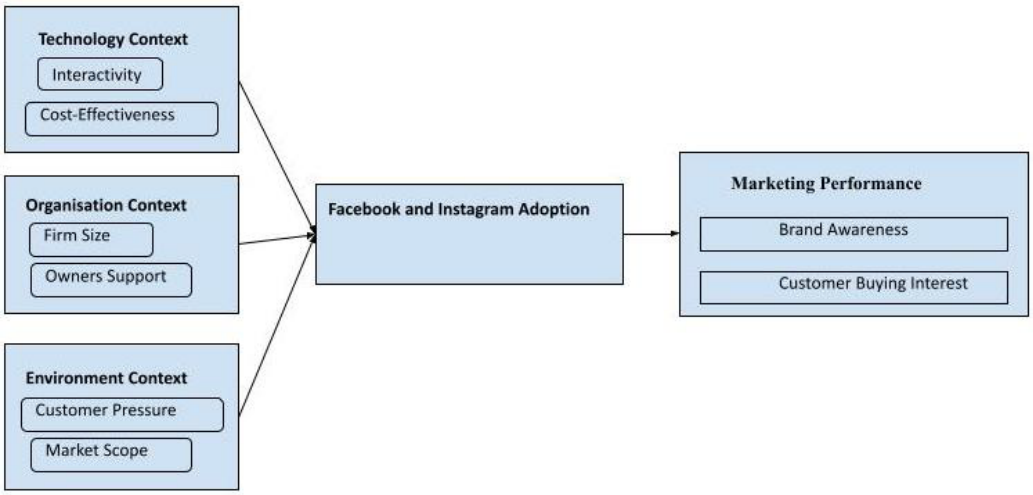

Figure 1: Framework for the Adoption of Facebook and Instagram in Marketing Performance.

4. Methodology

Researchers commonly use semi-structured interviews (Tonaka, 2015) to gather interview data. Castillo-Montoya (2016) claims that following an interview schedule (see Appendix 1) for semi-structured interviews achieves rigour and reliability. We interviewed thirty fast-food SME owners in Lahore, Pakistan, using a semi-structured interview schedule to examine personal accounts and analyse their perspectives (Kallio et al., 2016). Gudmundsdottir & Brock-Utne (2010) argue that piloting is advantageous because it increases the validity and dependability of a study. We piloted the study with an academic, a context specialist, and an SME owner to prepare for handling jargon, justifying questions, and facilitating smooth conversation. Braun & Clarke (2022) adopt a thematic approach to analyse the data collected through interviews. We conducted thematic analysis on interview data from thirty fast-food SMEs selected through purposive sampling via Facebook and Instagram marketing (Kumala & Sijabat, 2022) with fewer than 250 employees classified as SMEs by SMEDA and registered as an SME with the Securities and Exchange Commission of Pakistan (SECP). After rigorous reading and analysis of interview transcriptions, we identify the themes and sub-themes. We use NVivo 12 plus, qualitative software, to identify key themes for data analysis (Maher et al., 2018). We conduct member checking with study participants to ensure clear and unbiased data interpretations, validate responses, and assess transcribed interview data (Levitt et al., 2017; Yin, 2018). We code the interview transcripts as potential interpretations and investigate themes to present the findings (Corbin & Strauss, 2008; Guest, MacQueen & Namey, 2012).

5. Findings

SMEs in developing countries utilise Facebook and Instagram as a means to interact with customers, receive feedback, and respond to inquiries. These platforms are preferred due to their cost-effectiveness, allowing SMEs of the developing countries to maximise their marketing efforts with limited resources and reach their target audience at a lower cost. Firm size is not an important element in the adoption of these platforms for marketing. However, the owner's support and customer pressure play crucial roles in their adoption. The study highlights the case of fast-food SMEs in Pakistan who use Facebook and Instagram to expand their market scope. Moreover, these platforms enhance brand awareness and generate customer interest in purchasing products.

6. Discussion

SMEs owners in developing countries recognise the importance of leveraging Facebook and Instagram as a means of interacting with customers. The work of Ciuchita et al. (2022), and Jevremovic et al. (2022) supports this finding, emphasising the interactive capabilities of social media platforms to foster new connections and open two-way communication channels between SMEs and customers. SME owners in developing countries perceive the adoption of Facebook and Instagram in their marketing efforts as a cost-effective strategy. This finding corroborates Kusumadewi et al. (2022), Sangi, N., Shuguang, L., & Sangi, A. R. (2018), and Wibawa et al.

(2022), who argue that the financial implications of utilising social media platforms for business marketing are relatively low. SME owners in developing countries do not view firm size as an integral element when considering the adoption of Facebook and Instagram for marketing. These findings align with the perspectives of Dirgiatmo et al. (2020) and Mohammed et al. (2023), who argue that business size is not a hindrance to social media adoption. SME owners consider their support as critical in their decision to adopt Facebook and Instagram for marketing purposes. This viewpoint is shared by Effendi et al. (2020) and Rhee, S. Y., Park, J., & Shin (2020), who contend that owner support is a key element in the adoption of technological innovations among SMEs. SMEs in developing countries place significant emphasis on customer pressure as a driving force behind their decision to adopt Facebook and Instagram for marketing purposes. These findings align with the assertions made by Al-Qirim (2007) and Maroufkhani et al. (2020), who suggest that SMEs are inclined to embrace social media as a response to customer pressure. We discover that market scope holds great importance for SMEs in developing countries when deciding to adopt Facebook and Instagram for their marketing endeavours. These findings are consistent with the viewpoints of Erind (2015) and Ramdani, Raja, & Kayumova (2022), who state that the integration of technological innovations has the potential to broaden the market scope of SMEs. Our research reveals that the use of Facebook and Instagram enhances the brand awareness of SMEs. This finding is supported by the assertions made by Ananda & Wisudawati (2022) and Kalkautsar & Listiani (2022), who believe that social media adoption in marketing is effective in enhancing brand awareness. Our research findings suggest that the adoption of Facebook and Instagram has a favourable impact on the customer interest in buying SMEs' products. These findings corroborate Eman (2022), and Erdiyana (2022), who assert that social media adoption in marketing enhances customer buying interest.

7. Conclusion

We extended the theoretical base of the TOE framework to analyse Facebook and Instagram adoption among fast-food SMEs in Pakistan, and recommend that SMEs in Pakistan and other developing countries adopt these platforms to enhance marketing performance. Future research can compare the importance of Facebook and Instagram in other developing countries, and explore the adoption of other social media platforms and their impact on marketing performance.

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Appendix 1 (Interview Schedule)

General Information (SME background)

1. **Could you please tell me about your enterprise's background?**

- *How long have you been in the business of fast-food?*
- *What is your role in the enterprise?*
- *What are your main products?*
    - *How many employees do you have?*
    - *Who is your target audience (s)?*

2. ***How do you perceive Facebook and Instagram for business marketing?***

- *How long have you been using Facebook and Instagram?*
- *Why did you decide to use Facebook and Instagram in marketing?*
- *How often do you use Facebook and Instagram for marketing purposes?*
- *How has the usage of Facebook and Instagram affected your business marketing?*
- *How effective is Facebook and Instagram in marketing?*

Technology Context

3. **What technology elements influenced the adoption of Facebook and Instagram in marketing your business?**

- *Do you think Facebook and Instagram enable interaction with customers? Did it influence the adoption? If so, how?*
- *Do you think Facebook and Instagram are cost-effective for marketing? Did it influence the adoption? If so, how?*

Organisation Context

4. **What organisation elements influenced the adoption of Facebook and Instagram in marketing your business?**

- *Do you think your firm size influenced the adoption of Facebook and Instagram in marketing? If so, how?*
- *Do you think that as a business owner, your support influenced the adoption of Facebook and Instagram in marketing? If so, how?*

Environment Context

5. **What environment elements influenced the adoption of Facebook and Instagram in marketing your business?**

- *Do you think pressure from customers influenced the adoption of Facebook and Instagram in marketing? If so, how?*
- *Do you think market scope influenced the adoption of Facebook and Instagram in marketing? If so, how?*

Marketing Performance

6. **Did the adoption of Facebook and Instagram impacted the marketing performance of your business?**

- *Did the adoption of Facebook and Instagram enhance brand awareness? If so, how?*
- *Did the adoption of Facebook and Instagram enhance customer buying interest? If so, how?*

The Impact of COVID-19 on e-Commerce Through a Systematic Review

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Abstract: The novel coronavirus (COVID-19) has changed the world in a catastrophic way. The impact of COVID-19 brought in regulative measures such lockdown and human movement restrictive regulations; safety precautions needed to be put in place to help people stay safe from the virus infection. Some of the regulation included limiting traveling and implementing lockdown. The business sector was heavily affected and needed a solution immediately. The supply chain needed to continue to function hence the application of e-commerce was the most lucrative opportunity. The purpose of this study was to determine the impact of COVID-19 on e-commerce, both the negative and positive impacts were considered for this study. The suitable and utilised research approach for this study was the systematic review known as the PRISMA Protocol (PRISMA-P). Qualitative research method was chosen for this research paper, using search strings on the Emerald database to collect data. 50 Journal articles from the Emerald Insight database search were identified, these articles were further screened by analysing the title and abstract of the articles to assess their eligibility to be included in the study final analysis. After the eligibility criteria and exclusion process, 4 article were fully assessed and included in the study. This process of exclusion was done through the Mendeley website and the captured in the PRISMA flow diagram. The research findings indicate a correlation between the proliferation of the COVID-19 pandemic and the profitability of businesses conducting online transactions. Findings further indicate that COVID-19 improved digitisation, online shopping, and sales. In conclusion, this study has shown ways in which the e-commerce industry benefited from Covid-19, highlighting on the increase in sales and the use of digital platforms. Also, the novel coronavirus led to the increased digitisation of business processes and services.

Keywords: COVID-19; e-commerce; digitisation; online shopping; online services; systematic review.

1. Introduction

Setting clear objectives for studies has grown more important for scientists during the last two decades (Mele, Russo-Spena & Kaartemo, 2021). Identifying and defining knowledge gaps in the research issue determine the development of a study topic (Gummesson & Mele, 2010). Although researchers adhere to the standards set by their predecessors, the format of research papers might change in response to events on a global scale (Finsterwalder & Kuppelwieser, 2020)

The pandemic first came to existent in China late December 2019 and slowly became an epicentre in China to USA, eventually to Europe which has now killed countless people for years (Inzamam Ul Haqand &Tahir Mumtaz Awan, 2020). The magnitude of the pandemic was huge as there were more than 159 million conformed cases and 3.3 million deaths has occurred throughout the globe (Chiara, Paolo, & Mario, 2021). The rapid global spread of the COVID-19 pandemic has a significant impact on how organisations conduct their day-to-day operations due to the social distancing enforce by countries worldwide (Brown & Arnholz, 2020). The global pandemic pushed businesses to move faster toward digital operations as a result of the limitations they faced. Business owners needed to rethink their approaches to trade in light of the Fourth Industrial Revolution and the global pandemic and consider e-commerce as a means of business continuity (Mele et al, 2021). E-commerce has been a commodity when businesses are planning to move into a new market (Al-Khalidi Al-Maliki, 2021). It is very cheap and easier which has led to improvement of value chains and operations (Al-Khalidi Al-Maliki, 2021). It has created a new era where business strategies are shifted from traditional trade to more focused advance technology trade (Alzahrani, 2018). Some people refer to e-commerce as simple conducting business online, but a more fitting description would be a platform that allow business to sell products through the internet and communication technology (Alzahrani, 2018). With the development of COVID-19, e-commerce became the top choice for people making purchasing selections to avoid getting the virus or adhere to national restrictions and lockdowns (Al-Khalidi Al-Maliki, 2021).

This report presents the results from a systematic review of the impact of COVID-19 on e-commerce, conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis reporting guidelines (PRISMA). The PRISMA model is used to determine the smallest set of items that need to be examined, as stated

by Kaur, Sood, & Grima, (2022). This article will firstly state the research aim and objective, the literature review, followed y the research design and methods section, the limitations of the study will be discussed followed by the results and discussion and finally the conclusion and the reference list.

2. Research aim and objective

E-commerce will be more crucial in the future as the world continues its transition towards the fourth industrial revolution, COVID-19's restrictions on enterprises have increased the importance of e-commerce for future success. This study aims to analyse whether COVID-19 presented new opportunities for companies to invest in digital aids for e-commerce and the challenges that businesses had to face during the COVID-19 pandemic. While online shopping has been around for quite some time, it has become more commonplace lately which has sparked the interest in e-commerce. This kind of investigation is often backed by a qualitative method. Its primary goal is to get a fresh understanding of pressing challenges and the potential of e-commerce. The studies objectives were:

- The impact of COVID-19 on e-commerce.
- The limitations that covid imposed on businesses.
- Mention the benefits of covid-19 on e-commerce.

To accomplish these three objectives, the researchers provided a historical framework for understanding COVID-19, its impact on e-commerce and defined definitions and their significance. This research paper aims to introduce the research topic by conceptualising the key terms; COVID-19 and e-commerce, provide literature findings that other scholars have discovered based on the impact and benefits of COVID-19 on e-commerce, furthermore outline the research design that was utilised to collect and analyse data, present results that have been extracted from selected and fully analysed articles, lastly provide a discussion of the findings of the impact and benefits on COVID-19 that the researchers have identified.

3. Literature Review

During the COVID-19 period, there was a surge in the number of transactions that took place online, which enabled businesses to keep in touch with both their customers and their suppliers. Companies used e-commerce in place of more conventional ways of product distribution as those options became unavailable (Mele et al, 2021). There is mounting evidence to show that the advent of COVID-19 corresponds with the emergence of e-commerce.

The global economy has entered the deepest recession since Globe War II as a direct result of the devastating impact that the COVID-19 outbreak has had everywhere in the world (World Bank, 2020). U.N. Economic Commission for Europe (2022) reports that the COVID-19 pandemic hindered economic global economic activity throughout global commerce, supply networks, and labour markets. This trend has been hastened by the COVID-19 pandemic, as many workers were forced to self-isolate or work from home and internet shopping, healthcare, communication, and education have become the "new normal" (Edvardsson & Tronvoll, 2021). This has an impact on demand and creates uncertainty in the supply chain for the e-commerce (Elsayed, 2022). More people have utilised digital tools in COVID-19 since these technologies provided several people to engage with one another. On the other hand, given that engagement has traditionally been tied to face-to-face contacts, it has hampered some fundamental components of connection in B2B contexts (Gereffi, 2020).

According to (Nakhate and Jain, 2020) the word e-commerce refers to any kind of commercial transaction that includes the movement of information over the internet. E-commerce refers to the use of electronic transact and/or commercial transactions that include the exchange of values or services. Furthermore, electronic commerce (e-commerce) refers to the exchange of products and services and the transfer of money or data on a digital network such as the World Wide Web. These transactions might be B2B (Business to Businesses), B2C (businesses to consumers), C2C (consumer to consumers), or C2B (consumers to businesses) (Kaur et al., 2020). In a recent report, the World Trade Organization (WTO) said that now is the moment for e-commerce to rescue the global economy, and that the WTO should step in with full force to demonstrate e-significance commerce's and efficacy in the realms of trade and online purchasing (WTO,2020).

4. Research design and methods

The systematic review research approach known as the PRISMA Protocol (PRISMA-P) was used in this study. During the research investigation, the most recent revision of the PRISMA 2020 approach was taken into

consideration. The Prisma protocol is a method developed within the medicine domain now used by other fields. Within the sphere of information and knowledge management, the PRISMA protocol is seen as a system that functions as an instrument that helps in decision making (Chlomoudis, Konstantinou, Kostagiolas & Pallis, 2022). According to (Ashiq, Usmani & Naeem, 2020) further emphasis on the fact that the procedure assists writers with reporting systematic literature review and meta-analysis. A flowchart known as the Prisma flow diagram was used to sift through all the available literature in order to locate relevant facts. The identification, screening, and eligibility checks were incorporated in the filtering process (Ashiq, Usmani & Naeem, 2020). This study takes a purely qualitative method throughout. Within the period of 2019-2022, the topic “how COVID-19 impacted e-commerce" was utilised to collect data from the Emerald Insight database.

This study used pragmatic paradigm to practically investigate the impact of COVID-19 on the e-commerce industry. The scientific method and a structuralist orientation are characteristics of older approaches, whereas naturalistic techniques and a freewheeling attitude are characteristics of contemporary practices. Pragmatism is a paradigm that promises to bridge this gap between the two (Creswell 2013). The PRISMA procedure was used to conduct systematic reviews to search the Emerald database for relevant Journal articles, and then that information was analysed to determine the extent to which online commerce had benefited or been hindered by the COVID-19 pandemic. Throughout the investigation, inductive reasoning was applied to bolster the reliability of the findings. The study utilised the PRISMA procedure to obtain high-quality textual data from the Emerald database and conducted qualitative research. Multiple scholarly publications were analysed, however only data from a specific period was used for the analysis in this research. A selected sample of academic, peer-reviewed publications in the fields of Information and Knowledge Management were used in the study.

The criteria for the included papers were determined using a PRISMA diagram. The utilisation of Boolean search strings; "E-commerce" AND "benefit" AND "COVID-19" yielded many results from the preferred database. Duplicates were removed from the submitted articles. Full-text articles containing relevant textual information were used as the criterion for article eligibility. The study used 50 of the sources found to be eligible to do the research, this was completed using a data extraction form which consisted of an eligibility criterion for exclusion and inclusion of data sources (Figure 1). Based on our in-depth analysis of each article, the researchers identified 4 articles from the Emerald Insight database as suitable for inclusion in the study (as shown in the figure 1: PRISMA flowchart). Additional papers that presented an accurate characterization of the issues related to the topic and understanding were also included into this study.

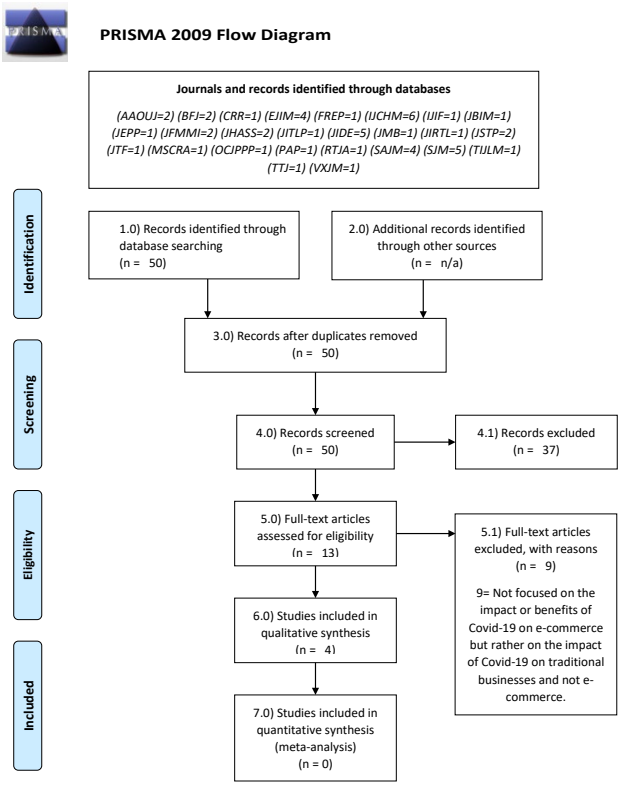

Figure 1: PRISMA Flow diagram for Knowledge Management Capabilities during 2019-2020 (adapted from Moher, Liberati, Tetzlaff & Altman, 2009).

Some sources were excluded from the data analysis as they were irrelevance to the research aim and objective. The method of qualitative research was chosen for this investigation. Qualitative research is a special study encompassing a wide range of sectors, topics, and problems.

The research strategy carried out in this study the was done in English because the relevant material is only accessible in that language. The period that was examined was from 2019 to 2022. The Emerald database used Open Access, a free and open-source software application that facilitates the administration, organisation, and processing of literary data for any purpose (Zotero, 2019). When doing any literature searches, the researchers made sure to include the terms "e-commerce," "benefit," and "COVID-19" whenever possible within the title and abstract sections of the research.

This investigation was limited to the Emerald database; consequently, the researchers moved on to a more extensive search by permitting Open Access publication. In addition, there was a limitation within the period of 2019 to 2022, which should be mentioned here. The presented results are based on articles that were published in academic journals. No constraints were placed on the documents based on the nations in which they were published. This was done so that the literature evaluation would not exclude significant research.

4.1 Limitation of the study:

- The research was conducted on a single database.
- Conducted in the years between 2019-2022.
- Could lead to biased results based on the time period it was conducted.

Though there were constraints, the PRISMA methodology was helpful in producing the desired results. The Mendeley reference management application was used to store all of the data, and both virtual and in-person meetings were organised to guarantee participation from all team members.

5. Results and discussion

The study question that was posed was as follows: "In what ways has COVID-19 impacted e-commerce?" After conducting the analysis of the papers that were obtained from the Emerald database, the results are presented in this section. The bibliometric method outlined in the Research Methodology Section was used to arrive at the findings of this investigation, which may be seen below. The findings were obtained by searching the Emerald database for papers on topics such as COVID-19 and e-commerce.

As shown in Figure 2 below, studies that were included in the findings of the paper amounted to 4 articles. By making use of an excel spreadsheet, the articles there thoroughly assessed using characteristics that determine the type of each article and the findings that articles contains which were distinguished by different colours and categorised according to their colours.

Table 1: Study characteristics for each study (final 4 articles) from which data was extracted.

	ARTICLES			
Study characteristics	A cross-cultural analysis of the motivation factors and profitability of online wine tastings during Covid-19 pandemic	Evaluating the customers' dining attitudes, e-satisfaction and continuance intention toward mobile food ordering apps (MFOAs): evidence from Bangladesh	Impact of e-banking service quality on e-loyalty in pandemic times through interplay of e-satisfaction	Understanding motivations to use online streaming services: integrating the technology acceptance model (TAM) and the uses and gratifications theory (UGT)
Citation	Szolnoki, G., Lueke, M.N., Tafel, M., Blass, M., Ridoff, N. and Nilsson, C. (2021), "A cross-cultural analysis of the motivation factors and profitability of online wine tastings during Covid-19 pandemic", British Food Journal, Vol. 123 No. 13, pp. 599-617. https://doi.org/10.1108/BFJ-04-2021-0438	Al Amin, M., Arefin, M.S., Sultana, N., Islam, M.R., Jahan, I. and Akhtar, A. (2021), "Evaluating the customers' dining attitudes, e-satisfaction and continuance intention toward mobile food ordering apps (MFOAs): evidence from Bangladesh", European Journal of Management and Business Economics, Vol. 30 No. 2, pp. 211-229. https://doi.org/10.1108/EJMBE-04-2020-	Camilleri, M.A. and Falzon, L. (2021), "Understanding motivations to use online streaming services: integrating the technology acceptance model (TAM) and the uses and gratifications theory (UGT)", Spanish Journal of Marketing - ESIC, Vol. 25 No. 2, pp. 217-238. https://doi.org/10.1108/SJME-04-2020-0074	Ul Haq, I. and Awan, T.M. (2020), "Impact of e-banking service quality on e-loyalty in pandemic times through interplay of e-satisfaction", Vilakshan - XIMB Journal of Management, Vol. 17 No. 1/2, pp. 39-55. https://doi.org/10.1108/XJM-07-2020-0039
Sample size	After first conducting 40 in-depth interviews in Germany, a global online poll was launched with 1,423 wineries from more than 40 countries, yielding a 14% response rate.	The respondents received 580 questionnaires in all. 277 replies were given in response to these. A total of 250 respondents (43.10% response rate) were retained for data analysis after the incomplete replies were discarded	A local email and messaging marketing company sold the information on 3000 account holders. A total of 1,102 responses were submitted; 976 of them were judged suitable for further study, and the other 126 were rejected because they were unfinished.	More than 10,000 students, both full-time and part-time, were enrolled in this institution and had willingly agreed to receive requests to take part in academic studies. There were 491 respondents that finished their survey.
Research methodology	Qualitative approach, Quantitative approach	Qualitative research method	Qualitative research methodology	Qualitative research methodology
Benefits of e-commerce during covid-19	Customer loyalty - Increase implementation of OWT - Positive impact - Increase in brand awareness - New consumer acquisition - Direct sales increases	Positive impact - E-commerce benefits - Operational benefits - Relational benefits - Customer health benefits	E - Banking satisfaction - E - Banking loyalty - Customer service support - Relational benefits - E-Banking service quality - Increase in digital banking usage	Consumer benefits - Site commitment - Impulsive use of online services - Positive impact
Impact of covid-19 on e-commerce	Negative impact - Innovation - Profitability - Challenges of OWTs - Green and	Covid-19 impact on online purchases - Improved online experience -Consumer behaviour	Privacy and security - Reliability - Website design - Website design	Covid-19 impact on online streaming services - Consumer behaviour
Indusrty in which the research was conducted	Online Wine Tasting	Mobile food ordering apps (MFOAs)	Electronic banking	Online streaming services

The findings of the research indicate that there is a correlation between the proliferation of the COVID-19 pandemic and the profitability of businesses that conduct their transactions online. The fact that these findings are only dependent on the PRISMA procedure is a constraint on the study. These conclusions are also based on research that was done during the last two years, which implies that there was no proof presented earlier or previously. The PRISMA protocol results were evaluated with the use of the Vos viewer data visualisation tool, which uncovered the recurring phrasing across the 4 articles that were ultimately chosen.

5.1 The benefits of COVID-19 on e-commerce

5.1.1 Increase in the use of digital platforms globally

Due to the abrupt speed that COVID-19 spread around the globe, there was a chance that e-commerce may be utilised as a replacement for traditional commerce. E-commerce created a setting in which traditional company processes might continue to perform normally. The abrupt and unexpected event was treated as a lockdown, and it was enforced to ensure the safety of the customers. However, the implementation of the lockdown caused individuals to experience disorientation, and they needed some kind of diversion (Camillerim & Falzon, 2020). COVID- 19 lockdown restrictions resulted in a large number of individuals making use of online platforms, and this prompted firms to be obliged to modify their business models.

5.1.2 Increase in revenue generated in the e-commerce

Depending on the provider the e-commerce platform may either be provided at no cost or for a price. The cost of providing the free version is often covered by advertising. As a greater number of consumers utilise these platforms, there will be a rise in the number of advertising corporations that invest, which will result in an increase in income (Camilleri & Falzon, 2020). The paid price that some requested during the period of covid increased as a result of the fact that people were beginning to rely less on conventional media (Camilleri & Falzon, 2020).

5.1.3 The increase in Customers loyalty for organisations and brands

The level of satisfaction that a customer felt after using one of these platforms was directly correlated to their level of brand loyalty. Convenience is the name of the game when it comes to retaining existing consumers and winning over new ones. The consumer was able to continue using the platforms since the applications could be utilized in an easy and intuitive manner (Al Amin et al., 2021). The usage of the e-commerce platform was strengthened as a result of the experience of the customer (whether C2C or B2B).

5.1.4 Increase in brand exposure for digitally strong brands

Using e-commerce, businesses were able to significantly expand their brand exposure (Szolnoki, Lueke, Tafel, Blass, Ridoff & Nilsson, 2021). E-commerce platforms, such as social media platforms like Facebook, Instagram, or YouTube, were used because businesses made significant investments in these platforms and were able to cultivate relationships with their clientele as a result (Camilleri & Falzon, 2020). Since the vast majority of customers utilized these platforms to amuse themselves, companies saw an opportunity to communicate with customers.

5.2 Negative impact of COVID-19 on e-commerce

The data were taken from four separate journals covering four distinct industries, each of which was quite different from the others. The emphasis of each section of the publication was on a different aspect, such as online gambling, wine sampling, online banking, and online food delivery. Each research that was looked at gave results that were quite comparable to what everyone was experiencing throughout the pandemic. All these studies had one thing in common, and that was the urgent need to modify the standard operating procedure of the company to ensure that it can continue to thrive in the current climate. Because individuals were required to remain inside their houses to maintain social distance, business operations were negatively impacted (Al Amin et al., 2021). It was possible to do business, but only on the condition that all transactions be made online, and restaurants were permitted to remain open, but solely for the purpose of delivering customers' orders (Szolnoki et al., 2021). Financial institutions were obliged to spend more money on their online platforms due to the tourist industry being entirely shut down and there was a fear of being infected via contact, (Szolnoki et al., 2021). As a result, the wine tasting session was moved to an online wine tasting (OWT) (Ul Haq and Awan, 2020).

The pandemic distorted the online retail industry's supposed triumph. There was already a perception among consumers that virtual reality platforms couldn't compete with the real thing; this suggests that after the pandemic is over, VR and AR will be left in the dust (Szolnoki et al., 2021). Demand for certain e-commerce platforms has increased rapidly, which has ramifications since some systems cannot accommodate a high number of customers. This, in turn, led to client discontent since their concerns were not remedied; for example, banking systems lost customers and produced irritation, resulting in dissatisfaction (Ul Haq and Awan, 2020). Even though e-commerce provided an alternate answer for companies, they nonetheless suffered due to the constrained operations it enforced. Due of these problems, the company, and restaurants in particular, lost a lot of money (Al Amin et al., 2021).

6. Conclusion

This research aimed to determine whether COVID-19 presented new opportunities for companies to invest in digital business for e-commerce and the challenges that businesses had to face during the COVID-19 pandemic. The study utilised the PRISMA technique as research strategy to address the above-mentioned research aim or objective. Due to its ability to filter out irrelevant information, the PRISMA technique was used in this study, a PRISMA protocol was used to screen secondary data sources and determine the most suitable articles to be analysed for the results presented. The results from the data analysis revealed that the common outcomes of e-commerce regardless of the industry catered through site commitment, impulsive use of platforms, consumer benefit and conveniency. Covid-19 brought many changes which enabled the e-commerce industry to adjust their systems which catered for the changes brought, and so this led to Improved online services and consumers leaning more toward using the platform rather than the traditional methods of buying and selling products. The results of this research demonstrate the positive effects of Covid-19 on the e-commerce sector, with particular emphasis on sales growth and the increased use of digital channels, the increase in the utilisation of digital platforms and services was influenced by the restrictions that businesses had to put in place due to the global pandemic. This enabled most e-commerce companies and traditional to further improve their online offering using new advanced technologies and AI applications to improve their services.

Given the benefits that Covid – 19 had on the e-commerce industry, it also impacted the e-commerce industry negatively, online transactions placed customers and companies' information at a risk of cyber-attacks. Furthermore, another negative impact the Covid-19 imposed on the e-commerce industry was through digitising services that require physical meeting, e.g., wine tasting, wine tasting is a form of an event that require individuals to get together or meet physically thus resulting in customers being reluctant to make use of the services because the experience would not be same. In conclusion, key recommendations are to encourage the development of cutting-edge strategies and technologies for improved online services, making it possible for offline and online elements to be seamlessly integrated. Lastly, it is recommended that future research should be conducted on the strategies and tools for data privacy and security in the e-commerce environment post COVID-19.

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Corporate Responsibility for Digital Innovation: A Systematic Review of the Literature

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Abstract: The digital transformation of the economy and society is fundamentally changing the possible value creation processes of companies. These changes increasingly involve the processing of personal data into information and knowledge that can be used to create individualised user experiences or gain insights from aggregated data. Customer relationships and the interconnectedness of customers are similarly changing as a result of this digital transformation. As customers become more demanding and involved, voluntary activities that go beyond compliance and regulation are becoming increasingly important. At the same time, companies are increasingly recognising the potential of privacy-friendly goods and services. They are using the heterogeneity of their offerings to develop unique selling propositions that focus on fulfilling their digital responsibilities (e.g., Apple, Samsung). In this way, digital responsibility fosters innovation in goods, services and digital markets. The voluntary responsibility of companies in dealing with digital technologies and creating value from data is discussed under the term 'corporate digital responsibility' (CDR). This young field of research has its origins in the study of corporate social responsibility (CSR) and is often discussed in that context. However, with the growing importance of digital responsibility for organisations and the proliferation of related activities, it is increasingly establishing itself as a discipline in its own right. Correspondingly, research on CDR has also seen a sharp increase in the number of publications since 2019. The paper evaluates existing research approaches in a systematic literature review. It highlights definitional approaches, approaches to describing the entrepreneurial motivation for CDR activities and their consequences for corporations, their business relationships and society. Further, the paper identifies research gaps of CDR and provides a basis for further research. This paper shall also serve as a starting point for organisations to establish their own efforts in this area, as well as for the evaluation of existing activities.

Keywords: Corporate Digital Responsibility, Digital Ethics, Data Ethics, Data Protection, Digital Transformation

1. Background, relevance and objectives

Corporate Digital Responsibility (CDR) has become an increasingly important concept in business practice and research. It was taken up at the political level in 2018 by the German Federal Ministry of Justice and Consumer Protection. In the course of this, an initiative was set up that meets at regular intervals and companies such as Deutsche Telekom, Otto Group, Telefonica and Zalando published their first CDR Reports in 2022 (Pick & Knopf, 2023). In parallel to the ministerial initiative, researchers from various disciplines have dealt with the term. While the first publications can be found in 2016 to 2017, the frequency of publications has increased since 2018.

Some researchers consider CDR to be a crucial aspect of corporate social responsibility (CSR) in the digital age (Herden et al, 2021; Wade, 2020). Other researchers define it as a field of study in its own right that emerged from CSR (Lobschat et al, 2021; Mihale-Wilson et al, 2022) and digital ethics (Mueller, 2022; Wallimann-Helmer et al, 2021). Companies are increasingly aware of their digital responsibilities and the need to harmonize business practices with sustainability and social responsibility principles (Janiszewska-Kiewra, 2020; Yokoi et al, 2023). CDR emphasizes the discretionary and self-governed aspect of business dedication to ethical digital advancements, employing the established concept of CSR as a guiding structure. Simultaneously, this issue creates unique links between the notions of corporate responsibility and digital innovation (Trittin-Ulbrich & Böckel, 2022). The relevance of the topic in the context of data processing, especially through artificial intelligence, can be emphasised (Ashok et al, 2022; Elliott et al, 2021). CDR is multidisciplinary, involving areas such as information technology, business ethics, social responsibility, privacy and security.

Increasing regulation around data security and privacy further highlights the importance of CDR (e.g., European General Data Protection Regulation, ePrivacy Regulation, Data Act, AI Act). Many jurisdictions have introduced laws and regulations governing the responsibilities of businesses in their digital practices and data management. Companies that fail to comply can expect severe financial penalties and reputational damage.

In summary, CDR is a key challenge for companies to meet sustainable and responsible expectations. While the conceptualisation of CDR is progressing (Mueller 2022) and some researchers are beginning to explore the field industry-specific (Liyanaarachchi et al 2021; Weber-Lewerenz 2021; Wirtz et al, 2023) and empirically (Carl et al 2023; Merbecks 2023), there is still no clear, unified definition. This provides challenges for research and practice.

Some researchers have already conducted literature reviews on CDR. Londoño-Cardozo & Paz (2021) examined works that appeared up to 2019 addressing the emergence of CDR from CSR. Wallimann-Helmer et al (2021) focus on a related term of "Digital Ethics". Yadav & Noida (2022) are the first to systematically list existing CDR concepts. However, the literature overview does not provide a content analysis of definitions of CDR. Thus, with our work we intend to close that research gap. The most recent systematic review by Bednárová & Serpeninova (2023) provides a list of definitions. They focus on artificial intelligence in their work and thus direct their attention to the CDR aspect of data processing, which can include recording, collecting, storing, analysing, accessing, disclosure and transfer of data (Pick & Knopf, 2022). For manifold reasons we consider an additional systematic literature review to be necessary. The authors only searched for "corporate digital responsibility". We consider a more comprehensive keyword collection. Further, the authors noted that many publications are created in Germany. We assume that there is also a larger body of German-language literature on this topic. While previous systematic reviews only evaluated the literature in English, we also have the possibility to evaluate English and German definitions.

Our systematic literature review aims to provide a comprehensive understanding of the various definitions, with their conceptualizations of CDR in the existing literature. The objectives include identifying common themes and divergences, discussing the implications for theory and practice, and proposing a unified definition or framework to guide future research and implementation of CDR initiatives. The study's findings will contribute to a much clearer understanding of CDR, benefiting researchers, practitioners, and policymakers in the development and implementation of effective CDR strategies. The research question for the paper is therefore as follows:

RQ1: What definitions and underlying concepts of CDR are given in the scientific literature?

We presume that existing definitions differ in terms of (1) the scope of responsibility taken, (2) the scope of activities to address this responsibility and (3) the scope of beneficiaries of those activities. We therefore address the following question:

RQ2: Can a unified definition be reached across contexts (e.g. industries, cultures)?

2. Methodology

A comprehensive search of relevant databases was conducted to identify studies addressing CDR definitions and conceptualizations. We followed the approach from Bednárová & Serpeninova (2023) to search Scopus and Google Scholar databases but waived the Web of Science database because of its high overlap in indexed titles with Scopus (see for such analysis Singh et al 2021). In addition to the term "Corporate Digital Responsibility", we included terms that are also frequently used in the discourse. To integrate the ethical focus of the CDR, we examined "digital ethics". We also included the search prompt "Digital Responsibility" AND "Corporate" to address the limited freedom of sentence structure in abstracts. Further, we follow the arguments of Meier et al (2022) and assume that "Digital Responsibility" is also being written about outside of the corporate context and include the term as well. This also is reasonable because "Corporate" may have been substituted with other words such as "Business" or "Company". Similar to other systematic reviews on CDR, we searched with these terms in title, abstract and keywords on the Scopus database. Google Scholar searches the full text by default and a reduction to title, abstract and keywords is not possible. To make the search process as transparent as possible and not to disadvantage publications to which the database has no full-text access, we reduced the search to the title of the publications and deactivated the search option "include citations".

Basic descriptive analysis included all studies with the keywords mentioned, that were searchable on the first of May 2023. Studies were screened and full-text articles were reviewed for eligibility if they were published in peer-reviewed journals or conference proceedings and were written in English or German. We also focused on publications with the Keyword "Digital Responsibility" as of the year 2018 for this step, due to findings from the descriptive results (little overlap of "digital ethics" and "digital responsibility" but very strong overlap of the keyword with "corporate digital responsibility"). Articles published before 2018, Non-English or -German works, unpublished manuscripts, and studies that did not specifically address "Digital Responsibility" were excluded.

The PRISMA guidelines were followed for the study selection process. After removing duplicates, titles, abstracts and keywords were screened for eligibility. Full-text articles were assessed for inclusion, and the final set of studies was selected for data extraction and synthesis. For this in-depth content analysis of the articles, we selected and analysed only those that mentioned 'digital responsibility' in a corporate context and addressed the issue with definitions, conceptualisations or frameworks or empirically.

Data on study characteristics (e.g., publication year, geographic focus, study type), definitions, and conceptualizations of CDR were extracted and systematically synthesized to identify common themes and divergences.

3. Results

3.1 Study Characteristics

As mentioned, our study follows the PRISMA Guidelines. The procedure with the corresponding samples can be taken from Figure 1. The search yielded a total of 864 studies, representing a diverse range of geographies, publication years, and study types.

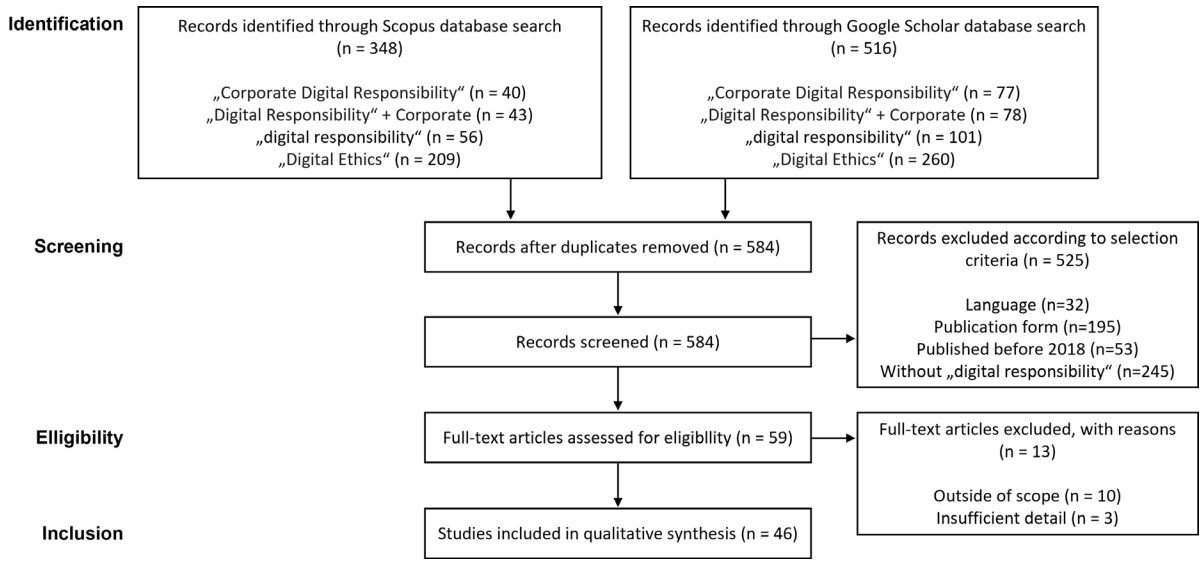

Figure 1: Records identified, selected and included for the systematic literature review (PRISMA Flow Diagram)

Most studies were published in the last five years, reflecting the growing interest in CDR. Digital ethics has been researched more seriously since 2010. Digital responsibility is a more recent field, with publications only appearing on a more regular basis since 2019. Table 1 shows this by the number of publications per year found for this paper in the Scopus database. We can comprehend that publications about “Digital Responsibility” in a business context almost always use the term “Corporate Digital Responsibility”. From this high correspondence, we assume that CDR as a term has established itself.

Table 1: Number of publications found on Scopus

Search term	2010-2015	2016	2017	2018	2019	2020	2021	2022	2023*	Sum
“Digital Ethics”	13	8	9	15	26	30	57	42	9	209
“digital responsibility”	0	1	3	0	5	1	18	18	10	56
“Digital Responsibility” + Corporate	0	0	0	0	2	1	15	16	9	43
“Corporate Digital Responsibility”	0	0	0	0	2	1	13	16	8	40
Sum	**38**	**29**	**48**	**63**	**113**	**112**	**218**	**209**	**66**	**348**

*only articles published by May 1, 2023

After removing duplicates, applying selection criteria and assessing full-text articles for eligibility, 46 Studies were included in the qualitative synthesis.

3.2 Identified Definitions of Corporate Digital Responsibility

We found four publications (Herden et al, 2021; Mueller, 2022; Bednárová & Serpeninova, 2023; Cheng & Zhang, 2023) listing a summary of definitions and included definitions that could be found in these papers and had not yet been discovered in our own research. This concerns early definitions that were mostly quoted from website articles (Dörr, 2018; Joynson, 2018; Price, 2018, Wade, 2020). Since these authors have already made an effort to harmonise their definitions, we integrated their results here (Dörr et al, 2021). In

Table 2 we summarised selected definitions of CDR from literature.

Table 2: Definitions of Corporate Digital Responsibility (Source: own compilation)

Authors	Definition
BMUV (2021)	"CDR is a voluntary corporate activity, particularly considering the consumers' perspective, which strives to go beyond what is required by law to shape the digital world for the advancement of society"
Carl et al (2022)	"CDR activities exceed the legally binding (national) minimum requirements and rather describes the voluntary acceptance of additional responsibilities"
Dörr et al (2021)	"a set of practices and behaviours that help an organisation use data and digital technologies in ways that are perceived as socially, economically, and environmentally responsible"
Driesens et al (2017)	"CDR is a voluntary commitment. It starts with the need to conform to legal requirements and standards – for handling customer data, confidential, intellectual property and so on – but it also extends to wider ethical considerations and the fundamental values that an organization operates by"
Elliott et al (2021)	"a potential collaborative mechanism to navigate such complexity, proposing guidance frameworks towards responsible corporate digital actions in preserving societal interests"; "a voluntary commitment by organisations fulfilling the corporate rationalisers' role in representing community interests to inform "good" digital corporate actions and digital sustainability (i.e. data and algorithms) via collaborative guidance on addressing social, economic, and ecological impacts on digital society"
Herden et al (2021)	"is an extension of a firm's responsibilities which takes into account the ethical opportunities and challenges of digitalization"
Huber (2022) ***Translated from German***	"Framework for action and decision-making that shows how AI risks and opportunities are to be balanced in order to meet the social responsibility of companies with regard to digital issues"; "perception of a voluntary, beyond the legally prescribed, corporate responsibility for the consequences of the development, dissemination or use of digital technologies on society as a whole, but also on the concrete individual person"
Kenning (2020) ***Translated from German***	"Extent [...] to which companies and organisations use digital technologies to achieve societal goals in the areas of ecology, economy and social issues, as well as the extent to which companies and organisations take into account aspects of data protection and data security as well as use data and digital technologies responsibly"
Leonard (2016)	"Expanding the remit of CSR to address the impact of the digital tools and environments that businesses operate in"
Lobschat et al (2021)	"the set of shared values and norms guiding an organization's operations with respect to the creation and operation of digital technology and data"
Mihale-Wilson et al (2021), (2022)	"CDR seeks to ensure an ethical and responsible development, deployment, and use of digital technologies and data", Part of the "obligations that companies have toward society"
Schymura (2018) ***Translated from German***	"Corporate Digital Responsibility is an understanding of corporate responsibility in and for a digital society. It involves a regulated and a voluntary level: on the one hand, the observance of relevant laws or directives, on the other hand, the exercise of a voluntary responsibility in shaping the digital society"
Suchacka (2019)	"CDR means the awareness of duties binding the organisations active in the field of technological development and using technologies to provide services"
Thelisson et al (2019)	"... means a kind of digital corporate social responsibility"
Trittin-Ulbrich & Böckel (2022)	"CDR emphasizes the voluntary, self-regulatory character of corporate commitment to responsible digital innovation"
van der Merwe & Al Achkar (2022)	"as the set practices, policies, and governance structures of corporations as they relate to the digital transformation"
Weißenberger & Marrocco (2022)	"CDR is a voluntary corporate orientation to ensure a responsible use of digital technologies"
Wirtz et al (2023)	"We define CDR in the context of service as the principles underpinning a service firm's ethical, fair, and protective use of data and technology when engaging with customers within their digital service ecosystem"

3.3 Common Themes and Divergences of CDR definitions

To compare and structure the given definitions, we differentiate (1) the scope of responsibility taken, (2) the scope of activities to address this responsibility and (3) the scope of beneficiaries of those activities.

On the evaluation of the scope of responsibility we use the CDR pyramid of Herden et al (2021). This structure helps to differentiate between economic, legal, ethical and philanthropic responsibility that is covered in the definitions.

To compare definitions in the scope of activities that address this responsibility, we apply the ESG framework (Environmental, Social, and Governance) and map the stakeholders that are affected by the responsibilities.

Finally, we assess if definitions mention the scope of beneficiaries of those CDR activities. For this, we use the CDR framework provided by Deloitte (2022), which considers the corporate itself, corporate relations (including customers and suppliers) and society. Focusing on individual beneficiaries could help researchers to derive motivations and companies to implement stakeholder-specific activities. Table 3 shows the evaluations according to these criteria for the definitions found.

Table 3: CDR Definitions by scope of responsibility, activities and beneficiaries (Source: own compilation)

Categories	Scope of responsibility				Scope of activities			Scope of beneficiaries		
	Eco-nomic	Legal	Ethi-cal	Philan-thropic	Enviro-mental	Social	Gover-nance	Corp-orate	Corporate relations	Society
Sum	2	11	14	5	4	8	10	3	3	6
BMUV (2021)		×	×	×		×		×	×	×
Carl et al (2022)		×	×							
Dörr et al (2021)	×		×		×	×	×	×		
Driesens et al (2017)		×	×	×		×				×
Elliott et al (2021)	×	×	×	×	×	×	×			×
Herden et al (2021)			×							
Huber (2022)		×	×			×	×	×	×	×
Kenning (2020)		×			×	×	×			
Leonard (2016)					×		×			
Lobschat et al (2021)			×				×			
Mihale-Wilson et al (2021), (2022)		×	×			×	×			×
Schymura		×	×	×						×
Suchacka (2019)		×					×			
Thelisson et al (2019)						×				
Trittin-Ulbrich & Böckel (2022)			×	×						
van der Merwe/Al Achkar (2022)		×					×			
Weißenberger & Marrocco (2022)			×							
Wirtz et al (2023)		×	×				×		×	

The review identified various conceptualisations and frameworks for CDR, including those that address the relation to CSR (as an extension or distinct field) and guidance for corporate activities. These concepts are reflected in the definitions presented. Several definitions of CDR were identified, highlighting the multifaceted

nature of the concept. Some definitions emphasise the voluntary aspect of firm behavior, which goes beyond legal aspects. While some definitions focused on ethical considerations, others emphasized the role of digital technology in addressing social and environmental challenges.

The definitions are very general in that they refer to norms. However, these are often not further defined (scope of activities). Most definitions agree that the responsibility goes beyond legal regulations (scope of responsibility) and they are based on constructs such as culture (practices and expected behaviours based on shared values), some of which are vague and in need of a further refinement (culture-relatedness).

Few definitions address the economic responsibility (be profitable). One could argue that, according to the CDR pyramid, the perception of legal responsibilities already includes economic responsibility as a fundamental requirement. Accordingly, one could conclude that definitions that emphasise voluntariness also implicitly include legal and economic responsibilities. However, differences can be found in the characteristics of this voluntariness. Most of the definitions focus on the ethical expectations of society and only a few of them describe a philanthropic attitude of the organisation.

Although ethics is a common theme, very few definitions address the scope of beneficiaries of CDR activities. Only 8 out of 18 definitions mention any beneficiaries, of which 6 refer to society, only 3 to the corporate itself and 3 to its relations. As with the scope of responsibility, we could argue that Corporate and their relations are part of society and are implicitly included by mentioning the latter. However, not explicitly mentioning individual categories of beneficiaries makes the separation of priorities difficult to comprehend and thus to evaluate activities, which could be a motivation for companies. Context-specific definitions of CDR should become more specific here.

4. Discussion, conclusion, and further research

The goal of our study was to summarize given concepts of CDR and to derive a definition. Our systematic literature review lists most relevant existing definitions, with its conceptualizations of CDR and provides a comprehensive overview of the field. The study contributes to a better understanding of CDR and its implications for research and practice by identifying common themes and divergences. We highlight several gaps in the literature, such the lack of consensus on a unified CDR definition.

Publications in the field have rarely focused on the business perspective. CDR research is still in its infancy, so it may be too early to draw reliable business implications. However, it is of paramount importance to draw implications from the research for companies' CDR policies and practices. A clearer understanding of CDR can contribute to more robust theoretical frameworks and guide the development of practical strategies for organizations navigating the digital landscape. Establishing a shared understanding of CDR is essential for developing effective strategies to address the ethical, social and environmental impacts of digital technologies.

A unified definition can guide future research, practice and policy, with researchers refining their approaches based on common themes and divergences identified in this review. Based on the findings of this review, we propose following unified definition:

> *Corporate Digital Responsibility is a voluntary commitment, beyond what is legally required, that an organisation makes to itself and to society as a whole, as well as to the individual.*
>
> *It is also a framework that guides an organisation's operations by providing a business orientation with a set of practices, behaviours, policies and governance structures based on a set of shared values and norms to achieve economic, social and environmental goals when engaging with stakeholders or shaping the digital world with responsible digital innovation for the advancement of society.*

Building on this unified definition, a comprehensive framework for CDR should encompass several key dimensions. These dimensions could be based on the ESG framework but should also take into account the individual characteristics of CDR. Empirical studies examining the scope of responsibility and activities at a granular level are needed to refine and validate frameworks. Definitions, with their conceptualizations have evolved, but are still at a rather generic level. It is difficult to generalise about the required activities and their design, as companies' business models are too diverse and their environmental, social and governance impacts are too varied, so that the requirements for companies must also be considered in a differentiated manner. More specific conceptualisations and definitions might only be possible through more context-specific adaptations (e.g. in specific industries and/or cultures). Some industries are very advanced in their digital transformation or have a long history in this field, such as retail banking, insurance and retail. Stakeholders can

be expected to be particularly interested in responsible corporate behaviour in these sectors. Simultaneously, a fine-grained CDR approach can be particularly useful for these companies to differentiate themselves from their competitors. These reflections follow another gap in the literature we found, the consideration of beneficiaries of CDR activities. When assessing CDR measures, evaluators should take those into account to better understand motivations and to distinguish whether economic, ethical or philanthropic responsibility have been taken. We attempted an initial classification of motivational factors in a first approach (Pick & Knopf, 2023). The extent to which actors benefit from activities has hardly been researched yet. These potential or given benefits need to be researched and understood to motivate more companies to conceptualize and implement their CDR approaches. For example, if firms benefit from their CDR concept and its communication in image and turnover, more firms might be motivated to apply CDR.

Continued research and collaboration among academics, practitioners, and policymakers are necessary to refine and develop the concept of CDR further. By working together, stakeholders can create a more sustainable and responsible digital future for all.

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Intelligent Organization Through the Lenses of Entrepreneurship and Project Management Approaches

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Abstract: The main research question of the paper is what is the concept of an intelligent organization as a critical area in the field of building modern socio-technological concept of organization with resiliency as its central feature. The research method is systematic literature review in the field of management and intelligent organization concept discussion in the light of entrepreneurship and project management research streams. The outcome of the research is the cybernetic and network based theoretical concept of intelligent organization. According to approach taken in the paper intelligent organization is revealing as the result of paradoxical process of effectuation and causation synthesis.

Key words: Intelligent Organization, Entrepreneurship, Project Management, Effectuation And Causation Synthesis.

1. Introduction

The purpose of the paper is to formulate a multidimensional concept of an intelligent organization in the light of the entrepreneurship and project management as two separate but also complementary management approaches. The intelligent organization area has been present in the management research literature for some years, but recently both the theoreticians and practitioners are more and more interested in this issue. Literature review shows that the roots of intelligent organization are located around the learning organization (Senge, 1997; Nonaka, 1991), very popular concept at the turn of the twentieth and the twenty-first centuries. Today, the growing importance of Industry 4.0 concept (Schwab, 2016) is changing qualitatively the learning organization concept towards complex, cyber-physical systems that are very often defined by an intelligent organization. Knowledge management and intellectual capital are two crucial aspects of learning organization area, however today it is strongly complemented by cyber-physical networks as pillar issues in the field of intelligent organization. Entrepreneurship and project management approaches, especially their combination, seems to be promising to explain the intelligent organization phenomenon. Entrepreneurship emphasizes the chaotic side of intelligent organization that is responsible for creativity, project management highlights the order side of intelligent organization that leads to its effectiveness. Explaining the phenomenon of intelligent organization authors based on a systematic literature review in the previously marked theoretical areas of entrepreneurship and project management. The following section of the paper is devoted to synthesis of research reports regarding the intelligent organization, both theoretical and quantitative/qualitative empirical studies. In the following section the concept of intelligent organization is briefly described in the light of entrepreneurship and project management. Finally, the paper regards the synthesis of entrepreneurship and project management theories as bases for intelligent organization concept.

2. Towards an Intelligent Organization Concept

Today companies face rapidly growing uncertainty and complexity, and therefore they are trying to evolve towards intelligent organizations. The most important features of intelligent organizations are adaptability and flexibility – the basic success factors in VUCA (volatility, uncertainty, complexity, and ambiguity) contexts. The intelligent organization concept is today very popular among consulting companies, especially information and technology (IT) based like SAP. According to this company "an intelligent enterprise is one that consistently applies advanced technologies and best practices within agile, integrated business processes" (SAP, 2023). These companies are offering various applications to help the enterprises to transform towards more intelligent ones in Software as a service (SaaS) platform business model. The most important solutions delivered by consulting companies on the way to transform towards more intelligent enterprise include (SAP, 2023): (a) sustainable business solutions, (b) business technology platform, (c) artificial intelligence, (d) business network, (e) industry cloud, (f) extended planning and analysis, (g) experience management, and (h) business process management. These applications are offered together with training and implementation programs. The abundance of different ready to use technology tools to support building intelligent organizations should be complemented by the

comprehensible theory of intelligent organization. The purpose of the paper is to formulate the multidimensional concept of an intelligent organization in the light of the entrepreneurship and project management as two separate but also complementary management approaches.

To discover the state of the art of theoretical knowledge on intelligent organization in management literature the Systematic Literature Review (SLR) according to Tranfield, et al. (2003) was carried out. According to Tranfield (2003) there are four main SLR stages: (a) planning the review (incl. identification of the need and protocol development); (b) identifying and evaluating studies; (c) extracting and synthesizing data (including conducting data extraction, conducting data synthesis); and (e) disseminate the review findings.

The SLR was conducted in April 2023 using the SCOPUS scientific database. The adjective smart as synonymous with intelligent was also included in the selection of the set of reviewed scientific articles.

The keywords used during the literature research were smart or intelligent organization, smart or intelligent enterprise and smart or intelligent business. In order to obtain the research outcomes strictly regarding the intelligent organization in management literature only articles with the keywords in the title and in the business, management and accounting theme were analyzed. The synthesis of SLR process and outcomes is presented in Table 1.

Table 1. The outcomes of SLR regarding intelligent organization concept

	Smart	**Intelligent**
SLR stage 1: The purpose	To recognize the "state of the art" on intelligent organization concept in management research literature	
SLR stage 2: Strings/protocols	TITLE("smart organization" OR "smart enterprise" OR "smart business") AND (LIMIT-TO (SUBJAREA,"BUSI")) AND (LIMIT-TO (DOCTYPE,"ar")) AND (LIMIT-TO (SRCTYPE,"j")) AND (LIMIT-TO (LANGUAGE,"English")) AND (LIMIT-TO (PUBSTAGE,"final"))	TITLE (*"intelligent organization"* OR *"intelligent enterprise"* OR *"intelligent business"*) AND (LIMIT-TO (PUBSTAGE , *"final"*)) AND (LIMIT-TO (DOCTYPE , *"ar"*)) AND (LIMIT-TO (SUBJAREA , *"BUSI"*))
SLR stage 2: number of articles without time range	24	18
SLR stage 3: The most common keywords listed according to the level of popularity (>=2 times)	Decision making (4), smart business networks (4), business networks (3), industrial management (3), big data (2), information technology (2), integrated model (2), intelligent agent (2), managers (2), marketing (2), smart business (2), smart organization (2), structural modeling (2)	Intelligent organization (3), organizational cybernetics (2)
SLR stage 3 and 4: the definitions in the most cited articles	Smart organization is knowledge-driven, internet worked and dynamically adaptive to new organizational forms and practices, it is learning as well as agile in its ability to create and exploit the opportunities offered (Khan, Halen, 2012) The basic networks of smart organization (Filos, 2005): - ICT networking (the internetworked, virtual organization) - Knowledge networking (dynamic interlinks of competence nodes) - organizational networking (agile flexible teaming)	Intelligent organizations are the ones that can learn how to create and innovate so as to improve the technical innovation capability (Alnuaimi, et al, 2021). The basic subsystems of intelligent organization are (Schwaninger, 2000): - the model for systemic control - the viable system model - and the team syntegrity model

The SLR on intelligent organization theory in management literature shows that this theory is at nascent stage and propose only attentive answers for main phenomenon (Edmondson & Mcmanus, 2007). Relatively small number of management research articles including whole phrases "intelligent organization" or "smart organization" in their titles shows that despite the popularity in consulting community the concepts are not well recognized in management science community. The need for building a consistent theory of intelligent organization as a synthesis of existing management research outcomes on intelligent and smart is obvious in the context that the number of management articles which titles include separate words intelligent and smart is growing very rapidly.

Smart organization is both internetworked (internally in the form of networks of teams and externally in the form of interorganizational network) and knowledge driven (codified and personalized knowledge). Three crucial

networks of smart organization are: ICT virtual cooperation networks, knowledge networks consisted of three contexts, i.e., business model, project teams and knowledge base, and organizational network base on agile teams principles. Smart organizations create ecosystems based on interorganizational relationships (Kordel, 2010). The smart organizations consist teams that are linked via ICT-enabled business processes between individuals and teams inside or outside the organization. According to Matheson and Matheson (2001) the highly smart organization has almost five times the chance of being a market leader than the counterparts. The nine principles, grouped according to three dimensions of smart organization are following Matheson and Matheson (2001): (1) achieve purpose, including value creation culture, creating alternatives, and continual learning; (2) understand the environment, including embracing uncertainty, outside-in strategic perspective, and systems thinking; and (3) mobilize resources, including disciplined decision making, alignment and empowerment, and open information flow.

The most common keywords connected with smart organization research are decision making and smart business networks. Smart organization is based on smart decision making which is based on Internet of Things (IoT) and Artificial Intelligence (AI). A large amount of IoT sensor information is gathered by IoT devices, and devices are connected to each other through IoT communication technology. The Artificial Intelligence of Things (AIoT) system, which uses the internet to exchange and transfer data, send commands and instructions to the device, and then conduct prediction and decision-making using artificial intelligence (AI) following big data analysis (Kuo, et al, 2022). Smart business networks are a dynamic, unpredictable web of individuals and companies that work together to produce smart results by quickly (re)configuring linkages between participants (Vervest, et al, 2004).

Coping with complexity is at the heart of intelligent organizations. The most common keyword connected with intelligent organization research is organizational cybernetics. From a cybernetic perspective, an organization's intelligence encompasses the following capacities according to Schwaninger (2000): (a) adapt to changing circumstances, (b) influence and shape its environment, (c) if necessary, to find a new domain or to reconfigure itself with its environment, and (d) contribute to the sustainability of the larger wholes into which it is embedded.

A framework for the design of intelligent organizations is consisted of three organizational cybernetic models according to Schwaninger (2000): the model for systemic control, the viable system model, and the team syntegrity model. In accordance with the model of systemic control different organizational effectiveness criteria apply at the three logical levels of management: (1) at the operational level, productivity, quality, and profitability are some examples of efficiency criteria; (2) effectiveness in both a cooperative and competitive (i.e., coopetitive) meaning is crucial at the strategic level (the best is being unique and have sustainable competitive advantage or in the ideal situation having no competitors at all; (3) legitimacy is defined at the normative level as possessing the capacity to uphold the claims of different stakeholders. The second, viable system model, is based on recursive organizational model consisted of autonomous parts. Autonomous units within autonomous units create a recursive structure. Additionally, a viable organization is composed of viable units, which are themselves embedded in more thorough viable units. The two models till now described deal with control and design issues. The third, the team syntegrity model is a structural framework for fostering cohesion and synergy in bigger groups of people or for encouraging the development of organizations with distinct identities from merely aggregates of people with similar interests (e.g., holacratic structures).

Synthesizing the existing knowledge, the intelligent organization should be described on the bases of network theory and cybernetic system theory. Using these two theories, the intelligent organization should be defined as a socio-technological knowledge driven network which is able to reconfigure together with the environment and to develop in the over average rate in the circumstances of uncertainty and complexity. Two overlapping, crucial dimensions of intelligent organization are internetworkness and cyberneticness.

3. Intelligent Organization in the Light of Entrepreneurship and Project Management Approaches

Entrepreneurship seems to be very promising in the field of intelligent organization development. The nature of entrepreneurship is based on commonly accepted by researchers concept of three dimensional entrepreneurial orientation (Rauch, 2009): innovativeness that reflects the tendency to adopt new practices and technologies and to go beyond the current state of knowledge, risk-taking which means the tolerance for uncertainty, and proactiveness that emphasize the initiative and ability to anticipate and pursue new opportunities (i.e., the first mover advantage).

Non-linear effectuation as an opposite to linear causation is the predominant logic of entrepreneurial thinking and entrepreneurial process (Sarasvathy, 2009). Entrepreneurs meet the universe of possible outcomes that can be created with the available means at their disposal and focus on continuous interactions with a committed network of stakeholders. Process of effectuation is consisted of following stages (Sarasvathy, 2009): (1) starting by asking oneself who you are, what you know, and whom you know; (2) limiting risk by calculating how much one can afford to lose; (3) embracing the surprise factor and trying to use it as a leverage; (4) reducing uncertainty by obtaining commitment from early partners; and (5) focusing on activities within one's control rather than trying to predict the unknown future. Entrepreneurship process is consisted of two crucial stages: opportunity identification/creation and opportunity exploitation (Shane & Venkataraman, 2000). Opportunity as a central category of entrepreneurship can be identified according to philosophical approach that reality is given or created according to philosophical approach that reality is constructed (Barney & Alvarez, 2007). The opportunity exploitation process means that a given set of resources should be configured in such a way that it creates the business model that is valuable for customers, rare comparing with competitors and costly to imitate by them (Alvarez et al., 2013). Technology entrepreneurship as a type of entrepreneurship construct that is rooted in innovation management and entrepreneurship and can be defined as process when development in science or engineering constitute a core element of the opportunity that enables the emergence of a venture, market, cluster or industry (Beckman, et al., 2012; Kordel, 2018). Technology entrepreneurship and technology opportunity as its central category seems to be crucial in the context of intelligent organization as socio-technological network (Kordel, 2021).

Popular methods created in the stream of entrepreneurship are discovery based planning (Cartolano & Pierantozzi, 2016), the lean startup (Blank, 2013), design thinking (Brown, 2008). The logic of discovery driven planning (Cartolano & Pierantozzi, 2016) method is following: uncertainty can be managed and reduced by systematically converting assumptions to knowledge and by redirecting its activities in the face of emerging understanding. Entrepreneurial process according to discovery based planning is consisted of following stages: (1) framing the desired business idea; (2) benchmarking the parameters that promise a successful outcome; (3) strategic translation of operations by specifying relevant organizational deliverables; (4) documenting, testing, and revisiting previously held or newly formed assumptions; (5) managing key milestones to reflect on actions taken and planning subsequent milestones; and (6) finding creative ways to run operations with a minimum amount of resources until major assumptions are tested. The most popular entrepreneurial tools in this method: reverse income statement, targeted experiments, and assumptions checklists.

The lean startup method is based on logic which is concentrating on eliminating the bottle-necks and in consequence shortening the process of startup building (Blank, 2013). This method favors experimentation over thoughtful planning, customer feedback over analyzing, and iterative design over design based on previously analyzed customer needs. The lean start up process includes three following steps: (1) reformulating a business idea into testable business model assumptions and building a minimum viable product, (2) testing the product with customers and objectively analyzing the results of the completed tests to validate the business model, (3) learning from the results and designing the next rounds of experiments. The crucial tools within this method are business model canvas, minimum viable product, key performance indicators and experiments.

The design thinking is a method for designers to use their creativity and methods of fitting people needs with what can be made possible by technology (Brown, 2008). Design thinking is based on iterative and human-centered practice based on user experience research. The process begins with defining the problem that given users experience, next understanding it deeply, and then creating a testable solution, the process ends with reflecting on the results Design thinking consists of five steps: (1) empathizing with the problem by understanding it from the users point of view, (2) formulating the users problem very deeply, in detail, (3) brainstorming different ways of solving the problem through generating a whole spectrum of possible solutions and combining insights about them, (4) prototyping a solution to highlight its strengths and weaknesses to identify new paths, and (5) testing the solution with users through soliciting feedback about prototypes to gain a better understanding. Design thinking offers tools such as empathy maps, value maps or user interviews.

Project management (PM) have increasingly become more relevant to organizations, regardless of the industry (Fernandes et al., 2020), especially in the context of intelligent organizations where they need to constantly learn how to create and innovate in order to enhance innovation capability (Alzoubi, 2021). Moreover since business has become project-oriented (Hobday, 2000; Martinsuo et al., 2006), it is crucial that intelligent organizations find the appropriate PM approach to support the governance of innovation and learning processes in the context that these intelligent organizations function. Since intelligent organizations have to frequently deal with complexity and uncertainty in the external environment, therefore project management can assist

intelligent organizations by bringing order and efficiency by defining a set of repeatable actions (Price Waterhouse , 2013).

Nevertheless, the value of PM is a function of what is implemented and how well it fits the organizational context (Cooke-Davies et al., 2009). PM approach is here defined as a high-level outline of guiding principles, perspectives, and characteristics of how a project is managed and governed (Špundak, 2014). A PM approach describes how a project will be managed and governed (Gemino et al., 2020).

General literature on PM presents different approaches varying in the level of flexibility and rigidness of the environment. For business environments where standardization of processes is valued and it is possible to clearly define projects characteristics in early stages, the waterfall approach (predictive or traditional approach) or process-based approach are suitable options (Project Management Institute, 2021). The waterfall approach is mostly used in environments where it is possible to plan in advance determining the scope, time, budget of the project, with a limited number of future iterations and changes in the initial plan (Fernandes et al., 2018; Project Management Institute, 2021), since the environment has a low level of uncertainty. The project-based approach is suitable for environments and organizations where their projects are similar to so processes can be normalized with small changes and adaptations from one project to other (Bravo et al., 2021). It is evident that in the context of intelligent organizations, relying solely on these two approaches is insufficient to effectively address the demands of high levels of uncertainty.

A less rigid PM approach that is commonly used is focused on results rather than process (Bravo et al., 2021). By doing so, organizations agree in advance on a set of indicators to measure results, in this way whenever monitors identify an event that can causes disturbance in future outcomes, a risk trigger is set, an pre-agreed plan is implemented without the need for a project team meeting to decide which actions to take (Gumz & Parth, 2007). Even though this approach allows organizations to be more active in relation to changes in the environment, it has a limitation, once it only works in environments where there is a low level of uncertainty and it is possible to have accurate predictions of future scenarios, which is not the case of intelligent organizations.

The agile approach (adaptive approach) is most useful when requirements of the project are very volatile and there is a high level of uncertainty in the environment (Project Management Institute, 2021; Serrador & Pinto, 2015). Agile approach works with iterative cycles, which at the end of each iteration the project evolves and the requirements are reviewed and depending on the environment changes or the occurrence of unexpected events the requirements are adapted (Project Management Institute, 2021).

Changes may sometimes lead to conflicts among collaborators. In agile PM, the scope of the project is defined and approved before each iteration. Several agile frameworks have been studied and developed such as the Scrum (Santos et al., 2016), Kanban (Flora & Chande 2014); Dynamic Systems Development Model (Agile Business Consortium, 2014), eXtreme Programming (Flora & Chande, 2014), and Crystal (Cockburn, 2004). Serrador and Pinto (2015) demonstrated a positive co-relationship between agile use and project success. However, other research argues for a combination of traditional and agile approaches (Gemino et al., 2020; Špundak 2014). One must value the specificities of each approach and, if possible, work with both at the same time, the called hybrid PM approaches.

Finally, there is the hybrid approach, which combines elements from both predictive (more rigid approaches) and adaptive approaches (more flexible) making it possible for project teams to use the adaptive approach to deal with the uncertainty elements from the project (innovation) and the predictive approach to handle the predicable elements of a project (standardized processes) (Fernandes et al., 2018; Project Management Institute, 2021).

The concept of an intelligent organization meets the current need for organizations to keep their radar on constantly changing environments and to remain competitive. This is largely due to the integration of all individual intelligence, as highlighted by the importance of this factor in the definition of intelligent organizations (Bratianu et al., 2006). Agile approaches, as defined by the PMBOK, are highly suitable and easily adaptable to projects characterized by high levels of uncertainty and volatility. Methodologies such as Scrum and Kanban are highly aligned with the concept of intelligent organizations. For instance, Scrum promotes iterative communication and collaboration among team members through frequent sprints, incentivizing participation in decision-making and facilitating the development of solutions to address challenges encountered during projects (Schwaber & Sutherland, 2020).

Kanban stands out as a highly suitable methodology, attending to the need for flexibility in intelligent organizations. According to the Kanban Guidebook, this methodology is focused on the continuous delivery of

value, which allows a quick response to changes in the environment and customer needs where aligns perfectly with the demands of intelligent organizations that need to quickly adapt to changes in the environment. In addition, the Kanban is highly visual, providing collaboration and teamworking within the workplace (Kniberg, 2010), thus promoting the integration of the intelligence of its members.

Cooke-Davies et al. (2009) argue that PM value is created or destroyed depending on the extent of fit or misfit between the organization's strategic drivers and the characteristics of its PM system. They criticize the unconditional use of PM standards and a misfit between specific project characteristics and the chosen management approach.

Engwall (2003) emphasizes the importance of a contingency approach and argues that projects are open systems dependent on history and organizational context. All different project types would benefit from a contingency theory perspective. Developing an intelligent organization in particular is comprised of highly heterogeneous activities and managerial conditions. Therefore, as König et al. (2013) argued, it is challenging to generalize PM practices, advocating instead for a contextual PM approach.

PM practices are the mechanisms by which PM processes are delivered and supported, and that, when managed effectively, can lead to project success (Barbosa et al., 2021) and consequently to an intelligent organization. This includes PM techniques (e.g., work breakdown structure or earned value management), various guidelines in which organizational processes are defined, including the use of procedure documents, checklists, job aids, and templates, as well as the use of software packages and various databases (Fernandes et al., 2013). Searching for tools and techniques is a tangible way to study PM practices because they represent how managers execute PM processes. They are also concrete and specific ways to apply rules and principles that must be selected according to the context of the organization where they fit (Besner & Hobbs, 2008). Tools and techniques are closer to day-to-day practice, closer to the things people do and closer to their tacit knowledge (Besner & Hobbs, 2006). Therefore, here PM practices are simply seen as those tools and techniques that practitioners use to 'do the job' and execute a PM process. Several investigations have identified the most used and useful PM practices (e.g., Besner & Hobbs, 2008; Fernandes et al., 2013; Tereso et al., 2019; Fernandes & O'Sullivan, 2023).

The summary of entrepreneurship and project management approaches according to five criteria: main attributes, traditional logic and stages of the process, the most suitable type to intelligent organization concept, example methods and the role in the context of intelligent organizations is presented in Table 2.

Table 2. Intelligent organization in the lights of entrepreneurship and project management approaches

	Entrepreneurship approach	Project management approach
Main attributes	Innovativeness Proactiveness Risk taking	Planning Monitoring/controlling & replanning Risk management
Traditional logic and stages of the process	Effectuation consisted of: - opportunity identification - opportunity exploitation	Causation consisted of: - identify causes - identify consequences
The most suited type of entrepreneurship and PM to intelligent organization concept	Technology entrepreneurship	Agile project management PM practices
Example methods	Discovery based planning Lean startup Design thinking	Scrum and Kanban
The role in the context of intelligent organization	Technology entrepreneurship can be supposed as effectual mechanism of building the intelligent organization	The Agile project management approach can serve as a strong foundation to manage the uncertainty inherent in an intelligent organization that is constantly undergoing changes.

4. Conclusions

The intelligent organization understood like in this paper as a socio-technological knowledge driven network able to develop in over-average pace in uncertain and complex environment can be described as the outcome of synthesis of entrepreneurship and project management approaches. Despite today, because of many methods formulated within the time frame of entrepreneurship seems to be more and more disciplined, in the nature of entrepreneurship is chaos and in consequence an effectual logic. The analogous but the opposite situation regards project management, today project management evolves towards more and more agile but in its nature is order and in consequence casual logic. Taking these two approaches under the umbrella of paradox management (Lee, 2016) can be promising in explanation of intelligent organization building process. The link

between entrepreneurship and intelligent organization is especially visible when emergence of this organization is becoming according to effectuation process. The link between project management and intelligent organization is clear when development of this organization is taking place according to causation process. Paradox management allows to join both processes of effectuation and causation and in consequence to explain the intelligent organization as an outcome of interplay between them (see figure 1.).

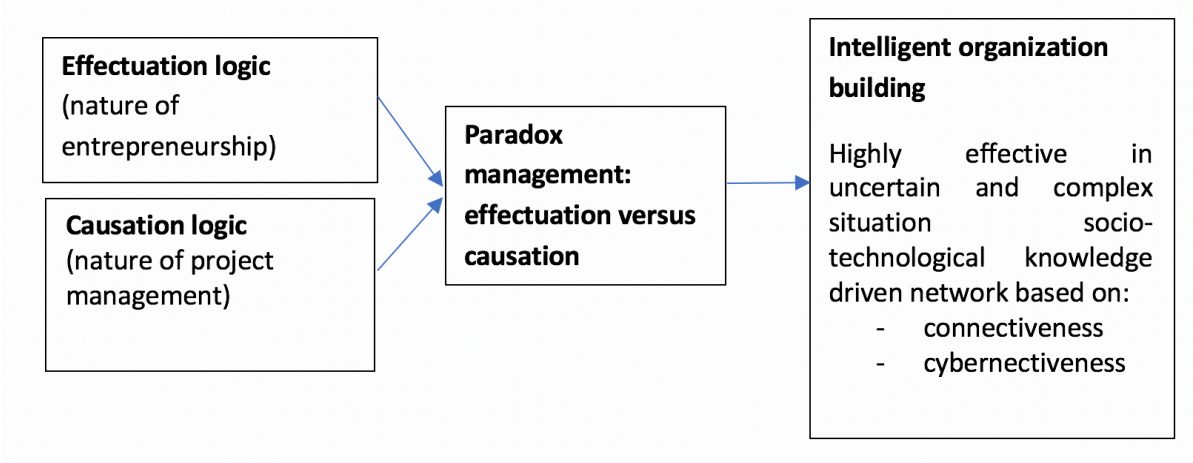

Figure 1. Conceptualization of the intelligent organization shaping as effectuation versus causation logic.

Based on our conceptualization of intelligent organization development as effectuation versus causation logic, we will adopt the process theory perspective proposed by Hernes (2007). Hernes argues that "process is constitutive of the world" (p. 44) and describes two perspectives on the process: technical, which focuses on processes, tools, and techniques, and social, which focuses on personal motivation and group dynamics. In our understanding of intelligent organization we are synthesizing this two perspectives. Following next work by Hernes (2007) we can classify the intelligent organization process as connectivity. According to this approach organization is seen as the unfolding of relations among heterogeneous units. In this context very promising in the field of intelligent organization explanation seems to be Latour's (1996) works in Actor-Network Theory.

As any research work this research also has limitations. This SLR gives a general overview rather than an extremely detailed account of findings due to the high number of articles reviewed. Thus, more specific research is required to carry out in-depth analyzes of each identified topic. Additionally, further empirical research is needed to better understand how intelligent organizations can maximise their benefits from the lenses of entrepreneurship and project management for its development.

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Voice Behavior in Creative Teams: A Case Study of Music Production

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Abstract: Putting people together with distinct roles on a team often seems effective for creative work, as group work can share diverse ideas based on roles and expertise. However, to refine and build on one another's suggestions, members must proactively engage in voice behavior without fear of being criticized or negatively evaluated. Voice or challenging the status quo and expressing suggestions for change are critical in enhancing the final team outcome. However, not all the team members engage in voice behavior. What is often ignored is the effect of variation in members' role centrality on voice behavior. A member's role in a team is highly related to the member's perception of his or her status on a team and perceived self-efficacy. Self-efficacy motivates members to engage in voice behavior and express their diverging ideas that could eventually improve the creativity of the joint team outcome. The present research aims to examine the dynamics of voice behavior focusing on creative teams considering two contextual factors: variation in team members' role centrality and time pressure. The results from pilot qualitative field interviews and observations indicate that members with a less central role on a team are less likely to be proactive in voice behavior, and time pressure is likely to strengthen such a tendency. In particular, our preliminary findings suggest that dampened self-efficacy might be one underlying mechanism that explains the negative effect of low member role centrality on voice behavior, in particular, for teams that work under time pressure.

Keywords: Voice Behavior, Time Pressure, Self-Efficacy, Creativity, Team Innovation

1. Introduction

To make superior decisions, groups need honest input from their members. In fact, teamwork requires that group members share ideas and knowledge so that multiple insights are considered in making decisions (LePine & Van Dyne, 1998). More importantly, sharing thoughts and ideas about work processes can enhance team learning (Edmondson, 1999). However, despite having valuable information and learning opportunities, team members often are reluctant to voice, defined as the discretionary communication of ideas, suggestions, or opinions intended to improve organizational or unit functioning (Morrison, 2011). Because voice plays a vital role in the creativity and innovation process in teams and organizations, it is crucial to understand better the factors that suppress the likelihood of voicing in teams, particularly creative teams.

Three lines of research have focused on barriers to voice. The first line of research has focused mainly on individual personality differences, highlighting that some individuals (e.g., extroverts) are more likely than others to engage in speaking up (e.g., LePine & Van Dyne, 2001). The second line of research suggests that employees engage in voice behavior when dissatisfied with some aspects of their workgroup or organizations (e.g., Withey and Cooper, 1989). Finally, the third line of research focused on organizational or contextual factors, such as the perceived safety of voice climate or leadership behavior as predictors of speaking up (e.g., Detert & Burris, 2007; Edmondson, 1999; Morrison & Milliken, 2000).

In the present research, seeking to develop further the contextual stream, we focus on the roles that time pressure (or deadlines) and the degree of centrality of members' roles play in the dynamics of voice behavior in groups. As contextual factors, time pressure and members' role attributes are critical aspects of new product development teams that could significantly affect how members collaborate to produce the final product (Chen et al., 2010). Current empirical research on team dynamics provides some initial evidence on how time pressure and the centrality of members' roles might affect the likelihood of voice behavior in groups.

Time pressure is a critical contextual factor affecting members' cognitive and emotional appraisals and, eventually, team decision-making. Time pressure, in particular, has been linked to stress (Cannon-Bowers and Salas, 1998). According to a stream of research exploring the effect of stress due to time pressure, when experiencing stress, members are less willing to engage in interpersonal communication. This line of research highlights that team members' ability to communicate, share information, and seek information is hindered

under time pressure (Kleinman and Serfaty, 1989, Durham et al., 2000). Importantly, members' tendency to conform under time pressure increases, and they rely more on high-status team members to produce ideas (Driskell and Salas, 1991). Such findings suggest that team members may engage less in voice behavior under time pressure due to what we call in the present research the "status gap" that develops due to time pressure and affects people's perceptions of their relative status and self-efficacy within their teams. Thus, the first aim of the present research is to gain a deep understanding of the processes underlying the effect of time pressure on voice behavior.

As another critical contextual factor, the degree of a member's role centrality may also affect the likelihood of voice behavior; the nature of the work a team member performs within a workgroup is likely to promote or demote voice behavior. For instance, team members who occupied a more central role in the team had a more personal influence on their team and engaged more in voice behavior (Venkataramani and Tangirala, 2010). Voice requires the speaker to feel confident that their message gets across, and status is suggested to promote this type of confidence and efficacy (LePine and Van Dyne, 1998). The degree of centrality of a member's position in a team is positively associated with status (LePine and Van Dyne, 1998), suggesting that the high degree of member's centrality is likely to provide the member with efficacy and credibility to engage in proactive behaviors such as voice (Venkataramani and Tangirala, 2010). Thus, the second aim of the present research is to explore whether members who occupy a more (vs. less) central position in a team (e.g., producer in a music production team) feel more (vs. less) confident and experience higher (vs. lower) self-efficacy that their suggestions for change will be received more (vs. less) positively by other members. As such, they engage more (vs. less) in voice behavior.

In sum, in a qualitative field study, we address the questions, "*How do time pressure (formulated as deadlines) and the degree of member's role centrality affect voice behavior?*" and "*If so, why?*" Our study extends the current literature in meaningful ways. First, researchers have long raised the critical role of understanding and incorporating temporal dynamics in team effectiveness (Mathieu et al., 2014; McGrath & Tschan, 2007). Investigating whether and how time pressure formulated as deadlines affect voice behavior in a team extends our current understanding of the effect of temporal dynamics on team effectiveness (Mohammed & Nadkarni, 2011). Conducting in-depth interviews with teams with temporal pacers such as deadlines enables us to get deep insights into voice behavior in these teams and its effect on their performance. Second, conducting semi-structured interviews with teams composed of members with identified roles that vary in the degree of centrality (e.g., producer versus lyric writer) will enable us to understand whether and why members who occupy various team roles would exhibit differential voice behavior. We add to research that suggests attributes of members with identified team roles and positions might differentially affect team performance (Humphrey, Morgeson, & Mannor, 2009; Pearsall & Ellis, 2006). Voice behavior may be one crucial underlying mechanism explaining the relationship between team members holding various roles and team outcomes. Combining the evidence from the literature, interviews, and observations, we aim to develop a conceptual framework and testable propositions regarding the effects of time pressure and members' role centrality on voice behavior.

2. Theoretical background

2.1 Creative teamwork

Our study of voice behavior in music production teams draws from literature on social cognition and creative process in teams. As in many inductive studies, our literature review serves as a guiding point that anchored our research questions, informed our methods, and provided directions for our analysis (Dutton et al., 2006). Our emerging awareness of the importance of time pressure and members' role centrality in the team's proactive interactions, such as voice behavior, led us to enrich our understanding of these dynamics by incorporating insights from the literature on voice behavior. Creativity in teams, such as music production teams, is defined as the generation of novel and useful ideas by members and is a product of interactions and influence of team members (Gilson et al., 2005). While challenging the status quo and suggesting new ideas are central to the creative process, social and contextual factors will affect such behaviors (Shalley and Gilson, 2004).

2.2 Time pressure and voice behavior

Many groups in organizations face deadlines. A deadline is a critical time maker that motivates groups to start working on the task within the time allotted (Gevers et al., 2001). Time pressure arises when members work under fixed or stable deadlines, which creates a perception of insufficient time to complete a task, leading to

increased arousal and psychological stress in employees (Driskell et al., 1999, Škerlavaj et al., 2018). How does stress due to time pressure relate to voice behavior? According to theories on coping with stressful situations (Schaubroeck and Merritt, 1997), a negative association exists between experiencing stress and perceived self-efficacy. Current empirical evidence suggests that team members were less likely to share their ideas with others when they worked under time pressure than when they did not (Kleinman and Serfaty, 1989, Durham et al., 2000). Self-efficacy plays a significant role in voice behavior. Indeed, expressing opinions and sharing suggestions for change requires team members to believe their suggestions will improve group performance and that other group members will value the suggested ideas (Detert and Edmondson, 2011). However, such belief and confidence in improving performance and successfully communicating suggestions are hindered under stress (due to time pressure), leading to decreased perceived self-efficacy (Bandura et al., 1988). Nevertheless, despite the current empirical research supporting the assertion that time pressure can induce stress and hinder self-efficacy and, as such, willingness to voice suggestions, there is also empirical evidence suggesting that time pressure might not necessarily impede information sharing and voice behavior in teams (e.g., Ellis, 2006).

2.3 Member's role centrality and voice behavior

Individual members' role on a team affects their behavior, including proactive or extra-role behaviors (Morrison, 1994). Members who are central to a team interact more frequently with other team members and, as critical hubs of the wheel, continuously facilitate their teams' performance. As such, members with more central positions on a team attain status and respect, which makes them highly respected and causes their opinions and ideas to be influential (Venkataramani and Tangirala, 2010). The status these members gain due to their role centrality is likely to equip them with a higher feeling of self-efficacy and belief that their ideas will make a change and be influential (LePine and Van Dyne, 1998), and fear less challenging the status quo (Morrison and Rothman, 2009) all of which facilitate voice behavior (Venkataramani and Tangirala, 2010). However, although the current literature provides converging evidence on a positive linkage between a team member's role centrality and voice behavior, how and why members in less central positions in a team might engage in voice behavior is less clear. Evidence in the current literature nevertheless suggests that members who occupy a less prominent role in a group may engage less in voice behavior. In line with research on status differentials (Hage et al., 1971, Bendersky and Hays, 2012), the likelihood of information sharing and flow among the team members is influenced by members' perceptions of their relative status within a team. For instance, when team members perceived the difference between their status and other members higher, they were less likely to engage in voice behavior (Edmondson, 2003, Koudenburg et al., 2013). According to social identity theory (Tajfel, 1978), when individuals perceive their status as lower than others, they are more likely to fear being criticized or penalized by others, conform to group norms, and avoid challenging the status quo or sharing diverging ideas (Jetten et al., 2006, Durand and Kremp, 2016).

3. Methods

3.1 Context: Music production teams

Our interest in music production teams emerged from the fourth author's extensive experience (cumulatively ten years) as a music producer and instructor. Given our interest in elaborating theory on voice behavior in creative teams, we conducted an inductive qualitative study using a grounded theory approach (e.g., Strauss & Corbin, 1990). Such a method is appropriate when the research question focuses on developing a theory. Aligning with this logic, we used purposeful sampling, which relies on a context that offers a less cluttered view of the dynamics of theoretical interest (Yin, 2009). Given our research question, it was important to find a context that emphasizes creativity and enables us to observe group interactions and communication (e.g., Harrison and Rouse, 2014). The members of music production teams have diverse expertise and roles (e.g., lyric writer, producer) and need to work collectively throughout improvisations. More specifically, the music team members in our study are students who work in groups during which they need to develop songs under time pressure (e.g., the group needs to start working at 10 in the morning and perform the song they produced at 10 in the evening). Taken together, typical organizational group features in music teams, such as holding various roles and working under time pressure or deadlines, allow us to observe a phenomenon of interest that can have important implications for organizational groups with similar features (e.g., new product development teams).

Music team formation. The process through which music instructors establish a team to develop a new song is based on the resource-seeking strategy (Davidsson and Honig, 2003), that members should be selected based

on the resources required to create a new song. More specifically, a week before the song development project starts, the instructors survey the students and ask them about the role they will feel more comfortable having on a team (e.g., vocalist, producer, lyric writer). Then, the instructors put the members together based on the preferred roles they indicated on the survey, and each team has at least four members (meeting the criteria of being a group which is at least three members) with identified roles. Group members' identifiers or roles included producer, lyric writer, vocalist, idea maker, instrumentalist, and singer.

***Access and sample*.** We gained access to five groups for this project via the paper's fourth author, who is instructing students during the song development project. After each group is formed, they are requested to work together from morning till evening. They must decide on the music genre and engage in idea generation, initial idea development, further development and implementation, and performance. It is important to note that there is a general deadline for these groups to develop a song (from morning to evening); however, the groups are not provided with a specific timeline about which task they need to work on within a particular time window. That is, they need to take care of the progress of each stage of song development themselves. The groups are composed of second-year bachelor students who study music production. To capture the interactions and extra-role behaviors, such as voice behavior in collective creative work (Hargadon and Bechky, 2006), we followed the groups throughout the song development process, starting in the morning and ending in the evening. Next, we describe the data collection in detail.

3.2 Analytical Process

The process began with early themes that arose during the pilot interviews, and we iteratively moved between data collection, analysis, and theory throughout the study. Initially, we were interested in how group members with identified roles and working under pressure engage in voice behavior. The reviewed literature suggested new opportunities for theorizing if we considered these groups' dynamic nature of voice behavior. We adopted an inductive approach to our analysis, integrating back and forth between the data we collected (e.g., via interviews, observation, recordings, etc.), relevant literature, and an emerging set of theoretical concepts (Strauss and Corbin, 1990).

Pilot interviews. We conducted exploratory pilot interviews to better understand the music groups' group process. The interviews were purposely broad and touched on topics such as general feelings about working on a team, motivation to engage in discussions and working with others, and attitudes about disagreements and managing them on a team. Specifically, the first and second authors interviewed five individuals with distinct roles on the team: two producers, two vocalists, and one singer. We excluded these individuals from the groups that became the present study's focus.

An initial outline of emerged themes. The notions of members' role centrality, efficacy, and time pressure emerged using these pilot interviews. For instance, one producer (Produc01) noted that he feels comfortable expressing his disagreements and openly telling others about the directions they should take and is open to others' inputs: "*I often listen to others and let them speak. I usually give them feedback*." More importantly and related to our research question, the producer sees voice behavior as part of his role and feels confident to share his opinions: "*I usually give feedback. It's my job to tell them my opinions. I kind of try to figure out that artists try to do this and that idea; if I feel the idea does not seem good because of this, I say, oh, maybe you could try something different*." Notably, the fact that the producer sees speaking up as part of his role encourages him to engage in spontaneous voice behavior, raising suggestions and concerns without being asked to do so.

Similarly, the producer (Produc02) highlighted: "*[…] when I disagree with my team, I usually speak up first and then look for a solution to which I can contribute."* Notably, the producer is proactive in sharing his ideas and consciously frames his opinions in a way that will be perceived as less offensive. As an example, the producer (Produc02) said: "*[…] sometimes I have heard someone come up with an idea but feel we can do better, and then speak up in the best way I can in the situation so that it is not perceived as wrong or as criticism of their ideas or opinions*."

More evidence supports that the role individuals occupy on a team affects their perceptions of the efficacy of the voice, and in turn, it is likely to guide their tendency towards voice or silence (Detert and Edmondson, 2011). For instance, in contrast to the producer, who has a more central role on a team, the vocalist seemed less proactive in initiating the voice or raising suggestions. One vocalist (Vocal01) said: "*If we disagree, usually someone takes the lead, and we just follow*." In another example, another vocalist (Vocal02) mentioned that she speaks up only if she has a solution or alternative ideas and noted: *"[…] what happened was that I slightly disagreed with the content of some lines in the text. So, I spoke about it and had another alternative to the text.*

This was well received by the group." This last example shows the relationship between members' roles and confidence in speaking up. While a producer (with a more central role) may easily disagree without having an alternative solution or suggestion, the vocalist (with a less central role) is confident to speak up only if she has an alternative idea or solution. Regarding questions related to group deadlines, the singer clearly pointed to the interplay of members' lack of confidence/efficacy and time pressure to share ideas and raise suggestions. Specifically, she (Singer01) mentioned: "[…] *I had no self-confidence to take place, so I didn't feel I had anything to do, no one else wanted to take any responsibility…so then we just sat and just, no one said anything, didn't they ... so then the time pressure became very difficult because we had no clear leader figure who started the creativity and the thought pattern."* She (Singer01) added*: "*[…] *then you also have the group members who are really just interested in making their own music, and then it's actually like that. The time perspective has nothing to do with it because they know they have a plan and know what they want to make*." In these examples, the singer pointed to the importance of having a detailed time-based guideline for pursuing the project or a proactive member or leader on board who initiates sharing ideas under time pressure. Such a proactive member will be able to stimulate other members to speak up and engage in active discussions when a team works under time pressure or has strict deadlines. Finally, the signer pointed to the role of time pressure in encouraging conformity and discouraging discussion and disagreements on a team when she (Singer01) noted: "*[…]the more pressed for time you are, the easier it is easier to go with the first idea…it is a little easier to prepare for discussion if we have more time.*" In sum, our pilot interviews indicated that the roles members occupy on a team and the time pressure/deadlines might be critical factors for understanding the dynamics of voice behavior in creative teams and that music production teams aligned with our theoretical sampling needs, providing a strong sense of methodological fit (Edmondson and McManus, 2007).

Song development observations and video collection. To capture the real-time aspect of social and continuous aspects of voice behavior during the creative development process of a song, we relied on our observations as primary data sources. Particularly, we observed group interactions during song development at various times. The first author observed one group in the morning, during which the group members began discussing the choice of music and melody. The second and third authors observed the rest groups in the morning, afternoon, and evening. In addition, the last author recorded some group interactions as additional support for our findings from observations. To reduce the presence of research and camera on group interactions, we kept the duration of observations and recording short.

Formal interviews and informal conversations. To enrich our understanding of voice behavior dynamics in groups, we conducted formal interviews with at least two group members, which were recorded and transcribed[1]. We interviewed each group member individually during their song development process breaks and asked them questions regarding their interactions and voice behavior. In addition to formal interviews, one of the authors had informal conversations with some group members a couple of days after the project and took notes.

Preliminary analysis. The first, second, and third authors met throughout the data collection process and reviewed filed notes. In addition, they have several follow-up conversations with the fourth author (the music instructor) to verify some of the insights and reflections on these groups' interactions and development process. Importantly, these conversations were beneficial because the fourth author was psychologically close to the research setting and could offer a distinct perspective on the process and dynamics of these teams, which enabled us to bring in our theorizing a broadened interpretative frame (Bartunek and Louis, 1996). During this preliminary stage of data analysis, initial themes began to emerge; we noticed that the group members seemed to engage in voice behavior when they felt confident and considered doing so as part of their role and that members with certain types of roles seemed to be more proactive in speaking up. Furthermore, we realized that team members with less central roles tend to engage less in voice behavior under time pressure and delegate responsibility to another member with a more prominent role (e.g., producer). Additionally, when stressed due to time pressure, they follow the suggested ideas by the producer without engaging in further discussion or challenging the status quo. Figure 1 illustrates a testable research model based on the preliminary findings.

[1] The analysis is in progress and unavailable at this research stage.

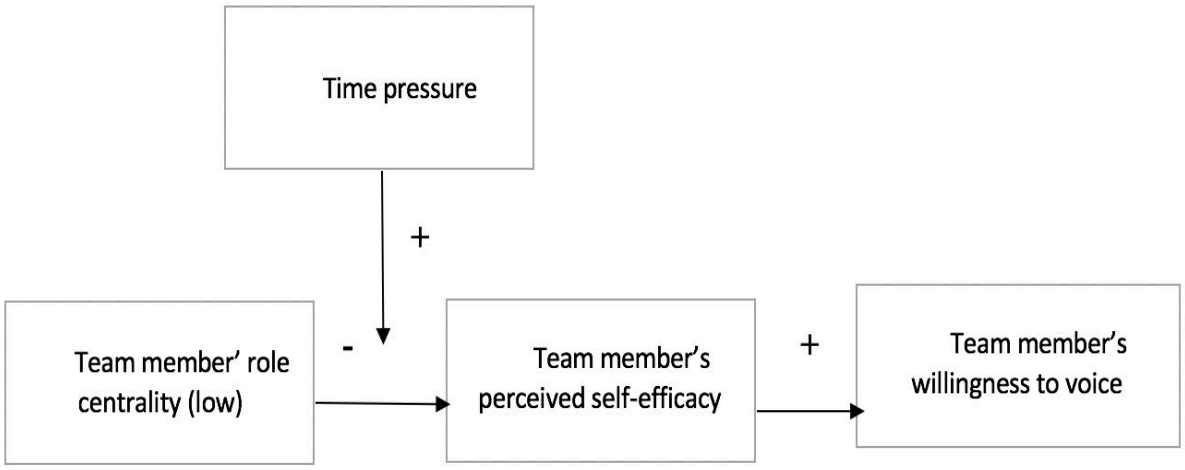

***Figure 1*: A testable research model based on the preliminary findings.**

4. Findings

Our preliminary analysis of music groups reveals that, throughout the song development process, a group's voice behavior and tendencies to challenge the status quo seem to be influenced by the role of team members. In particular, those members who occupy a more central role in a team, such as a producer, are likely to feel more confident and able to step in when they believe the group ideas are suboptimal. This finding supports our notion that the effect of a member's role centrality on voice behavior operates through perceptions of self-efficacy. Additionally, the preliminary analysis indicates that the time pressure due to the deadlines might suppress the voice behavior more for the team members with less central roles. In particular, the time pressure may lead to an increased "status gap," which can hinder members' self-efficacy, a key driver of voice behavior. Such a finding suggests a possibility of interactive effects of the degree of member's role centrality and time pressure on voice behavior.

5. Discussions

In the present study, we aimed to examine the relationships between team members' role centrality, time pressure, and voice behavior. The preliminary findings from exploratory pilot interviews and our observations indicate that members with lower central roles on a team engage less in voice behavior due to perceived lower self-efficacy. Additionally, the results reveal that time pressure might be more detrimental to voice behavior when it leads to a "status gap" in teams, and members with low central roles on a team are more prone to the detrimental effect of time pressure. Based on these findings, we suggested a testable research model illustrating the team member's role centrality and time pressure interact to affect group voice behavior. It is important to note that our research is not without limitations. One significant limitation is that our findings are based on five pilot interviews and observations, limiting the generalization of the current research findings.

Nevertheless, our research question and initial findings may contribute to several lines of research in the current literature, including research on group creativity and innovation, voice behavior, and group information sharing. Finally, our research has an important practical contribution, particularly for organizations planning to use interventions to enhance creativity and innovation in project teams with strict deadlines. Although further research is needed to explore the interventions that can help members with less central positions on a team to engage in voice behavior under time pressure, our preliminary findings suggest two possible interventions: providing the team members with specific guidelines on the tasks informing them which tasks they should perform within a particular deadline or ensuring the presence of a proactive leader or member who engages early in voice behavior in the idea development process in a team. Such interventions may be helpful for organizations and managers aiming to cultivate team creativity through heightened extra-role behaviors such as voice.

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Using Neuromarketing to Create more Effective Messages in Sustainability Advertising Campaigns

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Abstract: Sustainability has become a hot topic in recent years, and it is essential for businesses to integrate sustainability into their marketing strategies. However, it is not enough to simply communicate messages related to sustainability in advertising. The challenge is to create campaigns that inspire consumers to act in ways that are better for the environment. Currently, many brands are trying to communicate topics related to sustainability in advertising, but not all campaigns will make people want to treat the environment better. It is knowledge from neuromarketing that allows us to better understand consumer motivations and behaviour. Thanks to this, brands can communicate their sustainability messages more effectively. In the article, we focused on a review of existing research that deals with the topics of sustainability in the context of advertising and consumer behaviour. We describe findings that help in the creation of advertising messages in campaigns that aim to motivate the consumer to be environmentally responsible. Neuromarketing research provides valuable insights into the emotional drivers of consumer behaviour, empowering brands to design effective sustainability campaigns. Companies can drive behaviour change and build a more sustainable future. Ultimately, the effective communication of sustainability topics in advertising not only benefits the environment but also helps companies build a stronger relationship with their customers, creating a beneficial scenario for all stakeholders. Our goal is to offer companies recommendations for a better understanding of their consumers and to be able to communicate sustainability topics more effectively so that they have a real impact.

Keywords: Advertising campaigns. Consumer behaviour. Environment. Neuromarketing. Sustainability.

1. Introduction

More and more companies are incorporating the theme of sustainability into their communication activities and advertising campaigns. This is because they realise that today's consumer does not look at a brand in the same way as they used to. They are no longer just interested in the lowest price. On the contrary, they also focus on what values a brand stands for. It is not just about the customer as such. The fact that companies are focusing on communicating themes such as sustainability, climate change or fairness in working conditions also helps them considerably in employer branding. This is evident in the Edelman Trust Barometer, which reports that up to 69% of respondents confirmed that they are more likely to be interested in a job if the company reflects their values, has a higher sense of purpose or is meaningful work that impacts society and addresses social issues.[1] Focusing on Corporate Social Responsibility increases customer retention, brand loyalty, improves brand image and brings more opportunities to attract investment (Murphy, 2022).[2]

Thanks to advanced technologies that allow us to understand consumer emotions, we can communicate the individual messages of advertising campaigns more effectively. It is these tools and research in this area that can help us not to rely on creativity alone. Thanks to neuromarketing, we can find out the effectiveness of individual advertising campaigns before they are actually launched. This gives us the ability to create marketing campaigns more effectively, taking into account the consumer and the emotions that the advertising campaign will evoke in them. Although in the past marketers have relied on a creative approach to advertising as such, wanting to create interest, surprise or memorability in consumers, few of them have actually used insights from behavioural science that can be applied to the creation of advertising campaigns. A specific category is campaigns that are intended to communicate a societal problem. In our work, we further focused on campaigns that aim to communicate a sustainability message and encourage consumers to engage in more sustainable activities. Although many companies.

[1] *2023 Edelman Trust Barometer*. [online]. [2023-05-13]. Available at: <https://www.edelman.com/sites/g/files/aatuss191/files/2023-03/2023%20Edelman%20Trust%20Barometer%20Global%20Report%20FINAL.pdf>.

[2] MURPHY, B. CH.: *Why Social Responsibility Matters to Businesses*. [online]. [2023-05-13]. Available at: <https://www.investopedia.com/ask/answers/041015/why-social-responsibility-important-business.asp>.

2. Literature review

Sustainable marketing is the process of communicating a company's commitment to the environment to customers, partners or employees. This can range from supporting organisations that are dedicated to sustainability to developing products that will have less impact on the environment. For example, many companies are starting to develop comprehensive plans to achieve sustainability. This is because they have found that their customers are changing, they are no longer just interested in the lowest price, and if they want to appeal to them and persuade them to convert, they need to look at this area too.

The goal of sustainable marketing is to promote a company's core values, which in turn will resonate with its customers. By doing so, businesses can build a relationship with their customers and gain lasting support. In the context of various environmental adversities, such as excessive air pollution, the climate crisis and biodiversity loss, for example, customers have become more interested in where their products come from, under what conditions they were produced, what they contain and the environmental impact of their production.

A number of companies have noticed that customer interest has changed precisely because of the urgency of solving these problems. However, if they were unable or unwilling to think about improving their product or production processes, they often resorted to so-called "greenwashing". This is false advertising designed to convince the customer that the company is acting in accordance with environmental values. It uses a variety of means to do this, but it is about misleading the consumer. If the consumer subsequently discovers that such advertising was merely deceptive and therefore greenwashing, their relationship with the brand is negatively affected.

2.1 Sustainability advertising campaigns

Nowadays, when new businesses are being created in the market quite constantly, it is increasingly important for consumers if a brand behaves in a socially responsible way. As McKinsey points out in its study on sustainable packaging, although environmental impact is still not a major factor in consumers' purchasing decisions, it is one of the things that can positively influence customers and encourage them to buy a product that, for example, uses packaging that is environmentally friendly (Feber et al, 2023).[3] Millennials are becoming a major target group, with a purchasing power of up to $2.45 trillion. It is this group of shoppers that really care about what they are buying and where their money is going. More than 70 percent of them prefer to spend their finances at companies that support their interests (Patel, 2017).[4] This is a major reason why companies should not only look at the environmental side of the products they provide, but also make sure that their marketing communications clearly communicate to consumers their interest in doing business more sustainably. This is what can help them to build a long-term relationship with their customers.

Advertising campaigns focused on sustainability have several benefits. As the Green Business Bureau reports, these include:

- Attracting customers from the ever-growing market of sustainability-minded consumers.
- Getting employees who are passionate about making a difference in the world.
- Building strong brand awareness.
- Shaping a corporate culture that is focused on a higher purpose.
- Winning more tenders, as larger companies or government organisations are increasingly looking for suppliers who have sustainability as one of their values.[5]

[3] FEBER, D., GRANSKOG, A., LINGQVIST, O., NORDIGARDEN, D.: *Sustainability in packaging: Inside the minds of US consumers.* [online]. [2023-05-13]. Available at: <https://www.mckinsey.com/industries/paper-forest-products-and-packaging/our-insights/sustainability-in-packaging-inside-the-minds-of-us-consumers>.

[4] PATEL, D.: *The Millennial Marketplace and The Propagation Of The Triple Bottom Line.* [online]. [2023-05-13]. Available at: <https://www.forbes.com/sites/deeppatel/2017/07/28/the-millennial-marketplace-and-the-propagation-of-the-triple-bottom-line/?sh=6d6f1eefd04a>.

[5] WEST, D.: *What Is Sustainable Marketing and Why Is It Important in 2022.* [online]. [2023-05-13]. Available at: <https://greenbusinessbureau.com/business-function/marketing-sales/what-is-sustainable-marketing-and-why-is-it-important-in-2021/>.

2.2 Applying knowledge from neuromarketing to the creation of socially responsible campaigns

The use of emotions in marketing as such is a fairly well-known topic. The use of such emotional appeals in marketing communication is a current trend and the authors consider them an important part of modern marketing practice (Horňák, 2015).[6] The importance of using emotions in marketing is also confirmed by the study that emotions influence purchase decisions. They are also an inevitable part of all (not only purchasing) decisions. In his study, the author found that consumers use emotions (experiential and personal) more than information consisting of data and facts when evaluating brands (Murray, 2013).[7] Next research confirms that people mainly use the criterion: *"How will I feel when I do it"* when making decisions (Demasio, 1998).[8] Several researches have confirmed that if an advertisement evokes an emotion in the viewer, it is easier to remember.

Neuromarketing research is giving marketers new insights into how to communicate advertising campaigns more effectively. Often times, when marketing campaigns are implemented, they do not have the benefit that was originally expected, or even elicit the complete opposite reaction from the customer. We can apply the individual findings from the field of neuromarketing to the creation of campaigns, but at the same time, thanks to neuromarketing research, it is possible to verify in advance the effectiveness of advertising and the emotions it has evoked in the customer.

There are many specificities in campaigns that address sustainability. It's not just a matter of ensuring that campaigns are well-designed and evoke the desired emotion in the target respondent. It is also about influencing consumer behaviour to want to be interested in sustainability. Future Proof Insights conducted a study to, Evaluate the cognitive impact of Sustainability Messaging versus Traditional Promotional & Purpose-Driven Messaging for both Luxury & Commodity goods. This study compared three different versions of the advertising message, namely:

- Traditional Promotional: Typical creative or promotional advertising
- Sustainable: environmental related messaging
- Purpose Driven: Cause based marketing for topics such as Social Justice, Gender, Mental Health and more

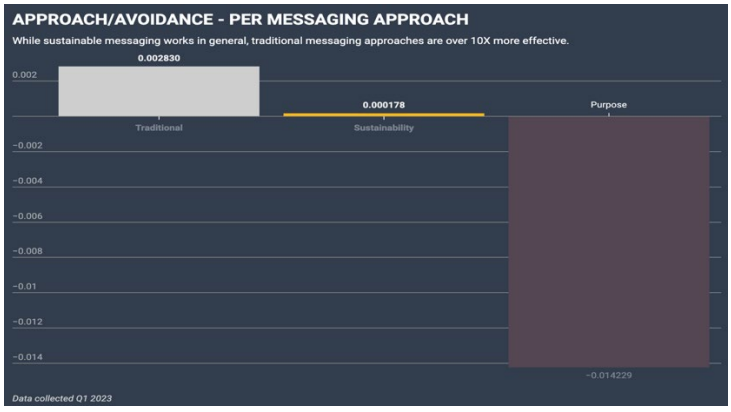

Image 1: While sustainable messaging works in general, traditional messaging approaches are over 10x effective.

Source: *People Care About Sustainability… But Do Shoppers?* [online]. [2023-04-10]. Available at: <https://www.futureproofinsights.ie/2023/03/30/people-care-about-sustainability-but-do-shoppers/>.

The traditional form of the advertising message was more than ten times more effective than a message that included information about the environment. It is important to note, however, that the study goes on to note

[6] HORŇÁK, P., ŠURINOVÁ, S.: Fear in advertising - The phenomenon of fear and its effective use in advertising. In HORŇÁK, P. (eds.): *Marketing Communication and Media 14. Proceedings of scientific studies in the field of history and theory of marketing communication and media*. Bratislava : Comenius University, 2015, p. 10.

[7] MURRAY, N. P.: *How Emotions Influence What We Buy.* [online]. [2023-05-13]. Available at: <https://www.psychologytoday.com/intl/blog/inside-the-consumer-mind/201302/how-emotions-influence-what-we-buy>.

[8] DAMASIO, A. R.: *Descartes' Error: Emotion, Reason, and the Human Brain.* New York : Grosset, 1998, p. 101.

that these results are individual for different categories of goods. Sustainability-focused advertising messages performed better for goods that can be described as luxury.[9]

Consumers' views on sustainability often differ from their actual purchasing behaviour. Although people often state in surveys that they care about protecting the environment and prefer products or companies that share their values, a study by researchers at Sungkyunkwan University confirms that people are not always willing to give up their convenience at the expense of sustainability. When shown a green logo that represented a company that cared about sustainability, research participants demonstrated higher ACC and higher SLP and lingual gyri activity. This indicates that participants showed greater cognitive resources and more time in managing green logos. However, this may play a role in building a stronger bond with the company. Based on these findings from the study conducted, the following recommendations were formulated for the marketing campaigns:

- Emphasize subtle priming marketing techniques to foster relational reasoning and empower consumers to make independent product choices.
- Sustainability campaigns should educate the public about the environmental risks faced by all living beings, including humans, instead of indiscriminately pressuring consumers towards sustainability.
- Marketers should showcase additional advantages of sustainable products to meet customers' needs and desires effectively.[10]

Exploring the emotions that people experience in individual advertising campaigns and their impact on viewers' overall attitudes or decisions can be very useful. This also applies to advertising campaigns that focus on the topic of sustainability. The consultancy *Kantar* has compiled an extensive database of ads that address social and environmental issues. Since 2016, the number of such ads has tripled, but consumers themselves are often not convinced of the credibility of the ad. As many as 64% of people believe that brands are only engaging on these issues for profit.[11] In collaboration with Emotion AI company *Affectiva,* they conducted research to provide a comprehensive view of consumer reactions to the topic of sustainability. They compared successful ads that addressed various environmental ones to unsuccessful ones. The less successful ones are often more concerned with describing the problem than solving it. However, by examining emotions when viewing the ads, it was found that the more effective ads were those that evoked more positive emotions in people. Although they also contained a proper need to address the environmental issue, these ads contained a more optimistic call to action. Thus, advertisers should consider incorporating humour and optimism (Pang, 2022). [12]

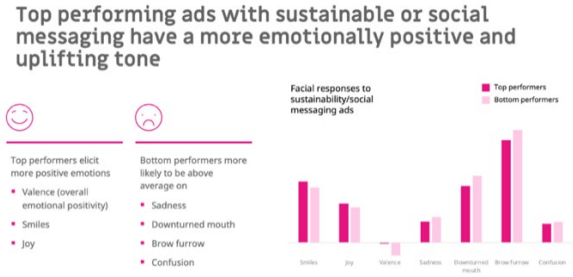

Image 2: Ads that are more powerful in communicating socially responsible themes evoke more positive emotions in consumers

[9] *People Care About Sustainability… But Do Shoppers?* [online]. [2023-04-10]. Available at: <https://www.futureproofinsights.ie/2023/03/30/people-care-about-sustainability-but-do-shoppers/>.

[10] *The Neuromarketing Behind Sustainable Consumer Behavior* [online]. [2023-04-20]. Available at: <https://www.popneuro.com/neuromarketing-blog/consumer-behavior-psychology-sustainability-neuroscience-market-strategy-eco-friendly>.

[11] *Navigating the Emotional World of Sustainability in Advertising*. [online]. [2023-04-20]. Available at: <https://www.kantar.com/inspiration/advertising-media/webinar-how-to-navigate-the-emotional-world-of-sustainability-in-advertising>.

[12] PANG, S.: *Navigating Sustainability in Advertising with Emotion AI*. [online]. [2023-04-20]. Available at: <https://blog.affectiva.com/navigating-sustainability-in-advertising-with-emotion-ai>.

Source: LYRHEDEN, F.: *5 Key Insights about Advertising in Times of Crisis* [online]. [2023-04-10]. Available at: <https://blog.affectiva.com/5-key-insights-about-advertising-in-times-of-crisis>.



Image 3: A sample of the emotions felt by viewers in each sequence of a sustainability ad

Source: PANG, S.: *Navigating Sustainability in Advertising with Emotion AI.* [online]. [2023-04-10]. Available at: <https://blog.affectiva.com/navigating-sustainability-in-advertising-with-emotion-ai>.

The integration of communication into sustainability and fashion industry awareness has become essential. The promotion of sustainable brands and fashion businesses through marketing communication serves as the primary prerequisite and means to encourage a shift in thinking and alter individual purchasing habits.[13] Precisely because brands want to communicate more also the topic of sustainability it is very important to do it right. Many methods of communication are more likely to create fear or hopelessness in consumers, which is not desirable in this case, as advertising may not be that effective. Kantar and Affectiva based on research have identified five key psychological factors that contribute to the success of sustainability messages in advertisements:

- Nature Connectedness: Capture viewers' ability to connect with the natural world by incorporating elements that resonate with their relationship to nature.
- Implementation Intentions: Include a clear roadmap towards sustainability within the ad, effectively communicating a credible strategy for achieving goals.
- A Sense of Control: Empower viewers to consciously make changes in their daily activities to adopt a greener lifestyle, tapping into their intrinsic motivation for personal growth.
- Mitigating Present Bias: Overcome the tendency for people to view sustainability as a future problem rather than an immediate concern by using ad creative that highlights the relevance and urgency of the issue.
- Social Learning: Portray sustainable brand behaviours by understanding and modelling the behaviours, emotions, and perspectives of others, fostering a sense of social influence and positive role modelling.[14]

3. Methodology

The aim of our paper was to compile a set of recommendations, based on the analysis of secondary sources, to help make the communication of the message of sustainability advertising campaigns more effective. In the context of modern technology and the constant advancement of opportunities in research, we mapped the opportunities available to brands in leveraging insights from behavioural science and neuromarketing. Secondary research consists of analysing data that has been collected for other purposes in the past. The data that we have mentioned in this paper was mainly collected from rolled research conducted abroad, but we have

[13] URMÍNOVÁ, M., KUSÁ, A.: Innovative Approaches in Marketing Communication in Sustainable Fashion Business. In NISCO. A.: *Proceedings of the 15th European Conference on Innovation and Entrepreneurship. Roma : Università degli Studi Internazionali di Roma. 2020.* [online]. [2023-04-20]. Available at: <https://www.proquest.com/openview/1503caff36253c71cbd32ab063712b39/1?pq-origsite=gscholar&cbl=396494>.

[14] PANG, S.: *Navigating Sustainability in Advertising with Emotion AI*. [online]. [2023-04-20]. Available at: <https://blog.affectiva.com/navigating-sustainability-in-advertising-with-emotion-ai>.

also drawn from research that has been conducted in the past at our university. This gave us the opportunity to look at the current situation from a broader perspective. However, the data we decided to analyse could not come from Slovakia alone, as it is not currently possible to collect enough sources, either in the form of research or literature, to be able to provide a sufficient number of recommendations applicable to marketing practice. Neuromarketing research is mostly conducted outside Slovakia, and thus for the relevance and topicality of our paper we had to use foreign sources. On the basis of the description and subsequent analysis of individual findings based on neuromarketing research in the context of advertising campaigns focused on sustainability, we were able to identify the advantages as well as the weaknesses that can be encountered in the development of marketing communications for brands. We drew data not only from international written sources, but also through expert lectures and interviews with people working in this field, who were able to provide us with valuable information for the purpose of improving our work. By summarizing the data obtained from the qualitative content analysis, we arrived at the possibilities of using neuromarketing, which thanks to such a summary overview, it is much easier to apply these findings to the process of creating marketing communications. As we have already mentioned in the thesis, consumers are increasingly concerned about the values to which a brand ascribes and its overall impact on society and the environment. This is also the reason why we have chosen a specific type of advertising campaigns for our work, namely those focused on sustainability. As we expect this topic to be increasingly relevant in the context of a brand's potential differentiation from its competitors, we see our work as a possible contribution to the design of more effective advertising campaigns. A disadvantage of secondary data may be its lack of timeliness for the period. Especially in a field such as neuromarketing, it is very important to examine information for the current period. However, we have tried to avoid this by obtaining information from as up-to-date and relevant sources as possible. We have supplemented these with our own knowledge from practice, which we have acquired while researching the topic or working directly with the individual tools such as eye-tracking, facial recognition, and galvanic skin response measurements. We have conducted number of academic research studies to gain an understanding of consumer behaviour in the neuromarketing laboratory at the Faculty of Media Communications of the University of St. Cyril and Methodius in Trnava. Thanks to that we could better analyse and understand the profound effects of colours, movements, contrasts, and emotions in shaping individuals' behaviour and decision-making processes. In this way, we wanted to bring the readers closer to the current state of the possibilities of using knowledge from neuromarketing in the implementation of marketing activities. We also conducted a content analysis of the ways in which the different tools used in neuromarketing are used in message development in advertising campaigns aimed at sustainability, and by deduction we arrived at our own findings.

4. Discussion

The topic of sustainability has recently become very popular not only among the general public, but also in the communication of brands and companies. Companies have long been focusing on how to build a positive image of themselves in the eyes of their customers. Price and availability are no longer the only factors. Increasingly, brands need to pay more and more attention to the environmental impact of their business. Not only do regulations come from the legislative framework, but often brands are faced with the fact that it is their customers themselves who care about the brand behaving responsibly. So, their role is also to create communications that sufficiently describe how the brand feels about sustainability. With the coming climate crisis, we need to make sure that we communicate more and more to our customers the importance of making informed purchases. Although many surveys show that people care about the environmental footprint of their brand, this is not always true. As we described in the article, sometimes it is very difficult for people to give up their own comfort. So how do you encourage people to prioritise products or services that care about the environment? How to motivate them to care about this issue themselves? The need to involve emotions in advertising campaigns has been described in many research studies. Also, in this paper we have mentioned several studies that discuss the need to use emotions in marketing. With the advent of technology, opportunities are opening up for brands to get to know their customers even better. It is neuromarketing research and the application of its findings that can help brands create more effective advertising campaigns that will motivate people to choose products or services more responsibly. As we stated in the article, it is still not a purely automatic choice for most people. On the contrary, considering the choice of a particular product that is eco-friendlier in nature requires a lot of concentration. That is why some people end up opting for a different product. This may also be due to an automatic perception of a high price. Attitudes towards sustainability vary not only across countries but also across age generations. It is the knowledge we have gained from secondary studies and scientific sources that can help brands to focus on how to reach their customers in the right way when formulating their advertising messages. It is neuromarketing that offers us proven insights into how people

make real choices, what they experience and what they think. At the same time, these technologies offer marketers the opportunity to be more responsive to our target audience, specifically at the level of communicating with the individual. By adapting communication to current trends and verified information from research, companies are able to choose not only the appropriate moment, but also the form in which to communicate their message.

5. Results

The paper provides a brief insight into the importance of emotions in marketing. Primarily, however, it looks at how brands can communicate more effectively in sustainability advertising campaigns thanks to findings from neuromarketing, i.e. how people actually make purchasing decisions. As this is a great help that has benefits not only in marketing but also in other areas, such as changing people's behaviour to be more concerned about the environment, there is a need to continuously engage in finding out new information about this area. It is understanding customer emotions that offers brands the opportunity to implement marketing activities more effectively. The effectiveness of various neuromarketing techniques in sustainable advertising is critically evaluated, considering the implications for promoting environmental behaviours and fostering emotional connections with environmental issues. The limitations of the study are also discussed, along with potential avenues for future research. Overall, the results demonstrate the potential of neuromarketing strategies in enhancing the impact of environmental campaigns. The findings provide valuable insights for practitioners and researchers interested in leveraging neuroscience-based approaches to drive positive environmental changes and encourage pro-environmental actions in society. The findings suggest that adding neuromarketing techniques in environmental campaigns can lead to improvements in behavioural change, engagement, and message recall. We think that neuroscience-based approaches have the potential to create more impactful and persuasive campaigns that resonate with audiences on a deeper level. However, while the results are encouraging, we are sure that further research is needed to fully understand the underlying mechanisms and to explore how to optimize these strategies for different environmental issues and target demographics.

6. Conclusions

Neuromarketing is increasingly being talked about nowadays, not least because artificial intelligence has made many of the tools used in this type of research much more accessible to the general public. However, it is still a topic that is not relevant in every country, mainly because of the lack of financial resources, technology or qualified research staff. By using insights from neuromarketing or behavioural science, many brands are able to make their marketing communications more effective and achieve higher conversions. However, neuromarketing does not only offer the opportunity to increase companies' profits. In our article, we looked at how neuromarketing insights can make advertising communications that convey a message of sustainability more effective. Although surveys often claim that people make decisions based on how a company treats the environment, many studies have shown that this is not yet true. While people may be interested in supporting a brand that presents itself as more sustainable compared to its competitors, they may be deterred from making a purchase by the perceived higher price tag associated with a greener product. These attitudes vary not only across countries, age groups of consumers but also across the category of goods they buy. It is therefore very difficult, if not impossible, to come up with miracle recommendations to make such specific communication more effective. Brands therefore need to know very well the situation in their market, their consumers and their attitudes towards the environment. In this article, however, we make some recommendations that may work to improve advertising communications that address sustainability. These include, for example, how to work with people's emotions to ensure that they have the most positive experience possible from a given advertisement. While there is a need to express concern about the current climate crisis we are facing, there is also a need to provide people with solutions on how they can make a difference. It is this motivation that will evoke positive emotions in them, so that they are more likely to make a purchasing decision that is kinder to the planet. The importance of talking and educating about the climate crisis is used by many brands as it is one of their values they want to present. However, it is important that they do it in the right way.

7. Limitations and Future Research

Research paper Using neuromarketing to create more effective messages in sustainability advertising is not without its limitations. While the findings have provided promising insights into the potential of leveraging neuroscience-based strategies, it is essential to critically examine the boundaries of the study to interpret the results accurately and to know, how effectively communicate environmental messages.

The study primarily focused on short-term emotional engagement and changes in human behaviour. Long-term effects of neuromarketing strategies on sustained pro-environmental behaviours remain unclear, and future research should explore effects over time.

While neuromarketing provides valuable insights, its usage raises ethical concerns, such as for example manipulation, regarding privacy, and informed consent. It is essential to continue addressing these issues to ensure responsible and transparent application of neuromarketing in environmental and sustainable campaigns.

A comparative analysis will offer insights into tailoring strategies to optimize campaign outcomes for specific environmental issues and target audiences. Future research should compare the effectiveness of different neuromarketing techniques.

Cross-cultural investigations are crucial to understanding how neuromarketing strategies may vary across different societies. Cultural nuances should be considered when designing effective campaigns for specific targets.

In conclusion, while this study provides interesting insights into the potential of neuromarketing in advertising, there are inherent limitations which is important to take into account.

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AR and VR as a Shaping Trend in Consumer Behaviour

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Abstract: Augmented Reality (AR) and Virtual Reality (VR) have been on the rise in recent years. These technologies have had a great impact on the marketing field and, especially, consumer behaviour. This paper examines the potential and influence of AR and VR as a shaping trend in consumer behaviour, including their usage across various industries and their impact on consumer engagement, purchasing experience and decision-making. We are discovering the challenges that are occurring with the adoption of AR and VR in marketing and retail, such as the need for innovation, privacy concerns, and potential ethical issues. Opportunities that those technologies bring with their adoption are also researched, including personalized shopping experiences, interactive advertising or virtual showrooms. The importance of the consumer perspective on the topic and the way marketers understand this perspective are also highlighted. This way, we provide information not only from the marketers' point of view but also, from the consumers` one, including challenges and obstacles they may face while interacting with selected technologies. At the end of the article, we suggest ways how companies may implement AR and VR in their marketing strategy, which in turn would provide them with the value they can give to their customers as well as an enhanced brand image on the market. Suggested ways may also be used as a starting point for further research, where a complex model of implementation would be created. The main goal of the article is to provide readers with information that brings a comprehensive understanding of the role AR and VR have in modern marketing, how it is shaping consumer behaviour, and how big and small businesses can use those technologies to stay competitive in an ever-changing environment. The article is based on theoretical research from trustworthy sources, both printed and digital, including statistical information from external sources.

Keywords: Augmented Reality, Virtual Reality, Consumer Behaviour, Marketing Communication.

1. Introduction

Challenges that occurred in the market during the last three years had a giant impact on both, online and retail shopping. First and foremost, most brands were, quite literally, forced to move their businesses online, either partly or entirely. During the COVID-19 pandemic, when social restrictions were in place, small businesses had to implement some measures in order to stay on the market. War in Ukraine that occurred last year brought a whole new wave of uncertainty among citizens in many countries, with prices rising on goods and services. To a big extent, changes were required on the market, since the competition in the online environment has grown, and a need for differentiation was in place. In our article, we want to speak about one of the biggest trends in shopping today – the usage of augmented and virtual reality.

In our article we are aiming to fulfill the following research objectives:

- To conclude a bibliography research and provide the necessary theoretical background on the topics of Augmented Reality (AR) and Virtual Reality (VR).
- To analyze real case studies of AR and VR usage in retail.
- To analyze the challenges of AR and VR in shopping.
- To write about the ways, how AR and VR may be implemented in brands` marketing strategies.

2. Theoretical background

We must start an article by providing a required theoretical background on both technologies to specify, what exactly we are talking about. Firstly, let's define what is virtual reality. By Merriam-Webster`s dictionary, virtual reality is: "*an artificial environment which is experienced through sensory stimuli (such as sights and sounds) provided by a computer and in which one's actions partially determine what happens in the environment*" (Merriam-Webster, 1987). Cambridge dictionary, on the other hand, says that virtual reality is: "*a set of images and sounds, produced by a computer, that seem to represent a place or a situation that a person can take part in*" (Cambridge Dictionary, 2015). As we may see, the definitions are somewhat different as they approach the topic from different angles. We find Merriam-Websters` definition to be more accurate since it mentions the way information is received, and it states that the user can affect the environment to some degree, while Cambridge one takes the user as a passive visitor of a virtual environment, not an active one. Both definitions state that the environment itself is generated on a computer, but we find neither of them to be completely satisfying. Jason Jerald summarized definitions of other authors: "*Virtual reality is defined to be a computer-*

generated digital environment that can be experienced and interacted with as if that environment were real." (Jerald, 2016). For our article, we find this definition to be appropriate since it summarizes the main ideas of VR perfectly: it is generated on a computer and it can be interacted with. We also may define key elements of experiencing VR:

- The participants;
- The creators;
- Virtual world;
- Immersion;
- Interactivity (Sherman, Craig, 2019).

Now, let`s take a look at augmented reality (AR) and how it is different. Since both terms have the word reality in them, it means that both somehow deal with the environment the user sees and interacts with. Unlike VR, AR doesn`t fully simulate the environment, meaning it does not create a whole new virtual world to experience but rather augments the real world. In the "*Handbook of Augmented Reality*", the following definition is provided: "*real-time direct or indirect view of a physical real-world environment that has been enhanced/augmented by adding virtual computer-generated information to it*" (Fuhrt, 2011). However, it is important to note that augmented reality usually has the goal of providing a user with an experience. The core idea is that AR may engage the user in an activity with an augmented element while leaving the user with an opportunity to interact with the real, physical world (Craig, 2013). Now, when the definition of both technologies was provided, we need to compare the two between each other to understand, in which use cases certain technology would be better or worse.

The biggest difference between technologies is that VR intends to completely "take people to another world", while AR only blends the real environment with certain virtual elements (Owens, 2022). To make it clear, let`s look at an example. If a person wants to experience a rollercoaster from their home, they can try to take a trip using a VR helmet. In such cases, AR won`t be much of a help due to lower levels of engagement and overall limitations this technology provides. Users will be able to produce an image of a rollercoaster on a table, for example, but it won`t make them experience it. Let`s consider another example. A person wants to buy a new pair of sneakers but is deciding between two models. Since those items are online exclusives there is no way to try them in a retail shop before purchasing. Using VR, a person will be able to try them on, but it still would require a headset, and certain problems can occur. Moreover, what if a person is on the move, has to decide quickly, or just doesn`t have a VR headset at the moment? In such cases, AR may come in handy. Most AR shopping activities are held through the phone of the user, making them usable anywhere and anytime. Another question is whether the user really needs to have a full-on immersion to check how a pair of sneakers would fit them. In most cases, trying them on with one`s camera would be sufficient. The same applies to most fields of online shopping, and in this article, we will look at several examples of usage of both technologies – AR and VR.

3. Virtual reality in shopping

Virtual reality in shopping has been a researched topic for more than a decade already. Based on the summarization of the research made by Xi and Hamari (2021), we can trace certain similarities among those studies. They found that the majority of existing scientific studies of VR in shopping simply attempt to create an identical environment user would encounter in a physical shop, thus trying to recreate the same experience. By using this approach, it is expectable that the results of those studies would be somewhat similar to studies of consumer behaviour in physical shops. In our article, we would like to look not only at this "traditional" approach to VR in shopping but also at other ways it may be used to enhance user experience while buying.

Before analysing certain examples, we need to emphasize that VR as a technology requires users to have a VR headset of any kind, making it less accessible for mass markets. If we look at high-end VR headsets, they tend to be rather expensive, with prices ranging from a few hundred to even thousands of euros, and not always meant for the general public. On the other hand, there are cheap alternatives, like the Google Cardboard, which can be bought for as low as 10 euros, but requires a phone with VR content to operate (Kerrebroeck, Brengman, Willems, 2017).

A recent study of consumers shows a big shift toward massive usage of VR technologies. In March 2022, the National Research Group conducted a study with 2500 respondents aged 18-64 throughout the United States of America. Among the highlights from this study, we need to emphasize that 13% of all households owned at least one VR headset, with 88% of owners using it multiple times per month and 60% using it more than once a week.

53% of respondents specified as a reason for purchase that they wanted to play games, followed by 33% who wanted to see what the hype around VR is about, and 32% of new technologies adopters (Navaratnam-Blair et al, 2022). Most VR headsets owners use VR for gaming – 72%, watching films or TV – 42%, or exercising – 35%. From this information, we can see the mental challenge VR technology has yet to overcome – showing people that the technology brings much more possibilities than just gaming. However, according to a systematic literature review made by Taufik, Kunz and Onwezen in 2021 (2021) on the topic, in all studies where there were only VR conditions by design, at least part of these experimental designs affected consumer behaviour and outcome measures. Since the second and third biggest amount of votes were given to the statements that were based on the interest in technologies, we may summarize that, today, most people are either buying VR headsets for gaming or out of general interest, without certain use cases in mind.

The first example we want to mention in our paper is the basic usage of VR – virtual showrooms or virtual shops. A great example of such a use is IKEA Immerse, which provided users with the possibility to experience VR shopping both in-store, and in the house of the users (Demodern, 2019). It provided users with an option to see, what certain pieces of the interior would look like in real size or even inside their rooms. The user could change the type of furniture in real-time, as well as the type of the material, its colour, as may be seen in figure 1, design variation, and even such details as lightning or putting out the candle were included. In the case of IKEA, which sells big furniture as well, such usage may be very appropriate for their customers, since it is not always easy to imagine how certain pieces will look inside certain rooms.



Figure 1: IKEA Immerse UI

Source: "IKEA Immerse" (2018), [online], Demodern, https://demodern.com/projects/ikea-vr-immerse.

But we believe that VR has a much bigger potential in shopping. A great example of a company that approaches VR from different angle is *The North Face*. As an example let's look at the campaign from South Korea from the year 2015. The idea was to create the most immersive experience possible, for which a replica of the South Pole camp was created inside the shopping mall to introduce a new collection of coats McMurdo (Davidge, 2015). When entering the spot users were provided with *The North Face* coats, to be more engaged in the experience. They were next invited to take a seat and put on the VR headset. In virtual reality, they were riding with a dog sled on the South Pole. However, VR was only one part of the experience prepared for its customers. After some time in the virtual reality, when a user was already engaged, the headset was taken off and the user got to ride the same dog sled inside the mall, as shown in figure 2. At the end of the ride, customers were able to grab the specific model of McMurdo coat. This way company was able to create a unique experience and combine VR, retail, and their brand`s value – *Never Stop Exploring*, all in one campaign, thus not only potentially increasing sales, but building a strong image of the brand, connection with the customers, as well as gaining media attention. We believe, that today such VR campaigns have the most potential in shopping, to cover the goals of increasing sales, building connections with customers as well as bringing attention to the brand from the media and public side.



Figure 2: The North Face South Pole Campaign

Source: THE NORTH FACE KOREA. (2015) "맥머도 남극탐험 | 노스페이스 The North Face #Sudden Exploration #VR Experience with Oculus", [online], THE NORTH FACE KOREA, https://www.youtube.com/watch?v=FSfkE4emoBE.

4. Challenges of virtual reality in shopping

As with every new technology, VR massive adoption will require overcoming certain challenges that will occur. In this part of our paper, we want to describe a few that are present now on the market in connection with virtual reality in shopping.

- **Need for innovation** (National Research Council, Computer Science and Telecommunications Board, Committee on Virtual Reality Research and Development, 1995). On the one hand, as we already mentioned, only a small percentage of households own a VR headset today, creating a big question about the profitability of such activities. Most VR headsets tend to be expensive, while cheaper alternatives don`t provide a similar level of experience. On the other hand, the technology is still not that advanced so any business could create a VR experience for their audiences without breaking the bank. Today, with the creation of Artificial Intelligence (AI) services, VR also got affected. Services like Skybox Labs from Blockade Labs enable users to create 360-degree images from any text prompt they input.
- **Security threats.** While security threats are common on the internet, the virtual environment brings a whole new level of information hackers may want to collect from the consumer. From their movements and manners up to the changes in the virtual reality person is experiencing, all of this may be a target for hackers.
- **Imitation of the real experience.** To make a user believe that the VR experience is real, the visual itself is not enough (ScienceSoft, 2021). Things like sound, smell and other little disruptions are essential for the recreation of what we consider to be real experience. As soon as those external factors are not included, the brain will realize that, thus not associating the VR experience with the real one. As a solution, different methods may be provided, from the creation of special environments or special soundtracks to the usage of modern technologies providing 360-degree sounds to increase level of immersion.

5. Augmented reality in shopping

Augmented reality (AR) has been used on the market for more than 5 years already, and statistics show us, that interest in the technology only rises over time. According to the research held in 2022 by McKinsey&Company, 48% of respondents are interested to use a "metaverse" technology, where belong AR and VR, for shopping in the following 5 years. Moreover, 38% said that they were already using AR in 2022, compared to only 23% in the year 2017 (Keenan, 2022). According to the leading Visual Commerce company Threekit (2023), 61% of consumers prefer those retailers, that provide AR experiences for them, as well as 71% of consumers express their willingness to increase their shopping frequency if they were to utilize AR technologies. From this data, we may state that AR may serve as a factor that increases customer confidence since they can try the product virtually before buying or ordering it. Another interesting data from this research says that 40% of consumers

are open to the idea of paying more for a product that can be customized with the help of AR. This information may serve as a great insight for brands who are afraid to invest in AR as a technology – since almost half of the consumers are prepared to pay more, those investments may pay out fast. To show just how widespread this technology has become already, according to the same researchers, in 2023 more than 1 billion people use AR worldwide, however, only 1% of retailers stated that they are using VR in their businesses. This information shows that there is still a big open space for brands to get noticed and increase sales thanks to AR.

There are many ways AR can be used to help customers while buying products or services. The most popular and used one is through social media apps and camera filters (Keenan, 2022). To a big extent, it is due to the simplicity of this method – you don`t need to create a whole new application, it is enough just to make an AR filter, and users will be able to use it through, applications like Instagram. It doesn`t mean that the process is very easy, but many brands are capable of it. It is also worth mentioning that social networks themselves are providing users with applications, where AR filters can be created, like Spark Studio by Meta or SnapAR Lens Studio by Snapchat.

The first example of AR usage we want to talk about is in a form of a virtual try-on. As it can be derived from its name, the customer gets the ability to try on a product on themselves before buying, anywhere and anytime. A whole range of successful implementations can be named, but we will take a look at two – one with the usage of the social network, and the other outside of it. The first was made by the luxury fashion brand – Farfetch in collaboration with Snapchat. The idea and the whole process were simple – the customer just had to stay in front of the camera, and vocally say, which type of clothes they would like to try on. After that, the software would search for appropriate results in the brand`s catalogue and put them directly on the person`s body. Also, people could`ve shared photos of themselves with try-on and buy products directly from the filter (Kristensen, 2022).

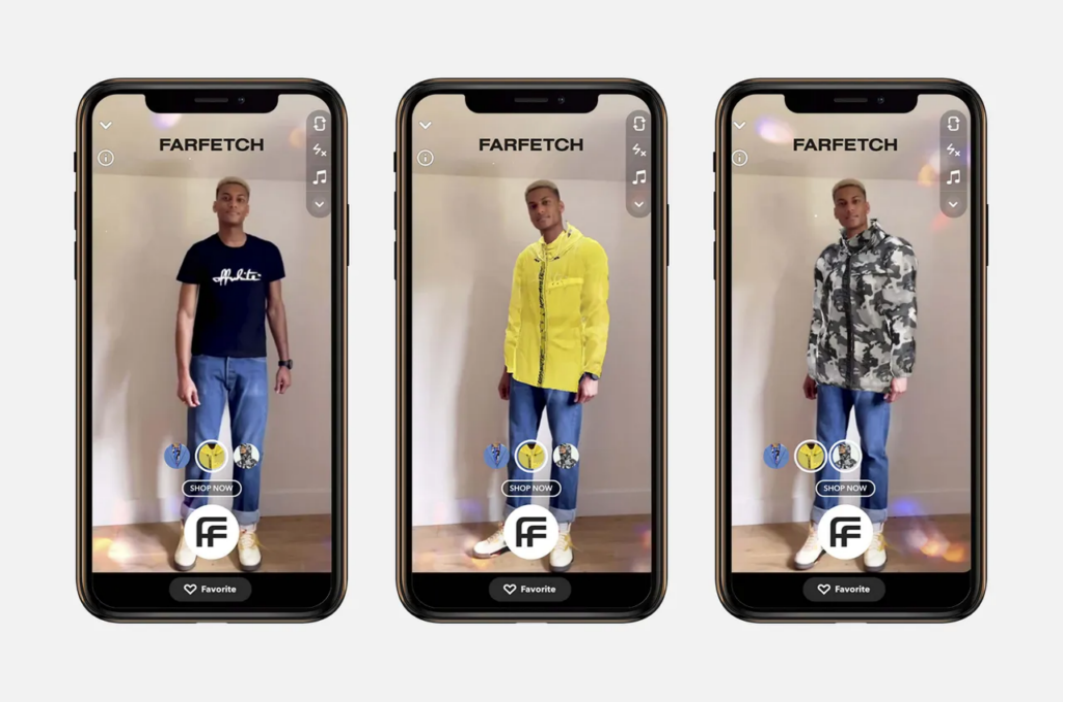

Figure 3: AR filter by Farfetch on Snapchat

Source: Kristensen, E. (2022) “The 6 Best Virtual Try-On Examples We’ve Seen”, [online], Drip, https://www.drip.com/blog/virtual-try-on-examples.

The second example was made by the brand eyerim in Slovakia. They implemented an AR filter on their website, instead of using social media. The brand itself specializes in selling glasses, so the AR filter they created allowed users to try glasses on them. It was called “Magic Mirror” and worked simply, you just open the glasses of your liking, push the button, and a window with a filter will appear. Since everything is happening right on the company`s website, there are no barriers for purchase after trying. Customers can also go to a catalogue and try different products at once – without the need of opening many carts of products.

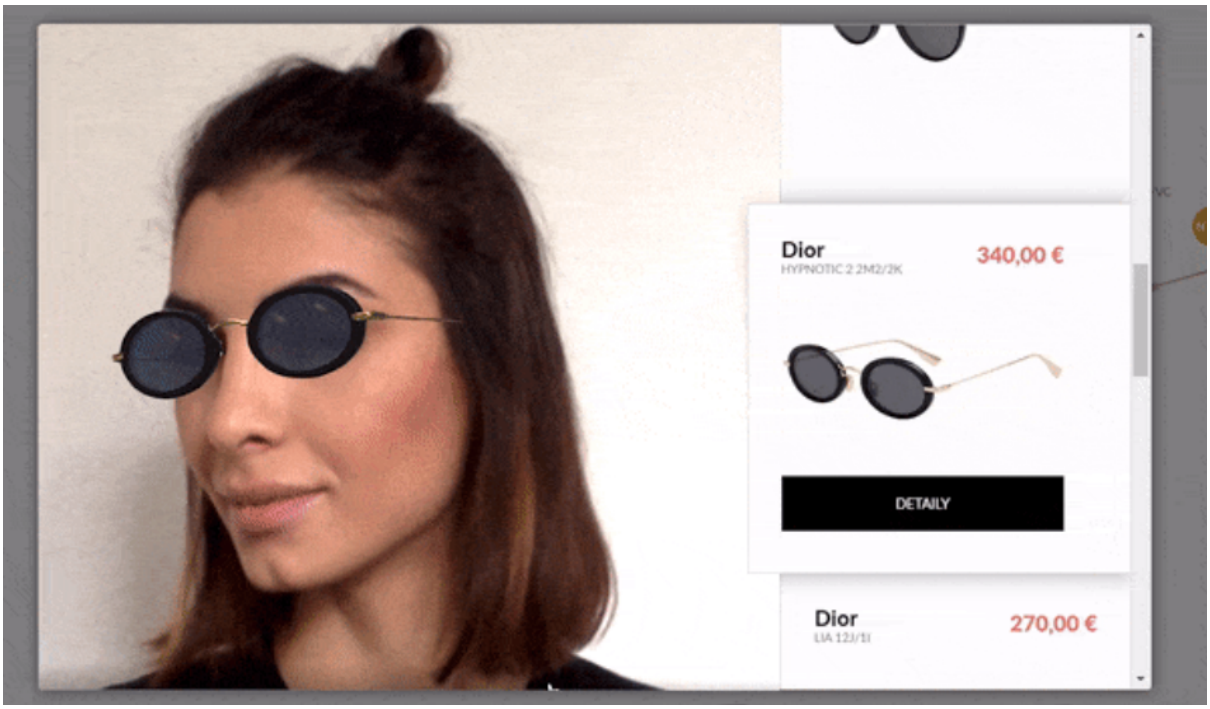

Figure 4: AR filter by Eyerim

Source: Patrícia. (2019) "eyerim predstavuje: Magic Mirror", [online], Eyerim, https://eyerim.sk/blog/magic-mirror.

But virtual try-on is just one way augmented reality can be used. Let`s take a look at some other types of usage. AR filters in shopping may also be used to help customers with the problems they can encounter while making a decision. For example, we all know how frustrating choosing the right size of sneakers can be. Different brands have different measures, and you don`t know for sure if shoes will fit you when ordering something new. To deal with this problem, Nike in 2019 released Nike Fit, an AR application where customers could measure their feet, and get the correct size for Nike shoes. As a result, the number of returns has reduced, and overall performance on Nike shoes was improved (Taoufiki, 2022). As we can see, such highly-personalised and helpful AR extensions can also be created with enough creativity and resources. It can be possibly used not only in the fashion sphere but, for example, while purchasing medicine from a store, for example, so the person can see the whole medicine instruction or precautions right from the product page.

Many consider AR to be the future of shopping, both online and retail. We agree with that statement, but only partly. In our opinion, it is not only the future of shopping but also its present. Of course, there are many more ways of implementation and usage, both online and retail, and in this article we didn`t cover even a quarter of them, which leaves a giant field for further research. One thing is certain, AR is a technology that brings a completely new dimension to shopping, and it is changing shopping the way we know it.

6. Challenges of augmented reality in shopping

- **Privacy concerns**. The key requirements for the usage of augmented reality are access to the users' camera and, oftentimes, location (Arth, Schmalstieg, 2011). This brings concerns about the privacy of the user and the safety of their information. If some AR application gets hacked or data from it gets breached, it may mean that the hackers behind it not only get access to the personal data but also the real footage from the camera, as well as the location from which this footage was taken.
- **Device challenges** (Abed, 2018). Even though today most phones are capable of handling AR filters or extensions without problems, the situation may change when the light conditioning is worse, for example, in the evening. In a dark environment, not every camera can handle the situation, understand where the object is, and provide an appropriate AR experience. This challenge, however, will most likely get solved by itself in a few years, since technologies, as well as mobile phones, are constantly becoming better, and even today many budget phones are capable of most things in connection to VR.

- **Ethical issues**. Many AR filters are aimed at people`s faces, making anonymity a big question for the usage of the technology. Also, many of those filters are projected to somehow "improve" the face of the person, what can lead to the creation of unrealistic expectations, reality distortions or even mental problems. Research on ethical issues were conducted in connection to different brands or social networks, however, we were not able to find many of them about the usage of AR, which is surely an interesting topic for further research.

7. AR and VR implementation into the brand`s marketing strategy

We think that it is necessary to divide possible implementation of AR and VR into the brand`s marketing strategy based on the size of the company, technological background, interests of the public and target audience. Today, virtual reality still seems to be a rather niche marketing opportunity for the brands, that have bigger budgets for their marketing. To summarize, on our opinion, as of June 2023, if the company wants to create a VR experience for its customers, we would recommend creating these activities not to increase sales, but to build unique experiences, get media attention, and build an innovative image of the brand. A great example of what we mean was portrayed in "The North Face South Pole Campaign" which we described earlier. It was such a unique experience for the customers, that even years after the campaign was conducted, it is still talked about.

On the contrary side, augmented reality has already become deeply integrated into the market, and both, small and big brands use it in a certain way. One of the biggest advantages of it is that augmented reality activities may be accessed with most smartphones today. Smaller brands may tend to create simpler filters, like mini-games on Instagram or face filters on Snapchat. Bigger brands also tend to use such simple filters as well as more complex AR extensions, like the ability to try brands` furniture inside of a house in case of an IKEA, or trying on clothes like Farfetch. In today`s market, it seems to become more of a necessity to use AR to stay relevant among competitors, as well as build the image of a modern, progressive brand in the heads of the customers. In our paper, we also provided statistics on how consumers perceive AR today, and why investment in this technology is worth it for many businesses. To summarize, if the company wants to implement AR in its marketing strategy today, we would recommend making it in a way that can be not only entertaining but also helpful for the consumer. As we mentioned in the examples earlier, if the company sells glasses or clothes, an AR filter with these products may be a good idea. And the similar idea may be implemented for almost any business on the market. Our main advice is to try to make AR a helping tool for the consumer – and not implement it as just modern technology for the sake of modern technology.

8. In conclusion

VR revolution has been predicted to appear on the market for many years already, but only now it starts to seem that the possibility of it actually happening appears on the horizon. Every year we see more companies doing VR activities, more headsets are being sold and companies face a larger need for differentiation. AR, on the other hand, has revolutionized the consumer market and greatly affects customer behaviour. In the conclusion of our paper, we also have to mention the limitations of the study conducted. It is important to understand, that we took a look only at a tiny fraction of the information, and examples available as of today, and since technologies are on the rise and actively developing, new papers, scientific research, market analysis, and case studies are being created and published every month. It is also important to acknowledge that, like with any new technology that comes to the mass market, it is required to follow its development and adapt one`s marketing strategy according to the current trends in the market and remember, that what is valid today does not have to be valid on the market tomorrow. As AR and VR technologies continue to advance, we can expect to see more and more brands incorporating them into their marketing strategies. While the potential profitability of certain AR and especially VR marketing activities may still be uncertain, the positive experiences and engagement levels seen in the market suggest that these technologies are here to stay. As the cost of entry continues to decrease and the technology becomes more widely available, we can expect to see more and more brands adopting AR and VR as part of their marketing strategies.

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A Tale of Two: How Network Agency Influences Network Creation for Start-ups

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Abstract: There is an existing consensus that networks positively impact start-ups. New ventures gain access to market information, funding, emotional support and improved legitimacy from networking. However, existing efforts at articulating network creation and impact on new ventures are skewed due to a strong focus on structural properties. Although these properties contribute to understanding network creation and impact, they often ignore the individual who is either a network beneficiary or broker. This study examines the role of the network actor's agency in entrepreneurial network creation. Understanding agency is critical for explaining how individuals make sense of network opportunities available within their context. Network agency reveals how entrepreneurial networks are created, what influences actor motives and behaviour, and the brokerage methods adopted to meet these motives.

This study explores network agency in two contexts: the interventionist incubator context and the location-induced cluster context. The Lagos Technology Ecosystem comprised of different incubator models and cluster is examined. 31 semi-structured interviews with start-ups from both contexts were conducted to get a nuanced view of how the context influences entrepreneurs' network agency. This paper reveals that network motives like personality, reciprocity, and legitimacy as the main motives for tenant firms to engage in network activities. Conversely, cluster firms listed trust, and the need to access knowledge, information and opportunity as key reasons for engaging in network action. In both contexts, direct and indirect brokerage is utilised to meet the motives triggered. However, the dynamics and nature of these brokerage methods are different across the two contexts. Tenant firms demonstrate a tertius Iugnes behaviour, while cluster firms demonstrate separation behaviour.

Keywords: Social Network, Agency, Entrepreneurial Networking, Networks, Lagos

1. Entrepreneurial Network and Networking Impact

Networks act as stimulants to the entrepreneurial process, as it allows entrepreneurs to obtain information and resources needed for battling business uncertainties (Chell and Baines, 2000). Additionally, Witt (2007) views that existing network studies hypothesize a positive relationship between networking and entrepreneurs. Therefore, there is a need to account for why individuals and groups enact certain networks. This will account for how and why the structure and processes of embeddedness affect entrepreneurs, and how this contributes to variations in the form of entrepreneurship generated (Slotte-Kock and Coviello, 2010; Mckveer, Anderson and Jack, 2014). Recognising the importance of these relationships in shaping organizational behaviour and firm performance, studies seem conflicted on how individuals make decisions; whether it is done independent of network structures or embedded within the dynamics of the network structure (Tasselli and Kilduff, 2019). This paper joins the emerging network agency discussion, exploring how individuals leverage network agency in creating and making decisions independent of their network structures. Agentic tools like network motivation and brokerage are used to understand how entrepreneurial networking is created within the entrepreneurial context of business incubators and enterprise clusters.

Studies like Kidluff and Brass (2010) and Tasselli et al. (2015) argue that the exclusion of individuals from social network research has never made sense, as researchers tend to treat network structures as given, and therefore pay less attention to how actors create, perpetuate and modify network structures through their actions (Gulati and Srivastava, 2012). According to Tasselli and Kidluff (2021), relying on the structural approach to networking and network creation ignores the importance of individual volition and action in network processes. Therefore, Emirbayer and Mische (1998) argue that empirical network studies continue to privilege network structure over network action initiators. They add that even when the individual's role is noted, it is often under-theorized. Equally, structuralist perspectives on network creation and impact have yielded conflicting findings, as attempts have been made to validate the impact of structural holes and closure; see studies like Kidluff and Oh (2006); Semrau and Werner (2013); Redlich et al. (2013) and Kreiser (2011). A plausible explanation for these varied views is provided by Jack et al. (2010) study, which opines that networking and networks exist as dynamic endeavours and relationships that could induce various changes within the network creation process. Hence, compositional ties that might be useful at one point might not be later. This focus on network structural attributes relegates the individuals at the centre of the network creation process to passive agents, even though the networks created, and the resulting network structures are functions of individual choices and needs (Willer

and Willer, 2000). Following these observations, numerous calls have been made to account for network agency in network creation (Emirbayer and Goodwin 1994; Baum and Rowley, 2008 and Kidluff and Brass, 2010).

Building on the emerging network agency debates and the need to expand entrepreneurial networking studies, this study investigates how human motives, network behaviour and brokerage methods expand understanding of network agency within entrepreneurial networking creation. Entrepreneurship does not occur by accident or in isolation but is conditioned by existing social relations embedded within a social context (Young, 1998). Therefore, this study investigates the social context that influences entrepreneurial networking in the Lagos Technology Ecosystem in Nigeria. This spans the Ikoyi, Yaba and Ikeja axis, home to several business incubators and the Otigba Computer Village Cluster, one of the largest commercial hubs in West Africa. In this study, the network “why” and "how" is explored to understand how entrepreneurs in these locations make sense of the entrepreneurial network opportunities available and how they engage with them. Consequently, this paper would first provide a background to the discussion on network agency by summarising the existing perception of network agency. The second section discusses agentic tools such as motivation and brokerage as well as the impact they have on entrepreneurial networking. The third section covers the methodology, while the last section presents the discussion and findings of the network creation process in two locations.

2. What We Know So far about Agency

This section provides a brief overview of ongoing conversations about network agency. It will then discuss the alternative agency approach to entrepreneurial network creation. Porter and Woo (2015) define network action as rational efforts motivated by interpersonal exchanges aimed at gaining and maintaining relationships with specific contacts to access specific interpersonal resources. Human action as noted by Emirbayer & Goodwin (1994) is intentional, creative, and instrumental to creating powerful social networks. For this reason, understanding why actions are triggered and how network opportunities are leveraged requires understanding network agency within network creation. However, Emirbayer and Mische (1998) point out that network agency remains elusive, vague, and rarely invokes systematic analysis. Kilduff and Tsai (2003) and later Tasselli and Kilduff (2021) attribute this to an emphasis on the composition, function and consequence of network structures and less on individual attributes, motives and dispositions.

Although this study does not examine all perceptions of network agency, it is prudent to present the prevailing arguments. Tasselli and Kilduff (2021) identify four schools of thought influencing network agency conversations. They include social psychology, anthropology, sociology and the modern schools. Pivotal contributions within the social psychology school are influenced by the works of Jacob Moreno identified as the founder of sociometry (Burt, Kilduff and Tasselli, 2013) and Kurt Lewin on interaction patterns (Tasselli and Kilduff, 2021). Moreno’s 1936 study used sociometry and structural properties to explain runaways within a school. Moreno attributed runaways to the girls' position in the network structure. While Moreno reviewed the position on network structure, Lewin advocated for the examination of patterns of interaction between the individual and the social field in which the individual is located (Tasselli and Kilduff, 2021). The anthropology school, on the other hand, focused on network cognition. Brand (2013) notes that cognition is useful in describing the patterns of interactions perceived by individuals and the subjective experiences of their social worlds. Some notable works include Bott’s (1957) on how social interaction shapes gender roles. However, Bandura (1986) asserts that for agency to shape behaviour or social action or interaction, it is imperative to account for triadic reciprocal causation, that is the relationship between motivation, action and environmental events. This is because individuals are not autonomous agents or simply mechanical conveyors of animating environmental influences (Bandura, 1986). The sociology school focused on network brokerage. Tasselli and Kilduff (2021) spotlight works from the sociological school, referencing George Simmel’s (1950) “tertius gaudens” broker as one who tries to prevent interaction with others to maintain supreme advantage from others' disconnection. A tertius gaudens broker achieves this through taking advantage of the ongoing conflict between the other side parties, or in some instances pitting one side against another to take advantage of opportunities the other parties ignore (Stovel and Shaw, 2012). Tasselli and Kilduff (2021) argue that agency within the sociological school is focused on network structure and negates the individual who is the source of action. As a result, this study advocates for a different route to studying network brokerage, by paying attention to the brokerage process and network behaviour. More coverage of network brokerage actions is reviewed in the next section. The last school presented by Tasselli and Kilduff (2021) is the modern school that again advocates the need to bring the "person back in”. However, they note that there exists an unsatisfactory dualism between individuality (motivation from within) and other external pull factors.

The ongoing debate about network agency points to network structure overreliance. However, some attempts have been made to provide an alternative insight into network agency, for example, Gulati and Srivastava's (2012) work on constrained agency and Engel, Kaandorp and Elfring 's (2017) work on the dynamic model of entrepreneurial networking under uncertainty. However, while both works acknowledge the intentional and purposive entrepreneur, they both fail to account for how the network context could trigger network structure changes, or how different network motivation, behaviour and brokerage methods can aid an actor to make sense of network opportunities they may engage in or choose to ignore. Unfortunately, Gulati and Srivastava's (2012) work succumbed to structure pressure by arguing that network structure influences actors' actions and motivation. While Engel, Kaandorp and Elfring (2017) argue that network agency is constrained by uncertainty. Both studies ignore the contextual influence on the individual actor. They also ignore how network actors within a context determine what is perceived as uncertainty or how motivation is triggered or acted upon. This creates an urgency to explore agency from an individual and context perspective. The next section investigates how an individual's network motivation, network brokerage, and behaviour act as agentic tools to trigger entrepreneurial network activity.

2.1 An Alternative Approach to Agency within Entrepreneurial Network Creation

Engel, Kaandorp and Elfring (2017) affirm the notion that entrepreneurs shape their networks to create and discover opportunities for resource mobilization and inter-organizational partnerships. However, they argue that prevailing entrepreneurial studies paint an image of entrepreneurs as heroic network architects. These entrepreneurs search for, plan for, and pursue contact with the right people. In their view, this narrative is incomplete, as it suggests that network actions and network ties are predetermined in advance. They advocate for creating an agency model that accounts for altruism, pre-commitment, serendipity, and co-creation in understanding network agency. While these factors might help improve understanding of agency, the reflective and purposeful entrepreneur should not be ignored, since they account for the endogenous factors that lead to entrepreneurial network action. This paper explores how sense-making in the network creation process is used to explain network agency, by exploring the role of motive, brokerage behaviour and brokerage method in the entrepreneurial network creation process. In this study, the specific individual network, also described as the ego network by Burt, Kilduff, and Tasselli (2012) and Borgatti and Foster (2003), is the main focus.

Casciaro et al (2015) define motivation as the choice of goals to pursue. It is the amount of energy directed at these goals, and the amount of time spent achieving or pursuing these goals (Casciaro et al., 2015). Additionally, several studies agree that goals trigger participants to establish or maintain networks or seek returns for participating (Burt, 1992; Westlund and Nilsson, 2005). In the case of entrepreneurs who are identified as reflective agents that are intentional about the thoughtful creation of relationships (Vissa, 2012), research focused on entrepreneurial networking must take into account the needs and expectations of entrepreneurs to understand their motivations for engaging in networks (Lockett, Jack and Larty, 2013). Hence, Gulati and Srivastava (2012) view network motivation as how actors are empowered to exert agency to achieve network aims. Thus, this paper argues that understanding network motives is essential to understanding network behaviour or why certain brokerage methods are used to achieve said motives. However, Reinholt, Pedersen and Foss (2011) note that existing network research describes network motivation in a limited way and treats it as a unitary concept. Other studies like (Shaw, 2006; Westaby, 2012; Zahra, Wright and Abdelgawad, 2014) call for a deeper investigation of participants' network motivation, as it is useful in understanding how network behaviours are enacted. Oliver's (1990) critical contingency proposition is the earliest comprehensive study of network motivation. Oliver cites necessity, asymmetry, reciprocity, efficiency, stability, and legitimacy as factors that motivate organizations to have relationships with each other. Critical contingency theory has been applied to studies of network motivation, especially from an entrepreneurial standpoint. These include Cooper, Hamel and Connaughton (2010) who examined the role of legitimacy and reciprocity but identified it as information sharing, capability building and shared experience. Shaw (2006) identified bartering and exchange as a network motivation condition, similar to reciprocity. Oliver's contingencies are used in this paper to explore network motivation from an ego network perspective.

To summarise, the first motive, identified as necessity reflects the need to fulfil an action prompted by a policy or regulation compulsion. Asymmetry, on the other hand, is a network motive triggered by a desire to exert power or control, particularly when resources are limited. In addition to asymmetry and necessity, Oliver (1990) describes reciprocity as the ability to collaborate, coordinate, and cooperate to achieve a common goal for an expected return. As the name implies, efficiency is the process of optimizing input-output ratios or optimizing. resources to the maximum. Stability contingence is described as the motivation to form relationships in response

to market uncertainties, caused by resource deficits or limited knowledge of market fluctuations (Oliver, 1990). Lastly, legitimacy refers to the need to enhance an institution's reputation, image, or prestige in accordance with prevailing standards. Exploring these different motives highlighted is useful for explaining why network action is triggered in the first place. However, to understand how these triggered motives are achieved, attention moves to the "how", where network brokerage and behaviour are reviewed.

Halvey, Halali, and Zlatev (2018) describe the network broker as an intermediary that connects (either directly or indirectly) two disconnected alters. As an intermediary, the broker is a dynamic coordinator responsible for creating knowledge value and information transfer, a role that addresses market imperfections by linking actors who would not necessarily have connected (Quintane et al. 2012). However, Obstfeld, Borgatti and Davis (2014) assert that brokerage is not just about bringing parties together; it is also an opportunity for exploring how networks between intra and inter-organizational entities evolve and expand. In discussing network brokerage, Grosser et al. (2019) argues for the need to understand brokerage behaviour, as network actors demonstrate multi-actor behaviours to seek out advantages and explain network experiences. Consequently, several studies (Obstfeld, Borgatti and Davis, 2014; Quintane and Carnabuci, 2016; Obstfeld, 2017; Grosser et al. 2019) all capture varied insights into brokerage behaviour and explain how the behaviours identified enhance the mobilization of resources and opportunities. The different brokerage behaviours captured include 'Tertius Iungens', 'Tertius Gaudens', 'Conduit Brokerage' and 'Separation Brokerage' behaviour. For detailed coverage, please review the studies highlighted. For a quick summary, the 'Tertius Iungens' broker facilitates introductions between individuals within an individual's social network (Obstfeld, 2005; Obstfeld, Borgatti and Davis, 2014). This introduction brings together individuals to foster collaboration and ease coordination between different networks (Ottani, 2016). In contrast, Tertius Gaudens' broker promotes disunity within the network. This broker is self-seeking and thrives on unfamiliarity, competition and conflict between parties for their own gain (Obstfeld, Borgatti and Davis, 2014). The 'Conduit broker' also identified as a mediator attempts to pass information between network groups without changing the relationships between alters (Obstfeld, Borgatti and Davis, 2014: Grosser et al., 2019). Finally, the separation broker seeks to separate alters when they are at risk of losing their position as a middleman in a network. They will prevent alters from getting to know each other so that they can secure control in a network (Grosser et al., 2019). A network actor that demonstrates separation behaviour charges rents or gains status by conveying information between two parties unknown to each other and prevents a coalition from forming against him or her (Grosser et al., 2019).

Entrepreneurial networking involves creating, shaping and reshaping network ties. This process could include tie formation, utilisation and evolving behaviours, networking styles, strategies or processes (Bensaou et al., 2014; Porter and Woo, 2015). For the entrepreneur, a dominant network behaviour can precede or intertwine with every aspect of the entrepreneurial process. This includes idea generation to resource acquisition, team formation, production and execution (Porter and Woo, 2015). As such the entrepreneur can adapt particular network behaviour to get through a particular process or achieve a goal triggered by a motive (Engel, Kaandorp and Elfring, 2017). This paper adds that network behaviour provides an appreciation for network evolution. Which accounts for how an entrepreneur utilises dominant ties or mixed ties as they achieve different milestones or evolve as a business. However, existing studies remain unclear about the actual brokerage process that takes place to facilitate network access. Some network behaviour studies describe network processes and behaviour as the same (Spiro, Acton and Butts, 2013; Soda, Tortoriello and Iorio, 2018). This conflated thinking makes it difficult to differentiate between network behaviour and process. Hence, sense-making will not be complete if the brokerage method used by the entrepreneur is not addressed.

As this study explores entrepreneurial networking mechanisms in two entrepreneurial contexts, it briefly examines network brokerage methods discussed in extant studies. Brokerage takes place through direct or indirect mediation between actors in the incubator micro-net, macro-net, and meso-net (Pettersen et al., 2015; Cantu, 2017; Shih and Aaboben, 2019). Incubator micro-network actors are those with whom the incubator has developed relationships over time. Meso-nets include local actors within the incubator's network, while macro-nets represent national and international actors who are within the incubator's network but do not necessarily interact (Cantu, 2017). Direct mediation relies on incubator management's active participation in building relationships with network partners (Shih and Aaboben, 2019). In this case, the incubator facilitates networking activities, such as conferences, workshops, pitch competitions, and face-to-face meetings, or provides referrals to incubating firms (Sa and Lee, 2012; Cantu, 2017; Shih and Aaboben, 2019). Conversely, indirect mediation doesn't require incubator management's active participation but rather facilitates it through proximity to network partners, the brand name of the incubator, incubation space or location or previous relationships with network actors (Sa and Lee, 2012; Pettersen et al., 2015; Shih and Aaboben, 2019). However, it is critical to note

that this brokerage process is not coincidental but influenced by trust and substantial time investment, which yields embedded relationships that can be internal or external (McAdam and McAdam, 2008; Baraldi and Havenvid, 2016).

To understand brokerage methods used within enterprise clusters, Patrucco's (2005) and Eisingerich, Bell and Tracey's (2008) studies provide a comprehensive account. Patrucco suggests that localised technological knowledge and geographical proximity factors were instrumental in network creation. Patrucco explains that the localised technology knowledge that emerged within the Emilian plastic cluster was an output of collective learning replete in the cluster. This did not occur randomly but through deliberate formal and informal interactions and spontaneous networking among firms. What can be deduced from this study is that network action begins first through indirect mediation, facilitated by localised knowledge, space and the agglomeration of firms. However, firms in this location directly broker network relationships for themselves. Eisingerich, Bell and Tracey (2008) also acknowledge the role of space in the brokerage process. However, they add that strong ties and network openness are other ingredients of network action. According to Eisingerich, Bell and Tracey (2008), strong ties are a key feature of high-performing clusters. Strong ties provide access to locational resources that are not easily accessible to a firm. Entrepreneurs can leverage repeated face-to-face interactions with established network ties, trust and mutual obligation to ensure inter-firm interaction. Eisingerich, Bell and Tracey (2008) add that network openness and cluster performance has a positive relationship, especially in the face of environmental certainty. Their study notes that when environments are uncertain, resident firms will continuously modify their offerings to maintain competitive advantage. This is to meet changing market preferences and respond to technological changes. Network openness within a cluster creates new sources of information and diversity of talent that can be exchanged (Eisingerich, Bell and Tracey, 2008). In sum, indirect and direct brokerage is also noted in this study. The cluster space and network openness indirectly trigger network action, this is then directly leveraged using strong ties.

So far, this section has attempted to explain how network motives, brokerage methods and behaviour reshape the existing perception of network agency. This is done by taking away focus from network structures and focusing on the entrepreneur who triggers these relationships. This creates an opportunity to explore entrepreneurial network creation and networking dynamics. To get a nuanced understanding of how the context of incubation and cluster in the Lagos technology ecosystem influences entrepreneurial network creation, attention turns to data collected from both contexts.

3. Research Methods

A qualitative approach was utilised to obtain deeper insights and explain the meanings that individuals, which in this case are entrepreneurs attach to different experiences (Leech and Onwuegbuzie, 2007). Additionally, several network studies like (O'Donnell et al., 2001; Hoanga and Antoncic, 2003; Jack et al., 2010) have also advocated for qualitative studies for a deeper and richer analysis of network relationships and network activities that have been created.

Data collection occurred between March 2019 and May 2019, using semi-structured interviews from start-ups within 5 incubators and the Otigba Ikeja cluster. Lagos provided a promising location for investigation, as it is home to some successful fledging start-ups and also the second location with the highest concentration of incubators in Nigeria (NINE, 2018). Semi-structured interviews present an opportunity to probe for answers and build on the responses of participants (Saunders et al., 2016). It is also flexible to use as this allows the researcher to change approach slightly to fit the audience interviewed (Noaks and Wincup, 2004).

For anonymity, incubator tenants' firms are identified by numbers but bear the corresponding letter of their incubator; for example, AT1, BT2, and CT3. Pseudonyms like Company A, B and C are used for cluster firms. 31 entrepreneurs were interviewed. 13 firms within the cluster were interviewed. These businesses include businesses in the early stages; businesses aged 1-4; businesses approaching the growth stage (4-6 years) and (8-12 years) businesses at the maturity stage. Non-probability sampling was employed, Saunders and Townsend (2018) recommend this sampling technique to gain understanding and insights that informs rich insights from the qualitative data collected. A total of 18 tenants in the business incubator were interviewed, most of whom are in their early stages. These incubators were all technology focused. Incubator A, B and E operated a hybrid model (Pre-incubation, Incubation and Acceleration) and Incubator D was a corporate accelerator (set up as an investment spin-off company of a wealth and asset management firm) and

Table 1:Interview Participant Profile

Incubator Type (All incubators are technology focused) **Incubator A** Private owned (Hybrid) Incubator Provides Co-working space Access to internet Finance Management and Finance Business support and an array of networking events like (entrepreneurial events, social events, mentorship and advisory sessions, hackathons and funding events). **Tenant firm** AT1 **Sector** Software Development **Age** 3years **Tenant firm** **AT2** **Sector** Real Estate Technology **Age** 1year **Tenant Firm** **AT3** **Sector** Health and Fitness **Age** 5years **AT3** **Sector** Identity Technology **Age** 1 year	**Company A** **Age** 1 year and 2months **Service** Digital marketer and dealer in mobile phone and accessories **Company B** **Age** 3 years **Service** Dealer mobile phone and mobile accessories **Company C** **Age** 5 years **Service** Software developer / reseller and hardware dealer **Company D** **Age** 4 years **Service** Dealer in computer networking and securities equipment. **Company E** **Age** 3 years **Service** Dealer computer networking, telecommunications and securities devices and an information technology consultant. **Company F** **Age** 6 years **Service** Dealer in computer networking and security devices **Company G** **Age** 2 years **Service** Repair and sale of laptops **Company H** **Age** 5 years **Service** Dealer in mobile phones, laptops and accessories and logistics **Company I** **Age** 8 years **Service** Digital gadget repair and sales. **Company J** **Age** 10 years **Service** Wholesale dealer in computer networking accessories. **Company K** **Age** 11 years **Service** Software dealer and Software deployment trainer **Company L** **Age** 12 years **Service** ICT consultant and digital gadget wholesaler **Company M** **Age** 12 years **Service** Computer securities manufacturer, internet service provider and software developer
Incubator B Private owned Incubator (Pre incubation and incubation) Service is double layer (at pre incubation start-ups access training school for one year, supported with training on how to build technology, business development and marketing) At incubation firms access end to end support from co-working space, trainings on how to pitch, code, market and raise additional funding. Access to internet and an array of networking events like (entrepreneurial events, social events, training and funding sessions) **Tenant firm** **BT1** **Sector** Hr Technology **Age** 6 Months **Tenant firm** **BT2** **Sector** Supply Chain Technology **Age** 1 Year **Tenant firm** **BT3** **Sector** Health Technology **Age** 2 years **Tenant firm** **BT4** **Sector** Hr Technology **Age** 3 years	
Incubator C **Private owned Deep Technology Accelerator** Provides Funding Co-working space Access to internet and an array of networking events like (entrepreneurial events, social events, mentorship and expert sessions, and funding events). **Tenant firm** **CT1** **Sector** VR Technology **Age** 1year **Tenant firm** **CT2** **Sector** **Artificial Intelligence** **Age** 1 Year **Tenant firm** **CT3** **Sector** Internet of Things **Age** 1 year	
Incubator D **Private owned Corporate Accelerator** Provides co-working space Access to internet Cloud Storage Funding and an array of networking events like (entrepreneurial events, mentorship/ training and funding sessions). **Tenant firm** **DT1** **Sector** Financial Technology **Age** 1-year 3months **Tenant firm** **DT2** **Sector** Insurance and financial technology **Age** **9 months** **Tenant firm** **DT3** **Sector** Financial Technology **Age** 1 year **Tenant firm** **DT4** **Sector** Financial Technology **Age** 1 year **Incubator E** Private owned (Hybrid) Incubator Provides Co-working space Support is tailored to meet request of support partners, however an array of networking events like (mentorship/advisory and funding session) **Tenant firm** **ET1** **Sector** Drone Technology **Age** 5 years **Tenant firm** **ET2** **Sector** Drone Technology **Age** 1 Year **Tenant firm** ET3 **Sector** Waste Technology **Age** 5 months	

a deep technology accelerator (focus was on high technology support like Artificial intelligence, the Internet of things, and Augmented and Virtual Reality). Table 1 above provides an overview of interview participants.

4. Discussion and Findings

Network creation in both contexts is enhanced by sense-making, that is the ability for entrepreneurs in both contexts to first determine network motives and then use specified brokerage methods and behaviour to meet them. Tenants' firms mention personality, reciprocity, and legitimacy as their three main motives. When an individual's motives are triggered by their personality, they are not influenced by external factors. Instead, they are triggered either by the desire to assist others or simply by meeting people without seeking benefit. Although these firms do not intend to gain any network benefits for participating in network activities, they mention that they get referrals, access ideas, and are more confident to handle future business challenges that may arise. This is similar to what Engel, Kaandorp and Elfring (2017) identify as intelligent altruism, where entrepreneurs are neither selfless nor opportunistic. However, they suggest that this happens when entrepreneurs are unsure of their goals.

A number of firms also cited the need to establish legitimacy and reciprocity as reasons why they engage in network activities. In this study, legitimacy is defined as access to funding opportunities, being remembered, exposure, and future collaborations. In contrast, reciprocity is defined as a value/vision-driven endeavour characterized by the ability to exchange and access information and share a vision. It is similar to studies conducted by Oliver (1990), Shaw (2006), Cooper, Hamel, and Connaughton (2010) that capture the motives of legitimacy and reciprocity. However, a subtle difference noted is that tenant firms' motives to reciprocate are not triggered by cooperation and intentional interactions hinged on goals and interests that are collectively pursued, but rather by a moral obligation to return favours to network parties they were involved with. This echoes Porter and Woo's (2015) view on when an entrepreneur receives benefits that create an obligation to reciprocate to the giver of the favour. Several respondents emphasized the importance of looking for opportunities to reciprocate so that both parties could benefit. Some have also pointed out the downside of being reliant on others, especially those who hold gatekeeper positions. In some instances, individuals look to profit from relationships, while in others, moral or business ethics may be compromised. As a result, this can also be classified as a network challenge. Tertius Iungnes behaviour is exhibited by most tenant firms for a brief period of time, as they are willing to use their own networks or introduce other tenant firms to network contacts, as well as to access the networks available to them. This is for a short time, as the benefits recede or can be re-enacted. Grosser et al. (2019) describe this situation as 'Brief Iungnes'. As well, both direct and indirect brokerage methods are used, indirectly, location is a major factor in network action facilitation. The incubator location within the Yaba/Ikoyi axis offers tenant firms access to a wide range of network actors, technology talent, community, and opportunities for knowledge transmission, collaboration, and learning. Direct brokerage is also used internally; incubator management makes connections between tenants' firms through social events, pitch events, exhibits, and technology events. They also provide training, referrals and mentor support for them.

Network creation at cluster locations is different from that of tenant firms in incubators. Cluster firms identified trust, the opportunity to access information and knowledge and the opportunity to learn as the main motives for network engagement. Trust motive is created where firms have successfully completed repeated exchanges with each other, as it is a low-trust environment where firms are reluctant to share information or collaborate (Lloyd and Smith, 1993). For cluster firms who are moved to network because of the opportunity to learn from other businesses, they note that networking with other cluster firms is inspirational, as they learn how to run businesses and survive in the cluster. Cluster firms lack active, sustained, and intentional network brokerage. Firms here exhibit separation behaviour, where brokers intentionally separate relationships within a network to take advantage of disconnected individuals. The separation broker separates alter when they are in danger of losing their position as a middleman, preventing alters from getting to know each other just to gain control of the network (Grosser et al., 2019). Control is crucial to these entrepreneurs, as they fear losing business if information gets into the wrong hands, especially with individuals they do not trust. As a result, they resort to knowledge hoarding as a protective measure. Brokerage methods are also direct and indirect. Directly, individuals broker relationships themselves using social media platforms like WhatsApp, informal face-to-face gatherings, referrals and partnerships with other firms co-located in the cluster. Indirectly, the cluster's reputation is a big asset in building network relations. It serves as an instrument for indirect brokerage, even though the facilitated networks are often business or trade networks. This is similar to Eisingerich, Bell and Tracey's (2008) and Patrucco's (2005) studies, where individuals broker their own relationships. However, social media is also useful within this cluster in self-brokerage.

5. Conclusion

This paper provides an alternative approach to exploring network agency, by focusing on the individual entrepreneur who is the source of action. The key message to consider is that context frames agency, as contextual factors and actors' resident in certain entrepreneurial locations would shape an entrepreneur's awareness of network opportunities, action and brokerage methods utilised for accessing resources needed to effectively run their businesses. Network motive triggers network action and acts as a pull for network actors to decide which brokerage method (direct or indirect) is utilised to meet the motives triggered.

This study recommends that entrepreneurial support stakeholders seeking to broker network relations or organise networking activities complete a priory needs assessment of the network beneficiary to first understand their needs, which could also be their motives and the best brokerage method to suit their situations. This is crucial, as it ensures resources are effectively used and that the networks created add expected value to the intended audience. An assessment should be completed afterwards that goals were met

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Possibilities of Using Online Tools and Artificial Intelligence in City Marketing

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Abstract: AI has had a significant impact on marketing, transforming the way companies approach advertising and customer engagement. But we are not talking only about the business sphere, marketing tools are transformed and applied also in regional conditions and in the marketing communication of cities. Artificial intelligence and its use therefore also concern this area. Its use can be found in various spheres of city services, one of these services is communication with target groups operating in the given territory. These target groups primarily include citizens, tourists, entrepreneurs, students and working people in the given area. One of the main tasks of the city is that the primary target groups are informed about current events and information is provided to them in the most modern, efficient and fast way possible, which reflects the current technological progress in marketing communication. The aim of this contribution is to point out the possibilities and ways of using artificial intelligence in the communication of cities in Slovakia. AI can help city marketers to create more targeted and effective marketing communication, improve the customer experience, and build stronger relationships with residents and visitors. By analyzing data and providing insights, AI can also help city marketers to make data-driven decisions and measure the impact of their marketing communication efforts. In general, Slovakia belongs to the countries in which the development and advancement of city marketing is difficult from the point of view of financing and lack of human resources. However, one does not always think about the fact that current online and digital tools can be beneficial only if we know about them and know how to use what they offer. In the paper, we will look at the current use of artificial intelligence in the communication of selected Slovak cities with tourists and at the possibilities that artificial intelligence brings in the field of city marketing development.

Keywords: AI, City marketing, Marketing, Regional marketing, Tourism.

1. Literature Background

1.1 City marketing

Based on the author Hanuláková (2005), we can distinguish regional marketing according to the size of the territory and its borders, for example marketing of the state, region, cities and municipalities. The country's uniqueness is symbolized by the state's marketing. Marketing at the regional level can be implemented as territory marketing within individual territorial units, and the term marketing of cities and municipalities can be understood as a management and systematic development tool. Its concept should be based on the regional development policy of the respective region. "City marketing involves engaging residents as active participants in the branding process, recognizing their role in shaping the city's image and promoting a sense of pride and attachment“ (Braun et al 2013). Marketing of regions is a significant element strengthening the economy, image and identity of a given location. Marketing tools are thus used to create sustainable, competitively advantageous regions.

The character of the proposed marketing concepts for municipalities, districts, cities, regions or states differs considerably in many cases, even if the same goal and purpose of these activities are pursued. From the point of view of management in marketing, at the level of regions, it is assumed that they will be successful in the long term only if they are managed in a market-oriented way, with the fact that the needs of citizens are met. "Place branding involve the development and implementation of marketing strategies to enhance a city's image, attract visitors, and foster economic development, with each approach tailored to the unique characteristics of the city“ (Guerreiro & Murphy, 2013). The primary goal of regional marketing is the comprehensive use of the potential of the given territory, economic and social development and improvement of the position within the competition. "City marketing plays a vital role in the development of local innovation ecosystems by promoting a city's attractiveness to entrepreneurs, businesses, and investors, fostering collaboration, and stimulating innovation-driven growth“ (Rainisto, 2016). The implementation of marketing in the regional environment is associated with various changes. We encounter changes in values and preferences, not only on the part of citizens, but also businesses, investors, visitors

1.2 Tourism marketing

The motivation of regions to obtain certain benefits using local means and resources, with the help of various activities, can be seen as an effort to stimulate socioeconomic activities by means of marketing and at the level of regions. "Tourism marketing is greatly influenced by technological advancements, which act as catalysts of change in shaping the tourist experience and have significant consequences for destination marketing strategies“ (Neuhofer et al 2012). Successful regions are primarily those that systematically develop the offer of the territory based on demand from target groups, introduce innovative processes and strive to make the territory more attractive, which by its progress helps itself as well as all entities operating in the given territory.

"Destination branding in tourism marketing has been greatly influenced by the use of social media platforms, which offer opportunities to engage with tourists, build destination reputation, and stimulate positive word-of-mouth“ (Kavoura & Sakas, 2016). In contrast to marketing used in a market environment, at the regional level it is a long-term time horizon, in which it is possible to observe changes mostly over a longer time horizon.

Applying marketing to public administration is not an entirely simple process. Fast and dynamic times bring with them fast and dynamic changes. The biggest problem seems to be the lack of trained marketing workers and lack of knowledge of marketing processes. "Marketing has been greatly impacted by the rise of online review platforms, providing valuable insights into tourist experiences and influencing destination choices through user-generated content" (Xiang, Du, Ma, & Fan, 2017). Regions are adapting management management systems and are increasingly oriented towards marketing and marketing communications. Communication tools, which until recently were the domain of private companies, are increasingly becoming a means of presentation and promotion for regions as well.

1.3 AI and cities

AI technology plays a crucial role in enhancing city marketing strategies by providing valuable insights and data-driven solutions. ,,AI is increasingly being applied in the field of tourism, enabling smart tourism initiatives that enhance traveler experiences, personalize recommendations, and improve destination management practices" (Gretzel et al 2020). With AI, cities can personalize their marketing campaigns based on individual preferences, delivering tailored messages and recommendations to potential visitors. "It has emerged as a transformative technology in tourism marketing, presenting significant implications for emerging destinations. AI-driven applications such as personalized recommendations, chatbots, and data analytics enable enhanced targeting, engagement, and competitiveness in destination marketing" (Buhalis & Sinarta, 2021). The predictive analytics capabilities of AI have helped cities forecast tourism demand, allocate resources efficiently, and plan targeted marketing campaigns, ultimately optimizing their marketing budgets.

2. Tourism in Slovakia

The Ministry of Transport and Construction is involved in the management and financing of tourism in the Slovak Republic and oversees the country's tourism policy, regional cooperation, international cooperation and state aid to tourism. The ministry cooperates with other government departments through various committees and working groups that address tourism issues. At the local level, municipalities and Destination Management Organizations (DMOs) play a role in tourism development, product development and promotion. There are 49 local DMOs and 8 regional DMOs whose financial resources are subsidies and membership fees. In 2021, the ministry will establish Slovakia Travel as a national tourism agency, which will act as a marketing, promotion and tourism data centre. The Slovak Tourism Association promotes industry cooperation and advises on changes in legislation, while local and regional tourism associations contribute to quality improvement, professional training and exchange of best practices.

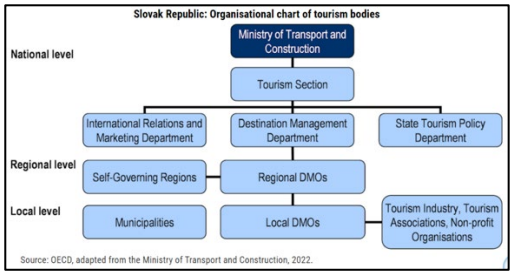

Figure 1: Organisational chart of tourism bodies

Source: https://www.oecd-ilibrary.org/sites/dba2fbca-en/index.html?itemId=/content/component/dba2fbca-en

In 2022, the Slovak Republic will begin the process of redesigning its National Sustainable Tourism Strategy and Action Plan towards 2030. The impact of the pandemic, the Ukrainian War, and the establishment of the National Tourism Board created the need for this redesign. The 2030 Revised Strategy for Sustainable Tourism Development aims to strengthen the competitiveness of the tourism sector, harness its potential more effectively, eliminate regional differences and create new employment opportunities. purpose.

In the Slovak Republic, tackling the job crisis in the tourism sector and providing government support for strategies in the hospitality and catering sectors are key priorities. The country faces a situation where some workers are reluctant to return to tourism due to uncertainty and instability, choosing to remain in such sectors as automobiles and other sectors considered safer. ing. Moreover, prioritizing sustainability in tourism is paramount. The strategy aims to set clear priorities and targets for sustainable and responsible exploitation of the tourism sector potential of the Slovak Republic. The strategy will incorporate the results of the European Commission's co-development process for tourism transition pathways.

Another focus is to bring together all stakeholders involved in tourism. The Slovak Republic aims to establish new information channels at the national level using the Regional Tourist Office, the National Tourist Office, local authorities and private organizations. The 2030 Strategy will also improve communication channels between national and international stakeholders, with a particular focus on EU countries (OECD Tourism Statistics (Database), 2022).

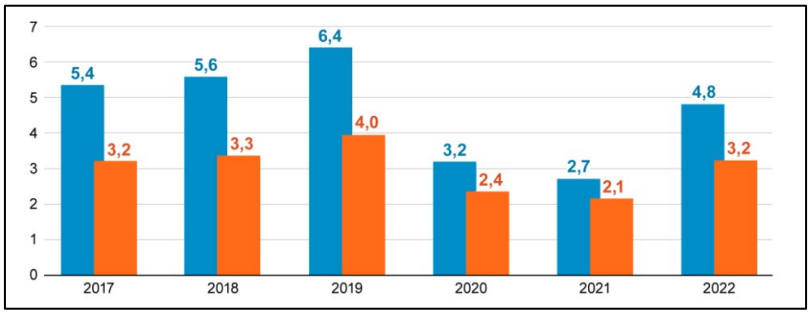

Figure 2: Visitors in tourism accommodation facilities in 2022 in mil. (Blue – visitors together, Orange – domestic visitors)

Source: https://shorturl.at/qvAGQ

In 2022, domestic tourists will account for two-thirds of the total, and the number of overnight guests at accommodation facilities has halved compared to the previous year, reaching 3.2 million. Only 18% of domestic travelers approached 2019 levels, just short of 2019, even though domestic travelers grew slower than foreign tourists. Over the summer, domestic travel numbers were closest to pre-pandemic levels, but did not exceed 2021 highs. In 2022, most domestic tourists visited tourist attractions such as Žilinský, Prešovský and Banskobystrický (https://shorturl.at/qvAGQ, 2022).

Table 1: Number of visitors and average number of overnight stay in Slovakia in 2022

2022	Number of visitors together	Average number of overnight stays
Slovakia	4 831 628	2,6
Domestic visitors	3 237 480	2,8
Foreign visitors	1 594 148	2,4
Western region		
Bratislava region	1 090 352	1,9
Trnava region	329 067	3,6
Trenčín region	291 653	3,8
Nitra region	240 368	2,7
Middle region		
Žilina region	1 087 373	2,6
Banská Bystrica region	546 690	2,9
Eastern region		
Prešov region	888 970	2,9
Košice region	357 155	2,1

Source: Own processing

During 2022, the return of foreign guests continued, the pandemic decimated foreign visitors the most. Their more dynamic growth was supported during the past year by the simplification of travel. The number of foreigners in 2022 was higher than in the previous two years combined (2020 and 2021). Their total attendance grew 2.7 times year-on-year and thus reached 1.6 million guests, almost a million foreigners were still missing from the values before the pandemic. Visitors from the European Union predominated, accounting for 81% of the total foreign visitors. Other European countries accounted for almost 11%, visitors from Asia 3.8% and America 3.5%. The structure of foreign visitors was dominated by guests from neighboring countries. The largest number of foreign visitors came from the Czech Republic (563,000) and Poland (190,000) (https://shorturl.at/qvAGQ, 2022).

Table 2: The most visited districts of 2022 in Slovakia

The most visited districts of 2022		
District	**Number of visitors together**	**Average overnight stay**
Poprad	609 747	2,8
Bratislava I.	570 739	1,7
Liptovský Mikuláš	468 123	2,6
Žilina	204 066	2,2
Košice I.	191 945	1,8
Trenčín	120 822	3,9
Piešťany	114 198	5,2

Source: Own processing

The most visited district in 2022 was the Poprad district. The total number of visitors exceeded more than 600,000. The average number of overnight stays reached almost 3 nights per visitor. The High Tatras, but also other attractions, can definitely take the greatest credit for the number of visitors. Within the Poprad region, the biggest tourist attractions are:

- *High Tatras* - The High Tatras mountain range is a major draw for tourists visiting the Poprad region. It offers natural beauty, with majestic peaks, alpine meadows, lakes, and picturesque hiking trails. Visitors can explore the region's landscapes, engage in outdoor activities such as hiking and skiing, and enjoy the atmosphere of the mountains. The High Tatras are a major attraction for tourists visiting the Poprad region. Enjoy the beauty of nature with majestic mountains, alpine meadows, lakes and scenic hiking trails. Visitors can explore the area's landscapes, enjoy outdoor activities such as hiking and skiing, and soak up the mountain atmosphere.
- *Spiš castle* - Located near the town of Spišské Podhradie, Spiš Castle is one of the largest castle complexes in Central Europe and a UNESCO World Heritage site. Delving into its ruins affords deep insights into the region's rich historical tapestry and rewards beholders with panoramic vistas of the surrounding countryside. Spis Castle, located near the town of Spiske Podradije, is one of the largest castle complexes in Central Europe and a UNESCO World Heritage Site. Exploring the ruins provides a deep insight into the region's rich historical diversity and offers panoramic views of the surrounding countryside.
- *Aqua City Poprad* - AquaCity Poprad serves as a renowned thermal park and wellness retreat. Comprising thermal pools, water slides, saunas, spa facilities, and an array of wellness treatments. Aqua City Poprad serves as a famous spa park and wellness retreat. It consists of thermal pools, water slides, saunas, spa facilities and a range of wellness treatments
- *Tatranská Lomnica* - Tatranská Lomnica stands as an idyllic mountain resort town, serving as a gateway to these majestic peaks while affording breathtaking panoramic vistas. Tatranska Lomnica is an idyllic mountain resort that serves as the gateway to these majestic mountains and offers stunning panoramic views.
- *Štrbské Pleso* - Situated in the middle of the High Tatras, Strbske Pleso is a mountain lake that attracts nature lovers, hikers and winter sports enthusiasts alike.

3. Concrete online and AI tool used by the most visited districts in Slovakia

As part of the most visited regions in Slovakia for the year 2022, we looked at selected digital elements and artificial intelligence tools. Specifically, we were interested in whether the given region has an official website, or a subpage containing information for tourists, an application that can be used by tourists, both in Slovak and in English, the possibility of using a virtual tour of the city, or selected tourist locations, and a chatbot or virtual assistant on the website for tourists or subsite. The aim of the analysis is to find out what artificial intelligence

tools are used by the most visited regions of Slovakia for communication with tourists and visitors and for promoting their region.

Of the 7 most visited regions of Slovakia, all regions, except the Pieštany region, have an official website or subsite for tourists, even in a foreign language. 3 districts out of 7 investigated have an application providing information in a foreign language about a given location, its attractions, the biggest attractions and containing practical information about the region. 4 districts have the option of using virtual tours of the city, its nearby locations or surrounding places representing tourist attractions. Only 2 of the investigated districts have a chatbot or virtual assistant.

Table 3: Online, AI tools used by the most visited districts in Slovakia

District	Offical webpage or subpage for tourists in English	Application in foreign language	Virtual city tour or selected areas	Chatbot/Virtual Assistant
Poprad	Yes	Yes	No	No
Bratislava	Yes	No	Yes	Yes
Liptovský Mikuláš	Yes	Yes	No	No
Žilina	Yes	No	Yes	No
Košice	Yes	Yes	Yes	No
Trenčín	Yes	No	Yes	Yes
Pieštany	No	No	No	No

Source: Own processing

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4. Discussion

The aim of the analysis is to identify how particular regions use technology to communicate with tourists and promote their destinations. The text provides a clear and concise overview of the key digital elements and AI tools that were investigated, including official websites, applications, virtual tours, and chatbots. The analysis covers multiple regions, providing a broader perspective on the use of technology in tourism promotion across Slovakia. By including a comparison between different regions, the text highlights disparities in the adoption of digital tools, offering insights into potential areas for improvement. After this analysis, a deeper analysis will be carried out using specific data specific data and metrics to support the results. Adding statistics, user feedback, or specific examples of how these tools are used would strengthen the findings. We will primarely focus on answering of questions why do some regions have chatbots while others do not? Are there any barriers to adopting certain digital tools in specific regions? While the text mentions the presence of digital elements and AI tools in the most visited regions, it does not assess the effectiveness of these tools in attracting and engaging tourists. Including data on the impact of these tools on tourism numbers or user satisfaction would provide a more comprehensive evaluation.

The use of online, digital and artificial intelligence tools will become more and more of a trend. Use of the website serves as a centralized hub of information about the city's attractions, landmarks, events, accommodations, dining options, transportation, and other essential details. Most Internet users logically search for information about a city or village on an Internet address - domain identical to the name of the city. These domains are also called intuitive. It provides visitors with a one-stop platform to access comprehensive and up-to-date information, making it easier for them to plan their trips effectively. It eliminates the need for physical brochures or guidebooks, providing quick and easy access to essential information, maps, and resources from their

computers or mobile devices. The page must leave a favorable impression, graphics must be used that are interesting, in line with the graphic visuals of the village or city, pleasing, not irritating, and above all, the page must contain up-to-date, clearly structured information. City webpages can offer personalized content based on visitors' interests, preferences, and demographics. By utilizing cookies, user profiles, or survey data, the webpage can recommend relevant attractions, activities, and events, enhancing the overall visitor experience and engagement. The main purpose of the city website should be to inform the residents and visitors of the city. Webpages can include high-quality images, videos, and virtual tours to showcase the city's attractions and landmarks. Visual content can create a more immersive experience for tourists, allowing them to get a glimpse of what they can expect and generating excitement about their visit. City webpages can integrate online booking systems for accommodations, tours, or activities, allowing tourists to make reservations directly through the platform. The truth is that the page's clarity, design and usability are closely related to the very functionality and findability of information.This streamlined process eliminates the need for multiple websites or phone calls, simplifying the booking process for visitors. Interactive maps integrated into the city webpage can help tourists navigate the city, locate attractions, and plan their routes efficiently. Features like GPS functionality, public transportation information, and suggested itineraries can further assist visitors in exploring the city with ease. Town website design needs to be mobile-friendly because audiences will access it from various devices (smartphones, tablets, desktops, etc.) That's why responsive web design is important — it is the most popular technique to make site layout reshape itself perfectly depending on the device.

The application allows tourists to easily access important information, maps and resources on their smartphones and tablets. This eliminates the need to carry physical brochures and guidebooks and allows visitors to access information anytime, anywhere, even offline. The goal is to use technology, data and apply digital interfaces to traditional infrastructure to increase efficiencies and convenience, reduce costs and improve the overall quality of life. Push notifications let tourists know about special offers, discounts, or important announcements, ensuring they are up to date during their visit. The application takes into account individual interests and preferences to suggest customized itineraries and experiences to enhance the visitor's overall journey. Technology is thrust into each of our lives where we can use smartphones and apps to discover information about traffic, transit, safety, news and weather alerts. Applications can integrate interactive maps and navigation features to provide tourists with accurate directions, suggested routes, and transportation options. Multilingual support can be provided so that tourists can access information in their preferred language. City applications can help to reduce costs, efficiently manage the use of resources and physical infrastructures and increase communication and information sharing. This feature improves accessibility so that visitors from different countries can easily understand and navigate application's content. Tourists can purchase, book and receive electronic tickets directly from the application, reducing the need for physical tickets. To be successful, an app strategy needs to start with a current pain point, either addressing internal workflow or citizen access to services or information, and then explore how a mobile app will remove current barriers. The City App showcases special offers, discounts, and special offers from local businesses, encourages tourist exploration, supports local establishments, integrates with social media platforms, and allows tourists to share experiences, photos, and recommendations. It can be shared and include features that allow tourists to provide feedback. Leave a review or rate your experience. Cities need to understand that apps can be an effective communication tool, but only if they are sensitive to making the experience a positive one for users.

Virtual city tours provide access for those with physical limitations or who are unable to travel directly into the city. Virtual tourism is an immersive experience of any location, activity or destination around the world which can come to life through technology. It is linked to virtual reality through 3D technology, audio and video narration, various images and so on. This will allow people in different parts of the world to experience the sights and landmarks of a city without actually being there. When it comes to travelling, majority of people are bounded by cost constrains and virtual tourism provides the opportunity for accessible "travelling" to everyone.This makes virtual tours a cost-effective option for tourists to virtually explore multiple cities and attractions in a short amount of time. This flexibility allows tourists to explore the city at their own pace, rest and revisit certain attractions as they please. The technology is more precise and interesting than a simple brochure or a website.It increases the probability that viewers will want to visit in-person in the real locations. Virtual city tours often use technologies such as 360-degree images, videos, and interactivity to provide an immersive experience for tourists. Users can access audio guides, text descriptions, and visual presentations to learn about the city's history, architecture, and important cultural aspects, thereby expanding their knowledge and understanding. Virtual tourism aims to create a near-life touring experience of a particular destination or tourist attraction. Visitors can take advantage of virtual tours to familiarize themselves with the city's layout, popular landmarks, and points of interest before visiting in person. This will help you create an informed itinerary

and prioritize the places you want to explore further. Virtual tourism can provide a glimpse of what a destination or tourist attraction has to offer; it can also be used to plan a future in-person trip.

Virtual walking tours can be educational and stimulating, especially for students and individuals with a keen interest in history, art, and architecture. It also allows travelers to experience and appreciate the city's sights and culture while minimizing the negative environmental impact of travel. The goal is not to replace in-person travel but complement and also reach new markets.

The city's chatbot can instantly answer tourists' questions and provide assistance at any time of the day. This allows tourists to access information and support outside of normal business hours, increasing convenience and customer satisfaction. Chatbots are also implemented in the government sector for citizens' quick access to public data and reporting complaints. Visitors can ask specific questions and receive instant answers, eliminating the need to search websites or contact multiple sources. Implementation of chatbots in various government agencies will totally transform the communication. By understanding individual needs, chatbots can suggest customized itineraries, attractions and activities to enhance the visitor experience. The use of chatbots by a city hall or a local authority remains pretty much the same as for companies. Chatbots provide an interactive conversational experience by simulating human-like conversations. It allows you to interact with tourists in a friendly and natural way, making interaction more comfortable and intuitive compared to traditional search methods or static websites. While some cities, town halls and local governments use classic chatbots, others rely on more customized tools designed to meet specific needs. They provide a platform for tourists to express their opinions, make suggestions, and report problems, helping the city improve its services and address tourist concerns Personalized efficiently and appropriately, the chatbot can be used to energize a city or to optimize the various services offered by the city hall. Deploying city chatbots can lead to cost savings for tourism organizations. Chatbots can handle large numbers of queries at once, reducing the need for additional customer support staff. It also offers scalability as it can handle increasing requests without consuming too many resources. Thus, chatbots generally used in communities or city halls differ from those intended for a company, an e-commerce site, an NGO or a school. The bot must be able to answer questions related to the operation of the city.

5. Conclusion

A study by the World Travel & Tourism Council suggests that AI and Machine Learning could result in a $1 trillion boost in global economic activity from the travel and tourism sector by 2025. The study found that AI-enabled features such as smart personalization, automated customer service, voice recognition, virtual reality, and facial recognition are all expected to become more prevalent shortly. AI technology is helping to streamline operations for businesses in the travel and hospitality sector. For example, AI-driven systems can be used to automate processes such as customer service, hotel management, marketing and sales, air ticketing, and baggage handling. These systems can save businesses time and money while providing improved services to their customers (Angry Nerds, 2023). Both Slovakia and many other countries have the potential to become attractive tourist destinations. Realising this potential is a real challenge, but innovation, smart specialization and building 'smart' competitive advantage provide opportunities to create new tourist destinations. Both Slovakia and many other countries have the potential to be attractive travel destinations. Realizing this potential is a major challenge, but innovation, smart specialization and building "smart" competitive advantages offer opportunities to create new destinations (Borseková et al, 2017).

Artificial intelligence in the travel industry provides historical and real-time insights quicker than manual data analysis. Travel intelligence can provide a single source of information and reveal problems with the customer's experience before it becomes a significant issue.

It is obvious that artificial intelligence technology is already having a significant influence on the travel and tourism sector, and this trend may last for years to come. Travelers should anticipate more effective service and more individualized recommendations for their forthcoming journeys as AI-driven capabilities become more widespread. Artificial intelligence (AI) applications in the travel and tourism sector have fundamentally altered how consumers plan, purchase, and enjoy travel. Access to enormous volumes of data about locations, costs, routes, and experiences has been made easier by AI. establishing a welcoming atmosphere with customized advice. AI-powered advancements optimize the travel experience, making it quicker and more effective. Examples include smart booking assistants, facial recognition technology, and luggage management systems. In conclusion, using internet and AI technologies to sell cities to visitors allows for improved user experience,

focused marketing, and data-driven decision making. This promotes open communication, teamwork, and environmentally friendly practices while enabling cities to change with emerging trends.

Acknowledgments

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The Potential Utilisation of Artificial Intelligence (AI) in Enterprises

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Abstract: Artificial Intelligence (AI) is a part of computer science that aims to create and develop intelligent machines. For AI to function and perform, it involves the development of algorithms and models that enable computers to learn from the data, identify patterns, and make predictions. Research indicates that AI can increase private industry output, decision-making, and effectiveness. AI can analyse vast amounts of data quickly and precisely, as well as identify patterns and trends (Marr, 2018). This makes AI well-suited for occupations requiring data processing and analysis, such as data entry, analysis, and customer service (Sharma, 2019). AI can also be used to automate processes and tasks (Sharma, 2019). Research implies that AI will impact jobs (WEF, 2018). This may involve providing individuals with training to improve their skills and knowledge to prepare them for occupations involving AI technology, as well as developing regulations and processes to ensure that AI is utilised in a fair, transparent, and accountable manner (WEF, 2018). An evaluation of AI's limitations and to ensure forecasting data is accurate and trustworthy (Marr, 2018). It is also crucial to consider the possibility of bias in AI systems and adopt precautions (WEF, 2018). Furthermore, AI offers many benefits but also presents problems, including the prospect of job loss, the likelihood of bias in AI algorithms, privacy, security, and ethical concerns (WEF, 2018). By identifying how enterprises are utilising AI, what is the impact of implementing AI in enterprise operations, how does it affect the efficiency, productivity, and overall performance of the business. This exploratory research begins with an insight into understanding AI, addresses how AI has been utilised and implemented into businesses, the ethical and societal considerations, and potential benefits and challenges businesses may confront. Ten interviews with leading industry experts using AI, followed by focus groups, have generated information. opinions, and key insights. By utilising the software Nvivo this quantitative research presents key themes and content findings to assist in educating enterprise personnel during AI decision-making and implementation stages.

Keywords: Artificial Intelligence, implementation, Ethics, Benefits and Challenges

1. Introduction

Artificial intelligence (AI) is advancing at a rapid pace and has the potential to transform the way organisations are run. McKinsey Global Institute estimated that the implementation of AI in businesses could generate up to $3.5 trillion by the year 2030. (Manyika et al., 2017). The implementation of AI can increase productivity, lower expenses, encourage innovation and expansion, and handle supply chain management, customer support, and product development. The use of AI raises many ethical concerns, including questions about privacy, accountability, and transparency (Mittelstadt et al., 2016). As organisations consider the adoption of AI, it is important for them to carefully consider these risks and challenges and take steps to address them. According to a survey conducted by the Harvard Business Review, 71% of respondents expect to be using AI in their businesses within the next three years (HBR Analytic Services, 2018). Throughout this exploratory research, we aim to provide a comprehensive overview of the current state of AI within enterprise and its future direction by:

1. Examine how AI is being utilised within enterprise and assess the potential benefits and challenges of such adoption.
2. Identify the ethical and societal implications of AI adoption within enterprise, including the potential for job displacement and the risk of bias in AI algorithms.
3. Provide recommendations for best practices for enterprise considering the adoption of AI to maximize the potential benefits while minimizing potential negative impacts.

1.1 What is Artificial Intelligence?

Artificial intelligence, or AI, is the term used to describe the emulation of human intelligence in machines designed to think and learn similarly to humans (Bostrom, 2014). AI is the capability of machines/robots to perform operations generally require human intelligence (speech recognition, decision-making, visual perception, and natural language comprehension). Alot of investigation and development in AI has lead to advancements in machine learning, deep learning, natural language processing, and robotics. The idea of building robots capable of mimicking human intelligence was first put forth by pioneers like John McCarthy, Marvin Minsky, and Claude Shannon in the middle of the 20th century. Machine learning involves training algorithms on big data sets to identify and pinpoint patterns as well as make predictions. As a result, there has been major advancement in systems, natural language processing, and computer vision. By facilitating neural networks to understand more complicated

data representations and deep learning, a branch of machine learning has improved neural network performance (Goodfellow, Bengio, & Courville, 2016).

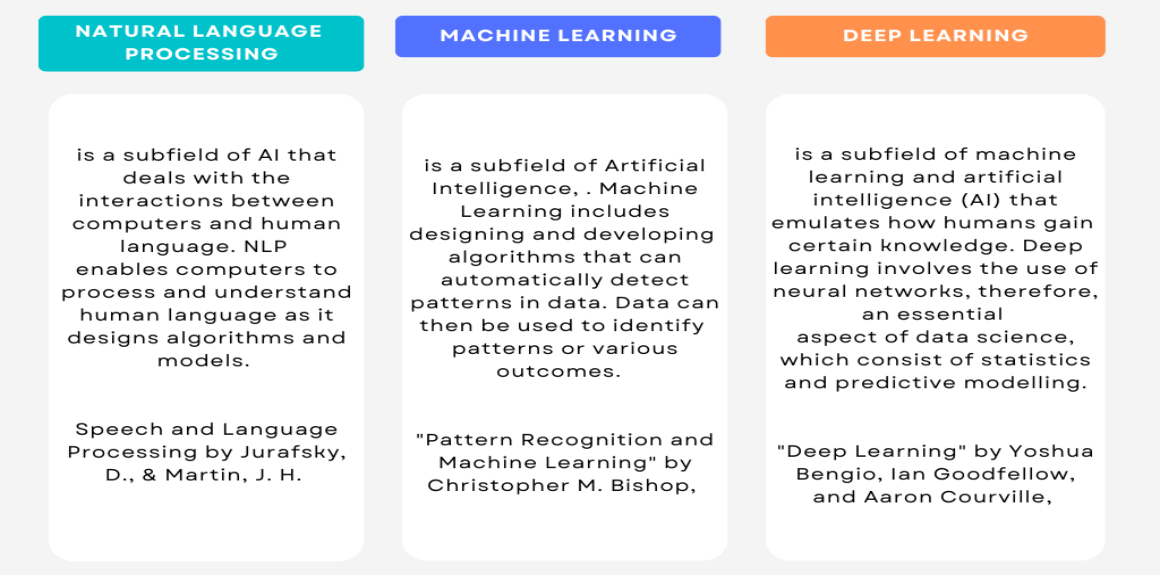

Figure 1

1.1.1 The Role and implementation of AI in Business

AI is used by companies to automate repetitive operations (Hassanzadeh et al., 2018), analyse data (Wang et al., 2019), and make predictions (Nguyen et al., 2019). A few of the major business applications of AI include Automation, Data analysis, Predictive analytics, Marketing, Fraud Detection, Supply Chain and Customer Service. AI implementation within a company can be a multi-step complex process (KPMG, 2018). Among the crucial actions in deploying AI in a company are: Clearly defining the business challenges the firm is attempting to solve (Hassanzadeh et al., 2018). By doing this, it will be easier to make sure the AI solution is customised to fit the unique demands of the firm (Zhang et al., 2017). Implementing AI into any organisation involves multiple steps: Problem Definition, Data Collection, Data Preparation, Model Selection and Training, Validation and Testing and Deployment each with its unique set of challenges and potential pitfalls. To mitigate these challenges, thorough planning and expert guidance are necessary at each stage. The data preparation stage should involve data auditing practices, data cleansing tools. When selecting and training the model, it could be beneficial to use techniques like cross-validation to avoid overfitting, and ensembling methods to improve model performance. During deployment and monitoring, having robust IT infrastructure, clear communication channels with users, and ethical oversight mechanisms aids successful implementation.

1.2 Benefits of AI (Business Perspective)

Integrating AI has a number of advantages for businesses (KPMG, 2018). AI can manage vast volumes of data (Wang et al., 2018) and automate repetitive operations (Hassanzadeh et al., 2018), boosting output and lessen the need for manual labour. AI can evaluate data and generate insights to help businesses make better decisions, increasing performance and competitiveness (Zhang et al., 2017). AI can help organisations labour expenses by automating operations and decreasing the demand for human labour (Raza et al., 2018). Personalised client experiences and more effective customer service can be achieved (Barbosa et al., 2018), which will boost customer satisfaction and retention. AI can be used for predictive maintenance which lowers maintenance costs and downtime by foretelling when equipment is likely to fail (Nguyen et al., 2019). A report by Accenture Research (2017) recorded the tangible improvements from AI implementation across 16 different industries and found that Ai has the potential to boost profitability. Salesforce (2017) highlighted that in the retail industry the integration of AI for customer relationship management has increased sales by 35%, Furthermore, a study undertaken by McKinsey & Company specifies that organisations implementing AI into their supply chain and manufacturing process recognised a reduction in forecasting errors by 20-50%, leading to a decrease in inventory reductions of 20-50%, resulting in significant cost savings.

1.3 Challenges of AI (Business Perspective)

AI in business has many advantages (KPMG, 2018), there are also difficulties to be taken into account (Liu et al., 2019). High-quality data is essential for AI systems to work efficiently (Wang et al., 2018). To ensure AI generates actionable results, businesses must ensure their data is accurate, current, and relevant (Zhang et al., 2017). Ethical issues are another challenge. As AI systems improve, companies will need to take into account ethical issues like prejudice (Berendt et al., 2019), responsibility (Bostrom, 2014), and transparency (Dignum et al., 2019. There is an increasing need for AI knowledge, and firms may have trouble locating the people they require to develop and maintain AI systems (KPMG, 2018). AI systems process a lot of data, so companies must ensure they are following data privacy laws (Hofmann et al., 2018) and the data is being used ethically and responsibly (O'Neil, 2016). Integration of AI can be difficult and time-consuming for businesses to incorporate AI technology into their current infrastructure and business processes (Li et al., 2018). As AI systems handle sensitive data, companies must make sure the systems are safe (Huang et al., 2018) and the data is shielded from intrusions and breaches (Zhang et al., 2017). An IBM annual report 'This Cost of Poor Data Quality' highlights that the quality of data that feeds the AI system is a primary concern. The U.S economy incurs an astounding annual cost of around $3.1 trillion due to poor data quality (IBM, 2016). To address data quality issues, businesses can implement data audits and enforce robust data frameworks to ensure the reliability and consistency of the data.

1.3.1 Ethics and AI

Ethical issues related to AI in the workplace need to be considered (Goodman & Flaxman, 2016). Key ethical concerns with AI in business include **Bias:** When taught biased data, AI systems have the potential to reinforce and even exacerbate that bias (Dastin, 2018). Decisions made as a result may be unfair or discriminating, which is harmful to both individuals and organisations (Wachter et al., 2017). ***Transparency:*** Many AI systems are "black box" models, which means people cannot see or understand the decisions they make (Lipton, 2018). This might make it challenging to comprehend how and why decisions are being made, which can cause issues with trust and responsibility (Goodman & Flaxman, 2016). ***Data privacy:*** As AI systems process a lot of data, companies must ensure they are following data privacy laws and the data is being used ethically and responsibly (National Research Council, 2014). ***Autonomous systems***: Systems that can operate alone, such as autonomous cars or drones, are referred to as autonomous systems (Lin, 2017). These systems raise moral questions about liability, responsibility, and safety (Wallach & Allen, 2009). ***Displacement of jobs***: A possibility when AI systems automate work and render human labour unnecessary (Frey & Osborne, 2017). Businesses must think carefully about the moral ramifications of job loss (Baert, 2018). ***Discrimination:*** A possibility due to the fact AI systems may make judgments based on factors like age, gender, and ethnicity (Angwin et al., 2016).

1.4 Societal Implications and Concerns

Many societal implications, and problems can be associated with using AI in business. Issues such as ***Job displacement:*** is possible when AI systems automate work and render human labour unnecessary. This might result in social and economic inequity. This might be especially problematic for low-skilled individuals, who may find it challenging to retrain for new professions (Frey and Osborne, 2017). ***Economic inequality***: AI systems may result in economic inequality because those who can access and afford the technology will gain from its enhanced productivity and efficiency, leaving those who cannot (Autor, 2019). ***Social isolation***: As AI systems take on more jobs previously handled by people, there is a risk of social isolation because there will be less opportunity for human interaction (Brynjolfsson and McAfee, 2014). ***Lack of accountability***: Because AI systems can act and make decisions without human supervision, it may be challenging to hold them responsible for their deeds (Wachter et al., 2018).

1.5 Future of AI

AI is predicted to continue to grow and be integrated into a variety of businesses in the coming years. *"AI is expected to add $15.7 trillion to the global economy by 2030" (PwC, 2018)*. Future advancements and trends in AI include **Increased automation:** AI systems are predicted to automate a broader range of tasks, increasing productivity and efficiency across industries (Gartner, 2020). "*Companies that adopt AI in their operations see an average increase in productivity of up to 30%"* (Amit & Schoemaker, 2003***). Edge computing***: As the amount of data produced by IoT devices rises, AI algorithms will be installed in edge devices closer to the data source, enabling faster and more effective data processing (Cisco, 2020). ***Human-AI collaboration:*** As AI systems improve, more attention is anticipated to be given to human-AI collaboration (Wachter et al., 2018), in which AI systems assist people in making decisions. ***Ethics and regulation:*** As AI systems proliferate, the ethical and legal ramifications of their use will come under more scrutiny

(Domingos, 2015). Businesses must ensure their AI systems are accountable, transparent, and compliant with applicable laws.

2. Methodology

This exploratory research comprised a total of ten interviews and two focus group sessions were conducted. Participants were recruited by undertaking purposive sampling to obtain a diverse representation from a variety of business sectors (IT services, finance, healthcare, automotive, and retail) and access to management and personnel who are involved in AI utilisation within their enterprise. A combination of face to face and online interviews utilising video conferencing technology was undertaken. Structured interviews were undertaken to gain knowledge and experience on the current level of AI adaptation, application and prospective benefits and obstacles as well as future applications. Each interviewee answered, shared opinions, and elaborated on each of the twelve questions. Interviews were time bound to 45 minutes to encourage participation and apply a level of consistency. Two Focus Group sessions were conducted utalising video conferencing technology. The focus groups were approximately 70-80 minutes in length and consisted of a total of 9 employees who utilise AI across seven distinct industries (Healthcare, Education, Automobile, Legal, Retail, Security, Finance). The aim of the two-focus groups is to acquire information and discussions about the attitudes, beliefs, and perceptions towards the use of AI in participants' enterprise/industry. A blend of questions and statements were communicated to encourage discussions and gain further information on the following topics: how AI is used in the organization, the benefits and challenges of AI adoption, the ethical and societal implications of AI adoption, future applications of AI, and implementation considerations for AI.

A systematic process was undertaken through which the data collected was analyzed, and subsequently, the key themes for the study were presented. **Step 1:** A total sample size of the set of interviews and 2 focus group discussions was conducted, and information was gathered on the Overview of AI adoption in various enterprises. **Step 2:** The qualitative information/data gathered were then imported into Nvivo 12 qualitative analysis software. The procedure involves categorizing similar and related quotations into codes. **Step 3:** The codebook and the transcript were then analyzed to capture key themes relevant to the study. The themes uncovered are: (1) Al implementation in business and consideration while deploying Al. (2) Advantages of AI, foreseeing Al uses and its future potentials in company sectors. (3) Difficulties faced in Al deployment/utilization and recommendations for best practices in businesses. (4) Impact of Al on growth and innovation in industries and potential effect on modern business operation allowing for a thematic content analysis to produce insights from the data.

3. Findings

AI has the potential to bring significant benefits to organisations in terms of efficiency, productivity, and decision-making.

"AI has given us the ability to develop more effective and precise solutions for our clients, increasing client happiness and boosting income." Customer Service Specialist

Numerous business sectors are starting to acknowledge the benefits of AI. In fact, 64% of businesses believe that AI will boost their productivity (Forbes Advisor, 2023). Among leading businesses, 9 out of 10 are investing in AI technologies, although only 14.6% have currently deployed AI capabilities in their operations (Authority Hacker, 2023).

"AI has increased the effectiveness of our supply chain and enabled us to offer a more individualized consumer experience." Logistics FmCG - Manager

Challenges and considerations that organisations must consider when implementing AI, including the potential for job displacement, the risk of bias in AI algorithms, and ethical concerns (WEF, 2018).

"Difficulties in gathering and processing the substantial volumes of data needed for AI training, in addition to worries about the security of auto vehicles" Automobile Representative

AI makes decisions using algorithms that either follow rules or, in the case of machine learning, review large quantities of data to identify and follow patterns which consists of multiple layers, machines develop their own learning and patterns, which makes it non-transparent compared to traditional rule-following computing.

"Biggest obstacles were controlling the cost of AI installation and dealing with concerns about potential job displacement." Transport and Logistics Representative

There are serious ethical, safety and societal risk associated with the growth of AI technologies, finding qualified candidates with experience in AI and incorporating AI solutions into clients' current systems has been a common hurdle

and overcoming early doubts about the accuracy and dependability of AI as well as assuring data privacy and security is a significant challenge and difficult to ensure regulatory compliance.

"Overcoming early doubts about the accuracy of AI as well as assuring data privacy and security was a significant challenge." Marketing Director

"Finding qualified candidates with experience in AI and incorporating AI solutions into our client's current systems were the biggest hurdles." Entrepreneur

A common challenge that arose was job displacement. AI automates tasks, therefore, poses a risk for human workers to become redundant. This is not just an industry-specific challenge, as job losses can cause economic disruption. Our research identified that job displacement is not a major issue as AI relies on humans to operate the programs. 80% of retail sector executives intend to implement AI automation by 2025 (Authority Hacker, 2023). However, AI has generated a level of fear and uncertainty amongst workers. Therefore, retraining, upskilling and investments as workers transition to new roles utilising AI emerged as a possible solution.

"Investments in frameworks and tools for AI auditing, the promotion of ethical AI development, and a focus on workforce development and retraining are a few potential remedies." Financial Representative

"While using AI, companies should give ethical issues, openness, and fairness a priority, as well as retraining and developing their personnel." Automobile Representative

Organisations should take several precautions to address the possibility of bias and ethical difficulties with AI systems. The first and most important step is to ensure that the data used to train AI systems is diverse, representative, and unbiased (Brundage et al., 2018). This could include cleaning and preparing the data, as well as ensuring that it was gathered honestly and openly. Finally, organisations should implement methods for routinely evaluating and testing AI systems to verify they are working as intended and are not creating biased or unethical results (Dastin, 2018).

"AI has made it possible for us to work with businesses to address ethical and safety issues in a more organized and efficient manner, ultimately enhancing the reliability of AI systems." HR Personnel

Implementing AI technology can be a complex process. This research highlights that industries and businesses investing in and applying AI applications must identify what type of AI should be implemented. Aligning AI initiatives with business objectives and strategy can be difficult for organisations. This could entail identifying the business problems that AI can solve as well as the criteria that will be used to assess the effectiveness of AI initiatives (Kohli, 2018). To obtain the full benefits of AI, businesses may need to consider how AI will integrate within their existing systems and processes and make any necessary changes (Goyal, 2017).

"Legal and moral issues related to AI in their sectors. These hazards can be reduced by working with regulatory organizations and maintaining current with industry best practices." Legal Representative

"Maintaining stakeholder trust requires making sure AI systems are transparent and understandable, even if this can be difficult. These issues can be addressed by creating explicit AI rules and encouraging open dialogue." Fin Tech Representative

AI applications can collect, process and store large quantities of personal data. The European Union's General Data Protection Regulation (GDPR) sets out detailed conditions for collecting, using, and storing personal data, and businesses operating in the EU must comply with these regulations. The legal framework for AI is evolving with an emphasis on ensuring that the technology is used in a responsible and ethical manner. (S. De Choudhury and J. Kleinberg 2017).

"Companies should take into account elements including data security and privacy, algorithmic fairness and bias, employee development and retraining, regulatory compliance, and moral issues." IT specialist

Recommendations drawn from the research that the AI system's design needs to be considered. The system requires testing and for any biases or errors to be addressed to ensure the system is accurate and trustworthy. In addition, businesses may face cultural challenges when integrating AI. Employees might resist changing, fear of job loss, and may have a lack of understanding of how AI works (Hee, 2018). Organisations may need to invest in education and training for employees to understand the benefits and implications of AI. They may also want to think about how to engage and inform their employees about AI initiatives (Kohli, 2018).

"Our company focuses on creating open and just AI algorithms and makes investments in training and up-skilling legal practitioners to work with AI systems."

Information and content acquired during the methodology stage of the research have allowed us to identify the Ai processes and applications that enterprises are utilising as a part of their external and internal processes.

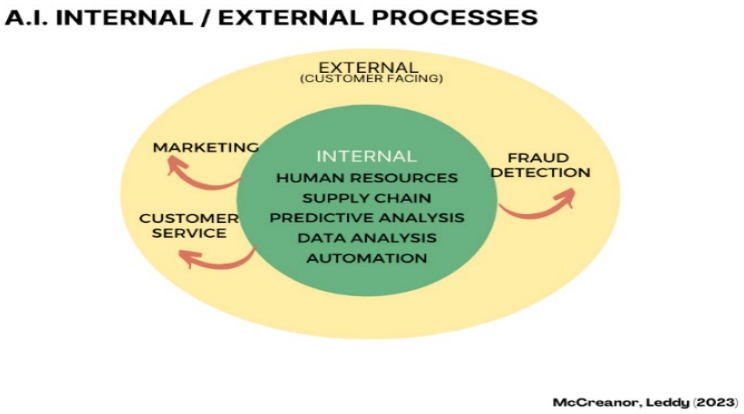

Figure 2

External Processes

1. ***Marketing***: AI-driven marketing tools like customer segmentation, tailored content, and predictive analytics substantially enhance marketing effectiveness and customer engagement. Companies that have adopted AI in marketing have seen increased conversion rates, more focused campaigns, and a more efficient allocation of marketing resources.
2. ***Customer Service:*** AI-powered chatbots and virtual assistants improve customer service operations by providing prompt and precise responses, reducing wait times, and offering round-the-clock support. However, balancing automated and human assistance is crucial, as customers continue to value human interaction for addressing more complex concerns.
3. ***Fraud Detection:*** Implementing AI in fraud detection has enabled organisations to more effectively identify and prevent fraudulent activities. Machine learning algorithms, especially those utilising anomaly detection and pattern recognition, have considerably improved the precision and speed of fraud detection systems, which leads to decreased losses and increased customer trust.

Internal Processes

1. ***Human Resources*****:** AI technologies have streamlined recruitment by automating CV screening, interview scheduling, and candidate evaluation. Moreover, AI has supported employee retention and career development by providing personalised training and performance management.
2. ***Supply Chain*****:** Incorporating AI in supply chain management has optimised inventory control, demand forecasting, and logistics operations. Companies using AI in their supply chain report lower operational costs, reduced lead times, and enhanced accuracy in demand forecasting.
3. ***Predictive Analysis:*** AI-driven predictive analysis for well-informed decision-making. AI-powered predictive models empower organisations to foresee trends, detect potential risks, and make data-driven decisions, which result in increased operational efficiency and a competitive edge.
4. ***Data Analysis:*** Employing AI in data analysis has enabled more accurate, efficient, and insightful data processing. Companies that have embraced AI-driven data analysis tools have reported improved decision-making capabilities and an increased ability to derive actionable insights from extensive data sets.
5. ***Automation:*** The study demonstrates that AI-powered automation solutions significantly boost operational efficiency by reducing human error and allowing employees to concentrate on more strategic and creative tasks.

3.3 Considerations for AI Implementation in Organisations

To successfully integrate AI several factors must be considered. Organisations implementing AI technologies in external and internal processes should consider the following.

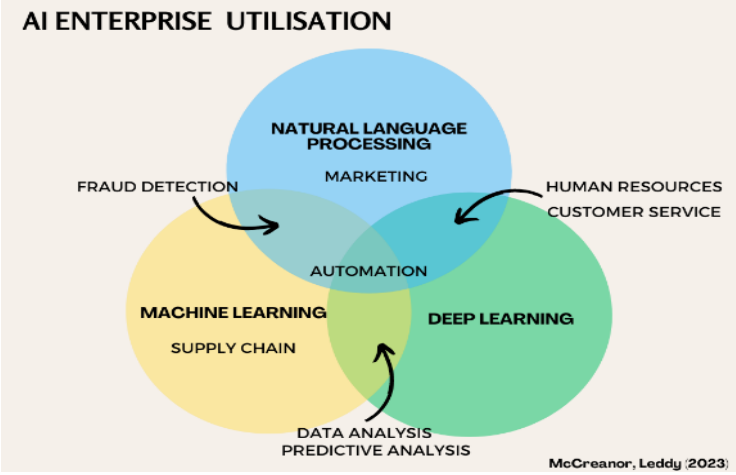

Figure 3

External (Customer-Facing) Processes *Marketing, customer service, and fraud detection:*

Customer Experience: AI must improve the customer experience, not detract from it. Ensure AI-powered solutions are user-friendly, efficient, and accessible to a diverse customer base. *Data Security and Privacy*: Since customer-facing AI systems handle sensitive customer data, organisations should implement strict data protection measures. To avoid legal issues and maintain customer trust, data protection regulations like GDPR in the UK must be followed. *Integration with Existing Systems*: To minimise disruptions and maximise resource efficiency, AI technologies should be seamlessly integrated with marketing, customer service, and fraud detection systems.

Internal Procedures: HR, supply chain, predictive analysis, data analysis, and automation are internal processes. Processes include: *Employee Engagement and Retraining*: AI may displace workers or change their roles. Employee engagement, retraining, and transition support should be prioritised. *Ethical Considerations*: Organisations should consider how adopting AI will affect fairness, transparency, and bias in decision-making. *Infrastructure and Compatibility:* An organization's infrastructure and IT systems must be AI-compatible. Scalability: AI systems should be scalable to support organisational growth. Organisations must calculate AI's short and long term ROI. AI technology costs must be weighed against their expected benefits and efficiencies.

Limitations

Limitations must be recognised while exploring the possible utilisation of AI within enterprises. A notable constraint was that 40% of the interviewees and focus group attendees were apprehensive about divulging details of operational activities. They were concerned that sharing such confidential information could have adverse effects on their industry. it was decided to anonymise all participants' information, only providing details about job title and industry.The anonymisation of data may impede the generalisability of our findings, therefore this exploratory research would require further research to address these limitations.

4. Review of Findings

Theme 1: Overview of AI implementation in business and consideration while deploying AI.

AI can process large amounts of data and perform complex calculations allowing certain tasks to be undertaken at a much faster pace and minimising the risk of human error. Allowing businesses to focus more time on strategic tasks. Another usage with AI's ability is to provide insights and predictions based on the large volumes of data that it can process and analyse. Businesses can utilise this information to assist in decision-making (i.e., predicting market trends, predicting sales forecasts etc....). This data can generate personalised recommendations or tailor products and services to specific requirements. Our research identified that AI has helped businesses provide more efficient and professional customer service. AI automating process, named chatbots, can quickly respond to customer inquiries and provide personalised and prompt customer support. Consumer trends and feedback can also be highlighted, allowing businesses to understand their customers.

Theme 2: Advantages of AI, foreseeing AI uses and its future potentials in company sectors.

There are many applications for AI, including the healthcare industry, banking, retail, and transportation. Another trend is the increased use of AI to automate processes and procedures. Employees may focus on more complex and creative

work using AI to automate mundane and repetitive chores (Goyal, 2017). This trend is expected to greatly impact the future form of employment and the necessary skills. Therefore, businesses must examine how to adapt (Bryson et al., 2018). The third trend is the growing use of AI in decision-making. AI can greatly increase decision-making speed and precision, as well as analyse massive volumes of data to uncover patterns and trends that humans would miss (Kohli, 2018).

Theme 3: Impact of AI on growth and innovation in industries and the potential effect on modern business operation

China advances in AI adoption, with 58% of companies deploying AI. In comparison, the United States has a lower implementation rate, with 25% of companies using AI and 43% exploring its potential applications (Forbes, 2023). AI is projected to have a substantial economic impact, contributing a net increase of 21% to the United States' GDP by 2030 (Forbes, 2023). AI can automate routine tasks, allowing employees to focus on more creative and strategic work. Make better decisions by providing accurate and timely data analysis due to AI-driven technologies that spur development and innovation across almost all sectors. Some industries stand to gain significantly from AI developments, including healthcare, automotive, manufacturing, and financial sectors. It is estimated that AI might cause the elimination of 85 million jobs by 2025 (Authority Hacker, 2023).

Theme 4: Difficulties faced in AI deployment/utilisation and recommendations for best practices in businesses.

Businesses that do not use AI risk falling behind competitors who do to improve productivity, efficiency, and decision-making (Bughin, et al., 2018). AI is becoming a crucial competitive differentiator in today's business environment (Daugherty & Wilson, 2017). According to a McKinsey & Company Analysis, companies that use AI see significant cost savings, revenue growth, and increased customer satisfaction (Bughin et al., 2018). Those that do not use AI may find it difficult to compete with these organisations and to attract and retain customers (Bughin, et al., 2018. Furthermore, the use of AI poses various ethical and legal concerns, such as the potential for bias in AI algorithms and the influence of AI on employment.

5. Conclusion

This research paper has examined the potential utilisation of AI in enterprise, addressing objectives such as understanding AI implementation, exploring the benefits and challenges, evaluating the ethical and societal implications, and providing recommendations for best practices. The findings reveal that AI is being used across diverse sectors, such as manufacturing, finance, software development, retail, and logistics, to improve operational processes and enhance customer experiences. The implementation of AI contains challenges, such as data quality, biases in algorithms, and compliance with ethical and legal standards. To address these challenges, measures such as employee retraining, collaboration with external partners, fostering transparency and accountability have been adopted.

The predictions for AI's future applications in enterprise are promising, but a focus on data privacy, workforce development, ethical considerations, and regulatory compliance must go hand in hand with this growth. It is crucial for organisations to approach AI adoption with careful planning, continuous evaluation, and a commitment to responsible and accountable AI practises, ensuring a harmonious integration of AI into the fabric of enterprise. The anonymisation of data may impede the generalisability of our findings, it is recommended that this exploratory research would require further research to address these limitations, such as undertaking case studies or securing the necessary confidentiality agreements that allow for the disclosure of more specific organisational information. Also, an increase in governmental management and surveillance like General Data Protection Regulation (GDPR) to safeguard data usage, eliminate bias and ensure data privacy.

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5G is not just Another G: A Review of the Managerial Literature

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Abstract: Due to the higher range of markets and applications opportunities it brings, the fifth generation of mobile communications (5G) cannot be considered just a technological transition, as it was for earlier generations of cellular technology, rather it represents a revolutionary phenomenon which could deeply change the competitive landscape for wireless services. According to the literature, it is "one of the most complex technologies seen over the past decade both in terms of technical development and business implications". However, on one hand, the 5G is a hotly discussed topic from a technical perspective, on the other the managerial literature appears ambiguous and fragmented in the way it is presented. Such absence recalls for a paper whose purpose is to position the 5G search thread also in the managerial literature. For this reason, the work aims to systematize previous knowledge and identify potential research directions related to the strategic adoption of 5G technology. To answer the underlying research question regarding the state of the art of the 5G in the strategy domain, a systematic search has been done, then, on the selected papers, a conceptual review has been carried out to identify (i) the "business reconfigurations" of 5G technology, (ii) the boundary conditions, intended as the conditions of existence of a 5G business case, (iii) the barriers, which instead hinder the development of cases. The research provides useful implications to both the theory and practice: from a theoretical perspective, it represents one of the first studies concerning 5G which is not strictly related to a specific industry or scenario. Secondly, the challenges and gaps identified generate research questions which can be traceable also to a general and more theoretical context, such as the business model innovation literature, where the strategic adoption of new technological paradigms entails further investigations. From a practitioner's perspective, it provides useful insights regarding 5G adoption for increasing actors' awareness of such technological innovation, especially concerning their attitude change which is needed to seize the business opportunities it embraces.

Keywords: 5G, Business Model, Business Model Innovation, Enabling Technology

1. Introduction

According to Chesbrough (2010), it is not just a matter of leveraging the best technologies available in today's digital world, rather being confident with the development of alternative businesses enabled by these allows firms to be more competitive. Furthermore, also from a more network perspective (Jocevski, Arvidsson, Ghezzi, 2020), the adoption of these technologies may entail in most cases the reshaping of market boundaries by highlighting new intersectional convergence within industries.

This is particularly true for what concerns the 5G technology since due to the higher range of markets and applications opportunities it brings, it cannot be considered just a technological transition, as it was for earlier generations of cellular technology, rather it represents a revolutionary phenomenon which could deeply change the competitive landscape for wireless services (Lehr, Queder, Haucap, 2021). It is more "a toolbox of capabilities than a one-size-fits-all technology" (Lehr et al, 2021; p.1), and for this reason, it not only constitutes a complex technology in terms of technical development, but it also requires a change in the actors' attitude, especially of Mobile Network operators (MNOs) (Lehr et al, 2021), which have always played an important role in the telecommunication domains (Noh et al, 2021), characterized by high rates of volatility (Ghezzi, Cortimiglia, Frank, 2015).

However, even if it represents a very new technology with high potential, there is still ambiguity and fragmented knowledge about its strategic adoption. All these implications recall further investigations to address emerging challenges with great scientific and social relevance. Consistently, this work aims to trace the state of the art of the 5G literature in the managerial sciences field by defining a search protocol to systematically structure extant knowledge about the above-mentioned technological paradigm and identify potential directions.

The paper is structured as follows: after having outlined the research's starting point and the overall objective in section 2, in section 3 the search protocol with the description of the eligibility criteria is presented. Afterwards, in section 4 a conceptual review about the state of the art of 5G literature in the business and management field is presented. Finally, the paper ends with a discussion about the methodologies used by scholars to try to investigate the gaps that emerged in literature and the identification of future avenues.

2. Research background and objective

The 5G represents an emerging digital infrastructure (Gooderman et al, 2022) that can revolutionize multiple sectors and it promises a significant economic impact on companies (Knieps & Bauer, 2022). The technical literature on 5G appears to be well-established, surpassing the number of publications concerning 5G in managerial literature. However, this is not surprising given that 5G is a cutting-edge technology that has required years of study and research. In the managerial literature, the publications on this topic range across various areas, such as environmental sustainability, emerging countries and political issues (e.g., Parcu, Innocenti, Carrozza, 2022). However, as already mentioned in the Introduction section, it is less common to find articles that deal with the strategic impact of 5G and all the opportunities it entails. Many papers focus on the description of the technology's adoption in specific fields (see Table 1), without then delving into the details of the strategic and entrepreneurial implications arising from a broader perspective. The work aims to position the theme of 5G also in the managerial literature, attempting to identify the current challenges for the main players and potential directions to take, which could foster the development of the 5G market. Despite having attained a certain level of technological maturity, it is currently grappling to gain momentum.

Table 1: 5G main application fields

Application Field	Authors
Smart city	Gooderham et al, 2022
Smart agriculture	Gooderham et al, 2022; Knieps and Bauer, 2022
Smart manufacturing	Forge and Vu, 2020; Vuojala et al, 2020; Dolgui and Ivanov, 2022;
Smart energy	Vuojala et al, 2020; Gooderham et al, 2022
Logistics	Vuojala et al, 2020; Dolgui and Ivanov, 2022
Smart hospital	Forge and Vu, 2020; Vuojala et al, 2020

3. Methodology

3.1 Inclusion criteria

First, The SciVerse Scopus online scientific articles database has been selected as the most appropriate source for the research. Regarding the selection of the keywords, the choice has been driven mainly by the necessity to draw a state of the art of 5G technology literature.

To do so, the identification of papers with "5G"; "Fifth generation technology"; "Fifth generation of mobile communication"; "Fifth generation of wireless networks" present in their title, abstract and keywords section has been carried out. Together with a keyword-based search, a backward approach to identify other related studies (n= 5) has been followed.

Other inclusion criteria regard the domain the papers selected belong to, which is Business, Management and Accounting. Furthermore, the subject areas of Social and Decision Sciences have been also considered to broaden the analysis.

Finally, only articles and reviews in English were considered due to their higher quality.

The output from The SciVerse Scopus database of the above-mentioned query was 977 papers, updated in July 2022.

3.2 Exclusion criteria

To maximize the specificity of the studies included in the research, several exclusion criteria have been defined.

(i) Studies requiring technical competencies (n = 186): all the studies where technical competence or

specific knowledge is required to deeply analyse technology-dominated sectors that have been excluded (e.g., Lee and Ko, 2021).

(ii) No implications for strategy, entrepreneurship, or innovation (n = 87): this criterion has been used to confine the research objective to the strategic, entrepreneurial and innovation field. Every article concerning different application domains has been excluded unless there was clear evidence of implications for the above-mentioned area without being mentioned expressly (e.g., Cheng, Hu, Varga, 2022)

(iii) Clear focus on Implications for sustainability, globalization, emerging countries and government issues (n=80): all topics about heterogeneous development at the global level, developing countries, and applications

to increase sustainability have been excluded because being highly relevant topics would need a separate literature review on its own (e.g., Parcu, Innocenti, Carrozza, 2022).

(iv) Scimago Journal Rank (n = 576): To guarantee both the inclusiveness of the Scopus database and the quality of the journal outlet considered, only articles published in journals whose rankings are Q1 have been included.

The last access on the above-mentioned list was done on the 15th of July 2022. After the text screening, other papers have been excluded (labelled in the prism below as "Out of scope") because they only fit the exclusion criteria just described after reading the entire text, or because 5G was not the central theme. The final sample of papers considered for the conceptual review was 37.

In Figure 1 the screening process of the query above mentioned is reported.

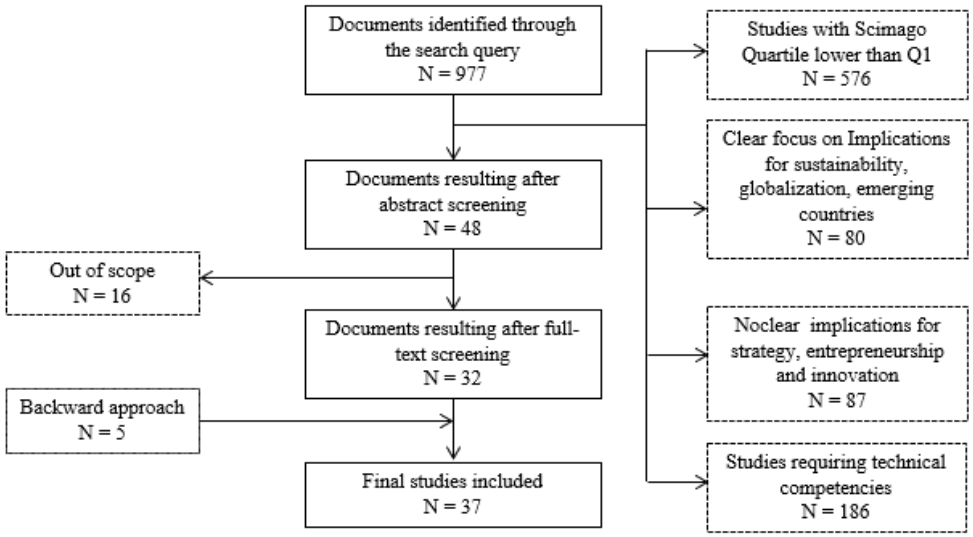

Figure 1: The document screening process

4. Findings

Looking at the papers' typologies, several works are conceptual reviews. However, among them, it is possible to find different perspectives adopted. For instance, most of these refer to spectrum policies and regulations, especially taking into consideration different countries (e.g., Teece, 2021; Blind and Niebel, 2022). Other conceptual reviews refer to specific application fields (e.g., Dolgui and Ivanov, 2021) or 5G implications in the digital innovation process of small and medium enterprises (Olokundun et al, 2022). Furthermore, two bibliometric reviews have been found (Mendonça et al, 2022; Buggenhagen and Blind; 2022).

Several papers are based on case study methodology where a specific business case, industry or country has been described (e.g., Gooderham et al, 2022; Lee and Yu, 2022; Schneir et al, 2022; Massaro and Kim, 2021).

In the sample of papers considered, also quantitative studies are present. The usage of predictive analytics and scenario-based assessment exemplifies the aim of such works, which try to measure quantitatively the effect of the factors considered, such as regulations, technological standards and 5G mobile broadbands coverage (e.g., Wen, Forman, Jarvenpaa, 2022; Rathje and Katila 2021; Schneir et al, 2019; Oughton et al, 2018).

4.1 5G Managerial reconfigurations

According to the European Commission and the 5G Infrastructure Association, 5G refers to the fifth generation of broadband data-networking digital communications technology (5G-PPP; 2016). From a more managerial perspective, in the literature considered it is possible to find several 5G definitions which appear as attempts to reconfigure the technological one in a business domain. In Table 2 the main 5G business reconfigurations explicit in the analysed papers are synthesized. Generally, due to its pervasiveness, 5G is envisioned to become the base for future services, and almost infinite applicability which may change the development trajectory of the telecommunication industry and beyond. Due to these characteristics, several authors classify it as an "enabling technology" or "Junior General-purpose technology" (Teece, 2018; Schneir et al, 2019; Rathje and Katila; 2021).

Enabling technologies are upgradable, adaptable technologies with improvement potential that have broad applicability (Gambardella et al., 2021). Even though they share part of the general-purpose technology's definition (Bresnahan and Trajtenberg, 1995), their economic impact is uncertain (Teece, 2018a).

4.2 5G Boundary Conditions

Table 2: 5G Managerial reconfigurations

5G Managerial reconfigurations	Authors
Game changer	Deng et al, 2020; Knipes & Bauer; 2022
General Purpose Technology (GPT)	Knipes & Bauer, 2022; Mendonça et al, 2022
Junior GPT or Enabling technology	Teece, 2018; Schneir et al, 2019; Rathje and Katila; 2021
Connectivity/Enabling platform	Ahokangas, 2021, Bauer and Bohlin, 2022;
Emerging digital infrastructure	Gooderman et al, 2022
Toolbox of capabilities	Lehr et al, 2021
Paradigm shift	Lehr et al, 2021; Teece, 2021

In this paragraph, the boundary conditions (Busse et al, 2017) intended as the conditions of existence of 5G technology have been figured out. In other terms, based on the managerial literature, the aim has been to identify which are the "building blocks" for the development of 5G business cases. The four categories identified are (i) promised value, (ii) ecosystem, (iii) regulation and (iv) infrastructural requirements.

4.2.1 Promised Value

According to Oughton and colleagues (2018), mobile network operators (MNOs), who have always played a key role in the telecommunications industry, must be aware of the advantages and the threats coming from such a technology paradigm shift (Lehr et al, 2021). Already with earlier technologies, MNOs have adjusted their business models, however, with the fifth generation, it seems that the development trajectory has changed strongly due to the high expected value such technology is promising (Lehr et al, 2022; Gooderham, 2022). Guo and colleagues (2022, p.52) affirm explicitly that MNOs must shift from "the business-to-individual-customers model to the business-to-business model". The same scholars put emphasis also on the fact that shifting from customized network structures could play a crucial role in terms of business model development. However, such reasoning is extended by Bauer and Bohlin (2022) by affirming that if one hand the 5G customized applications are promising higher revenues, on the other 5G networks infrastructure might be very expensive, for this reason, all the stakeholders involved must be aware of such risk, especially MNOs.

4.2.2 Ecosystem

According to Blind and Niebel (2022), the 5G ecosystem include a large variety of stakeholders with different goals and interests. The emergence of this technological paradigm will be not only related to the telecommunications industry, but rather other vertical industries will also exploit wireless communication (Vuojala et al, 2020; Dolgui and Ivanov, 2021). In these terms, greater attention must be given to all those opportunities which are not strictly connected to the MNOs, especially by considering that if they do not rejuvenate their business models, the risk is that specialized players are in some way sabotaged by them (Bauer and Bohlin, 2022). On the other hand, if MNOs continue to pursue the same role as suppliers of connectivity, they will risk losing competitiveness. What emerges is the importance of collaborations between the different players with heterogeneous competencies to reduce costs and gather all the opportunities the 5G offers (Hutajulu et al, 2021). More in general, Rathje and Katila (2021) demonstrated through their quantitative study the importance of collaboration between governments and private companies to shape the new ecosystem. This is the reason why in the following section the third boundary condition identified for the development of 5G business cases is the so-called "Government policy".

Similarly, Massaro and Kim (2020) state that 5G technology cannot be considered just as a technical artefact, rather, it is socially constructed. The authors distinguish between non-private actors, which are government, research institutes and universities and users, private actors, which are MNOs, equipment manufacturers, service providers and also "new actors", intended as additional players who join the ecosystem due to new opportunities the technology could bring.

From another perspective, Bauer and Bohlin (2022) distinguish between four different layers and place the different players depending on their core competencies and business strategy. In the lower part, it is possible to find passive and active infrastructure layers which constitute the physical network layer. In the upper find, it is

possible to find the enablers on the so-called enablement, the development layer and the application service layer. On the top, there is the end user, while on each layer an orchestrator provider is present.

4.2.3 Regulation

According to Knieps and Bauer (2022), the 5G technology has introduced governance and management challenges never seen before.

If on one hand, MNOs need government support to face the uncertainty arising from 5G adoption (Forge and Vu, 2020); on the other hand, a stable standards roadmap in terms of spectrum bands is necessary to foster the development of private 5G network deployments (Forge and Blackman, 2017). The fifth generation of mobile communications allows the development of deployments on a wider spectrum range, from 450 MHz to 24,25-52,6 GHz (Bauer and Bohlin, 2022). Vuojala and colleagues (2020) in their works analysed several "spectrum scenarios" to understand all the possible configurations in terms of licences and 5G private deployments for vertical industries. Knieps and Bauer (2022) summarized the spectrum policy to distinguish between principal deployment options and all the possible spectrum licence's configurations, both in terms of the licence and unlicensed spectrum and the national and local. The scholars also summarized the spectrum allocation by nation from 2017 to nowadays, distinguishing between the licenced and unlicensed spectra.

4.2.4 Infrastructural requirements

As previously mentioned, one of the exclusion criteria of the search protocol was related to the exclusion of studies requiring extensive technical competencies. The information is gathered just from the managerial literature due to the aim of the works, for this reason, some limitations may emerge in this paragraph. However, it is fundamental to consider it in terms of boundary conditions since without adequate technological infrastructures it is not possible to develop 5G business cases.

According to Henriquez and colleagues (2022), the main investments regard the ICT physical infrastructure, and it will foster also IoT use cases. In these terms, Bauer and Bohlin (2022) specify that inputs that might be considered necessary resources are antennas, routing of cables and backhaul. ICT infrastructures allow reaching the 5G requirements.

Accordingly, Lehr and colleagues (2021) underline the necessity to deploy more cellular base stations. In addition, they mention the re-architecting of the radio-access networks (RANs) which constitute a greater opportunity also in terms of cost management. Another element the scholars introduce is the necessity of expanding the use of radio-frequency spectrum resources, especially with private and dedicated network deployments.

Furthermore, the paradigm shift represented by 5G requires further improvement of the internet, such as network slicing (Kim, 2020). Vuojala and colleagues (2020) mention also Mobile-Edge computing (MEC) together with the network slicing function, to indicate which are the elements to guarantee adequate communication between different users.

4.3 5G Barriers and Literature's Gap

Together with the boundary conditions presented so far, it is important to mention that there are also barriers which slow down the diffusion of the technology. Furthermore, there are still several gaps which have emerged from the literature, and they refer both to the boundary conditions described and the barriers just mentioned.

4.3.1 Technological and Institutional Failure

Starting from the first barriers identified, both infrastructural or, in other terms, technological, and institutional failure may emerge in the development of 5G business cases. According to Hutajulu and colleagues (2021), From an institutional perspective, several scholars mention the necessity to deepen the mechanisms for developing technological standards, but also to allow companies which are not directly involved in the standards definition to have access to it since it represents an input for complementary innovations (Wen et al, 2022). Other uncertainties regard intellectual property rights and health and safety regulations (Blind and Niebel, 2022). Also considering the business-to-business sector, as already mentioned before, the necessity to regulate the spectrum's availability and accessibility, especially for what concerns 5G private network deployments, constitutes a boundary condition. Every kind of uncertainty and worse choice related to this could constitute another important barrier to 5G adoption.

4.3.2 Uncertain Costs and Benefits

Granted that scholars agree to the fact that 5G promises a great expected value and the possibility of sustainable and profitable business models, as proposed in the previous section about 5G business cases' boundary conditions, it is likewise true that the uncertainties related to costs and revenues influence negatively such dynamic (Dolgui and Ivanov, 2021). 5G technology is costly and more technologically complex than previous technologies (Forge and Vu, 2020), and due to its characteristics of being a junior GPT (Teece, 2018), it is cross-sectorial, and it involved a large portfolio of stakeholders, which complicate even more the situation.

Apart from choices regarding technicalities, each stakeholder involved must understand how to overcome the infrastructure's capex and the R&D investment costs (Forge and Vu, 2020; Blind and Niebel, 2022), and this aspect is particularly relevant for MNOs, which roles are fundamental. If on one hand there is still a gap regarding the value creation mechanism of private companies adopting 5G in a specific field (Dolgui and Ivanov, 2021), on the other hand, mobile network operators must rejuvenate their business models, especially for what concerns their value propositions and their networks architecture (Moqaddamerad, 2020; Lehr et al, 2021; Gooderham et al, 2022). Similarly, Rendon and Schneir (2019) reinforce these reasonings by explicitly saying that until now few authors have discussed 5G revenues and costs streams and how to build a sustainable business model. Schneir and colleagues (2022) tried to investigate it by looking at the possible business cases a mobile network operator could realize in a seaport area.

More in general, Noh and colleagues (2021) mention the challenge regarding the connection between technology resources and business objectives by underlining the importance of considering technology as a fundamental asset for strategic planning and by introducing the need for a "technology-driven strategy".

4.3.3 Actors' Reluctance

According to Hutajulu and colleagues (2021), several stakeholders are hesitant in adopting 5G technology. Actors involved perceive several risks in adopting the new technology, and they are also characterized by heterogeneous interests. On one hand, equipment suppliers foster the 5G roll-out, on the other, mobile networks operators need to understand how (i) to innovate their business model, especially considering new revenue streams, and (ii) how to face the rise of Over The Top (OTT) services, which pose a dangerous threat (Blind and Niebel, 2022). More in general, the private sector's reluctance in adopting 5G may emerge from a lack of a precise risk assessment (Forge and Vu, 2020), or maybe from the uncertainty driven by the lack of a clear definition of what the technology could bring to the society and business (Blind and Niebel, 2022). Such digital transition caused by 5G introduces many questions which need further investigation (Lee and Yu, 2022).

Finally, the debate regarding 5G's social impact (Mansell, 2021) as well as health implications (Bruns et al, 2020) is still open, and this negatively influences the 5G's social acceptance, further complicating the work of the actors involved. However, as mentioned in the exclusion criteria, papers regarding these matters, together with the ones describing the environmental impact and implications for sustainability have been excluded from the search protocol because, being extremely highly relevant topics, they would need a separate literature review on their own.

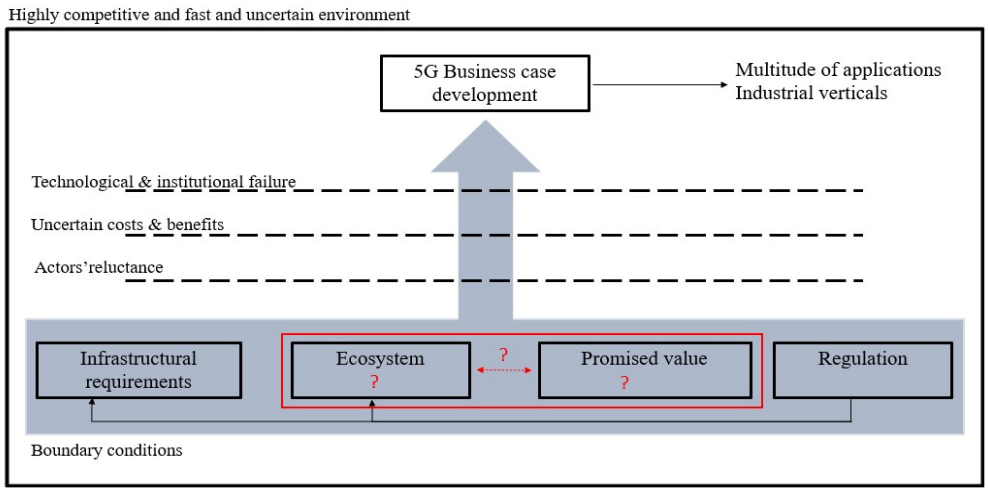

Figure 2. Boundary conditions and barriers for 5G adoption

5. Discussion

After an interpretation about which are the possible boundary conditions and barriers for the development of the 5G business case, in this section, the principal ways of investigations used by scholars to investigate the above-mentioned gaps are discussed. Finally, the limitations and further avenues are described.

In general, the techniques used in this context to close the gaps presented so far are future-oriented methods. For instance, the scenario-planning approach has been applied by Moqaddamerad (2020) and Jeong and colleagues (2016) studies, to forecast respectively how business models' innovation happens during the adoption of emerging technology and the feasibility of a specific application.

Furthermore, Hutajulu and colleagues (2021) mention simulation as an optimal method to gain the approval of the actors involved regarding infrastructure sharing. In a similar way, Ahokangas (2021) writes about the analysis of a future-oriented-case to deepen such complexity in terms of stakeholders involved, as it could be the case of a seaport developing a 5G private network. Such an approach is emphasized also by Noh and colleagues (2021) in mentioning the development of a value proposition map based on future circumstances defined by a depth-analysis of trends, predictions, and eventual relationships among them. For instance, the road mapping approach is a solution proposed by these scholars, especially they propose an integrated approach called "technology road mapping" which considers both the technology-push strategies with the market-driven one.

By analysing the 5G management literature, the need for greater structuring to intercept relevant phenomena emerged. As a matter of fact, it seems that the strategic impact of new technological paradigms, which may hold idiosyncratic implications in the strategy implementation dynamics, is still largely unstructured and there is still ambiguity and fragmented knowledge about it.

The gap just described emerged also through a non-systematic search regarding the literature about BMI and technology. As mentioned by Foss and Saebi (2016), several studies describe BMI in a retrospective way when considering the adoption of specific technologies, however, it is not the same way common to find predictive and theoretical perspectives. Accordingly, Baden-fuller and Heaflinger (2013) and Tongur and Engwall (2014) address the fact that often the impact of technology adoption is restricted to performance measurements, however, such a link with technology requires further investigation at a BM architecture level by understanding the mechanism to innovate BM through its components to create value.

6. Conclusions

6.1 Theoretical Implications and Future Avenues

The research aims to position the 5G search thread in the business and management literature by systematizing previous knowledge and identifying potential directions related to 5G technology in the above-mentioned stream of research. After having presented a search protocol to make the research falsifiable, reproducible, and scalable over time and to continuously update it, a conceptual review has been presented to figure out which are the managerial reconfigurations, the boundary conditions, the barriers, and the literature gaps of such very relevant and recent technological paradigm. By following the search protocol presented so far it will be possible to include also other papers to improve the framework presented and to reason about other boundary conditions and barriers, as well as enriching the existing ones.

According to the literature, due to its pervasiveness and the number of application fields which can be enabled, 5G is defined as an enabling technology (Teece, 2018; Schneir et al, 2019; Rathje and Katila; 2021). This nature is also confirmed when looking at the promised value resulting from the adoption of this technology (section 4.2.1), especially for MNOs which must rejuvenate their business models (Lehr et al, 2022; Gooderham, 2022), and the number of actors involved in different application areas (section 4.2.2). As a matter of fact, the emergence of this technological paradigm will be not only related to the telecommunications industry, but rather other industries will also exploit wireless communication (Vuojala et al, 2020; Dolgui and Ivanov, 2021). The promised value and the necessity of building an ecosystem represent two boundary conditions for the 5G business case development. Furthermore, for completeness other two boundary conditions have been outlined: (i) the necessity of infrastructural resources such as ICT physical infrastructure (Henriquez et al, 2022; Bauer and Bohlin, 2022) and (ii) regulation, since 5G technology has introduced governance and management challenges never seen before (Knieps and Bauer,2022). All these boundary conditions have been described in the Findings section together with barriers, which slow down the diffusion of the technology, such as the actors' reluctance to adopt and the uncertainty concerning costs and benefits, as well as infrastructural and institutional failures.

Furthermore, as deepened in the Discussion section, while this work contributes to the positioning of this technology trend in the management literature, it has also shown that the strategic adoption of enabling technologies, including 5G, is not yet fully investigated by scholars. Some authors have attempted to analyse this topic, however, there are still few studies (e.g., Moqaddamerad, 2020).

From a theoretical standpoint, conducting research on the potential evolution of MNOs' business models could be highly intriguing. Furthermore, from what emerges from this analysis, an in-depth investigation of the ecosystem revolving around this technology and the competencies of the various actors is still lacking. Therefore, this work aims to generate research questions which can be traceable to the general and more theoretical contexts such as the ones of Business Model Innovation (Foss and Saebi, 2016) and Ecosystem (Adner, 2017).

6.2 Practical Implications

The research emphasises that it is the right moment for stakeholders to brainstorm and develop sustainable business models to capture the value that 5G technology promises. Furthermore, the necessity to create an active ecosystem in the telecommunication industry and beyond has emerged as well.

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Open Innovation Maturity in Companies

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Abstract: Using open innovation approach instead of closed innovation approach improves productivity. To successfully implement the open innovation approach in a company, it is important to evaluate its maturity and readiness to use this approach. The aim of this study is to explore the open innovation maturity and readiness of Finnish and Greek companies. Hence, this study follows a quantitative approach and uses a 13-item survey to explore the open innovation maturity levels. A total of 81 participants from different companies and with different expertise and backgrounds participated in the survey. In addition to the survey, to examine the open innovation maturity of the companies the maturity model for open innovation which consist of five levels with level 5 depicting the highest maturity level was used. The aim was to examine the open innovation maturity of the companies participating in the study. Based on the results, the studied companies were found to mainly achieve level 3 regarding open innovation thinking. More attention and effort should be given to achieve levels 4 and 5. Due to the importance of achieving maturity levels 4 and 5 and their complexity, the need for companies to understand the significance of strategic thinking and for aligning their general strategy with their innovation strategy was highlighted. Additionally, it was evident that to achieve higher levels of maturity, open innovation approaches should be followed and changes in the organizational management should be implemented. Concluding we claim that for companies to adopt an effective open innovation culture, it is essential to integrate appropriate models, methods, and practices starting from lower maturity levels.

Keywords: Innovation, open innovation, maturity, companies.

1. Introduction

As modern society evolves, environmental changes occur and technological advances drastically affect several domains and industries, the need to promote innovation is imperative. According to Jelonek (2015), the key point in innovations is the implementation of new mixtures of resources and creative forces. Innovations are essential for the economic growth of countries. The statistics of WorldBank show that there is a correlation between Gross Domestic Product (GDP) and innovation investments. According to Schumpeter (1934), the core in the innovation concept is using existing resources in new ways to design and create novel products and services. Diaconu (2011) noted that innovation starts from an idea, also called the stage of ideation (Siakas & Siakas, 2016) and the result of an innovation process is an innovation which can be commercialized. Innovations can be either based on closed innovation concepts or open innovation concepts (Chesbrough, 2003).

Companies used to encourage closed innovation within their ecosystem (Kanakaris et al., 2019; Makkonen et al. 2019) but nowadays to stay ahead of competition and to address the dynamically changing market needs, companies adopt open innovation practices while overcoming the difficulties which are associated with its effective implementation and management (Lichtenthaler, 2011). Open innovation builds upon the need of companies to open up their solid boundaries to allow for new ideas and knowledge to flow in from outside sources (Gassmann & Enkel, 2004). Particularly, open innovation is a term coined by Chesbrough (2003) which is based on the fact that valuable ideas can originate from both inside and outside the company and refers to distributed innovation processes based on purposively managed knowledge flows (Chesbrough and Bogers, 2014), the use of pecuniary and non-pecuniary mechanisms which follow the company's business model and valuable ideas which derive from extensive interactions within a company's internal and external environment (Chesbrough, 2006a). In particular, it can be regarded as a sustainable development approach which focuses on empowering a company's internal knowledge basis using external knowledge exploration, retention and exploitation as well as external technologies and resources (Lichtenthaler, 2011). Open innovation systematically encourages and explores various internal and external sources (West and Gallagher, 2006), thus, it can either be inbound (outside-in) or outbound (inside-out) (Piller & West, 2014) with the intentional inflow and outflow of ideas and knowledge to promote innovation and expand market potentials (Chesbrough, 2006b). Moreover,

open innovation encourages the use of dynamic business models and the combination of both internal and external ideas to create the appropriate for each case systems, processes, architectures, mechanisms and platforms which, in turn, will generate value for the companies (Bogers et al., 2018).

Open innovation is characterized by its multi-dimensional nature, its various application domains and its diverse processes and activities (Huizingh, 2011). Additionally, the characteristics and principles of each entity (Huggins et al., 2020) as well as its cultural aspect, such as entrepreneurship, intrapreneurship or organisational entrepreneurship leading culture (Yun et al., 2020) are crucial in the realization of true open innovation as different cultures affect it in a different way. As a result, the effect that the integration of open innovation practices has on designing and developing new products and services differs drastically from one company to the other (Grönlund et al., 2010; Rubera et al., 2016). Hence, it is vital for a company to fully comprehend how and where open innovation can add value to knowledge-intensive activities and processes (Enkel et al., 2009; Siakas et al., 2014). Within this context, the innovation process, ideation, and collaboration of product and service development is becoming more interactive and permeable (Thrift, 2006). Hence, using the appropriate for each case collaboration tools and creating motivating environments that foster equality, cultivate a sense of belonging and support open communication is vital (Antikainen et al., 2010; Lampropoulos and Siakas, 2018). Therefore, open innovation is based on the fact that in order for a company to stay abreast of competition, it should not simply follow the linear model of innovation (Hippel, 1988) but instead, it has to engage in and collaborate with diverse external stakeholders and partners, to iteratively exchange ideas and knowledge and to come by resources and technologies from the external environment (Bigliardi et al., 2021). The critical organizational practices which a company should adopt to foster and promote innovation and sustainability according to Kennedy et al. (2017, p. 722) are: "i*) technology super-scouting throughout the value chain, ii) search heuristics that favor radical sustainability solutions, ii) integration of sustainability performance metrics in product development, iv) championing the value chain to build demand for radical sustainability oriented product innovation, v) and harnessing the benefits of open innovation*".

Furthermore, open innovation can improve productivity in different industries as it enables value co-creation. In particular, it has been showcased that open innovation supports the vision of Industry 4.0. and improves productivity operation industries (Aliasghar et al., 2019; Cincera et al., 2003; Lampropoulos, 2022; Lööf and Heshmati, 2002). Greco at al. (2021) showed that using the open innovation concept improves productivity in construction industry while Obradović et al. (2021) demonstrated the merits of adopting and implementing open innovation in the manufacturing industry.

The number of companies implementing open innovation is increasingly growing. However, there is a potential that innovative customers could become a scarce resource in the future, for which companies have to compete in order to get them on-board, thus adding a new side to competition among customers (Siakas & Siakas, 2016).

Nonetheless, to reap the benefits of open innovation, companies should create and adopt flexible business models and processes and encourage all the involved members to pursue innovation. The aim of this study is to showcase the necessity for companies to be aware of their maturity level and understand the need to adopt open innovation as well as to identify key aspects and elements which foster and promote the successful adoption and implementation of open innovation. The results provide guidelines to the companies to promote and improve the adoption of the open innovation approach.

2. Maturity in open Innovation context

Maturity means that a company is more dedicated to run innovation work for developing new products and services. An open innovation maturity framework has been developed to illustrate the innovation expertise and capabilities of an organization, by combining metrics in a number of areas of open innovation revealing, thus, areas of excellence and also areas for possible enhancement so as to attain the next level of maturity (Enkel et al. 2011).

The open innovation concept is a strategic option for a company. Samsung has created a network of four levels for innovating new products (Kim, 2013). In order for a company to become more successful, a road map is essential. Rozenfeld et al. (2006) emphasized that the role of the management is essential to upgrade the maturity of open innovation in companies. The management should guide product development process to the direction in which all stakeholders are involved.

Maturity models can offer crucial guidance to companies which in turn can lead to their business becoming more mature to successfully meet challenges and overcome competition. The maturity model examines the maturity level of open innovation in any company (Enkel et al. (2011). The maturity model includes five levels as follows:

"Level 1 —Creative individual attempts are dismissed. The organization focuses on day-to-day operations. Innovation output is inconsistent and unpredictable".

"Level 2 —The need to innovate is identified; innovation is clearly defined. There is a basic understanding of the influential factors. Innovation output is inconsistent but traceable".

"Level 3 —Appropriate practices, procedures and tools are in place, innovation is encouraged among employees. Outputs are consistent and ensure sustained market share and positioning".

"Level 4 —Practices, procedures and tools for integrating innovation activities are used. A deep understanding of the internal innovation model and how it relates to business requirements has been established. Innovative outputs are consistent, diverse and a source of differentiation"

"Level 5 —Practices, procedures and tools are institutional. Individuals are encouraged to innovate. Synergy is achieved through the alignment of business *and innovation strategy and synchronization of activities. Outputs provide sustained competitive advantages in existing and new markets."*

The aim of this study was to explore and reveal the maturity and readiness of Finnish and Greek technology companies to adopt and integrate open innovation by using the maturity model. Paulk et al. (1993) argued that the maturity models are needed to reach better performance in the efforts of innovating.

3. Our Study

Using the maturity model as a basis for examining the innovation levels a survey was conducted over the time period of spring 2022. The aim of the survey was to reveal the status of the open innovation maturity in the companies especially in Finland. The participants received a set of claims in the open innovation context. It is worth noting that claims regarding maturity level 1 were not included as no innovation activities occur at this level. Hence, the claims were related to the maturity levels 2 to 5. Three innovation related claims were made for each maturity level. The claims were as follows:

1. "*The necessity of innovation is identified in your organization*" (level 2)
2. "*The meaning of the word Innovation is clearly defined in your organization*" (level 2)
3. "*There is a basic understanding of the influential innovation factors in your organization*" (level 2)
4. "*Appropriate practices, procedures and tools are applied*" (level 3)
5. *"Innovation is encouraged among employees*" (level 3)
6. "*Innovation outputs are consistent and ensure sustained market share and positioning*" (level 3)
7. "*Practices, procedures and tools for integrating innovation activities are used*" (level 4)
8. "*Internal innovation model has been established in your organization which is deeply understood and it relates to the needs of your business*" (level 4)
9. "*Innovative outputs are consistent, diverse and a source of differentiation*" (level 4)
10. *"Innovative practices, procedures and tools are institutional*" (level 5)
11. "*Individuals are encouraged to innovate*" (level 5)
12. *"Collaboration is achieved through business and innovation strategy alignment as well as synchronization of activities*" (level 5)
13. *"Innovation outputs provide sustained competitive advantage in both existing and new markets*" (level 5)

After being given the above-mentioned claims, the participants were able to provide their comments on promoting open innovation. Particularly, the focus was on which aspects and elements promote open innovation and which hinder it.

In total, 81 master students, 35 females and 46 males who had a mean working experience of 12 years, took part in this anonymous survey. Particularly, 48 of the students who participated were from three different higher education institutes in Finland while the other 33 were from a higher education institute in Greece. The participants worked in different technology companies and they provided help to mid-career engineering positions in these companies. The industries included sawmills, ICT, steel and zinc industries, and public rescue services.

The data collection process involved the use of an online questionnaire which was uploaded on the Webropol platform as well as the use of a paper-based one. The participants rated each item (variable) of attributes on a Likert scale of 1 to 5 where 1 mean "Not at all important" and 5 meant "Extremely important". Statistical analysis was carried out using the Statistical Package for the Social Sciences (SPSS).

4. Data analysis

As previously mentioned, questions regarding the maturity level 1 were not included as it does not show any proof related to open innovation adoption in companies. Hence, a total of 13 claims are presented and analyzed. Three claims are defined for each of the maturity levels 2 to 4 while 4 claims are defined for maturity level 5 due to its higher complexity. More specifically, a 5-point Likert scale was used to assess each of the claims. Tables 1-4 depict the participants' average score for each claim as well as the mean value of the claims defining each maturity level. Finally, the distribution of the participants' responses is presented in Figure 1.

Based on the results, it can be concluded that within the companies, innovation was clearly defined, the necessity to innovate was above average, and employees had a basic understanding of the factors that influence innovation within their organization (Table 1, level 2). Additionally, companies' abilities to apply appropriate tools, processes, and practices, to promote and encourage innovation, and to ensure that innovation outputs lead to sustained market share and positioning were above average (Table 2, level 3). The companies' capabilities of using appropriate practices, procedures, and tools to adopt and integrate innovation, of effectively applying an internal innovation model, and of ensuring that innovative outputs are consistent, diverse and a source of differentiation were slightly above average (Table 3, level 4). Finally, the claims about the maturity level 5 were also average with the participants highlighting the fact that innovative practices and innovation outputs can result in a sustained competitive advantage in existing and new markets (Table 4, level 5).

Table 1: Level 2 claims

Claim	Average
"The necessity of innovation is identified in your organization"	3.64
"The meaning of the word Innovation is clearly defined in your organization"	3.19
"There is a basic understanding of the influential innovation factors in your organization"	3.38
Mean of responses at level 2	3.40

Table 2: Level 3 claims

Claim	Average
"Appropriate practices, procedures and tools are applied"	3.46
"Innovation is encouraged among employees"	3.54
"Innovation outputs are consistent and ensure sustained market share and positioning"	3.47
Mean of responses at level 3	3.49

Table 3: Level 4 claims

Claim	Average
"Practices, procedures and tools for integrating innovation activities are used"	3.36
"Internal innovation model has been established in your organization and it is deeply understood and it relates to the needs of your business"	3.27
"Innovative outputs are consistent, diverse and a source of differentiation"	3.20
Mean of responses at level 4	3.28

Table 4: Level 5 claims

Claim	Average
"Innovative practices, procedures and tools are institutional"	3.23
"Individuals are encouraged to innovate"	3.35
"Collaboration is achieved through business and innovation strategy alignment as well as synchronization of activities"	3.42
"Innovation outputs provide sustained competitive advantage in both existing and new markets"	3.57
Mean of responses at level 5	3.39

Based on the mean value of the responses in each of the maturity levels, it can be inferred that the open innovation thinking capabilities for most companies at level 2 and 3. Hence, it is clear that companies should look at the actions at level 4 and 5 to further develop their organizational cultures and innovation competences to obtain competitive advantages in relation to their competitors. Since everything starts from the strategic planning level 4 and level 5 are possible if these strategies are changed by companies.

Figure 1 shows participants' response distribution.

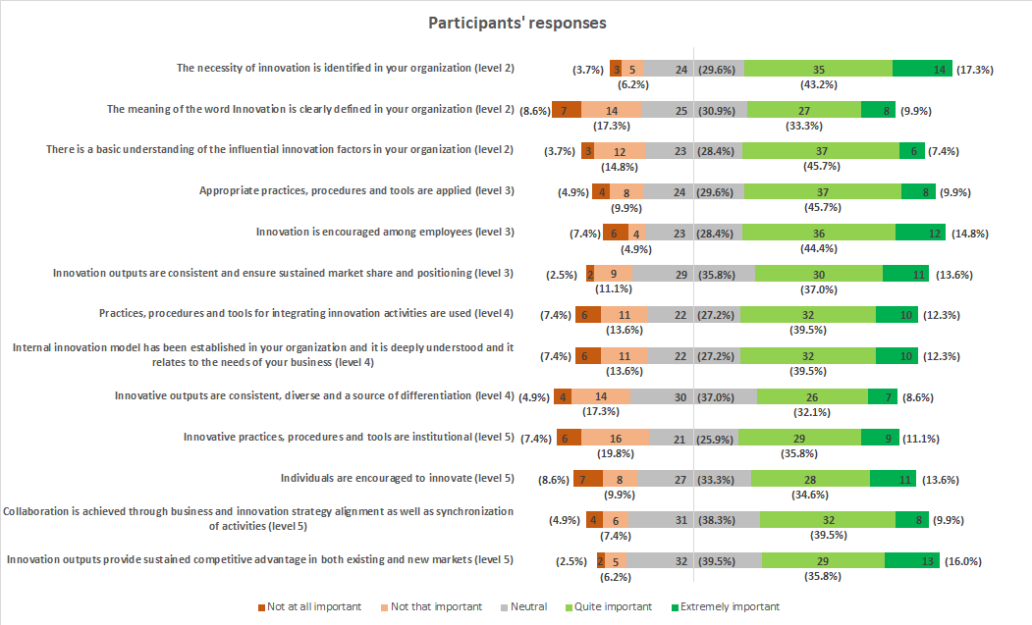

Figure 1: Distribution of responses

5. Discussion

In general, the results show that the open innovations concept has been moderately accepted in companies. This reflects that in the target companies, strategy-driven innovation work should be introduced. Creating policies is needed in which both internal human resources and external partners should be included. Samsung's example can work as a template for this work (Kim, 2013). Inside a company, individuals should be encouraged to freely express their ideas. Brainstorming is a technique that could be used as a group activity for gathering spontaneously and freely expressed and contributed ideas by the participants. Brainstorming is considered to remove inhibitions; hence it capitalizes on the experiences and ideas of the involved participants.

To realize this concept at level 4 or 5, it is important to understand two main starting points. First, companies should understand that strategic thinking is in the core of level 4 and 5 of the maturity model. Thus, their general strategy and innovation strategy should be aligned and interrelated. Second, companies should comprehend the significance of corporate change management. In order for companies to adopt an open innovation culture, drastic changes in the organizational management are required. For this transition to be successful, companies should follow appropriate approaches and methods that motivate and reward employees and that clearly introduce and present both short-term and long-term benefits, such as the one presented in Kotter (1996).

6. Conclusion

Developing new approaches to innovation is a 21st century imperative. The process of ideation is a key element of any strategy building on innovation. Open innovation is about expanding the innovation potential and extending the innovation process into new ways of working with external partners. Whether this manifest itself as new collaboration agreements, approaching start-ups with contemporary ideas and technologies, or spinning out new developments into external companies the ultimate goal is the same, namely to increase innovation and realize increased value as a result.

As innovations emerge increasingly from inter-organizational cooperation in the context of new product or service development also customers and users are increasingly invited to co-creation thus signifying an active, creative and social collaboration process. Crowd-sourcing is a contemporary tool for reaching out to potential customers and users through social networking.

In order to reap the benefits of open innovation, flexible business models and processes should be created, adopted and encouraged to all stakeholders with an interest in certain innovations. The aim of this study was to demonstrate the necessity for companies to be aware of their maturity level and to understand the need to adopt open innovation including the identification of key aspects and elements which foster and promote the successful adoption and implementation of open innovation. The results of our study aimed at providing guidelines to companies regarding how to promote and improve the adoption of the open innovation approach.

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Relationship between Entrepreneurial Competencies and Entrepreneurial Intention among South African University Students: A Gender Perspective

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Abstract: Promoting entrepreneurial activity is considered vital for stimulating job creation, innovation, and economic development. However, prior research emphasises the importance of entrepreneurs' confidence in their capability or skills as a driver in their decision to launch a new venture, and in facilitating opportunity recognition on which the entrepreneurial process rests. Thus, success in launching, managing, and ensuring the survival and growth of a new venture is dependent on entrepreneurs' competencies. Entrepreneurial competencies can be a differentiating factor between individuals with strong entrepreneurial intentions and those who have no entrepreneurial intentions. Despite the broad nature and variety of entrepreneurial competencies, there is some consensus among researchers that entrepreneurial competencies are learnable, and they can be developed through entrepreneurship education. Due to the realisation of their importance, there has been growing concerted research efforts directed at uncovering the nature and types, and the role of entrepreneurial competencies in achieving venture performance, and how they can be taught. Despite the fact that individuals can be taught to acquire entrepreneurial competencies, there is paucity of research on the effect of entrepreneurship education on entrepreneurial competencies. The objectives of the study were to determine gender differences in entrepreneurial competencies and entrepreneurial intention, test the relationship between gender and entrepreneurial competencies, to determine the effect of entrepreneurship education on entrepreneurial competencies and entrepreneurial intention, and the relationship between entrepreneurial competencies and entrepreneurial intention. The study was conducted based on a quantitative survey in which 585 South African university students completed a structured questionnaire. Data were analysed using the Statistical Package for the Social Sciences (SPSS) by means of regression analysis, Mann-Whitney *U* test and descriptive statistics. Findings indicate that entrepreneurial competencies had a significant positive relationship with entrepreneurial intention. Entrepreneurship education had an insignificant relationship with entrepreneurial competencies, and no significant differences were found between entrepreneurial competencies of the respondents who had had entrepreneurship education and those who did not. The results further revealed that gender had a significant positive relationship with entrepreneurial competencies. Additionally, the results revealed significant gender differences in entrepreneurial competencies and entrepreneurial intention.

Keywords: Entrepreneurial competencies, gender, entrepreneurship education, entrepreneurial intention, university students.

1. Introduction

Promoting entrepreneurial activity is considered vital for stimulating job creation, innovation and economic development (Tehseen et al., 2019; Hill et al., 2022). In view of the rising unemployment rates, it is crucial to encourage the youth to engage in entrepreneurship and equip them with the necessary entrepreneurial skills and competencies so they can create jobs for themselves and others (Mahlaole and Malebana, 2021). Prior research emphasises the importance of entrepreneurs' confidence in their capability or skills as a driver in their decision to launch a new venture (Arenius and Minitti, 2005; Bayon et al., 2015). Thus, success in launching, managing, and ensuring the survival and growth of a new venture is dependent on entrepreneurs' competencies (Bird, 1995, 2002). Entrepreneurs need not only possession of entrepreneurial competencies but should demonstrate them through their behaviour and actions (Man et al., 2002; Man et al., 2008a). Entrepreneurial competencies refer to "a higher-level characteristic encompassing personality traits, skills and knowledge that can be seen as the total ability of the entrepreneur to perform a job role successfully" (Man et al., 2002:124). These competencies are comprised of motives and traits, social role and self-concept, and behaviours, knowledge, and skills (Bird, 2002).

Among these entrepreneurial competencies, skills, knowledge and behaviours are easy to observe and can be changed through entrepreneurship education (Bird, 2002). Despite the broad nature and variety of entrepreneurial competencies (Bird, 2002; Malebana, 2012; Mitchelmore and Rowley, 2010), there is some consensus among researchers that entrepreneurial competencies are learnable (Bird, 1995, 2002; Man et al., 2008a). Therefore, entrepreneurship education should equip students with entrepreneurial competencies necessary to create and ensure the survival of the new venture, and those that could lead to the growth and performance of the venture (Bird, 2002). Thus, in line with these views, entrepreneurial competencies are

defined as the structured and integrated abilities, skills, knowledge, and motivation needed by an entrepreneur to perform entrepreneurial tasks and solve entrepreneurial problems (Onstenk, 2003; Izquierdo et al., 2005; Man et al., 2008a). Entrepreneurial competencies can be a differentiating factor between individuals with strong entrepreneurial intentions and those who have no entrepreneurial intentions (Brice and Spencer, 2007), and can differentiate entrepreneurs from non-entrepreneurs (Xiang, 2009). It has also been found that entrepreneurial competencies enhance venture survival and performance (Tola and Chimucheka, 2018; Barazandeh et al., 2015). Due to the realisation of their importance, there has been growing concerted research efforts directed at uncovering the nature and types (Mitchelmore and Rowley, 2010; Tittel and Terzidis, 2020), and the role of entrepreneurial competencies in achieving venture performance (Tola and Chimucheka, 2018; Barazandeh et al., 2015).

The fact that entrepreneurial behaviour is not a response to a stimuli but occurs as a result of intentional, deliberate, and planned efforts driven by the belief that one can successfully perform the associated tasks (Krueger et al., 2000), creates no doubt that possessing entrepreneurial competencies should stimulate entrepreneurial intention. The stronger an individual's entrepreneurial intention, combined with high confidence in one's entrepreneurial competencies should translate into entrepreneurial behaviour. While entrepreneurial competencies research began three decades ago (Bird, 2002), there are limited studies that have investigated these competencies rigorously in entrepreneurship literature (Mitchelmore and Rowley, 2010). According to Sheet and Sheet (2006), researchers should examine the determinants of both entrepreneurial intention and competencies to shed more light on the precursors of entrepreneurial behaviour. Even though individuals can be taught to acquire entrepreneurial competencies, there is paucity of research on the effect of entrepreneurship education on entrepreneurial competencies and the relationship between entrepreneurial competencies and entrepreneurial intention (Botha and Taljaard, 2021; Hou et al., 2023). Moreover, fewer studies have examined gender differences in entrepreneurial competencies (Gupta et al., 2009). Prior research has shown that there are gender differences in entrepreneurial intention, the determinants of entrepreneurial intention (Haus et al., 2013; Zhang et al., 2014; Malebana, 2015) and participation in entrepreneurial activity (Herrington et al., 2015). Furthermore, it has been reported that women lack confidence in their own business skills (Grichnik and Hisrich, 2005; Mitchelmore and Rowley, 2013), while other studies found that women entrepreneurs who possess entrepreneurial competencies are able to achieve business success or better performance (Irene, 2017, Tola and Chimucheka, 2018). In view of these gender differences, efforts directed at finding better solutions that could empower women to contribute meaningfully to the economy are vital to the achievement of Sustainable Development Goals (Global Entrepreneurship Research Association, 2022). Therefore, studies that examine gender differences in entrepreneurial intention and competencies can help in guiding the development and implementation of support programmes that are aimed at empowering women. This study attempts to address these mentioned gaps. The objectives of the study were to determine the relationship between entrepreneurial competencies and entrepreneurial intention, gender differences in entrepreneurial competencies and entrepreneurial intention, test the relationship between gender and entrepreneurial competencies, and to determine the effect of entrepreneurship education on entrepreneurial competencies and entrepreneurial intention.

2. Literature review

The creation of a new venture follows the formation of entrepreneurial intention (Shook et al., 2003). Subsequently, the entrepreneur searches for, discovers, evaluates and exploits opportunities in the market (Shook et al., 2003; Ardichvili et al., 2003). Successful execution of the tasks involving the identification, discovery, and evaluation of opportunities as well as the ultimate creation of a new venture are dependent on the entrepreneur's competencies (Ucbasaran et al., 2008; Izquiredo and Buyens, 2008). These entrepreneurial competencies help to initiate, manage and sustain the new venture and lead to its superior performance (Bird, 1995, 2002; Onstenk, 2003; Ahmad et al., 2010; Zainol and Al Mamun, 2018; Tehseen et al., 2019).

Adopting the process dimension of entrepreneurial competencies that focuses on the tasks or behaviours carried by entrepreneurs presents researchers with a viable alternative for predicting entrepreneurial outcomes such as venture creation, survival and performance (Man et al., 2002; Man et al., 2008a). Since competence is behavioural and observable, the process or behavioural dimension can provide a means of analysing the relationship between individual differences and venture outcomes than the personality trait approaches (Bird, 1995). Entrepreneurial competencies that have been identified by Man et al. (2002) are widely researched and tested (for example, Man et al., 2008a, 2008b; Xiang, 2009; Ahmad et al., 2010; Al Mamun et al., 2019). Researchers who have applied these entrepreneurial competencies found that they have a positive effect on

venture performance (Al Mamun et al., 2019) and can be successfully applied to discriminate entrepreneurs from non-entrepreneurs (Xiang, 2009). These entrepreneurial competencies include opportunity competencies, relationship competencies, conceptual competencies, organising competencies, and strategic competencies (Ahmad et al., 2010; Man et al., 2002; Man et al., 2008a, 2008b).

To undertake the entrepreneurial process, entrepreneurs should identify and evaluate opportunities (Izquierdo and Buyens, 2008; Onstenk, 2003; Zainol and Al Mamun, 2019). Prospective entrepreneurs should make personal sacrifices to ensure that their businesses get started and become sustainable (Brice & Spencer 2007; Man et al., 2002; Malebana, 2012). They should formulate the vision, set, evaluate and implement strategies for their businesses; establish and maintain relationships with various stakeholders in order to access resources and sell products/services; and engage in clear and persuasive communication about issues that affect the business (Onstenk, 2003; Izquierdo and Buyens, 2008; Tehseen et al., 2019). To successfully operate in uncertain and turbulent environments and make the right decisions, entrepreneurs should be able to absorb, interpret and comprehend complex information, and identify and weigh the risks; and they should organise and allocate resources, build teams, lead and train employees, and control business performance (Man et al., 2002; Zainol and Al Mamun, 2019)

2.1 Gender and entrepreneurial competencies and entrepreneurial intention

Extant literature indicates that women have low entrepreneurial intentions (Haus et al., 2013; Zhang et al., 2014) and low entrepreneurial activity rates compared to men (Bowmaker-Falconer and Meyer, 2022; GERA, 2022). These low entrepreneurial intentions and entrepreneurial activity rates are attributed to gender differences in the antecedents of entrepreneurial intention (Maes et al., 2014; Haus et al., 2013; Wilson et al., 2007; Malebana, 2015). Many scholars acknowledge the difference between men and women regarding entrepreneurial competence (Kacperczyk and Younkin, 2019). The lack of entrepreneurial competencies among women is compounded by the societal perceptions of traditional gender roles and inhibiting social norms that have predominantly favoured men (Kacperczyk and Younkin, 2019; GERA, 2022), which hinder women to perform at the level of male entrepreneurs (Wang, 2019). It has been found that possession of entrepreneurial competencies enhances the performance of women entrepreneurs (Tola and Chimucheka, 2018). Additionally, Diaz's (2022) findings indicate that there are no major differences between males and females in entrepreneurial competencies, whereas Devi (2023) reports significance difference between male and female students in opportunity competency and relationship competency.

2.2 Entrepreneurship education, entrepreneurial competencies and entrepreneurial intention

Researchers argue that to be effective, entrepreneurship education should change the antecedents of entrepreneurial intention and stimulate entrepreneurial intention (Fayolle and Gailly, 2015; Nabi et al., 2017), equip students with entrepreneurial knowledge, skills and competencies and contribute positively to entrepreneurial behaviour (Galloway and Brown, 2002; Matlay, 2008; Alakaleek et al., 2023). Previous research has found that exposure to entrepreneurship education has a positive effect on entrepreneurial intention (Lv et al., 2021; Mahlaole and Malebana, 2021; Pham and Le, 2023). In addition, entrepreneurship education increases entrepreneurial knowledge (Matlay, 2008), has a positive impact on entrepreneurial competence (Lv et al., 2021) and promotes start-up behaviour (Galloway and Brown, 2002; Dickson et al., 2008; Alakaleek et al., 2023). Despite these positive results from previous research, there are studies which could not find a significant relationship between entrepreneurship education and entrepreneurial intention (Ndofirepi and Rambe, 2017; Malebana and Zindiye, 2017; Mahmoud et al., 2020). Devi (2023) found that organising competencies and strategic competencies have a significant positive relationship with entrepreneurial intention. In another study, Botha and Taljaard (2021) observed that there is positive association between entrepreneurial competencies and entrepreneurial intention among nascent entrepreneurs.

3. Research methodology

3.1 Sample

This study surveyed 585 final year diploma students from two South African universities that have campuses in the Eastern Cape, Gauteng, Mpumalanga and Limpopo province. Since the aim of the study was to determine, in particular, the effect of entrepreneurship education on entrepreneurial competencies, the sample involved students who had exposure to entrepreneurship education and those who were not. The sample was chosen

because as final year students they were in process of making career decisions upon completion of their studies, which could include the entrepreneurial career option (Liñán and Chen, 2009; Malebana and Zindiye, 2017; Malebana, 2012). A convenient sampling technique was used to obtain the sample, as only students who were in class during the data collection days completed the questionnaire.

3.2 Data collection and measures

Data were collected using a structured questionnaire that involved questions that were adopted from prior studies on entrepreneurial competencies and entrepreneurial intention (Appendix A). Entrepreneurial intention was measured by means of a five-point Likert scale (1=Strongly disagree, 5=Strongly agree), with seven items that were adopted from Liñán and Chen (2009). Entrepreneurial competencies measures were developed from Man et al. (2002); Onstenk (2003); Malebana (2012); Man et al. (2008b); Izquierdo and Buyens (2008); Ahmad et al. (2010); and Chiru et al. (2012). These entrepreneurial competencies were based on a five-point Likert scale consisting of 11 items measuring opportunity competency (two items), relationship competency (one item), communication competency (one item), commitment competency (two items), organising competency (one item), conceptual competency (two items), and strategic competency (two items). Previous research that has tested the effects of entrepreneurial competencies on entrepreneurial intention and business performance or success of women also measured similar entrepreneurial competencies (for example, Irene, 2017; Zainol and Al Mamun, 2018; Devi, 2023). Entrepreneurship education and demographic variables were collected as categorical data (Yes or No). Ethical clearance was obtained from the two universities before commencement of the data collection process.

4. Data analysis

Data were analysed by means of the Statistical Package for the Social Sciences (SPSS), using both descriptive analysis and hierarchical regression analysis. Prior to data analysis the reliability and validity of the data were checked by conducting exploratory factor and reliability analysis. In terms of reliability, entrepreneurial competencies had Cronbach's alpha value of 0.913 while entrepreneurial intention had 0.911, indicating that the internal consistency of the data collection instrument was good (Field, 2013). The results of the exploratory factor analysis that was conducted using principal component analysis revealed a two-factor solution which accounted for 58.5% of the variance. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.926. As this value was well above the minimum criterion of 0.5, the sample size was suitable for factor analysis. Bartlett's Test of Sphericity was also significant (p=0.000). Data were also verified for independence of errors and multicollinearity. The values of the Durbin-Watson statistic were well within the acceptable limits of between 1 and 3 (Field, 2013) and ranged from 1.939 to 1.981. The variance inflation factors (VIF) ranged from 1.000 to 1.034 and tolerance values ranged from 0.967 to 1.000. The VIF values of below 10 and tolerance values of above 0.2 indicate that multicollinearity was not a problem in the study (Field, 2013).

5. Results and discussion

5.1 Demographic profile of the respondents

Of the 585 respondents as shown in Table 1, 57% were female and 42% were male while one percent did not indicate the gender. The majority (67.4%) of the respondents were between 18 and 24 years, followed by 25% between 25 and 34 years and 6.8% between 35 and 64 years. Less than one percent of the respondents did not indicate their age. With regards to exposure to entrepreneurship education, 81.2% did not study entrepreneurship education while 18.8% were enrolled for the diploma in entrepreneurship. More females (64.5%) had exposure to entrepreneurship education than men (35.5%).

Table 1: Demographic characteristics of the respondents

	Description	Frequency	Percentage
Gender	Male	245	41.9
	Female	336	57.4
	Other	4	0.7
	Total	**585**	**100**

Age	18 – 24 years	394	67.4
	25 – 34 years	146	25
	35 years and above	40	6.8
	Other	5	0.8
	Total	**585**	**100**
Entrepreneurship education	No	475	81.2
	Yes	110	18.8
	Total	**585**	**100**
Exposure to entrepreneurship education by gender	Male	39	35.5
	Female	71	64.5
	Total	**110**	**100**

5.2 Differences in entrepreneurial competencies and entrepreneurial intention based on gender and entrepreneurship education

The Mann-Whitney *U* test was used to test whether there are differences in entrepreneurial competencies and entrepreneurial intention among the sample based on gender and entrepreneurship education. As shown in Table 2, the results reveal that males were significantly different from females in entrepreneurial competencies. Males had higher mean rank values (314.54) than females (273.83) on entrepreneurial competencies (U = 35392.500, p = 0.001). Male and female respondents differed significantly in entrepreneurial intention, with males displaying higher mean rank values (327.17) than their female counterparts (264.63)(U = 32299.000, p = 0.001). These findings support previous research which has shown that men and women differ regarding entrepreneurial competencies and entrepreneurial intention. These results corroborate previous research that has found that women have low entrepreneurial intention (Haus et al., 2013; Zhang et al., 2014) and low entrepreneurial competencies (Thébaud, 2015; Kacperczyk and Younkin, 2019; Devi, 2023). Additionally, there were no significant differences in the mean rank values for entrepreneurial competencies of the respondents who had had entrepreneurship education and those who did not. The results suggest that the respondents who had had entrepreneurship education and those who did not had similar levels of entrepreneurial competencies.

Table 2: Mann-Whitney *U* test results for differences in entrepreneurial competencies and entrepreneurial intention

	Mean rank	**Test statistics**
Entrepreneurial competencies	Males = 314.54 Females = 273.83	Mann-Whitney *U* = 35392.500 Wilcoxon W = 92008.500 Z = -3.285 P = 0.001
	Entrepreneurship education = 296.44 No entrepreneurship education = 272.89	Mann-Whitney *U* = 23913.000 Wilcoxon W = 30018.000 Z = -1.503 P = 0.133
Entrepreneurial intention	Males = 327.17 Females = 264.63	Mann-Whitney *U* = 32299.000 Wilcoxon W = 88915.000 Z = -5.024 P = 0.001

5.3 Regression analysis results

The relationship between age, gender and entrepreneurial competencies was tested prior to testing the effects of entrepreneurship education on entrepreneurial competencies, and entrepreneurial competencies on entrepreneurial intention. The results in Table 3 (Model 1) show that there is no significant relationship between

age and entrepreneurial competencies, while gender (β = 0.140, p < 0.01) has a positive significant relationship with entrepreneurial competencies. In Model 2, the results indicate an insignificant relationship between entrepreneurship education and entrepreneurial competencies (β = -0.062, p > 0.05). These findings contradict the view that entrepreneurial competencies can be developed through entrepreneurship education (Bird, 1995, 2002; Man et al., 2008a; Lv et al., 2021; Hou et al., 2023). Model 3 tested the joint effects of gender, age and entrepreneurship education on entrepreneurial competencies. The results show that age and entrepreneurship education were non-significant while gender (β = 0.136, p < 0.01) had a positive significant relationship with entrepreneurial competencies. The findings on the relationship between gender and entrepreneurial competencies corroborate those of Hou et al. (2023). In line with the results of Botha and Taljaard (2021); Devi (2023) and Hou et al. (2023), findings (Model 4) indicate that entrepreneurial competencies have a positive effect on entrepreneurial intention (β = 0.188, p < 0.000). Additionally, the results in Model 5 show that relationship between entrepreneurship education and entrepreneurial intention was not significant. These results contradict those of Hou et al. (2023) in which a positive relationship was found between entrepreneurship education and entrepreneurial intention. The findings are consistent with those of previous research that reported an insignificant association between entrepreneurship education and entrepreneurial intention (Ndofirepi and Rambe, 2017; Malebana and Zindiye, 2017; Mahmoud et al., 2020; Alakaleek et al., 2023)).

Table 3: Hierarchical analysis results

	Entrepreneurial competencies			**Entrepreneurial intention**	
	Model 1	Model 2	Model 3	Model 4	Model 5
Control variables:					
Age	-0.022		-0.033		
Gender	0.140**		0.136**		
Independent variables:					
Entrepreneurship education		-0.062			0.018
			-0.060		
Entrepreneurial competencies				0.188***	
Multiple R	0.138	0.062	0.150	0.188	0.018
R Square (R^2)	0.019	0.004	0.022	0.035	0.000
Δ Adjusted R^2	0.016	0.002	0.017	0.034	-0.001
Δ F-Ratio	5.609	2.224	4.393	21.339	0.184
Significance of F	0.004**	0.136 n.s.	0.005**	0.000***	0.668 n.s.

* P<0.05 **P<0.01 ***P<0.001

6. Limitations and directions for future research

The study was cross-sectional and therefore it is not possible to infer the relationship between entrepreneurial competencies and the likelihood of new venture creation and performance. The study used self-reported measures of entrepreneurial competencies and thus, it cannot be concluded with certainty that the respondents indeed possessed entrepreneurial competencies. Additionally, the small sample of the respondents who enrolled for entrepreneurship education and the use of a convenient sample could bias the results. To address the stated limitations, future research should adopt the longitudinal approach to assess the link between entrepreneurial competencies and entrepreneurial behaviour in terms new venture creation and performance.

7. Conclusion

This study tested the relationship between entrepreneurial competencies and entrepreneurial intention and entrepreneurship education, and gender differences in entrepreneurial competencies and entrepreneurial intention. Findings revealed a positive relationship between entrepreneurial competencies and entrepreneurial intention, and between gender and entrepreneurial competencies. Additionally, an Insignificant relationship was found between entrepreneurship education and entrepreneurial competencies. There were no significant differences between entrepreneurial competencies of the respondents who had had entrepreneurship

education and those who did not. Thus, the study advanced the research on entrepreneurial competencies by filling the research gap on the relationship between gender and entrepreneurial competencies, and the effect of entrepreneurial competencies on entrepreneurial intention as well as the relationship between entrepreneurship education and entrepreneurial competencies.

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Appendix A: QUESTIONNAIRE

A. Entrepreneurial intention

For each of the statements in the table below, choose only one of the five options, ranging from "strongly disagree" to "strongly agree" and mark your answer with a cross.

		Strongly disagree	Disagree	Unsure	Agree	Strongly agree
1	I am ready to do anything to be an entrepreneur.	1	2	3	4	5
2	My professional goal is to be an entrepreneur.	1	2	3	4	5
3	I will make every effort to start and run my own business.	1	2	3	4	5
4	I am determined to create a business venture in the future.	1	2	3	4	5
5	I do not have doubts about ever starting my own business in the future.	1	2	3	4	5
6	I have very seriously thought of starting a business in the future.	1	2	3	4	5
7	I have a strong intention of ever starting a business in the future.	1	2	3	4	5

B. Entrepreneurial competencies

For each one of the statements in the table below, choose one of the options, ranging from "very little confidence" to "very confident" and mark you answer with a cross.

		Very little confidence	Little confidence	Unsure	Fairly confident	Very confident
1	My ability to recognise and evaluate opportunities in the market.	1	2	3	4	5
2	My ability to identify and define a viable market niche.	1	2	3	4	5
3	My ability to develop relationships with other business people for mutual learning and collaborative working to achieve common objectives.	1	2	3	4	5
4	My ability to persuade and discuss with various stakeholders about the issues that involve the business.	1	2	3	4	5
5	My ability to make sacrifices to ensure that the business gets started.	1	2	3	4	5

6	My willingness to take action on my own and eagerness to overcome obstacles.	1	2	3	4	5
7	My capacity to organise resources for the business.	1	2	3	4	5
8	My ability to make decisions that involve complex situations.	1	2	3	4	5
9	My ability to observe and interpret business information.	1	2	3	4	5
10	My ability to formulate a vision and mission statement for my business.	1	2	3	4	5
11	My ability to develop and implement a strategic plan.	1	2	3	4	5

How to Support Startups in Responsible Innovation Processes: A Tool Analysis

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Abstract. Innovation plays a vital role in economic growth and addressing societal challenges such as climate change, poverty, and ageing populations. However, the impacts of innovation are not always predictable, and negative outcomes can emerge unexpectedly. Anticipating the long-term effects of innovation is becoming increasingly important as technology and innovation continue to advance at a rapid pace. Responsible Innovation (RI) is an approach that aims to govern research and innovation by involving stakeholders early on to improve anticipation of consequences and make innovation ethically acceptable, environmentally sustainable, and socially desirable. Small enterprises, particularly start-ups, face significant challenges in implementing sustainability and responsibility in their innovation processes due to limited resources. This study aims to explore existing tools for operationalizing RI in a business context and assess their applicability to start-ups. The findings reveal that while there are numerous ongoing projects and tools for RI in a business context, there is a lack of tools specifically designed for start-ups. By identifying key concepts and characteristics of tools for RI implementation in start-ups, the paper contributes to the field of RI by laying the groundwork for the development of an RI tool tailored to the needs of start-ups. The study provides recommendations for improving existing RI tools, including the development of modular and user-adaptive tools. This research expands the knowledge base on RI, offers a theoretical foundation for further research, and paves the way for the development of the COMPASS self-check tool for RI implementation in start-ups.

Keywords: Responsible Innovation; Tool; Start-Up; RI implementation; COMPASS self-check tool

1. Introduction

Innovations have a tremendous impact on economic growth (Broughel & Thierer, 2019) and are needed to overcome great societal challenges like climate change, increasing energy needs, poverty, or ageing society (von Schomberg, 2013). Still, the impacts of innovation cannot always be predicted correctly and often innovation comes with unforeseeable challenges and negative outputs (Long et al., 2020). Long-term effects of innovation often only arise at a late stage and cannot be foreseen at the beginning (Lubberink et al., 2017b). The positive and negative impact of innovation increases with the constantly rising extent of technology and innovation (Stilgoe et al., 2013) and with a frequently faster pace of innovation pace. Hence, impact anticipation in innovation processes becomes more and more important (Long et al., 2020).

The concept of responsible innovation (RI) is defined as an approach to govern research and innovation, by including stakeholders in early development stages, to improve anticipation of consequences (Lubberink et al., 2017b). RI pursues the goal to make innovation ethically acceptable, environmentally sustainable, and socially desirable (Stilgoe et al., 2013). As companies nowadays face the challenges to design their processes and products more sustainably, RI can per se be a vehicle to pave the way to pursue their goals, while also having positive impacts on sustainable development goals (Lubberink et al., 2017b).

Still, framing new or existing companies towards more sustainability is a huge challenge, as it involves several institutions and stakeholders. Long et al. (2020) state that the need for a conceptualized approach to improve innovation processes and integrate sustainability and responsibility in innovations and processes arises. Especially for small enterprises like start-ups a guiding approach is crucial since they lack resources for controlling instruments like corporate social responsibility or corporate sustainability (Gurzawska, 2021).

To address this challenge, the aim of this study is to explore which tools for operationalizing RI in a business context exist. In this context, it needs to be analyzed which tools are suitable for startups and derived which characteristics are necessary for a tool to be applicable for a startup. Therefore, three central research questions arise:

RQ1: Which tools exist to operationalize RI in a business context?

RQ2: Which RI tools are applicable in a start-up context?

RQ3: How do existing RI tools need to evolve to improve their applicability in the context of start-ups?

By answering these research questions, the paper contributes to the body of knowledge on the RI field, by exploring existing tools for the practical implementation of RI in startups. Based on the findings, key concepts and main characteristics of the tools and their application factors are identified, which provides the fundament for further developing an RI tool for startups.

2. Methodological approach

The basis of this paper builds on a systematic literature review (SLR) to identify existing tools for the application of RI in a business context, with the special focus on start-ups. The SLR is necessary to get a better understanding of existing tools and to identify the research gaps (Booth et al., 2016). Considering Kitchenham and Charters (2007) approach, a research strategy and review protocol for the selection of the most relevant literature is created. Afterwards, the existing literature and models are reviewed and selected for further evaluation.

Following the CIMO (context-intervention-mechanism-outcomes) method by Booth et al. (2016) a search string is derived, dividing the keywords into four categories, thereby supporting the structure of the search string regarding the addressed research questions. This results in the following search string:

"(Responsible Innovation OR RI OR RRI OR Responsible Research and Innovation OR ((responsible OR responsibility OR sustainable OR sustainability) AND (Research & Innovation OR Research and Innovation OR innovation OR invention OR design OR founding OR foundation OR product development)) AND (application OR framework OR Tool OR operationalization OR operationalization OR implementation OR implementing OR instrument OR model OR supporting structure OR determinants OR impact OR assessment) AND (business OR industry OR work environment OR corporate context OR enterprises OR company context OR start-up OR entrepreneurial context OR entrepreneurship)"

The search process begins in online libraries such as EBSCO S1, KIT Library, Scopus, Web of Science, and IEEE Xplore. Two cycles of selection, backwards and forward citation, and an internet search are conducted, leading to 153 sources. Journal rankings and the CIMO method are used to further narrow down the selection to 21 sources that focus on the four determinants of RI. In total, 11 tools are analysed, with an additional four found in the RRI Toolkit. The combined search results in 15 different tools analysed.

For the evaluation, the following criteria for a comparable description of the different tools are used: reference in journal; part of RRI Toolkit; type (guideline, questionnaire, checkbox, evaluation, workshop and template); inclusion of EU guidelines; holistic nature and start-up focus. In the case of multiple publications concerning one tool, the different information is compared and synthesized. The evaluation of the tools is conducted in two stages. In the first stage, the tools are evaluated regarding the inclusion of the definition of RI, the four RI determinants by Owen et al. (2013), the six RI principles by the European Union (2020), and the applicability of the tool. The second stage is based on evaluation criteria, derived from the literature. The evaluation criteria describe tool requirements for the implementation of RI, from an academic perspective.

3. Results

The SLR in combination with the RRI Toolkit reveals 15 different tools as an input for the tool evaluation, shown in Figure 3 with their respective origin. In the following, the respective tools will be described in detail.

3.1 Tools referenced only in RRI Toolkit

The Corporate Responsibility Tool provides recommendations for the use of a set of given standards, global initiatives, and principles. Depending on the main goal of a company implementing RI, they recommend standards, guidelines, and norms for environmental protection, human rights, human health, sustainability, or business ethics.

The Ethical Operating System toolkit (EOS) is a tool with the goal to identify, anticipate and visualize future risks in the innovation and product development process at an early stage (Omidyar Network et al., 2018). Therefore, eight risk zones are identified, to address areas where unexpected risks are likely to occur.

The PAS (Publicly Available Specification) Responsible Innovation Guide provides two application frameworks to take responsibility more tangible, one focusing more on responsibility at a company level; the other targeting the innovation or product level (The British Standards Institution, 2021).

The RRI Toolkit project team itself developed the *self-reflection tool*, which targets the self-reflection of innovators and entrepreneurs on their research and innovation processes. It supports the self-reflection of RI practices within an innovation process by asking questions with a focus on these guidelines (RRI Tools, 2021).

3.2 Tools referenced in literature and RRI Toolkit

The PRISMA project offers an entire website including a roadmap to RI and KPIs for companies, as well as an own toolkit with different approaches. The toolkit offers tools for various application fields and refers to other tools from the RRI Toolkit (PRISMA Project, 2019).

The Responsibility Navigator Guidebook offers two frameworks: The Responsibility Navigator itself and the Co-construction method. It shall support the identification, development, and implementation of measures to institutionalize responsibility in the processes and ambition of a company (Res Agora Project, 2021).

The COMPASS website is structured in a similar way to the Responsibility Navigator. It provides companies with two tools, the self-check tool, and the co-creation method kit. The self-check tool offers companies the possibility for self-evaluation on the implementation of RI principles (Institute for Managing Sustainability, 2020). The Co-Creation toolkit supplements the self-check tool with a workshop guideline and provides a roadmap to evaluate the key challenges (Institute for Managing Sustainability, 2016).

The KARIM framework divides RI into three axes. It gives companies an overview of the advantages of the implementation of RI into the development process and helps to translate the sustainable development objective into an innovation project. Therefore, an RI analysis tool is provided (KARIM Interreg IVB, 2015).

3.3 Tools referenced only in literature

The RMoI tool provides a conceptual model to operationalize the RI principles with the help of the four determinants. It focuses on the question of how RI concepts can be transferred from an academic context to praxis within three steps (Long et al., 2020).

ORBIT provides two frameworks: The ORBIT self-assessment tool and the AREA 4P framework. The self-assessment tool is an online questionnaire with registration and a personalized account. The key areas are a mix of the four determinants by Owen et al. (2013) and the EU policy agendas (ORBIT RRI, 2021).

The AREA 4P Framework is a matrix, which provides guiding questions. The questions help to identify how responsible innovation is. One axis of the matrix is based on the four determinants by Owen et al. (2013) and the other on the four P's (process, product, purpose, and people) (ORBIT RRI, 2021).

The Societal Readiness Thinking tool emerged from the European Union Horizon project. It combines a conventional stage-gate approach with a questionnaire matrix on the fulfilment of RI. The stage gate approach divides the innovation process into four parts. The matrix is based on the four determinants according to Long et. al and the EU policy agenda (Jong et al., 2020; Nielsen et al., 2018).

The stage gate approach defines responsibility criteria for different product gates, to evaluate if an innovation passes a gate or not. The stage gate approach for RI builds upon the established stage gate approach for product development (Owen et al., 2013).

The Requirement tool for Stakeholder Engagement defines requirements for RI implementation to get commonly valid guidelines for RI. It focuses on the creation of common sense in RI to create a better engagement of stakeholders (Wilford, 2019).

The GRACE Reflection tool helps companies to reflect on the implementation of RI within their organization. It provides a blueprint sheet for the evaluation of an existing RI initiative within a company and evaluates the RI initiative about its effectiveness and impact on the six EU policy agendas (GRACE Project, 2021).

4. Discussion

To evaluate the existing tools, criteria from the literature are derived and applied in two stages. The criteria of the first evaluation stage include (1) inclusion of the most common RI concepts (definition of RI; four RI determinants by Owen et al. (2013); six RI principles by European Union (2020)) as well as the (2) origin and applicability of the tool. The second evaluation stage reflects upon (1) requirements and qualifiers for RI tools, derived from literature, and (2) suitability for innovation processes within impact start-ups.

For the first-stage evaluation selection sheets are used, including a checklist with several inclusion and exclusion criteria for the previously explained tools. It builds upon the definition of RI and on the existing policy guidelines (four determinants of RI, six EU principles). One criterion is the origin and appearance of the tool. It contains the information if the RRI Homepage and/or literature refers to the tool. Another criterion evaluates the nature and application of the tool. It provides the information if it is a guideline, questionnaire, checkbox, KPI list, feedback system, workshop format, or application blueprint. Additionally, the selection sheet includes the evaluation of the holistic nature of the tools. It includes information if all relevant aspects of the RI definition are included. Last, it investigates the integration of the six EU principles in the tool.

For the second stage of evaluation, further requirements are applied. Based on the vibrant and ongoing discussion on RI, the requirements for literature on RI tools are diverse. One requirement is the applicability in different industry contexts. Yet, there is consent that different company forms request different criteria for a tool (Groves, 2017), leading to the requirements for a flexible and non-compulsory approach to serve different fields of research and fulfil the requirements of different industries (RRI Tools Consortium, 2021). Hence, the easy adjustability to different company and industry environments helps to increase the scalability of such a tool. In addition, a tool must consider start-up and small company-specific requirements.

To successfully implement Responsible Innovation (RI) in a business context, stakeholders should be involved throughout the innovation process (Lubberink et al., 2017a). Integrating the pillars of RI early on in the process can identify critical issues, making them easier and less costly to address (Egeland et al., 2019). An effective RI tool should focus on positive aspects and provide benefits to entrepreneurs, rather than solely mitigating risks and punishing negative impacts (Gurzawska, 2021). It should also offer guidance, measuring key performance indicators and incentives for RI implementation. To ensure applicability and comparability in a company context, a tool should provide qualifiers that define "good quality RI" (Fraaije et al., 2020). Additionally, the tool should appropriately address conflicting aspects of RI, such as balancing economic impact and financial targets or freedom of science and regulation and governance (Gurzawska et al., 2021; Owen et al., 2021).

4.1 Evaluation stage one

Some of the previously described tools do not pass the selection process of the selection sheets and will not be included in the further evaluation process. The Corporate Responsibility Tools by Iatridis (2021) is rather a summary and not a tool in the sense of interaction with the user, also not providing any concrete application template or evaluation of a company or product. Similarly, the stage gate approach does not provide any template or application blueprint. It rather describes the well-known stage gate approach from product development. In addition, it does not give any guidelines on the integration of the EU principles (Owen et al., 2013). The focus of the requirement tool by Wilford (2019) is on the creation of requirements and criteria for an RI guideline. It does not provide a blueprint for the application of RI in a company context. The GRACE reflection tool by the GRACE Project (2021) does not display any holistic evaluation or integration of RI in a company. It is a complementary template to evaluate existing RI initiatives regarding their impact.

4.2 Evaluation stage two

The evaluation stage of Responsible Innovation (RI) includes several tools such as EOS toolkit, PRISMA, Responsibility Navigator, COMPASS self-check tool, PAS Responsible Innovation Guide, Self-Reflection tool, KARIM, RMoI tool, Orbit self-assessment tool/Orbit AREA 4P framework, and the Societal thinking readiness tool.

The EOS toolkit is flexible and applicable to different industries, with a focus on tech companies (Omidyar Network et al., 2018). However, it does not provide any evaluation or scoring nor covers all aspects of RI. It excludes the environmental component of RI and does not consider the EU principles of gender equality and open access. The tool only focuses on the innovation itself while the holistic company view is not included.

The PAS Responsible Innovation Guide (The British Standards Institution, 2021) is general and not industry-specific. It differentiates between the company and product levels and considers the different stages of the innovation process. However, it is vague, open, and lacks clear RI qualifiers. It gives limited guidance and is not interactive.

The Self-Reflection tool is a questionnaire template that partially supports a self-evaluation (RRI Tools, 2021). It strongly emphasizes the "to-do list" to achieve a certain responsibility goal, but does not define any qualifiers to evaluate innovation, the innovation process, or the company. It is not compatible with the start-up process.

The PRISMA approach provides a guideline with recommendations, a list of KPIs, and a template for a company roadmap (Lehoux et al., 2020; van de Poel et al., 2017). It is closely related to the EU principles and focuses on society and ethics. However, it does not offer any evaluation of a company or innovation. It is a holistic approach when it comes to the innovation process and is applicable in various different industries, but the target industry of the roadmap is definitely technology innovation. PRISMA definitely focuses on the positive impacts of innovation and rather gives hints on how to improve impact instead of pointing out things to avoid. The guidance of PRISMA is limited and especially in a start-up environment, it may not be very useful.

The Responsibility Navigator is available on the RRI homepage and includes a guideline, questionnaire, and workshop format (Res Agora Project, 2021). It has a holistic approach towards all aspects of RI and all EU principles. It is not product-centred, industry-specific, or aimed at a certain innovation.

The COMPASS framework is available in the literature and on the RI homepage (Lehoux et al., 2020). It includes a self-check tool, evaluation, and a workshop format. It has a holistic approach towards all EU principles, with a focus on ethics and society. It includes the whole innovation process, starting from the product life cycle stages to the commercialization phase.

The KARIM Network provides a template for a checkbox to execute a self-assessment and determine fields to improve (KARIM Interreg IVB, 2015). It is a holistic approach towards environmental, social, and ethical aspects but does not cover all EU principles. It is not industry-specific and focuses on innovation as a physical product.

The RMoI tool is a guideline and application format that gives suggestions but not qualifiers or clear KPIs (Long et al., 2020). It is designed specifically for start-ups, but it is vague and abstract, making it difficult to apply. The ORBIT toolset provides a holistic concept with an RI guideline, self-assessment questionnaire, evaluation, and an evaluation matrix with the AREA 4P framework. It is not industry-specific and can be applied to different company contexts.

ORBIT is a toolset that follows academic knowledge on responsible innovation (ORBIT RRI, 2021). It provides a holistic concept with an RI guideline, a self-assessment questionnaire with evaluation and a graphical representation, and an evaluation matrix with the AREA 4P framework. The toolset is not industry-specific and can be used in various contexts. It is grounded on EU principles and the four determinants, covering all aspects of RI, but it does not focus on recognizing the positive impacts of RI. The self-assessment tool includes qualifiers, and the tool is easy to understand and has a nice graphical representation, making it applicable in a start-up context. However, it is quite comprehensive and time-consuming, which may conflict with limited start-up capacity.

The societal thinking readiness tool is from an EU-funded RI project called New Horizon (Nielsen et al., 2018). It provides a guideline and questionnaire, but it does not include an evaluation or application template. The stage gate approach mainly focuses on the product innovation process and considers the entire innovation cycle, but it does not include the company view. The tool is based on EU principles and the RI determinants, making it a flexible tool applicable to all industries and compatible with the start-up cycle. However, it does not cover environmental sustainability aspects.

4.3 Selection of a tool for further analysis

Upon a detailed evaluation of various RI tools, several observations can be made. It is notable that none of the tools are industry-specific, making them universally applicable across different industries. Most of the tools are designed to consider all aspects of RI and align with the EU principles. However, some tools, such as the Ethical Operating System toolkit, focus only on a specific aspect of RI, failing to meet this requirement. While most of the tools aim to highlight the positive impacts of RI, some underrepresented the full range of benefits that can be derived from RI, including social, environmental, and business benefits. Furthermore, most of the tools focus on the research and development phase and neglect the "product-in-the-market-phase" and its impact on the company.

Regarding the features of an ideal RI tool, most of the tools fail to provide an applicable template, interactivity, and scoring system to enable comparison with other companies. Only the COMPASS self-check tool and the ORBIT self-assessment tool meet these requirements. In terms of clear qualifiers, these two tools also provide clear guidance on what qualifies a product, process, or company for RI. However, the RI tools underrepresent the issue of addressing conflicting aspects of RI in a business context. While some tools such as COMPASS and KARIM Network partially address such conflicts, many open issues remain unaddressed (Gurzawska, 2021).

Considering the applicability of these tools for start-ups, it is observed that all of the tools can be applied. However, the time-efficiency, cost-efficiency, and ease of application required for start-ups may conflict with other requirements of an RI tool such as holism and integrative approaches, which can increase the complexity and application time. While some tools partially meet the requirements for adaptability to different development stages and dynamic processes, the COMPASS self-check tool appears to be the most suitable for start-ups due to its scoring model, measurability, and comparability with other companies.

4.4 Evaluation of the COMPASS self-check tool

Based on the findings, the COMPASS self-check tool represents a good starting point for the further development of a tool for RI in start-ups. By including most of the evaluation requirements and approaches like the scoring model via percentages or the trial to gamify RI, it is suitable for practical application. Additionally, start-ups should be able to use it within limited resources. Yet, the tool still faces potential improvement aspects, which are summarized as recommendations for further development of the tool.

To ensure the value of RI tools, COMPASS should focus on highlighting the positive aspects of implementation, rather than punishment (Gurzawska, 2021). An interlinkage of actions and effects can aid in decision-making and the allocation of resources. KPIs can help standardize processes and make the tool a decision guide (Dreyer et al., 2017). The tool should be integrated into company regulations and evaluated and adjusted before becoming a standard. EU-funded projects should be bundled to create one commonly accepted tool.

Field experiments with companies are needed to evaluate the value of the RI tool in practice. Financial and business modelling aspects should also be integrated, along with KPIs to measure and compare impacts. This aligns with the recommendation to link RI measures and effects with KPIs (Cangioni et al., 2016).

Additionally, potential target conflicts within the implementation of RI should be integrated (Owen et al., 2013). While not only providing transparency about potential conflicts but also supporting guidance on how to deal with such conflicts it complements the tool and makes it more tangible. The section shall help a company to strengthen its system of values and to define its own guideline on how to prioritize among target conflicts (Dreyer et al., 2017). To support this process, the respected effects of different decisions must be linked to the RI measures.

Increasing the flexibility and adaptability of the tool is another recommendation for improvement. A multimodal toolkit is required that supplies the users according to their needs. Yet, the basic components and requirements should remain the same among one impact category to ensure comparability. However, the contents change over time of the innovation cycle or depending on the impact category (Parker, 2006). The multimodal toolkit should adjust to the different lifecycle stages of a company, aligning with requirements from the literature to adapt to dynamic and frequently changing processes in start-ups (Elia et al., 2020).

5. Conclusion, Limitations, and Further Research

Summarizing the findings of the research it becomes obvious that there are already many ongoing or completed projects in the research field of RI in a business context. Yet, there is still a lot of potential in the operationalization of RI in start-ups, especially regarding integrated approaches of academic concepts and requirements from practical application.

Considering the first research question, a variety of tools addressing the topic, originating from literature and different EU projects, were identified. The tools were found through the SLR and the RRI Toolkit website. Yet, none of the tools is commonly used or spread in a business context, even though the concept of RI receives growing awareness within the last few years.

Regarding the second research question, asking for tools applicable to start-ups, no tools were identified.

By evaluating existing RI tools, success factors, as well as deficiencies, were derived, which were transformed into improvement suggestions, addressing the third research question. By designing a modular tool with further sections but also user-based adaptations, existing tools can be improved to enhance their applicability in the context of startups.

The study contributes to the current state of research, giving an overview of all existing tools for RI operationalization in a business context. By evaluating the existing tools based on predefined criteria, this study

enables a valid theoretical base for further research in the operationalization of RI. Further, it builds a foundation for the further development of the COMPASS self-check tool focusing on RI implementation in startups.

Hence, in further research, stakeholders of several areas in the startup field should be interviewed to support the further devolvement of the tool. Additionally, field experiments in practice should be conducted, to gain more insights on the effects of the application of such a tool. Also, by conducting a survey that focuses on the evaluation of the requirements of an RI tool, a wider population can be integrated, thereby increasing the validity but also awareness of such a tool.

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Sustainability Management, Technological Innovation and Corporate Social Responsibility for Social Media Small to Medium-Sized Enterprises (SMEs)

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Abstract: The aim of this paper is to investigate the impact of the social and technological environment on business performance. Focus is placed on SMEs and their effort to achieve sustainable competitive advantage and thereby sustainable business performance. For this purpose, a survey study was carried out, where primary data was collected from a representative sample of SMEs operating in the Social Media industry of Greece. Questionnaires were distributed to managers and entrepreneurs of the Social Media Industry. These managers/entrepreneurs were selected using a simple random sampling methodology. The findings of the study revealed that social and technological developments have a major role in developing a sustainable competitive advantage. Strategy alignment was also found to be key in tackling the problems and in undertaking the opportunities that arise from the current social and technological environment, thereby reaching sustainable business performance. The findings of the study are especially useful to entrepreneurs and professionals in the industry in formulating effective strategies towards aligning their business with current advancements in emerging digital technologies. Such an alignment would bring numerous competitive advantages and in turn sustainable business performance.

Keywords: Sustainability, Social Responsibility, Entrepreneurship, Social Media, Technological Innovation, Digital Economy; Corporate Social Responsibility

1. Introduction

In the current highly competitive environment, sustainable performance is vital for success (Goel, Rana, and Rastogi, 2010). It is important to note that Sustainable performance has been a key goal for an increasing number of businesses in recent decades (Taylor, 2013). As a result, during the last decade there has been a growing interest for using strategic decision-making frameworks focussing on sustainability (Jiang et al., 2018).

An organization's sustainability performance is defined as a balance between financial and environmental objectives in delivering its core business activities. It encompasses the performance of a company in all dimensions and in all drivers of corporate sustainability (Sebhatu, S, 2009). Sustainable performance plays a key role in the sustainability management of Small and Medium Enterprises (SMEs) (Moore and Manring, 2009).

In the current tumultuous digital economy landscape, numerous companies and even entire industries are facing daunting obstacles that make sustainable performance almost an impossible goal. Such an industry that has received waves of disruption and restructuring is the Social Media industry. Note that the Social Media sector plays an important role for marketing and business performance and thereby increasing the Gross Domestic Product (GDP) (Williams and Schaefer, 2013). In the case of the Greece, this sector plays a highly influential role in the country's economic development, but at the same time the Greek Social Media sector faces various technological and social challenges. The main challenges are related to the adoption of new technologies and their successful implementation in order to safeguard a competitive advantage. In conjunction with technological changes, social developments impose new roles on businesses in the sector focussing on corporate social responsibility, which require the cultivation of a new set of values and beliefs.

The existence of distrust and the non-constructive beliefs of workers create resistance to change. This resistance could be attributed to the complexity of the new technology and employee fear of using the technology against their interests (Beck, Demirguc-Kunt and Levine, 2005). Such negative values and beliefs adversely affect new strategic initiatives and the development of competitive advantage, which ultimately reduces sustainable business performance. In addition, social responsibility is a necessary component in order to foster sustainable performance (Abdi Mussa et al., 2013). It has been shown that SMEs must be engaged in corporate social responsibility effort in order to handle the current social challenges and thus secure a sustainable competitive advantage.

The aim of this paper is to investigate the impact of social and technological environment on business performance in today's digital economy. Specifically, the role of technological advancements in conjunction with social changes to achieve competitive advantage and thus sustainable business performance is investigated. Explicitly the objectives of the study are as follows:

1. To examine the role of Information Technology in process of achieving a sustainable competitive advantage.
2. To identify the role of Values and Beliefs as moderators in the development of the right climate for achieving sustainable competitive advantage.
3. To identify the relationship between the development of corporate social responsibility practices and the achievement of sustainable competitive advantage to increase business performance.

2. Literature Review

This section presents a review of resources that small and medium-sized enterprises (SMEs) are leveraging to address their social and technological challenges. These resources include, corporate social responsibility (CSR), employee values and beliefs, IT managerial resources, IT implementation and strategic alignment all of which are contributing to an increase in the sustainable competitive advantage of SMEs.

2.1 Social responsibility

Despite the fact that there is no universal definition for social responsibility, numerous private organisations refer to it as a means of managing the environmental, social, and financial implications of their operations in a constantly evolving business environment (Newell and Muro 2006).

The social responsibility of companies has been studied by various researchers (Matten and Moon 2008, Brunsael 2009) and many of these studies overlook the relationship between the achievement of a competitive advantage and the sustainability of business performance. However, the social responsibility of organizations has been found to have an impact on sustainable competitive advantage (Ceglinski and Wisniewska 2017). It seems that achieving higher levels of social responsibility improves a company's competitive advantage and losing control of social responsibility reduces the competitive advantage.

In the current era of globalisation, businesses and organizations have been able to move away from the restrictions imposed by their home countries. According to Newell and Muro (2006) the prevalence of global organizations who operate beyond the restrictions of their home country has led to an increase in the desire for greater accountability and straightforward global operations. Due to globalisation and the challenge of limited resources, corporate social responsibility (CSR) has been at the top of the agenda among business networks and Government. Many advocates for CSR in the Western world claim that CSR is not merely corporate philanthropy but rather a fundamental logic for large, medium and small enterprises to achieve a comparative advantage and sustainably to perform among different companies. Various studies have shown that corporate social responsibility plays an important role in achieving sustainable competitive advantage (Hill and Jones 2014; Campbell 2007; Mohr et al., 2001). In line with the concept of social responsibility, it is equally important to have the proper values and beliefs to achieve sustainable competitive advantage.

2.2 Values and beliefs

Better values and beliefs have the potential to solve various IT issues. An organization's attitude towards adopting new technology presents a significant challenge (Balcerzak 2016). These values and beliefs are part of the culture of the organization. Tuan and Venkatesh (2010) explored how the culture of the organization is linked to technological adoption, in which attitude plays an important role and is closely linked to achieving a competitive edge.

2.3 IT managerial resources and IT implementation

Small and medium-sized enterprises (SMEs) are confronted with novel technological issues, such as IT managerial resources and the success of IT implementation. It is essential to have well-equipped IT management resources in order to successfully implement new technology, a task that is a challenge for most companies. This pre-requisite covers the relationship between business and IT managers when it comes to seller identification, contract negotiation, as well as the structure and utilization of IT projects.

According to Freeman and Sharp (1991), IT success is mostly a function of a good relationship between business managers and IT, which is the main driver of good seller relationships. According to Chan et al., (2006), IT partners must be trusted and advised in the fundamental leadership process. Prior to this, Boynton (1994) conducted a survey of administrative IT learning about the business' tasks and systems and found that knowledge of high-level administrative IT information strongly affects a higher use of IT resources.

IT managerial staff who are equipped with the necessary IT skills are more likely to be able to implement technology effectively, which can lead to an increase in the competitive advantage. Studies have demonstrated that IT management resources, such as IT skills, can have a positive impact on competitive advantage (Boynton 1994). Human resources are a fundamental component of IT managerial resources and are essential in achieving a competitive edge (Collins 2003). IT implementation is also of paramount importance, as the correct implementation of new technology has a greater impact than the mere introduction of it.

2.4 Sustainable competitive advantage

According to Barney (1997), sustainable competitive advantage is determined by the resources of an organization, both internally and externally. These intangible strategic resources are often unique, valuable, and irreplaceable, they drive both the creation and maintenance of competitive advantage. By leveraging these unique resources, an organization becomes proficient enough to produce as well as deliver innovative and high-quality products and services to make a difference (Russo and Fouts 1997). In order to achieve the desired strategic advantage, firms can develop competencies by examining factors such as human capabilities, internal organizational strategy, regulations, and appropriate information sources (Russo and Fouts 1997). In the context of the study, IT Implementation, IT Management Resources, Social Responsibility, Values and Beliefs are the key competencies for a competitive edge, which is essential for sustainable business performance.

2.5 Strategic alignment

Strategic alignment is a process of aligning an organization's structure and resources to its strategy and business environment, in response to its current and emerging societal and technological challenges. It involves the matching of skills to achieve specific objectives related to the organization's strategic plan. This process encompasses strategy, personnel, remuneration, and structure, and is essential for attaining a sustainable competitive edge.

Aligning the business strategy with its strategic decisions is an obvious area of focus that remains at the forefront of a high-priority business (Johnson and Lederer 2010). The strategic alignment between IT and business strategy is seen as a critical issue, particularly when IT becomes an integral part of the business, and is utilized to leverage unique business capabilities, consolidate organizations, reconstruct businesses, and enable global competitiveness (Peppard and Ward 2004).

Businesses are facing an ever-increasing competition at both local and global levels. Therefore, understanding the nature of creating a competitive advantage becomes a fundamental requirement for any organization. Several researchers (Chan and Reich 2007) have shown that the organizations can be competitive only if there is synergy between business innovation and data innovation. Therefore, aligning strategies in this direction is the key to gaining a competitive advantage.

Small and medium-sized enterprises (SMEs) face a range of social and technological challenges, including those related to corporate social responsibility (CSR), values and beliefs, IT managerial resources, and IT implementation success. Properly aligning strategies can help to address these challenges, allowing for the allocation of skilled personnel to address IT management issues and the challenge of IT implementation success. Additionally, social issues can be addressed through the alignment of appropriate strategies, which can lead to an increase in the company's sustainable competitive advantage. Numerous studies have demonstrated a strong correlation between strategic alignment and achievement of a sustainable competitive advantage (Powel 1992; Kearns and Ledener 2003; Brown and Blackmon 2005).

2.6 Synopsis

It is concluded that technological innovation and sustainable business may converge and it is hard to draw a boundary line between them. Innovation is perceived as the commercialization of an invention or idea. There is now a focus and pressure upon technology and innovation to achieve sustainable economic and socio-economic development. It is reported that research and experimental development (R&D), when properly harnessed, may

lead to technological innovation in the form of new products and processes, which contribute to growth, competitiveness and creation of jobs, producing further social benefits. On the other hand, is noted that the private sector, left to its own devices, might invest in areas that may not always be fully aligned and socially desirable and thus the business is not able to be fully benefited (Delanghe and Muldur, 2014).

To avoid such market failures, an appropriate business model could guide the firm in the right direction. A business model would act as a "market engine", a connective device between different stakeholders such as companies, funders, research institutes, etc., which are factors that shape innovation networks. A business model describes the principles by which an organization creates, distributes and captures value (Sempels and Hoffman, 2013). A business model is the means by which the company's strategy is established (Sempels and Hoffman, 2013). An answer to dilemmas about the relationship between business models and technological innovation, can be found in a brief statement by Chesbrough (2017) “Innovate the business model, not only technology". This is further elaborated as follows: “a better business model it often outperforms a better technology” (Jaksic, 2018).

In order for a business to be successful, it has to have certain advantages over its competitors. The main objective of any strategy is achieving competitive advantage as well as performance (Ulewicz and Blaskova, 2018). For the achievement of this goal, specific elements are required, such as social responsibility, appropriate positive values and attitudes/beliefs, IT resource management, successful IT implementation and strategy alignment to gain a competitive edge advantage in a competitive environment.

According to Porter (1996), to gain sustainable competitive advantage, social responsibility, values and beliefs, IT managerial resources, IT implementation success and strategy alignment are needed.

The social responsibility of companies has been studied by various researchers (Carroll 1991; Campbell 2008; Mohr et al., 2001). However, these studies overlook the relationship between the achievement of a competitive advantage and the sustainability of business performance. The social responsibility of organizations has been found to have an impact on sustainable competitive advantage (Brunsael 2009; Ceglinski and Wisniewska 2017). Achieving higher levels of social responsibility improves a company’s competitive advantage. Losing control of social responsibility reduces the competitive advantage.

Values and beliefs play an essential role in achieving long-term competitive advantage. These are the challenges that SMEs face. Values and beliefs of the people in the organization have a huge impact on many metrics of IT in companies. Values and beliefs can have a significant impact on one's career, including conduct and practices. These beliefs are shaped throughout one's career depending on the experience gained in the field of Information Technology. Therefore, IT issues are linked to values and beliefs and fosters competitive edge (Tanriverdi, & Venkatraman 2005).

Small and medium-sized enterprises (SMEs) are confronted with novel technological issues, such as IT managerial resources and the success of IT implementation. It is essential to have well-equipped IT management resources in order to successfully implement new technology, a task that is a challenge for most companies. This pre-requisite covers the relationship between business and IT managers when it comes to seller identification, contract negotiation and the executives, as well as the structure and utilization of IT projects.

Strategic alignment refers to the process of aligning your organization's structure and resources with your strategy and specific business environment, in line with social and emerging technological challenges. Strategic alignment is the process of matching your skills to achieve specific goals regarding your organization's strategic plan. It's a multi-faceted process that includes your strategy, your people, your rewards and your structure. It's a process that aligns your organization's structure with your business model, which has a significant impact on achieving your sustainable competitive advantage (Miron et al., 2011).

As mentioned above, an increase in sustainable competitive advantage leads directly to an improvement in sustainable business performance. Studies have shown that companies should prioritize competitive advantage in an environment with a satisfactory level of sustainable business performance. Several studies have shown a strong correlation between sustainable competitive advantage and sustainable business performance (Davis et al., 2000; Li et al., 2006; Zikmund et al., 2009.)

The interrelationships of such elements are investigated in the current study by means of the survey method and the use of the Partial Least Squares Structural Equation Modelling technique.

3. Methodology

The present study implements a quantitative research design to measure the structural relationship between the various proposed latent variables related to performance, technological development, sustainability and social responsibility. For this purpose, the Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed using the software package Smart PLS 3.0 where thirteen hypotheses where tested based on Resource Based View (RBV) theory (Hair et al., 2019). A cross-sectional research design was applied to the study in which the data were collected once. This process was followed by applying statistical analysis methods, while inferences were drawn about the SMEs in the Social Media industry. A brief cover letter detailing the study was also attached to the email. Further, assurance was given that the responses would remain confidential and would be used only for research purposes. The questionnaire was distributed via email to a representative sample of randomly selected Social Media SMEs and answered by the management staff.

A total of 100 questionnaires were distributed to the managers of Greek Social Media SMEs. Of these questionnaires 44 were returned and 8 were incomplete. Thus, 8 questionnaires were excluded from the study and 36 were used to analyse the data collected. The overall response rate was 36.4% which is considered adequate considering the low number of Social Media SME's operating in the country. According to (Hair et al., 2007) a response rate of 30% is good enough in the case of an email survey.

4. Results – Analysis via Partial Least Squares Structural Equation Modelling PLS-SEM

As indicated by Chin and Newsted (1999) PLS is suitable when (a) the theoretical model is new or not well framed (b) the model is generally complex with numerous variables as well as structural paths. It is also useful when the main goal of the research project is to predict relationships. PLS path modelling was used in the present study using Smart PLS 3.0 (Wold, 1985).

PLS is similar to the conventional regression procedure, but it offers an advantage for the simultaneous evaluation of the connection between variables (structural model) and the relationship between constructs (the measurement model) (Ringle, Wende and Will, 2010). Considering the above, this study used PLS-SEM to analyse the collected data. PLS-SEM is based on different steps suggested by Henseler, Ringle, and Sinkovics (2009).

Table 1: Direct Effects Among the Main Latent Variables

Relationship	β	St Dev	t-Statistics	p-Values	f 2
ITI→SA	0.827	0.052	15.704	0.000	0.950
ITI→SCA	0.186	0.090	2.055	0.039	0.024
ITMR→SA	0.155	0.037	4.136	0.000	0.023
ITMR→SCA	0.081	0.081	4.696	0.000	0.003
SA→SCA	0.637	0.098	6.41	0.000	0.269
SCA→SBP	0.717	0.043	16.154	0.000	0.851
SR→SA	0.184	0.046	3.930	0.000	0.038
SR→SCA	0.022	0.010	2.15	0.038	0.002
VB→SA	0.178	0.051	3.471	0.002	0.033
VB→SCA	0.060	0.024	2.54	0.011	0.001

Notes: (ITI) IT Implementation Success, (SR) denotes Social Responsibility, (VB) Values and Beliefs, (ITMR) IT Management Resources, (SA) Strategic Alignment, (SCA) Sustainable Competitive Advantage, (SBP) Sustainable Business Performance

The direct relationships between the main variables are shown in Table 1.

The relationship between social responsibility and sustainable competitive advantage was found significant and positive with a t value of 2.15 and a β value of 0.022. The relationship between values and beliefs with sustainable competitive advantage was also found to be significant and positive with a t-value of 2.54 and a b-value 0.060. In addition, IT management resources have a positive effect on sustainable competitive advantage with a t-value of 4.136 and a β-value of 0.155.

The results reveal that the relationship between the extend of IT implementation and the achievement of a sustainable competitive advantage is high. The t-value of 2.055 and a β value of 0.186 indicates a high relationship. SMEs should invest in technological advancements and especially in IT technology in an effort to achieve competitive priorities and safeguard market success.

The relationship between the existence of IT management resources and the achievement of strategic alignment is found to be high. The t-value of 4.136 and a β -value of 0.081 indicates this high relationship

In addition, the direct impact of social responsibility, of values and beliefs, IT resource management and its application IT have a significant positive effect on strategy alignment with a t-value of 3.930 and β value 0.184, t value 3.471 and β value 0.178, t value 4.136 and β value 0.155, t value 15.704 and β value 0.827, respectively.

Additionally, findings reveal that strategic alignment has a positive role in achieving sustainable competitive advantage with t value 6.41 and β value 0.637. Moreover, the same results are found in the case of viable competitive advantage and sustainable business performance with a t-value of 16.154 and β value 0.717. Therefore, the results have supported all direct hypotheses, showing a strong possible cause and effect relationship between Information Technology and performance, as well as social responsibility and sustainable performance.

Table 2 below indicates the indirect effect of performance variable on the achievement of a sustainable competitive advantage.

Table 2: Indirect Effects to Sustainable Competitive Advantage

Relationship	Sample (0)	Sample (M)	Standard Deviation	t-Statistics	p-Values
ITI→SA→SCA	0.527	0.514	0.088	5.953	0
ITMR→SA→SCA	0.11	0.10	0.002	3.387	0.002
SR→SA→SCA	0.117	0.118	0.04	2.30	0.013
VB→SA→SCA	0.113	0.115	0.115	1.641	0.072

Notes: (ITI) IT Implementation Success, (SR) denotes Social Responsibility, (VB) Values and Beliefs, (ITMR) IT Management Resources, (SA) Strategic Alignment, (SCA) Sustainable Competitive Advantage, (SBP) Sustainable Business Performance

The result reveal that there are significant indirect effects to the achievement of a sustainable competitive advantage via the mediating variable of Strategic Alignment (SA). Strategy alignment is an important mediating variable between social responsibility and sustainable competitive advantage with a t-value of 2.30 and a β-value of 0.117. The indirect effect was found to be also important in the case of IT management resources and successful IT implementation; t-value 3.387 and β-value 0.11, t-value 5.953 and β-value 0.527, respectively. On the other hand, the indirect effect between values and beliefs and sustainable competitive advantage was found to be insignificant at the 95% confidence level.

The findings reported in this study indicate significant relationships between the main variables and are in agreement with the literature review.

5. Discussion

The PLS SEM data analysis allows us to conclude that social responsibility and technological factors are very important determinants of achieving a long-term competitive advantage and sustainable performance in the Social Media sector. Specifically, it was found that there is a strong positive relationship between social responsibility and long-term competitive advantage. A large number of studies have also come to the same conclusion (Porter, 2011; McWilliams and Siegel, 2011). In addition, beneficial associations between values and beliefs have been found to be necessary for a long-term competitive advantage. These findings are consistent with other studies such as Kearns and Lederer (2004). This leads to the conclusion that the right values and beliefs, along with the notion of social responsibility, contribute to the formation of a long-term competitive advantage. Therefore, small and medium-sized enterprises (SMEs) should give high priority to cultivating a culture of Corporate Social Responsibility (CSR) in order to achieve and sustain a competitive advantage over their competitors.

Regarding new technology adoption, it was found that management resources information technology and IT applications contribute to competitive advantage. Research conducted by other studies such as Byrd and Turner (2001), as well as Kearns and Lederer (2004), revealed also a positive relationship between information technology management resources and of long-term competitive advantage. Moreover, the success of IT deployment has a significant beneficial impact on an organization's capability to maintain a sustainable competitive advantage.

According to Dehning and Stratopoulos (2003), information technology (IT) facilitates technology implementation processes. This helps companies gain a long-term competitive advantage by supporting the development of a plan for technology adoption. As a result, in order to achieve a long-term competitive advantage, both the availability of information technology management personnel as well as the implementation of information technology initiatives is critical. Improved development of information technology and management capabilities help a firm to gain competitive advantage in the long run. As a result, small and medium-sized enterprises (SMEs) must ensure that they improve their information technology capabilities and that their information technology status is up to date.

Additionally, strategy alignment is critical in order to maximize the positive effects of social responsibility and technology elements for long-term competitiveness and profitability. A more realistic connection between the social and technological elements and a long-term competitive advantage is created as a result of aligning the strategy with the company's long-term goals. Technology has a major role in achieving a sustainable competitive advantage and sustainable business performance.

Consequently, it is necessary to synchronize the business tactics in order to obtain the most benefits from the social and technological elements in the long term. The link between strategy alignment and creating a sustainable competitive advantage, is also supported by other studies (Chan, Shaffer and Snape, 2004. The results of the present study suggest that these factors can lead to an increase in the overall business sustainability of a company's performance.

6. Conclusion

The present study is primarily concerned with the long-term sustainability of Social Media SMEs in Greece. The purpose of this study is to investigate the role of social responsibility and technological innovation in achieving a sustainable competitive advantage and as a result a sustainable level of corporate performance in the long term. In addition, the importance of strategy alignment has emerged as a mediating variable between social barriers, technical challenges and long-term competitive advantage.

The relevance of the socio-technical environment to the long-term performance of a firm cannot be overstated. In order to achieve a sustainable competitive advantage SMEs should align their strategy to current social and technological developments and cultivate social responsibility, as well as positive employee values and beliefs. These would support the development of resources for the success of technological innovation projects. The alignment of strategy to the social and technological environmental trends is highly important for a long-term competitive advantage.

Consequently, it is recommended that Social Media SMEs in Greece should not only focus on addressing social and technological challenges but also exploit the trends and any opportunities for development. Small and medium enterprises (SMEs) should give priority to building up their social responsibility, positive employee values and beliefs, and technological innovation resources. This will bring them both short term survival and long-term sustainable business performance.

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The Impact of Marketing Communication on Social Innovation in the case Study of the Bottle and Returnable can Deposit System in Slovakia

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Abstract: Social innovation brings new solutions that contribute to improving people's quality of life and its role is to develop society. This can be development in different areas such as poverty, unemployment, climate change or ecology. Some social innovations are often perceived negatively by society at large, and it is the role of the institution introducing the innovation to correctly communicate the reasons for and impact of social innovations. Modern society includes modern communication through different communication channels. In order for a social innovation to be successfully introduced and accepted by society, a communication strategy needs to be developed. Organizations implementing social innovations are aware that marketing communication has a major impact on social innovations and can be a decisive factor in achieving behavioral change in society in relation to the problems the social innovation is intended to address. The aim of this study is to highlight social innovation in the environmental field in Slovakia using the example of the bottle and returnable can deposit system. In its government programme, the Slovak Republic has committed to increase the return rate of returnable packaging from the current 60% to 90% by 2025, while the returnable packaging deposit system was only introduced in Slovakia in 2022. In this paper, we will analyze the impact of marketing communication and its impact on the results of the introduction of social innovation in the field of returnable packaging deposit.

Keywords: social innovation, ecology, deposit return system, bottle, PET, can marketing communication

1. Introduction

At its core, social innovation seeks social change. Social innovation brings new solutions that contribute to improving people's quality of life and its role is to develop society. This can be development in different areas such as poverty, unemployment, climate change or ecology. In order for social innovations to be accepted by society, marketing communication to the public is important. In addition to bringing new solutions, social innovations address a number of societal problems. Social innovation is not only addressed by scientists, but also by legislation. Social innovation, as understood by the European Union, is meant to "empower people and lead change" in the sense that it leads to social change that creates sustainable social inclusion (Fougère, Segercrantz & Seeck, 2017). However, there are many opinions and definitions of what social innovation is. We can understand it as: "A social innovation is a new solution to a social problem that is more effective, efficient, sustainable, or equitable than existing solutions and whose value created accrues primarily to society as a whole rather than to private individuals" (Phills, Deiglmeier, & Miller, 2008, p. 39). Social innovation is present in human history as a manifestation of humanity's creative capacity and as a result of humanity's efforts to develop answers to its needs and to improve its quality of life (Cajaiba-Santana, 2014). The concept of social innovation is also related to social entrepreneurship. Social entrepreneurship strives for the common good, namely sustainability for both people and the planet (Muscat & Whitty, 2009). Green entrepreneurship is also an important area of social entrepreneurship. Social entrepreneurship is essentially a type of entrepreneurship; a social entrepreneur is a type of entrepreneur (Dees, 1998). There are a number of works that attempt to clarify what social entrepreneurship is. Nevertheless, social entrepreneurship is still a complex concept because it is difficult to draw clear boundaries between what is social entrepreneurship and what is not (Peredo& McLean, 2006). If we talk about social entrepreneurship, it should have elements of social innovation, i.e. to improve the social condition. One area is the Deposit return system, which is based on the legislation of countries and aims to make beverage containers more recyclable by a system of returning the packaging to the store. The Slovak Republic is one of the countries where this system is in place. Approximately 1.3 billion beverage containers are sold annually in Slovakia, with a target of collecting at least 60% of recyclable containers by the end of 2022 and up to 90% by 2025. Slovakia would thus be four years ahead of the targets set by the European Union's Single-Use Plastics Directive, which requires Member States to separate 90% of single-use plastic bottles by 2029 (Tomra, 2022). This is a social innovation that should have a positive impact on the environment. Less pollution of rivers or forests is expected. Deposit return schemes are now recognised as a very effective tool to reduce waste and ensure proper recycling.

2. Deposit return system in Slovak republic

In November 2022, the European Commission (Commission) presented a proposal for a Regulation on packaging and packaging waste. The proposal contains various measures on recyclability and packaging minimisation, including a requirement for each Member State to introduce a deposit and return scheme (DRS) for all single-use plastic and metal beverage packaging of up to 3 liters by 1 January 2029 (excluding packaging containing wine, spirits and dairy products). Member States are exempted if they can demonstrate a recycling rate of at least 90% of the materials covered by the Regulation in the two years prior to the entry into force of the Regulation. On 1 January 2022, the Slovak Republic became the eleventh EU country, along with Lithuania, to operate a Deposit Return System.

Table 1: Europe Countries with deposit return system

Country	State of DRS	PET bottles collection rate	Implementation year
Denmark	Implemented	96 %	2002
Estonia	Implemented	86 %	2005
Finland	Implemented	92 %	1996
Netherlands	Implemented	65 %	2005
Croatia	Implemented	86 %	2006
Iceland	Implemented	87 %	1989
Lithuania	Implemented	92 %	2016
Latvia	Implemented	54 % (first six months)	2022
Slovakia	Implemented	69 % (first seven months)	2022
Germany	Implemented	95 %	2003
Malta	Implemented	no data (implemented in november)	2022
Norway	Implemented	88 %	1999
Sweden	Implemented	86 %	1984

Source Own processing

The administrator was established by four non-profit organizations authorized by the Ministry of Environment of the Slovak Republic. They are (Deposit Return System Administrator's Annual Report 2021, 2021):

- Association of producers of soft drinks and mineral waters in Slovakia (Asociácia výrobcov nealkoholických nápojov a minerálnych vôd na Slovensku),
- Slovak Association of Beer and Malt Producers (Slovenské združenie výrobcov piva a sladu),
- Slovak Modern Business Alliance (Slovenská aliancia moderného obchodu),
- Association of Commerce of the Slovak Republic (Zväz obchodu Slovenskej republiky).

Slovakia has committed to increase the current collection rate of beverage packaging from 60% to 90% in 2025 (Deposit Return System Administrator's Annual Report 2021, 2021). Every consumer who buys a drink will pay a deposit of €0.15 for the returnable packaging in addition to the price of the drink. This money will be refunded if the returnable packaging is returned to a shop that has a machine for collecting returnable packaging.

3. Case study: Marketing Communication of Deposit return system in Slovak republic

The Deposit Return System in Slovakia was launched in 2022. This social innovation needs to be accepted by the public. The communication was aimed at two target groups (Deposit Return System Administrator's Annual Report 2021, 2021):

- the professional public - manufacturers, distributors and retailers - the brand of the Backup Scheme Manager,
- consumers - Slovakia backs up.



Figure 1: the logos of the communicated brands - the first brand aimed at wholesale and the second brand aimed at consumers.

Prior to the launch of the backup system, an integrated marketing communication was launched. It was targeted at all stakeholders, who passed the information about the back-up system on. In 2018, a survey was conducted in Slovakia, which indicated that 70% of Slovaks support backup and 30% reject it (Backup System Administrator Annual Report 2021). We can say that Slovakia had a good starting line in the case of adopting a backup system. The campaign aimed at consumers started in September 2021 and ended in April 2022. The aim of the communication was first of all to prepare people for backup and to set a positive emotion towards the system and the overall change in consumer behavior that the introduction of backup brings, and at the same time to stimulate in each one of us a social responsibility towards the future of our country and the environment in which we live (Annual Report of the Backup System Administrator 2021). The campaign involved social figures - media personalities, influencers. The pre-launch campaign was cryptic, with billboards carrying the message "The change comes from 1 January." The billboards (figure 2) depicted a well-known personality with the logo "Z - backup", which was not known to the public at the time. The billboard campaign resembled a political campaign and raised many questions. The campaign also focused on PR, with the aim of raising awareness of the back-up system in Slovakia through the media.



Figure 2: Billboard campaign

Source FLEMA Media Awards 2022

The campaign aimed to change consumer behaviour and teach people a new habit - to back up. The marketing goal of the campaign was to collect up to 60% of beverage packaging (PET bottles and cans) by the end of 2022. The campaign had to break down the initial barriers to returning beverage containers, clearly explain the principle of deposit and reach the whole population, including children and residents in every region.

3.1 Vratko Štupeľ advertising campaign

The 13-year-old boy Vratko Štupeľ became the face of the advertising campaign in Slovakia. His name in Slovak is a play on words *Vratko* from the word return, back up and *Štupeľ* as a colloquial expression for the lid of a PET bottle. Vratko is an ECO lover and his slogan, as well as the main motto of the campaign, is *"I back up, rap and enjoy life"*.

It is typical for Vratko to introduce generation Z, a green influencer who cares about the protection of nature and especially the elimination of plastics for the environment. He communicates his passion very creatively and playfully through social networks for his peers and also older age groups. Vratko Stupeľ does not see waste as a problem, but as an opportunity. That's why he advances by one hundred and six - he earns extra by collecting

bottles and cans wherever he goes. His generation is the greenest generation ever. *"We believe that he will support his peers to bring change to their parents, grandparents, aunts, uncles, neighbors... We all want to live in a more beautiful and cleaner world, but young people are the ones who are more willing to step out of their comfort zone to bring change. Vratko's mission is to support them and show them that they are not alone in this"*, said the creative director of the concept Branislav Macko from the Ponyhouse agency.



Figure 3: Vratko Štupeľ logo and character

Source https://vratkostupel.sk

As an influencer, Vratko tries to apply all the current music and dance trends on TikTok, Instagram and Facebook and creatively connects them all with the topic of backing up and returning bottles to PET machines. Of course, he answers the "diss" of fans, explains, educates, makes "how-to" videos and instructions on how easy it is to return bottles to stores, how exchange cards work, what the inside of bottle return devices looks like and why containers can't be bent, etc. His most watched videos reach over 100,000 views on TikTok and Instagram.

Table 2: Number of interactions on Vratko Štupeľ's profiles (as of 7/15/2023)

Social network	Videa name	Number of views	Number of likes
Instagram	"Stupel, how to contribute to a more beautiful nature?" Look 😎☝	247 000 views	434 likes
Instagram	Hello friends! I hope you like my new ad as well as the backup. 🎥 We had a great time with @fero_joke. 😜	150 000 views	612 likes
Instagram	And what type of backup are you? 😆 It's clear to me ✌	7 890 views	158 likes
TikTok	Replying to @Neviem You guessed several. 😁Follow me on IG and join the competition. 👀	16 500 views	477 likes
TikTok	The best thing in the world. 🤩	11 100 views	204 likes
TikTok	Thanks to Backup, we have a cleaner nature! 💚	7 890 views	158 likes
Facebook	Hi, I'm Vratko Štupeľ and I love backing up plastic bottles and cans. And you? Don't forget to follow me on TikTok and Instagram for more of my videos!	27 500 views	232 likes
Facebook	These are your most frequently asked questions about me and backup.	12 600 views	62 likes
Facebook	Just me, PETs and cans. You can find more of my videos on my Instagram.	11 200 views	100 likes

3.2 Results of Deposit return system in Slovak republic

Campaigns are often difficult to measure because we need to know the reality of the situation before the campaign is launched. The backup system administrator measured several indicators before and after the campaign. Seven Key Performance Indicators were measured:

- spontaneous knowledge (PET/Can, PET, Can),
- supported knowledge - knowledge of the backup system,
- clarity of the system,
- interest in getting involved - I'm certainly interested for 15 cents (PET, Can),
- Knowledge of the "Z - I back up" logo,
- Knowledge of the brand "slovenskozalohuje.sk",
- Knowledge of the message "The only effective solution".

The actual survey of the seven indicators was conducted by 2muse after Q1 in 2022. Deposit return system in the spontaneous knowledge before the campaign itself ranged from 6% to 15%. Post-campaign, spontaneous familiarity was 18% to 36%. At the end of the campaign, spontaneous knowledge ranged from 64% to 90%. Within the spontaneous familiarity, we see the impact of marketing communication on the adoption and familiarity of the social innovation within the deposit return system. Awareness of the deposit return system before the campaign was at 85% and after the campaign was up to 97%. Within this inquiry question, we see that marketing communication had an educative impact on the adoption and understandability of the social innovation in this case. Only 50% of respondents were interested in participating in the deposit return scheme in June 2021, whereas this was already 76% after the campaign and the impact of the marketing communication. The marketing communication had a large impact on the familiarity of the brand "Z" (Deposit). This brand that appears on PET and can was only at 7% in the month of June 2021, before the launch of the system. After the communication itself, this knowledge was up to 81%. In Table 2 we see more detailed data that shows the importance of marketing communication in the adoption and knowledge of a social innovation, in our case the deposit return system in Slovakia.

Table 3: KPIs of campaign

Key Performance Indicators		June 2021	October 2021	April 2022
Spontaneous knowledge	PET/ sheet metal	15 %	36 %	90 %
	PET	14 %	34 %	80 %
	Can	6 %	18 %	64 %
Supported knowledge		85 %	86 %	97 %
Clarity of the system		22 %	26 %	52 %
Interest in getting involved (I'm certainly interested for 15 cents)	PET	50 %	57 %	76 %
	Can	50 %	58 %	74 %
Knowledge of the ZÁLOHOVANÉ		07 %	15 %	81 %
Knowledge of the brand "slovenskozalohuje.sk"		05 %	10 %	34 %
Knowledge of the message *"The only effective solution" („Jediné účinné riešenie")*		65 %	67 %	74 %

Source: 2muse agency

Prior to the launch of the deposit return system, well-known celebrities who are close to green issues or who have a large influence and impact on the public were involved in the awareness campaign. These were personalities such as Adela Banášová (popular TV presenter), Sajfa (TV and radio presenter), Fero Joke (influencer) and others. Well-known faces also did an awareness campaign for this social innovation. It was necessary to get the letter "Z" into people's awareness. PR also played an important role, involving politicians, government institutions and other authorities. For example, people were introduced to the deposit return system, its benefits and the way it works through TV news reports. It was necessary to highlight the positives in order for the population to accept the system. Because of the campaign, only 50% of the population was willing to participate in the deposit return scheme. This has just changed with the campaign, where we are seeing an increase in willingness to participate of up to 26%. It should be noted that without marketing communication, this social innovation might not have been successful or would have taken much longer to be adopted by the discoverers, which would have had an impact on the environment.

3.3 Impacts of social innovation Deposit return system in Slovak republic in practice

The deposit return system has delivered real results not only in numbers but also in real life. This social innovation also has a positive impact on the environment. The media are interested in the environmental impact of the deposit return system. On 13 March 2023, the Markiza television station broadcast a report on the voluntary cleaning of the Liptovská Mara reservoir in its news bulletin. The report stated that the waste around the reservoir from PET bottles and cans has decreased by approximately 70% (PET bottle deposit..., 2023). In the case of this example, we see the real impact of social innovation in practice. The deposit return system also has a positive impact on national parks. Tomáš Dražil, Director of the Slovak Paradise National Park Administration, told the public broadcaster Rozhlas a Televízia Slovenska. "The idea of the deposit system itself is excellent. It is already a much better situation than it was years ago." He was referring to the litter situation in national parks, with conservationists saying 2020 would see the biggest pollution in the park's history. In both cases, the positive impact of social innovation is seen to have improved the situation that existed before the innovation was adopted.

4. Conclusion

Society in the new millennium is facing questions concerning the sustainability of life on planet earth. Governments, companies and individuals are trying to make a difference through social innovation. Slovakia adopted a similar social innovation in 2022: the deposit return system. In this paper, we have discussed the importance of marketing communication of social innovation, as non-adoption of social innovation by the society is a common phenomenon. It is the communication of positive messages that is an important element to positively influence companies to adopt a social innovation. Our paper described the relationship of marketing communication to innovation adoption. Today's times are full of information, often misinformation, that can influence the adoption or non-adoption of an innovation. It is therefore necessary to implement marketing communication that targets the public in the case of innovations, taking into account that the public itself is made up of several target groups (young to retired). In our case, the marketing communication was targeted at the whole of Slovakia, and was implemented in different environments - billboard campaign, television, press and internet. If we take the Internet, this is of course the communication channel that targets young people. Young people, on the other hand, do not watch television and television news, so this channel was primarily targeted at the middle and older generation. If we look at the results of the campaign that has taken place in Slovakia, we can consider it a success. The 'Z' symbol itself, which stands for deposit return system, was known to only 7% of the Slovak population before the campaign. After the launch of this campaign, the figure rose to 81%. In the context of this paper, we see that marketing communication must be an important part of the changes we want to achieve in social innovation.

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Innovative Strategies to Maximize Customer Loyalty in the Banking System: A Systematic Review

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Abstract: Customer loyalty in financial organizations can be assessed by observing virtual interaction, physical interaction, and service interaction. Loyalty in the banking sector is a consequence of customer convenience, good service received and good image of social responsibility to the environment. For this reason, the aim of the research is to analyze the studies that have been conducted in the scientific literature regarding innovative approaches and strategies of loyalty in the banking system between the years 2018 and 2023. To achieve the collection of information, 4 reliable databases were used: Scopus, Redalyc, Science Directc and Scielo, from which 22 scientific articles with relevant information on the topic were extracted, information systematized by journal, author, databases, year and country is presented. The most used database was Scopus followed by Science Directc and the year where the most was published was 2022, highlighting several publications in the journals Sustainability and Management and Accounting Review. The results show how financial organizations can develop their approaches and strategies to maximize the loyalty of their active customers, which translates into increased market share. It is highlighted that trust and commitment tend to have a positive and significant effect on bank customer loyalty. In conclusion, loyalty in the financial system plays a very important role as it allows them to be active in a competitive market, in addition to creating brand evangelist customers who will recommend the services to others.

Keywords: Financial System, Loyalty, Consumer Loyalty

1. Introduction

Banking and financial system participate with an important role in business and trade, therefore, a good banking financial sector can quickly help with the economic development of a person or a country, showing itself as the central pillar of the economy, gaining the loyalty of the country and customers (Karim and Chowdhury 2021). Since business activities tend to develop effects to the external environment, banks should analyze their business approaches to find and develop different strategies to help meet the sustainability expectations of customers (Leclercq et al., 2022).

At present, banking companies are facing different and increasingly rapid changes, so they must constantly monitor the approaches of their environment and service, thus evaluating the strategies that allow them to improve their social, economic and financial performance, since it has been proven that if banks provide higher quality of service will attract better customer satisfaction and with this the loyalty of their customers (Gonzalez and Carrillo 2022; Leclercq et al., 2022).

In these times of new financial implementations, Cahaya et al. (2023) indicate that loyalty has become an important need that banks have to take into account, which is why this systematic review is carried out in order to understand what has been written in the scientific literature on loyalty approaches and strategies in the banking system between 2018-2023?

The role of banks in the economy requires that companies in the sector adopt a sustainable approach so that the banking system can be seen as a succession of the use of financial products and services and thus be able to build a prosperous and competitive environment (Makudza 2020; Vallejo et al., 2021). Therefore, the need for sustainability has led to the development of various business approaches, being more specific this issue of sustainable loyalty has been seen from three different perspectives (social, technological and organizational), indicating that these perspectives help the development of the fabric economic and social. financial objectives

of the company, for which reason different authors have analyzed various strategies that show a specific loyalty behavior according to each perspective of the approach that the company requires to meet its objectives (Igbudu et al., 2018; Kavitha and Haritha 2018).

In recent years, the banking market has presented very important changes in technology, which has allowed the entry of new financial approaches and the penetration of loyalty strategies that have helped the expansion of traditional banking businesses, attracting customers who were not part of the traditional financial system (Monferrer et al., 2019). However, along with this, new financial agents were added that have had to implement strategies that help them compete with established financial institutions and thanks to the exponential growth of financial technology (Fintech), which today has become a necessary strategy for banks, allowing them to captivate the attention of the public that was not part of the traditional banking system (Cahaya et al., 2023).

Because people have long needed financial assistance in order to achieve their ideas and projects, banking organizations have had to develop strategies in which customers can perceive an ideal financial service and thus be able to achieve their goals, giving customer satisfaction and showing loyalty to the financial banking company (De la Fuente and Diaz 2013). Thanks to this, it has been proven that the customer experience regime is an integral part for the development of customer loyalty and banking business performance, in many countries have implemented digitization in an attempt to provide customers with a better banking experience and a convenient way to manage their transactions, making it a strategy to keep their customers loyal to the brand (Makudza, 2020). While the best financial banking brands have implemented a strategy that integrates branding at the corporate and marketing level linked to their branches, designed to attract customers and build loyalty by allowing interventions related to customer-brand interactions to be present creating familiar behavior and resulting in comfort and direct satisfaction with customers (Monferrer et al., 2019).

The banking financial sector has been much worked at the level of academic research, however authors such as Kamath et al. (2019) state that the topics of the study of customer experience, approaches and loyalty strategies remain unclear, mentioning that there is a scarcity of literature that examines the mediating role of customer experience and loyalty variables, so they suggest exploring in depth the network that allows perceiving the behavior of mediators in the relationship between consumer experiences and loyalty towards the traditional financial organization.

Regarding the systematic reviews found that presented a similarity with our research we have Bisschoff (2020) as he shows in his studies the measurement and management of brand loyalty of bank customers, mentioning that the criteria required by customers to grant their loyalty to a brand are both external and internal. In addition, another systematic review gives us insight into how an internal loyalty strategy of recruiting highly qualified employees in the banking system can result in maximizing customer loyalty to banks (Duc 2022). Finally, Hoang (2018) conducted his systematic review on the factors that affect service quality in retail banking such as poor service, stagnation of the company in the technological field and little interest in providing benefits to its customers, since customers are key pieces for companies to survive and grow, so banks usually set their main focus on customer satisfaction, carrying out internal and external strategies for the recruitment and loyalty of new customers.

With the context presented, the general objective is to determine what has been written in the scientific literature on loyalty approaches and strategies in the banking system between the years 2018-2023. In order to demonstrate the different approaches and strategies of customer loyalty and the fundamental role in the development of the banking system so that entities can maximize customer loyalty and also collect new users. Therefore, the research problem was posed What are the approaches and strategies of customer loyalty in the banking system that has been written in the scientific literature between the years 2018 - 2023?

2. Methodology

The present investigation is composed of a systematic review about the approaches and strategies of loyalty in the banking system between the years 2018 - 2023. According to Moreno et al. (2018) systematic reviews are characterized by having and describing the transparent and understandable elaboration process to collect, select, critically evaluate and summarize all the available evidence regarding the effectiveness of a treatment, diagnosis, prognosis, etc.

For the development of this systematic review, an investigation of articles with topics that are related to our title and that help us determine what are the approaches and strategies of loyalty in the banking system between the years 2018-2023 is carried out?

The databases used in this research were Scopus, Scielo, Redalyc, Science Direct, these are reliable sources that provided more than 100 results per keyword search, finally the scientific literature that was most related to the proposed research problem was chosen. Science Direct is the database that contains information sources for technical and medical research, it has added to 2,500 journals and shares book chapters, likewise we use the Scielo database as it is an online library model that includes a selection of journals very similar to Redalyc because this is a scientific literature platform that focuses on granting studies from Latin America, Ibero-America, Spain and Portugal, while Scopus is considered the most important bibliometric database in the world, it belongs to the prestigious publisher Elsevier and their articles are constantly reassessed in accordance with the quality requirements of the scientific community Likewise, the sources of information used are virtual bibliographies since they add importance to the work and support their theories.

For the development of the information search of the present systematic review, it was collected from different databases with their respective search equations, for example, in Scopus and Scielo, the keywords in English were used (loyalty AND banks AND "social responsibility"), while in Redalyc they were (loyalty AND banks AND strategies) and in Science Direct (Bank" AND "loyalty" AND "Strategy") was used.

In addition, the strategies for the search for information are carried out knowing the search processes and their tools, that is, you must have a clear idea of what you want to search for, related to the research topic, and where you are going to look for it, for this you can help yourself with the keywords and the years of publication. For this selection process of scientific articles, the keywords and the publication dates of 2019-2023 were used, the chosen language is filtered by Spanish and English, in addition to corroborating by reading and selecting these sources of information, a graph in Excel was used , in which a list of the titles of scientific articles, electronic books, journals, language, open access, among others, was generated, in which we also included authors, titles, dates, abstracts, conclusions of the articles referring to the research title , which allowed us to obtain an idea of what each selected article or text was about in order to be able to carry out the inclusion and exclusion process of the articles that were used for this systematic review.

This Excel has the selection criteria of the texts that contribute to the development of our theme, helping us to identify the articles that help us with the development of the systematic review and the results of our Excel respond to the research problem posed and thus be able to develop it. . These criteria were made because it allows us to have summarized and ordered information of the selected articles that are related to our topic and provide us with a greater contribution.

3. Results

For the collection of information for our research, different databases were used, obtaining a total of 10,297 articles, which were discarded one by one according to the convenience of our research, since many were not useful for our research and lacked relevant information for our topic and for the development of our question. The databases consulted were Scopus, Scielo, Redalyc and Science Direct.

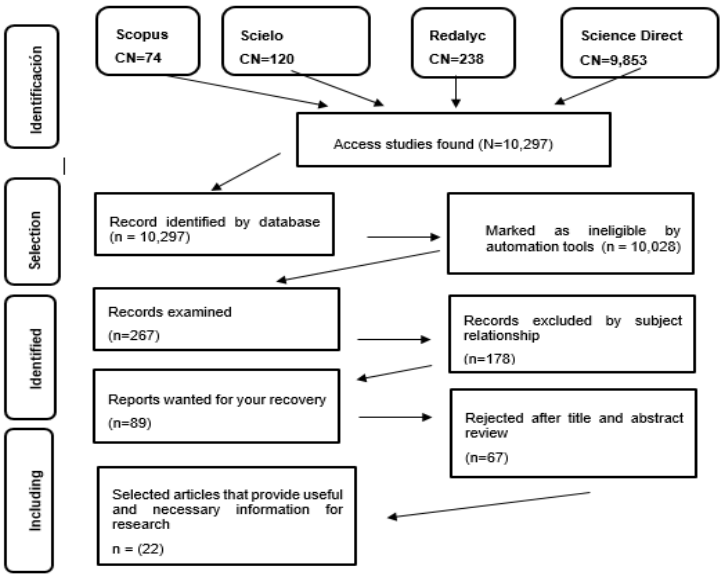

Figure 1: Prism dlowchart gor the study selection process

Table 1: Source of databases used

N°	Title	Journal	Author	Database	Year	Country
1	Revisiones Sistemáticas: definición y nociones básicas. (Systematic reviews: definition and basic notions)	Revista clínica de periodoncia, implantología y rehabilitación oral (Clinical journal of periodontics, implantology and oral rehabilitation)	Moreno, Begoña, Muñoz, Maximiliano, Cuellar, Javier, Domancic, Stefan, & Villanueva, Julio	Scielo	2018	Chile
2	Increasing customer loyalty through customer engagement in the retail banking industry	Spanish Journal of Marketing - ESIC	Monferrer, D., Moliner, M. A., & Estrada, M.	Scopus	2019	Spain
3	Increasing e-loyalty of banking customers through customer trust and commitment	International Journal of Applied Economics, Finance and Accounting	Cahaya, Y. F., Mursitama, T. N., Hamsal, M., & Tjhin, V. U.	Scopus	2023	Indonecia
4	Análisis de los factores determinantes de la calidad percibida del servicio prestado por una cooperativa de ahorro y crédito: una aplicación basada en modelos de ecuaciones estructurales. (Analysis of the determinants of the perceived quality of the service provided by a savings and credit cooperative: an application based on structural equation models)	Revista chilena de ingeniería. (Chilean engineering juornal)	de la Fuente Mella, Hanns, & Díaz Bravo, Isabel.	Scielo	2013	Chile
5	Augmenting customer loyalty through customer experience management in the banking industry. Journal of Asian Business and Economic Studies	Journal of Asian Business and Economic Studies	Makudza, F	Scopus	2020	Zimbabwe
6	A Study on Customer Experience and its Relationship with Repurchase Intention among Telecom Subscribers in Coimbatore District. International Journal of Management Studies	International Journal of Management Studies	Kavitha, S., & Haritha, P.	Redalyc	2018	India
7	Experiencia del cliente, confianza y lealtad de los millennials en el sector bancario de la ciudad de Cuenca-Ecuador. (Customer experience, trust and loyalty of millennials in the banking sector of the city of Cuenca-Ecuador)	Revista de Ciencias de la Administración y Economía. (Journal of Administration Sciences and Economics)	Vallejo-Bojorque, A.P., Cavazos-Arroyo, J., Lagunez-Pérez, M.A., y Vásquez-Herrera, S.E	Redalyc	2021	Ecuador
8	La gestión del recurso humano en la innovación y el desempeño de las Mipymes de Baja California. Un análisis basado en estructuras estructurales. (Human resource management in innovation and performance of Mipymes in Baja California. An analysis based on structural structures)	Revista de economía regional y sectorial. (Regional and sectorial economy juornal)	González Sánchez, RF, & Carrillo, S.	Redalyc	2022	México
9	Effect of corporate social responsibility on consumer satisfaction and consumer loyalty of private banking companies in peru	Sustainability (Switzerland)	Leclercq-Machado, L., Alvarez-Risco, A., Esquerre-Botton, S., Almanza-Cruz, C., de las Mercedes Anderson-Seminario, M., Del-Aguila-Arcentales, S., & Yáñez, J. A	Scopus	2022	Perú

10	Enhancing bank loyalty through sustainable banking practices: The mediating effect of corporate image.	Sustainability	Igbudu, N., Garanti, Z., & Popoola, T.	Scopus	2018	Turkey
11	Sustainable development and customer satisfaction and loyalty in north cyprus: The mediating effect of customer identification.	Sustainability	Ozkan, M., Cek, K., & Eyupoglu, S. Z.	Escopus	2022	Indonecia
12	The Impact Of Corporate Social Responsibility On The Customers' Loyalty In The Jordanian Banking Sector: The Meditating Role Of Customer Satisfaction	Xinan Jiaotong Daxue Xuebao/Journal of Southwest Jiaotong University	Hawamdeh, A. K. A., Padlee, S. F., Alfukaha, F. A., Al-Gasawneh, J. A., & Megdadi, Y.	Scopus	2022	China
13	Antecedents of customer loyalty towards private commercial banks in Bangladesh	Management and Accounting Review	Karim, M. W., & Chowdhury, M. A. M.	Scopus	2021	Bangladesh
14	Corporate social responsibility, electronic word-of-mouth and customer loyalty in Vietnam's banking sector.	Management and Accounting Review	Sang, N. M.	Scopus	2022	Ukraine
15	The relationship of sustainability communication on social media with banking consumers' loyalty through e-WOM	Sustainability	Wei, G., Lin, W., Yanxiong, W., Jingdong, Y., & Musse, S. Y.	Scopus	2021	Switzerland
16	Examining the effect of customers' perception of bank marketing communication on customer loyalty	Scientific African, 8.	Zephaniah, C. O., Ogba, I. E., & Izogo, E. E.	Science Direct	2020	Nigeria
17	Exploring the relationship between customer loyalty and financial performance of banks: Customer open innovation perspective	Journal of Open Innovation: Technology, Market, and Complexity	Rashid, M. H. U., Nurunnabi, M., Rahman, M., & Masud, M. A. K.	Science Direct	2020	Bangladesh
18	Exploring the impact of corporate social responsibility communication through social media on banking customer e-wom and loyalty in times of crisis.	International Journal of Environmental Research and Public Health	Zhang, D., Mahmood, A., Ariza-Montes, A., Vega-Muñoz, A., Ahmad, N., Han, H., & Sial, M. S.	Scopus	2021	Switzerland
19	Building customer loyalty in retail banking: a serial-mediation approach	International Journal of Bank Marketing	Kamath, P.R., Pai, Y.P., & Prabhu, N.K.P.	Science Diret	2019	India
20	Measuring and managing brand loyalty of banks' clients. *Banks and Bank Systems*	Banks and Bank Systems	Bisschoff, C. (2020)	Scopus	2020	Ukraine
21	Employee engagement in finance - banking organizations in vietnam: a meta-case approach	International Journal of Professional Business Review	Duc, P. M.	Scopus	2022	Vietnam
22	Factors affecting service quality at vietnamese retail banks.	Bancos y Sistema Bancario	Hoang, T. P.	Scopus	2018	Ukraine

Note: We can observe the 22 articles selected for the research, the database from which the article was extracted, the authors, the subject, the years and the countries of each article.

Likewise, for the selection of the articles that will contribute to the research, a range of years was determined between 2013 and 2023. The following image shows the years of the articles selected to develop the research, in which a greater participation in the research can be observed. the year 2022 with 6 articles, followed by the years 2018, 2020 and 2021 with 4 articles each, while in the year 2019 we worked with 2 articles and finally in the years 2013 and 2023 with 1 article per year.

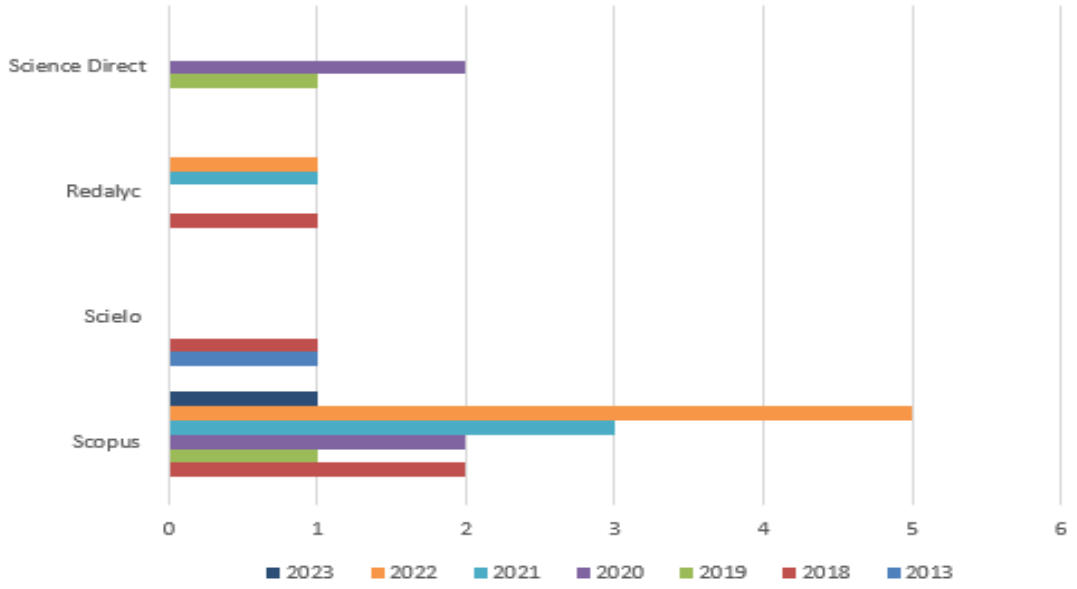

Figure 2: Analysis according to the year of publication of the data according to articles

Likewise, the selected articles belong to scientific research developed in different countries. Next, we can observe the percentages per country according to the selected articles, which are represented by the number of articles used per country, where Ukraine has the highest proportion of articles with 3 articles used, followed by Indonesia, Chile, India, Bangladesh and Switzerland with 2 articles per country, finally, in countries such as Turkey, Spain, Zimbabwe, Ecuador, Peru, Mexico, China, Vietnam and Nigeria, only 1 article per country was collected.

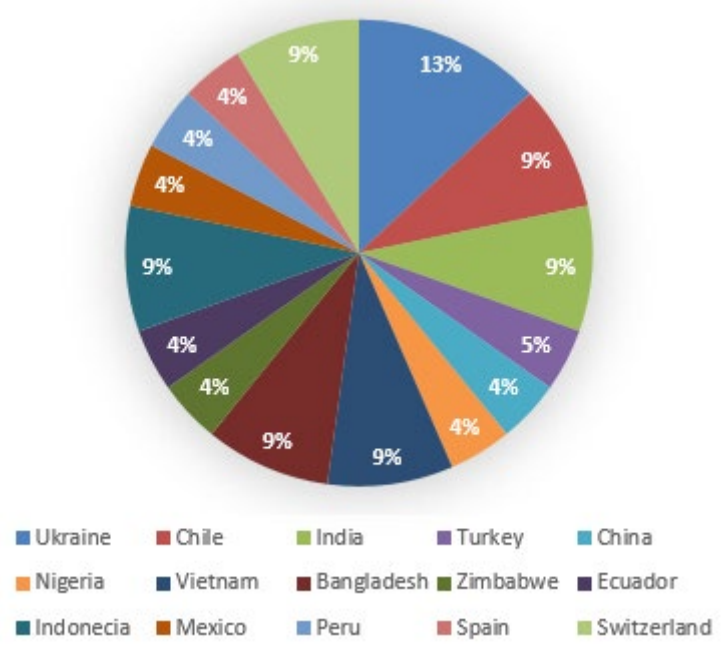

Figure 3: Number of articles consulted by country

The article selection process was carried out with the keywords based on the research question: banking system, loyalty, strategies. Thus, in the databases it is possible to obtain the articles related to our research that will help to solve the question later on. Next, the analysis of the scientific articles that were used for the development of our research according to the different databases will be presented. data used. Which were the following: Scopus; 63.64%, Scielo; 9.09%, Redalyc: 13.64% and Science Direct; 13.64%.

Table 2: Total articles used according to the database

Artículos	Cantidad	Porcentaje
Scopus	14	63.54%
Scielo	2	9.09%
Redalyc	3	13.64%
Science Direct	3	13.64%
Total	22	100%

Note: This table shows the number of articles used according to the databases.

4. Discussion

For this research, 22 scientific articles carried out between 2018 and 2023 were obtained, these articles were selected because they added important value and relevant information for the research. In addition to carrying out a classification of the articles and thus the objective of identifying which of these articles are directly linked to the research topic was achieved.

The search in the scientific literature gave us as a result authors that show in their studies different points of view about the banking system and the different loyalty strategies according to their research questions, helping us to find different approaches and strategies that banks should perform in order to achieve the maximization of loyalty in the banking system, managing to answer our research question based on the theory of the authors. However, we found some uncertain points such as the issue of the study of customer experience as loyalty strategies, since there is a scarcity of literature examining the role of the mediator of customer experience variables and loyalty.

In this systematic research it can be evidenced that the authors show their point of view according to the studies they conducted understanding the different opinions of the scientific literature, in that sense Ozkan et al. (2020); Kamath and Chowdhury (2019) and Igbudu et al. (2018) mention that to observe customer loyalty and loyalty it is not necessary to implement CSR as a strategy to achieve maximizing customer loyalty, since the benefits are not very precise when examining the study of their approach and this mentions that the best strategic method is to provide quality service and thus be able to meet the needs and improve customer satisfaction. This does not agree with what is described by Hawadeh et al. (2022); Hoang (2018) and Bisschoff (2020), since in their research they show three stages of CSR that have a substantial impact on customer loyalty, stating that these approaches can be used as a strategy to be able to obtain customer loyalty, however these authors agree that customer loyalty behavior comes from the good quality of service by banks, being this accompanied with the capabilities of staff in providing good service, as a result the satisfaction and preference of bank customers is accelerated. Therefore, Karim and Chowdhury (2021); Moreno et al. (2018) and Gonzales and Carrillo (2022) agree with these clarifications and in their research recommend that banks should train their staff with strategies that help to satisfy customer needs.

On the other hand, Sang (2022); De la Fuente and Diaz (2013); Vallejo et al. (2021) and Makudza (2020) show in their research how strategies are applied to help banks promote customer loyalty, including the mandatory implementation of CSR and eWOM, which allows users to analyze the activities carried out by banks and thus feel identified with the brand. In this regard, authors such as Wei et al. (2021) and Leclercq et al. (2022) agree with the above and add in their results that technology has been a favorable asset for the banking system, using it in marketing strategies, filling social networks and websites with information on the CSR carried out by banks and added to the eWOM strategy so that customers can recognize and feel identified with the brand, resulting in the loyalty of financial customers as well as the attraction of new users who feel familiar and identified with the CSR carried out by banks.

Finally, Zephaniah et al. (2020) and Monferrer et al. (2019) mention in their research that to achieve customer loyalty, banks are obliged to satisfy their needs, familiarize them with the brand and make them feel identified with them, so in their findings they present advertising as the best method of customer acquisition and loyalty, hand in hand with personal selling, direct dealings with customers and promotions aimed at developing customer needs. In that sense Roshid et al. (2020) and Kavitha and Haritha (2018) agree that the use of incentives to attract customers is a necessary strategy for attracting new users, but insufficient to generate customer

loyalty. Banks should focus more on advertising strategies, CSR and individualized customer care and follow-up activities (Zhang et al.,2021; Duc 2022 and Cahava et al., 2023).

In this systematic review, the relationship between the approaches and the different strategies used by banks to achieve customer loyalty at the time of requesting a banking service, choosing a financial banking institution more familiar with their needs, preferences and comfort at the time of performing their operations, is evidenced.

5. Conclusion

In conclusion, the purpose of this project is to show the approaches and strategies for customer loyalty in the banking system. It entails that banks have the obligation to direct their approaches with the commitment to build customer loyalty, implementing different strategies of satisfaction and conviction, making users feel identified with the brand, with greater confidence and comfort when performing any financial transaction within the company, since it plays a very important role in the financial market, This is thanks to different loyalty strategies such as eWOM, corporate social responsibilities, branding at corporate and marketing level, word of mouth among customers, computer digitalization, staff excellence, incentive programs for referred customers, among others, which make loyalty a positive and significant response from customers.

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Exploring Drivers and Barriers, Failure and Resilience, Success Factors and Strategies in Firms' Internationalisation: Literature Review and Research Agenda

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Abstract: The literature that studies firms' internationalisation has become very extensive and fragmented, taking different approaches and contributing across diverse facets of internationalisation. Therefore, there is a need to analyse and systematise those issues that received increasing attention in the international business field. Accordingly, this study aims to develop a systematic literature review on the internalisation process. We correspondingly make resources to the *Web of Science* database and analyse a total of 270 articles, spanning the period from 1996 to 2022, to identify the core issues and contributions made by the existing literature. The results enable the categorisation of the extant research into five main areas: (i) successful internationalisation, (ii) internationalisation strategies, (iii) failure and resilience, (iv) drivers and stimuli, and (v) barriers and obstacles. This structuring then established the grounds for grasping the gaps existing in the literature and to propose future research agenda.

Keywords: Internationalisation; Business; Systematic Review; Bibliometric Analysis; Bibliographical Coupling.

1. Introduction

Internationalisation has emerged as an increasingly topical issue, attracting great interest across the scientific community, which explains the exponential rise in publications in recent decades (Morais and Ferreira, 2020; Sousa *et al.*, 2021). Prashantham (2008) states that internationalisation reduces market risks, making the knowledge acquisition process more efficient. However, although its advantages, firms pursuing the path of internationalisation face several challenges that can hinder or delay this process (Katsikeas and Morgan, 1994).

Previous studies have identified several factors determining the companies' internationalisation. For instance, firm structure, strategy, entrepreneurial and market orientations, human resource capabilities, social network, trust, and environmental exigencies have been shown to play a key role in the internationalisation process (Chaston and Sadler-Smith, 2012; Mendy and Rahman, 2019). Moreover, the state-of-the-art literature does feature high-quality research on internationalisation (Eduardsen and Marinova, 2020) and, for example, about small and medium-sized enterprises (SMEs) internationalisation (Morais and Ferreira, 2020) or family business internationalisation (Debellis *et al.*, 2021).

However, the diversity of literature generates the need for the systematisation of the field's domain. There is a deficit in the literature studying the firms' internationalisation that clarifies the main barriers and stimuli, failure, and resilience in the processes of internationalisation (Martins *et al.*, 2021). Thus, there is a need to analyse, synthesise, and report on the main themes undergoing research and identify preponderant areas to develop a knowledge map for company internationalisation processes.

The application of a Systematic Literature Review (SLR) approach ensures the production of a framework allowing for a deeper analysis of the literature by adopting a transparent scientific process susceptible to replication by other researchers (Denyer and Tranfield, 2009). Hence, this study aims to systematise and analyse the literature detailing the internationalisation process over the last 26 years (1996 – 2022), setting out a review based on the bibliometric mapping techniques of 270 articles collected from Web of Science, and building a framework on VOSviewer that exemplifies the internationalisation process classified in five clusters. Adopting

this view, we intend to shed light on these pressing questions: *(1) What internationalisation-related topics and subjects have been studied?; (2) Where should we draw attention to?*

Our SLR is structured as follows. First, we present the review methodology, including the search strategy and the procedures used to summarise existing research. Second, we present the results of the literature analysis, including a thematic mapping. The purpose of this part is to explore themes and sub-themes on the topic to provide a systematic accumulation, analysis, and reflective interpretation of the extant body of literature. Then, we discuss the different themes by identifying the research foci and summarising key findings. Third, building upon the synthesis of previous studies, we highlight important gaps and propose avenues for future research. Finally, we conclude by summarising key contributions and discussing the main limitations and opportunities for further reviews.

2. Methodology

Following the procedures outlined by Denyer and Tranfield (2009), this SLR consists of four phases. The *first phase* involves formulating the research questions that will guide the analysis. The research questions specified in the introduction represent the starting point for the SLR. The *second phase* involves collecting the articles for inclusion in the systematic review; in our case, we resorted to the Web of Science database. The choice of the database stems from the predominance of peer-reviewed journals of high relevance to the topic of internationalisation (Jones *et al.*, 2011), which underpins confidence in the results presented. The search took place during February 2023 and deployed the following keywords "internationali* strategy", "re-internationali*", and "de-internationali*".

Following this selection phase, we carefully analysed the records that make up the study with the most relevant information stored to identify the goals of the respective studies and their methodologies, key findings, and contributions. This method allowed us to cross-check the information obtained with other articles, systematise, and thematically categorise them. The VOSviewer software was then used to illustrate, visualise, and build a scientific map based on citation data and keywords (Cobo *et al.,* 2011).

The *third phase* defined the criteria for validating the inclusion or exclusion of the articles by analysing the contribution made to the study of the internationalisation process and considering how the incidence of studies on this topic gained greater acuteness at the beginning of this century. We extracted only articles and reviews. Books, book chapters, reports, and conference papers were excluded from the database due to their variability in the review process (Jones *et al.*, 2011). Furthermore, we only considered the research conducted in the fields of Business, Business Finance, Development Studies, Economics, Engineering Industrial, International Relations, Management, Operations Research Management Science, and Social Sciences Interdisciplinary.

EndNote and Mendeley's citation management software served to store the articles before proceeding with reading the abstracts to ensure their relevance to the study. A more careful analysis was then conducted resulting in a final sample that totals 270 articles, including empirical studies (quantitative and qualitative), conceptual, and/or theoretical articles eligible for review. Finally, the *fourth phase* formally sets out the results obtained and discusses the findings within the scope of the research, thereby identifying the existing gaps and proposing a future research agenda.

3. Analysis of Results

3.1 Descriptive Data

This SLR displays a significant increase in citations from the beginning of the century through 2022 (Figure 1). From 1996 until 2022, there are few annual variations in the number of articles, with its peak occurring in 2020 with 32 articles published. The article "Emerging Multinationals from mid-range economies: The Influence of Institutions and factor markets", by Hoskisson *et al.* (2013), was the most cited article, with 462 citations.

3.2 Network and Cluster Analyses

The network analysis performed in this research applied the VOSviewer software, a tool that performs bibliometric analysis of the data sourced from the Web of Science database by producing map-based representations. Figure 2 displays the analysis of the co-occurrence of all keywords and summarises the selection process with eight or more co-occurrence, comprising a final sample of 74 keywords.

The bibliographic coupling of the unit of analysis of documents serves to assess collaboration trends, allowing researchers and leading organisations to be identified (Fonseca *et al.*, 2016). Figure 3 summarises the selection process of authors with four or more citations, comprising a final sample of 166 articles in five clusters.

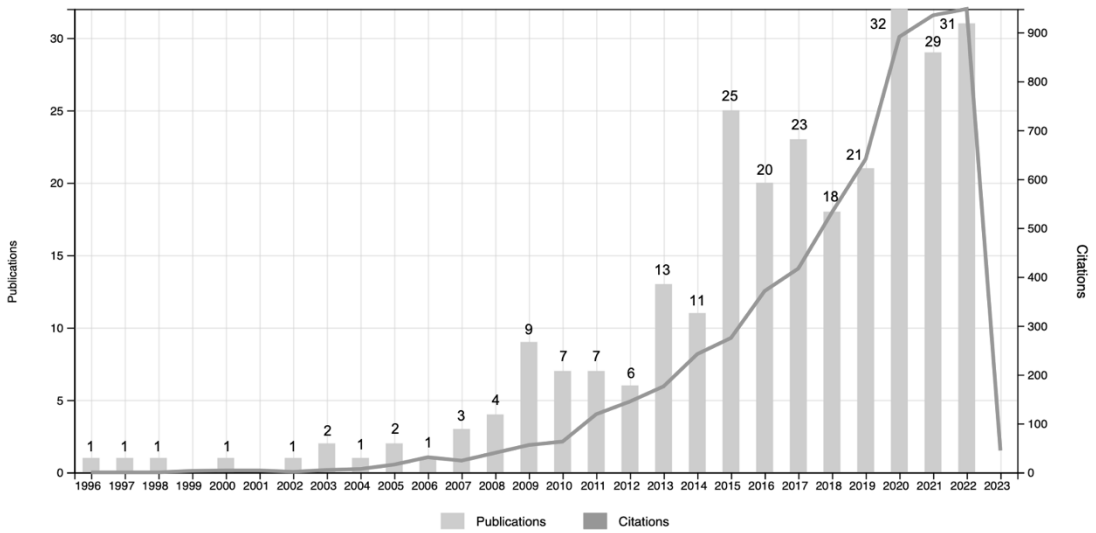

Figure 1: Evolution of the number of articles and citations

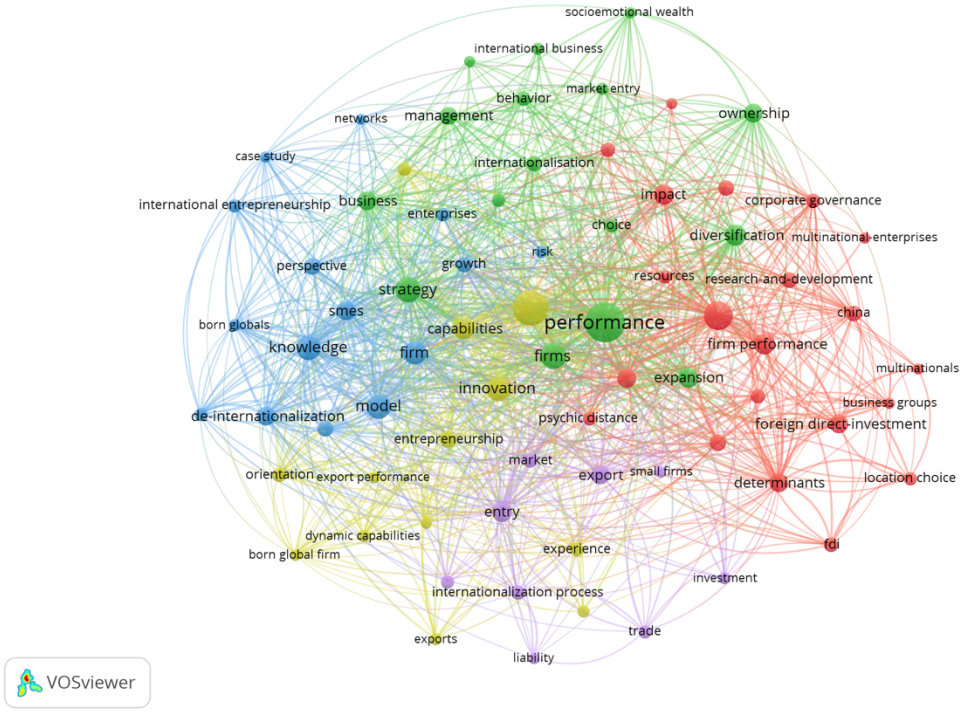

Figure 2: A network analysis of the co-occurrence of keywords

3.2.1 Cluster 1: Successful internationalisation (n = 41 articles)

Cluster 1, depicted in red (Figure 3), focuses on the firm's survival and on strengthening internationalisation processes focused on either exports and/or entering new markets. The research conducted by Eduardsen and Marinova (2020) highlights the impacts and implications associated with risk within the framework of enterprises embracing the internationalisation path, and hence, how companies seeking to engage in such processes encounter internal and external obstacles. These internal barriers are linked to a lack of resources (Fernández and Nieto, 2005), and the scarcity of the same resources for crucial activities, such as innovation (Sui and Baum, 2014) and research (Giuffrida *et al.*, 2017).

Although these constraints, Shi *et al.* (2019) emphasises how internationalisation plays an important role in the firm's strategic processes, with Hilmersson (2014) showing the positive effects of internationalisation on performance. Following a distinctive line of research, Bergamaschi *et al.* (2021) also called attention to the interplay between internationalisation and digitalisation (IDI) concluding that: (i) IDI influences intraorganisational and interorganisational aspects, (ii) digitalisation affects the balance between perceived risk and returns in internationalisation, and (iii) digital advances and available internationalisation channel alternative have an impact on IDI.

Using the socioemotional wealth perspective, Cirillo *et al.* (2022) explore the contingency effect of sales internationalisation strategy on the relationship between family firms' status and employee downsizing. They concluded that sales internationalisation strategy affects the link between family firm status-downsizing likelihood in a way that an advanced sales internationalisation strategy (i.e., higher export intensity, higher global focus, and direct export mode) decreases the negative propensity of family firms to downsize, while a less advanced sales internationalisation strategy (i.e., lower export intensity, lower global focus, and indirect export mode) increases the negative propensity of family firms to downsize.

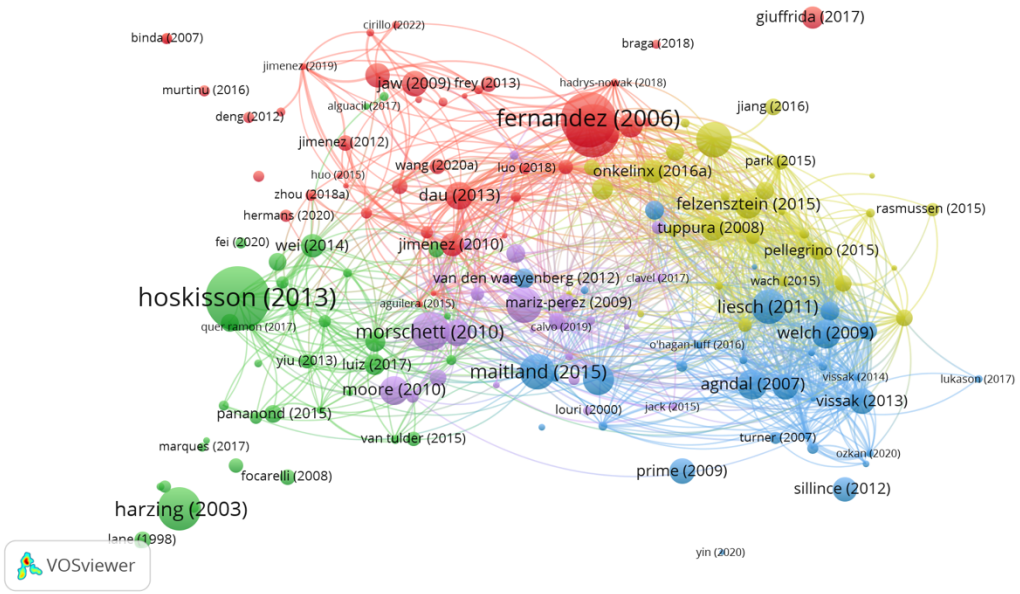

Figure 3: A network analysis of bibliographic coupling by documents

3.2.2 Cluster 2: Internationalisation strategies (n = 36 articles)

Figure 3 details Cluster 2 in green and brings together 36 articles that analyse internationalisation strategies within the scope of enhancing standards of company performance, through emphasising the scope of globalisation, on occasion targeting emerging markets and economies, and thereby seeking to engage in foreign direct investment (FDI). This cluster essentially covers those studies investigating market selection and entry modes, and their interlinked pathways related to internationalisation models and firms' international expansion.

The internationalisation strategies began to take on greater importance in the 1990s (Lane, 1998) with the first study produced by O'Neill (1996). In this regard, the research by Alguacil *et al.* (2017) conveys the differences between exporting firms and those making resources to FDI. Echoing similar thoughts, Boehe (2016) states that with the scarcity of resources, companies need to engage in FDI to acquire intangible resources in international markets. Calia and Ferrante (2013) also showed that the characteristics of firms influence their choice regarding the internationalisation pattern, with Marques *et al.* (2017) analysing how enterprises located in emerging economies strive to enter developed markets with a strategy for diversification able to minimise the firm's exposure to risk (Luiz *et al.*, 2017).

In light of the above, Apaydin *et al.* (2020) investigate how informal social networks can assist multinational firms in their internationalisation strategy. These authors propose a refinement of the Uppsala internationalisation model grounded in the network theory, by developing an intermediate position between an "insider" and an "outsider" for conditions when the transformation of an outsider into an insider is limited by

institutional constraints. The intermediary position represents one of the sides of "patron-client" informal networks allowing to mitigate the liability of outsiders.

From another point of view, Bertrand *et al.* (2019) contribute to an improved understanding of the effects of subnational regional corruption on the external growth strategies of emerging economy firms. They find four mechanisms through which a corrupt regional home context can affect firms' acquisition behaviors: (i) corrosive deal deterrence, (ii) deal facilitation, (iii) corruption escape into less corrupt contexts, and (iv) enhanced corruption ability to acquire in similarly corrupt environments.

3.2.3 Cluster 3: Failure and resilience (n = 33 articles)

The blue-colored Cluster 3 (Figure 3) approaches the development of international entrepreneurial initiatives that particularly emphasise the phenomena surrounding de-internationalisation and re-internationalisation. De-internationalisation can be defined as the total or partial withdrawal from foreign markets (Welch and Welch, 2009), therefore, leaving or cutting operations in one or more countries and changing how firms enter and engage with these markets (Johanson and Vahlne, 2009). The reasons for companies undertake de-internationalisation include changes in the external environment (Swoboda *et al.,* 2011), competition (Javalgi and Todd, 2011), and changes in international commitments (Welch and Welch, 2009). The increasing levels of uncertainty can also result in the firms' de-internationalisation (Liesch *et al.*, 2011) because not all decision-makers are ready for international expansion (Vissak *et al*., 2020).

However, de-internationalisation does not always represent failure and may emerge as a strategic option (Benito, 2005) and a logically made decision when assessing small international markets with low exit costs. In this case, decision-makers accumulate limited knowledge about the main export countries and learn from market penetration experiences to improve firms' capabilities (Gray and McNaughton, 2010; Vissak and Francioni, 2020); after an initial step backward, they continue their learning and growth processes, moving from de-internationalisation to re-internationalisation (Hallbäck and Gabrielsson, 2013).

Re-internationalisation, therefore, involves a period of international business activity followed by an interregnum of operations for a certain period until there is again an international re-entry process leading to the successful renewal of foreign operations (Welch and Welch, 2009). This process embraces learning, positive behavior toward re-internationalisation, and the capacity for resilience when confronted with some barriers that were not initially overcome. At this level, firms can choose to re-engage in internationalisation activities by assuming new network relationships (Hadjikhani, 1997), including different resources and capabilities (Javalgi and Todd, 2011), and diverging from previously established strategies (Jones *et al.,* 2011).

In this regard, Kuiken *et al.* (2020) show how different commitment profiles influence the de-internationalisation process. A general commitment profile, in which affective, normative, instrumental, and continuance commitment play a role, influences the timing of de-internationalisation, while the effort directed toward the execution of de-internationalisation is mainly influenced by the normative commitment and the extent of de-internationalisation mostly by instrumental commitment.

On the other hand, Yu *et al*. (2022) identify two types of digital transformation, operational and strategic, influencing the decision to re-internationalise. The complexity of digital transformation in re-internationalisation is delineated by the intricate tensions between strategic digital transformation and new product development. The authors also conclude that firm re-internationalisation performance can plausibly be differentiated by how these tensions are managed.

3.2.4. Cluster 4: Drivers and stimuli (n = 30 articles)

This cluster, portrayed in yellow (Figure 3), approaches the main reasons that lead companies to choose the path of internationalisation, aiming to increase productivity, economic growth, and economies of scale. As Morschett et al. (2010) highlight, the choice of how to enter a specific international market represents a key factor in defining a firm's internationalisation strategy.

The Bianchi *et al.* (2017) study establishes that the recognition of opportunities and the portfolio of international networks influence the relationship between business orientation and international performance in emerging market firms. Although collaboration-based strategies are susceptible to improving performance (Eisend and Schmidt, 2014), the concrete connections between the strategic and network positioning within the scope of internationalisation can have the opposite effect (Winch, 2014).

Echoing similar thoughts, Onkelinx *et al.* (2016) demonstrate how internationalisation may compensate when the human capital aligns and achieves harmony with the strategy, which is also a key driver in the research of Jensen and Petersen (2014) that highlights the importance of a solid and wide-reaching structure for the internationalisation of service firms. The global niche strategy (i.e., the creation of markets, the focus on global customers, and the control of technology) also emerges as a successful path to deal with uncertainty in smaller firms' internationalisation (Magnani and Zucchella, 2019).

3.2.5. Cluster 5: Barriers and obstacles (n = 26 articles)

The purple cluster contains the lowest number of publications (Figure 3) and focuses on the internal and external barriers to the internationalisation process. Hendriks *et al.* (2018) show how decision-makers fear that expanding into foreign markets may bring financial ruin. In a similar vein, Yan *et al.* (2020) demonstrate that the absence of government interventions and political changes may reduce the firms' willingness to go abroad.

Conversely, Hermans and Borda Reyes (2020) emphasise serious shortcomings in the internationalisation process, particularly, the role of capital markets, low levels of competition, and government intention. Their study explains how these characteristics shape the definition of value and presents how firm strategies can capture value in international markets. Wang *et al.* (2020) also conclude that, in periods of weak economic growth, Chinese firms explore the global market to generate more robust financial returns even while the criterion of geographic distance represents an influential factor to these companies (Schotter and Beamish, 2013).

Although these barriers, innovation processes provide excellent opportunities for companies focusing on the "green economy" to be competitive during their internationalisation processes (Frey *et al.*, 2013). The research findings put forward by Deng *et al.* (2012) also demonstrate that the propensity to deploy diversification allows one to achieve a broader knowledge about foreign markets.

3.3 Key Insights

Bearing in mind answering our first research question – *What internationalisation-related topics and subjects have been studied?* – the main findings of this review are summarised below (Table 1).

Table 1: Summary of main findings

Cluster	Thematic Area	Sub-Thematic Area	Key Findings
1	Successful internationalisation	Antecedents	Decision-makers and digital transformation play a relevant role on successful internationalisation.
		Outcomes	Successful internationalisation enhances firm performance and improves the chances of survival.
2	Internationalisation strategies	Market selection	The characteristics of the firms influence their choice regarding internationalisation patterns.
		Entry modes	Internationalisation through exports or FDI depends on resource availability and targeted markets.
3	Failure and resilience	De-internationalisation	International markets volatility, competitive intensity, and increasing levels of uncertainty are the main reasons to de-internationalise.
		Re-internationalisation	Assuming new network relationships, including different resources and capabilities, and diverging from previously established strategies allows firms to re-internationalise.
4	Drivers and stimuli	Internal	Firms' human capital and their strategy (niche) arise as relevant drivers of internationalisation.
		External	Competitive advantages are contingent on the portfolio of international networks.
5	Barriers and obstacles	Internal	The lack of financial resources arises as the main internal barrier to internationalisation.

Cluster	Thematic Area	Sub-Thematic Area	Key Findings
		External	The absence of government support is highlighted as the main external barrier to internationalisation.

4. Reflections and Avenues for Future Research

The main areas of research identified in the five clusters enable the development of a framework to analyse and understand the firms' internationalisation process (Figure 4).

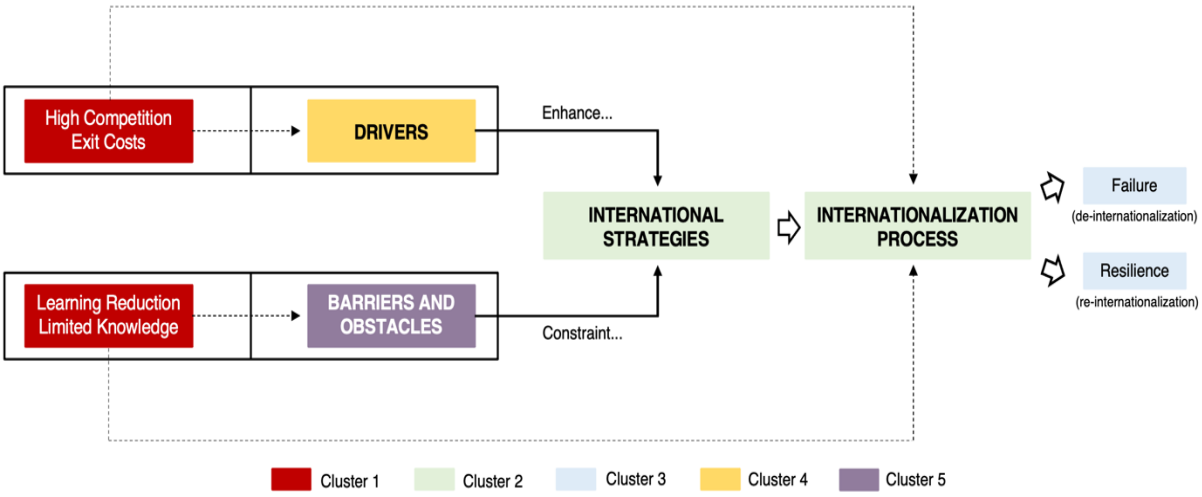

Figure 4: Knowledge map for the firms' internationalisation process

This SLR represents an attempt to understand the path of internationalisation, allowing us to conclude that international strategies are cross-cutting areas to all the preponderant themes of internationalisation, reflected by the careful attention given by researchers in those areas. Accordingly, the SLR results identify several lines of research for each cluster, which allows us to answer the second research question that has been posed – *Where should we draw attention to?* (Table 2).

Table 2: Proposed topics for future research

Cluster	Thematic area	Proposed topic	Potential avenues for further research
1	Successful internationalisation	• The role of managers, entrepreneurs, and decision-makers in the internationalisation process. • The link between e-commerce and successful internationalisation.	*RQ 1.1. How do managers perceive the impacts and implications associated with the risks of internationalisation?* *RQ 1.2. How can international markets be used to ensure firms' survival?* *RQ 1.3. How enterprises use e-commerce to explore new opportunities and ensure successful internationalisation?*
2	Internationalisation strategies	• The influence of the home-country in international market selection and entry mode choices.	*RQ 2.1. What are the main challenges companies face when involving with multiple international markets?* *RQ 2.2. How do higher education institutions and technology centres in the country of origin, with a view of technology transfer and industrial property, support the firms' internationalisation?*

Cluster	Thematic area	Proposed topic	Potential avenues for further research
3	Failure and resilience	• The factors that enable or inhibit commitment on failure and resilience.	*RQ 3.1. What are the reasons for the reduced success on the implementation of international projects?* *RQ 3.2. How the home-country affects de-internationalisation and re-internationalisation processes?* *RQ 3.3. When pursuing the path of re-internationalisation, do firms choose the same external markets or do they opt for other markets? Why?*
4	Drivers and stimuli	• The competitive advantage depending on internal and external factors.	*RQ 4.1. How does the public sector can support firms re-engaging with internationalisation?* *RQ 4.2. What are the main challenges faced by firms following the re-internationalisation path?*
5	Barriers and obstacles	• The mechanisms through which firms can overcome their internal and external barriers in the internationalisation process.	*RQ 5.1. What are insurmountable barriers that force firms to de-internationalise? How can firms learn to manage them?* *RQ 5.2. How the negative international experiences influence the re-internationalisation path?*

5. Conclusion

Our study aimed to update this field of research by identifying the main current issues related to the internationalisation process and by developing a framework that can serve as a reference for researchers, academics, and managers better understand how firms behave when expanding abroad. The analysis of the articles allowed us to identify five clusters, which concentrate on the main issues discussed in the firms' internationalisation field – successful internationalisation, internationalisation strategies, failure/resilience, drivers/stimuli, and barriers/obstacles – among which there is a clear interdependence of issues.

This SLR contributes to theory development by allowing us to understand the scope of future studies in this subject area and potential gaps. It also helped to explain how internationalisation strategies allow to implementation and nurture of good international business practices to anticipate opportunities for sustainable growth and increase firms' competitiveness, whether by diversifying their target markets, intensifying their presence in existing ones, and/or gaining the trust of new customers. Moreover, our findings emphasised the "market" variable during the re-internationalisation process, coupled with the learning and entrepreneurial orientations of decision-makers and their ability to offset any shortcomings in this process.

As practical implications, this SLR reveals several opportunities for firms to feel encouraged in engaging with international markets within a perspective of increased sales, increased customer portfolios, prospects of improving results/profits and strengthening competitive advantage. Furthermore, our review allows company managers that have not yet expanded into foreign markets to ascertain which factors they should consider when embracing the internationalisation path, especially in terms of international strategies (market selection and entry modes), the barriers faced, and the impact of de-internationalisation and re-internationalisation on their levels of performance.

Despite the above findings comprise important contributions, this study was not exempt from limitations. First, the results and conclusions result from the database constituting the review – Web of Science – and require interpretation only in that context. Future studies can use other databases (e.g., EBSCO, Google Scholar, and Scopus) to increase the scope of this analysis and obtain further insights. Second, while systematic reviews adhere to rigorous scientific methods, the data collection process holds a certain level of publication bias (Kepes *et al.*, 2012) as we have focused on articles and reviews published in peer-reviewed journals, excluding relevant research that can be published in books or conference proceedings. Finally, although this literature review may

not be fully comprehensive, it provides new insights that complement the knowledge generated by previous studies and helps to stimulate future research in the scientific community.

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Minority Entrepreneurship in Switzerland: The Challenges and Needs of Brazilian Women Entrepreneurs

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Abstract: The number of Brazilian citizens in Switzerland has risen significantly over the past decades by factor 24 compared to the total foreign population, which grew by factor 2.5. As with many migrant groups, integration into the labour market is difficult. This can lead to a higher number of people choosing to start their own business. Brazilians in their home country are more entrepreneurial than Swiss people and among Brazilian women, 17.3% are entrepreneurially active. This can partly be explained with less options on the labour market – a challenge that Brazilian women also experience in Switzerland. Therefore, entrepreneurship also became a viable career option abroad. Little is known about neither the businesses, the challenges, and the needs of female Brazilian entrepreneurs, nor of female entrepreneurs of other minority groups. This paper looked at these points to find out how they can be supported best to enhance their businesses. The findings will be of use for entrepreneurs themselves, as well as for supporting organisations to adapt their offerings. To get the required insights, we took a quantitative approach and surveyed 54 Brazilian women in Switzerland with an online questionnaire. The participants were members of a Brazilian women business club. The results were analysed using SPSS. The entrepreneurs came to Switzerland mainly for love and family reasons. The businesses are small, mainly targeting the Brazilian community and only a small minority can sustain themselves from their self-employment alone. While the financial success is rather low, the personal satisfaction of having a business is very high. The biggest challenges are finding customers, where also the biggest need for support is. The results show that the support structures are not accessible enough for founders from minority groups and that offerings need to be adjusted to have a broader reach.

Keywords: Entrepreneurship, Minority Entrepreneurship, Migrant Entrepreneurship, Female Entrepreneurship

1. Introduction

Research on minority entrepreneurship has grown in importance over the past 15 years (Mazzarol, 2021). Entrepreneurs from minority groups make an important contribution to a country's economy, above all by creating jobs and generating economic activity in underserved communities (Sithas & Surangi, 2021). However, there is only limited availability of support programmes targeted at minority entrepreneurs. The term minority entrepreneurs is ambiguous, as there are different possible categories for distinguishing minorities, such as groups of migrants, religious or ethnic minorities.

Switzerland has traditionally had a high share of foreigners, which is one of the possible minority groups in a country. In 2021, there were 2,24 million foreigners in Switzerland, which is an increase of 240% compared to 1980. Over the same period, the total population only grew by 38%. There are a few groups that stand out with strong increases, often due to humanitarian crises. One that stands out without a humanitarian crisis is the number of Brazilians, which increased by a factor of 24 to 22'944 people (Federal Statistical Office, 2022a).

Brazil has a higher number of entrepreneurs than Switzerland (GEM, 2023) and in many countries, minority groups have a higher proportion of entrepreneurs than non-minority groups (OECD/European Union 2015; Lam et al., 2019; Sithas & Surangi, 2021). However, this is not the case in Switzerland. Looking at migrant groups as minority, they have a lower number of self-employed than the native Swiss (Federal Statistical Office, 2021). This raises the question, why the number is lower in Switzerland. By looking at one subsection of minority entrepreneurs, female Brazilian entrepreneurs, we aim to gain insights in a so far under-researched population. We answer three main research questions: Who are the female Brazilian founders? What are their motivations? What are their challenges?

The paper is further divided into five sections. A literature review shows the state of research on minority entrepreneurship focusing on our research questions. After, the data collection and analysis are described. In the following results section, the findings are presented, which are discussed in section 5. The paper concludes with implications, limitations, and future research opportunities.

2. Literature Review

2.1 Minority Entrepreneurship

There is still a lack of agreement on the term minority entrepreneurship, as different countries, organisations, and scholars include different minority groups. For example, research in the USA focuses on ethnic groups as minorities (Dana & Vorobeva, 2021). Alternatively, the term has also been used to describe younger or older groups of entrepreneurs, female business owners, disabled people, or members of LGBTQIA+ (Mazzarol, 2021). To allow a broad view on the topic, this paper defines minority entrepreneurship as the process of beginning and running a business by people who identify as members of minority groups—such as racial, ethnic, cultural, or religious minorities.

2.2 Female migrant entrepreneurship

One focus within minority entrepreneurship has been on the subfield of female immigrant entrepreneurship (Chreim et al., 2018). While migrants are generally regarded as minority, the situation is less clear for women. The distribution of men and women are close to equal in most societies around the world; however, the number of men who become self-employed is much higher in most countries (GEM, 2022; GEM, 2023). Women are therefore by some researchers to be a minority. The lower proportion of women can partly be attributed to social norms and traditions in different ethnic groups (Kwong et al., 2009).

Research on female entrepreneurship in Switzerland has shown that the similarities between male and female founders are greater than their differences (Meyer et al., 2021). Unique about female migrant entrepreneurs is that they rely heavily on and use their networks. They have strong ties to their identity, their community and their families and use the resources these networks provide (Piperopoulos, 2012; Sithas & Surangi, 2021).

For this study, we can define a female migrant entrepreneur as a woman who "has moved across an international border or within a state away from his/her habitual place of residence" starting a business (UN, 2022).

2.2.1 Motivations of female migrant entrepreneurs

General statements about the motivations of female migrant entrepreneurs are difficult to make, as they can vary greatly between different migrant groups and generations. For example, Vietnamese and Chinese immigrants into the US were more likely to be opportunity entrepreneurs, responding to pull factors, whereas Koreans or Latinas chose self-employment out of necessity, respectively push factors (Peare, 2005). Soydas & Aleti (2015) analysed Turkish migrant entrepreneurs in Australia and found that for first generation migrants earning money is the main motivation and they are more reliant on the ethnic community; the second generation, in contrast, seeks opportunities more and opens to the whole society. Thus, it is important to keep in mind that the national origin and the community they live in abroad influence their motivations for starting a business (Pearce, 2005).

One of the motivations for female migrant entrepreneurs are the often-unfavourable circumstances in which they live. This can be the non-acceptance of degrees from their home countries, discrimination in the labour market, and social exclusion (Baycan-Levent & Nijkamp, 2011). These entrepreneurs need to earn a living and see entrepreneurship as the only option (Dheer, 2018).

Push motivation arises for similar reasons to those generally observed among entrepreneurs. Baycan-Levent and Nijkamp (2011) list the generation of additional income, independence, and being one's own boss as main motivators. Freedom and work flexibility are further reasons (Dheer, 2018). A study of Ghanaian women entrepreneurs in Canada found that flexibility was the main reason, as women wanted to spend more time with their children and family, especially as childcare is expensive in many Western countries (Nkrumah, 2016).

2.2.2 Challenges of female migrant entrepreneurs

The challenges faced by female migrant entrepreneurs are manifold. A study on migrants in Switzerland shows that there are challenges associated with not being native-born, having temporary residency, or having only recently immigrated (Piguet, 2010). Lack of language skills and access to (professional) networks is another hindrance, particularly for women and non-Europeans (Chreim et al., 2018; Mittmasser, 2022). Language barriers are mainly observed among first generation migrants though (Chreim et al., 2018). Also, access to training or support programmes is lacking, partly because they do not exist, partly because they are not known. Lack of business skills and knowledge of how to approach local clients or collaborators is another challenge

(Mittmasser, 2022). Discrimination based on race, gender, and colour may also be a challenge, depending on the community in which entrepreneurs operate (Nkrumah, 2016; Surangi, 2022). In general, immigrant entrepreneurs face the same challenges as any other entrepreneur, although they may be more severe for the reasons mentioned above, such as missing language skills, lack of knowledge of the legal system, or discrimination.

2.3 Context

Switzerland is an interesting case to study a subgroup of minority entrepreneurs for several reasons. Firstly, Switzerland has a very low unemployment rate and job seekers are well-absorbed by the labour market (Federal Statistical Office, 2022b). Secondly, many migrants are highly skilled and/or already have a job when they migrate. Additionally, most migrants come from the Schengen area, facilitating their ability to work (Federal Statistical Office, 2022a). Thirdly, contrary to global trends, self-employment rates among migrants in Switzerland are lower than among the native population (Federal Statistical Office, 2021). Lastly, in Switzerland and globally, women are generally much less likely to become self-employed and if they do, their businesses are smaller and grow less (GEM, 2023). These factors are interrelated, and this paper aims to shed light on a group of migrants, who have chosen the entrepreneurial path despite a well-functioning labour market.

3. Methodology

3.1 Sample and data

We gained access to the Swiss section of Grupo Mulheres do Brazil (Brazilian Women's Group). The organisation was founded to involve civil society in achieving improvements for Brazil and the world. Nearly 90,000 people are involved, both in Brazil and abroad. For this research, we used the database of 238 Brazilian businesswomen in Switzerland, which represents about 1% of all Brazilians living in Switzerland. The survey, written in Portuguese, was emailed to the target population in November 2022. A reminder was sent in January 2023. A total of 54 women completed the online questionnaire. This corresponds to a response rate of 22.7%.

3.2 Measures of variables

The aim of the questionnaire was to find out about the businesses, challenges, and motivations of a group of minority entrepreneurs. The variables are based on a survey conducted among newly self-employed in Switzerland over the last two decades (Meyer & Meyer, 2020), supplemented by aspects specific to minority entrepreneurs identified in the literature. In addition to the demographics of the entrepreneurs and their businesses, the survey focused on motivation, personal satisfaction, and financial success (measured on a five-point Likert scale), challenges and support needs (inquired with a free text field to obtain a wider range of responses). The questionnaire consisted of 15 questions and can be requested from the authors.

3.3 Data analysis procedure

The data were analysed using the statistical software SPSS. First, free text responses were analysed and categorised. Second, descriptive statistics were performed for all variables.

4. Results

This section shows the results of the survey.

4.1 The founders

Age. The women are between 26 and 64 years old, with an average age of 43. Interestingly, this corresponds to the average age of all founders – male and female, migrant and non-migrant – in Switzerland, which is 42 years (Meyer, & Meyer, 2020; Meyer, & Meyer, 2022).

Language. 72% of the women speak three or more languages. Of these, 99% speak Portuguese, 52% German, 46% English, 43% Spanish, 35% French, 14% Italian, 6% Swiss-German, and 2% speak Japanese. Overall, the average and median number of languages spoken per person is three. Swiss-German is counted as an individual language and is spoken by 2 of the 54 women.

Reasons for moving to Switzerland. The selection of multiple reasons was possible. Overall, 46% of Brazilian female entrepreneurs came to Switzerland for love, 30% due to family, 22% based on work, 7% in relation to their studies and the remaining 4% for the quality of life or lifestyle.

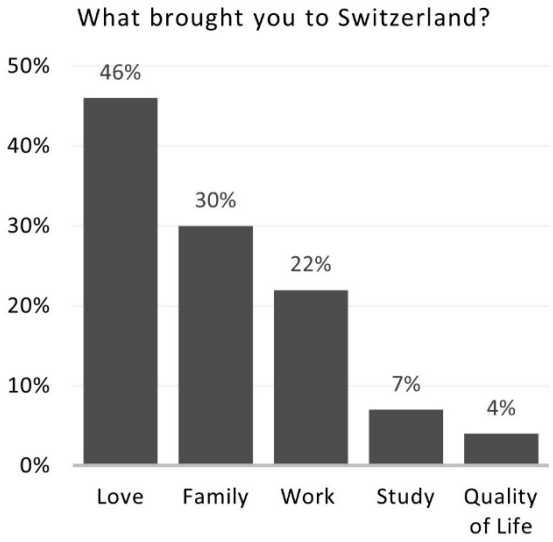

Figure 1: Reasons for moving to Switzerland.

Since when in Switzerland. The women came to Switzerland between zero and 34 years ago, with an average of 10.28 years. The largest group of women arrived between the years 2013 and 2018. The second largest group arrived in the last five years (see **Error! Reference source not found.**). One explanation for the over-representation of those two groups in the Brazilian female entrepreneurial community might be that the drive to start a business and establish oneself in the new market is greatest during the first ten years, especially the years five to nine.

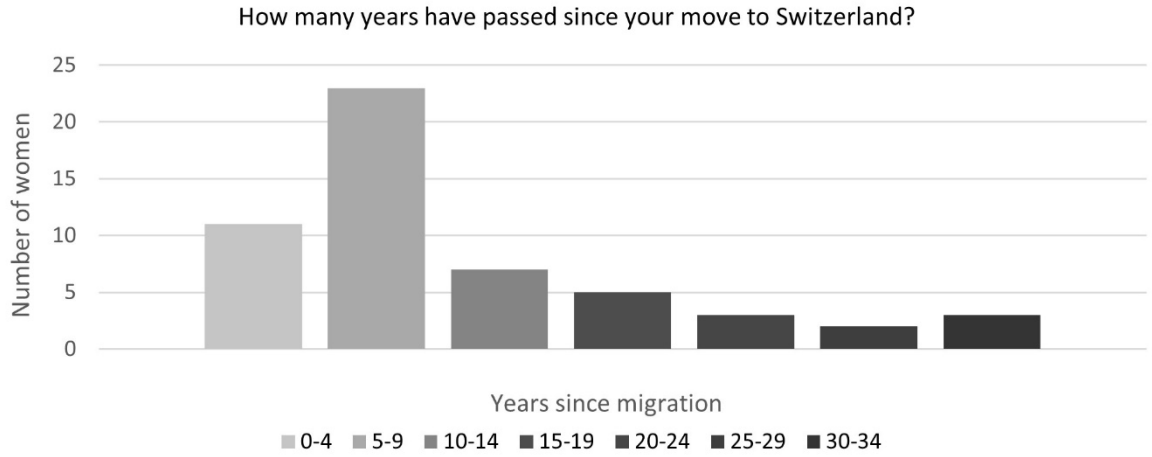

Figure 2: Distribution of years since move to Switzerland.

Prior experience as entrepreneur, relevant experience, and education. At 30%, the proportion of women who were entrepreneurs before moving to Switzerland is high. Among the businesses they founded in Brazil, Spain and Portugal are two dental clinics, a TMC-clinic, a spa, a hair salon, a café, a children's events organiser, a nutritionist, an architect, and a fashion designer - including two serial entrepreneurs who have founded two or more businesses before starting one in Switzerland.

Only 42% of the founders have prior experience in at least one economy-related field that proves relevant to them as entrepreneurs, e.g.: experience in management, in sales, in administration, in multinational companies. Even fewer, 28%, have an education or training in at least one economy-related field that proves relevant to them as entrepreneurs.

4.2 Their businesses

The median time between moving to Switzerland and starting a business is 4.5 years with the longest timespan being 29 years and the shortest already 4 years before moving. The business age ranges from zero to 13 years, with an average age of 3.28 years. Cumulatively, 78% of businesses are 5 years old or younger. 9% of business are at least 10 years old. The start-ups are small and only four companies have employees. On average, the women work 30.2 hours per week, with 48% working full-time on their start-up.

Reasons for starting a business. The motives for starting a business are dominated by the desire for self-realisation (83%), the assertion of one's ideas (76%), independence (70%), and flexible time management (63%), followed by the ambition to set an impetus for social change (48%), as illustrated in **Error! Reference source not found.**.

It is worth noting that better income as a motive for becoming independent is significantly higher among Brazilian female entrepreneurs than among Switzerland-based founders in general. For 39% of Brazilian female founders in Switzerland, a better income is very important, for another 19% it is important; whilst a study from 2020, looking at the motives of Swiss founders overall, finds that only 12% rate a better income as a very important motive, for another 29% it is important (Meyer, & Meyer, 2020, p.23).

The motive of continuing a family tradition is higher among Brazilian female founders (27%) than among Switzerland-based founders overall (11%) (Meyer, & Meyer, 2020, p.23). Also, the desire for greater reputation and recognition through business venture is significantly higher in the Brazilian female founder community (76%) than in the Swiss population as a whole (39%) (Meyer, & Meyer, 2020, p.23).

Moreover, for a cumulative 45% of Brazilian female founders the lack of official recognition of their Brazilian education in Switzerland motivated them to start their own business. These figures are consistent with the fact that self-employment constitutes a way out of an unsatisfactory job situation for 35% and a way out of threatened or actual unemployment for 31%. In comparison, only 24% of all Switzerland-based founders use self-employment as a way out of actual or threatened unemployment (Meyer, & Meyer, 2020, p.23).

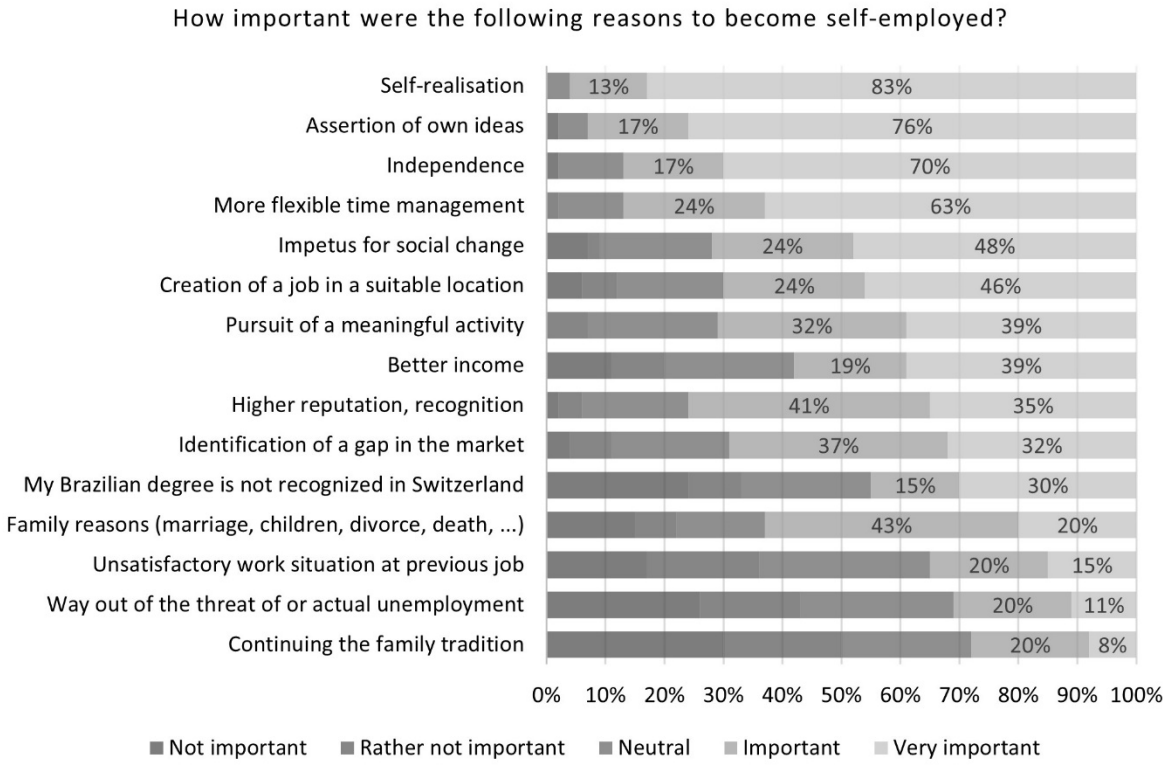

Figure 2: Importance ratings of reasons for becoming self-employed.

Link to Brazilian culture. As depicted in *Figure 3***Figure** 3, 46% of business ideas exhibit a strong link to Brazilian culture, 28% do not, 26% of founders neither agree nor disagree with this statement. 39% of founders state that

their customers are mainly from within the Brazilian community in Switzerland, 26% disagree with this statement, 35% neither agree nor disagree.

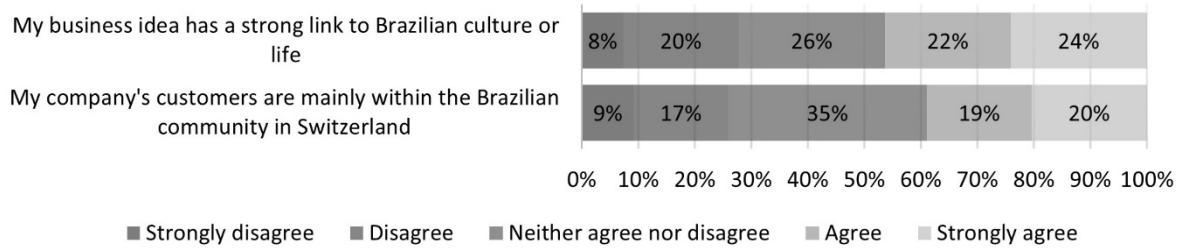

Figure 3: The businesses' link to Brazilian culture.

*Challenges***.** The main challenge for Brazilian female entrepreneurs in Switzerland is market entry, i.e., marketing (44%). The second most common challenge is finances (17%), including lack of investment and initial financing, challenges with financial planning, cash flow, currency devaluation, and occasional losses incurred due to a lack of experience with administrative matters in Switzerland. Business growth, language barriers, a lack of recognition, and time constraints pose a challenge for 9% of founders respectively. 28 additional challenges were mentioned by a maximum of 3 women each.

Support. Entrepreneurs were asked what kind of support they would appreciate; multiple answers were possible. As ***Error! Reference source not found.****5* shows, marketing and networking are mentioned by 31% and 20% of the founders respectively, followed by administrative support (11%), business development support (9%) and legal support (9%).

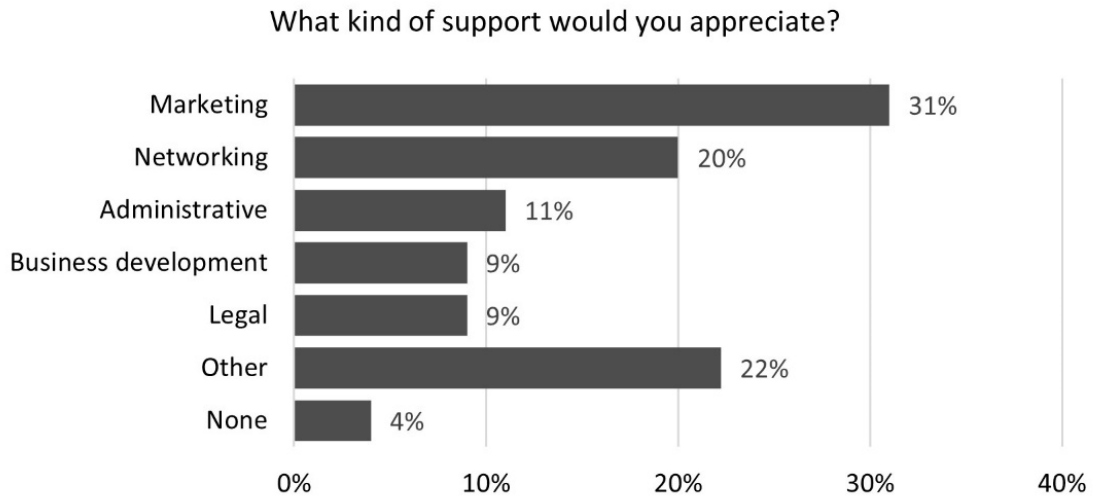

Figure 5: Support gaps in the Brazilian female entrepreneur community.

Success. Women were also asked to rate the success of their business in terms of (a) financial and (b) personal satisfaction. It is worth noting that in terms of financial success, the spectrum ranges from very unsuccessful to successful, with the majority (56%) rating their financial success as neutral, neither successful nor unsuccessful.

In addition, the founders were asked whether they could live from their business. Only 7% can live from their business, while 59% of the founders cannot live from their business financially. 15% neither agree nor disagree that they earn enough money to live from their business. Nonetheless, only 9% of entrepreneurs would give up their business if they were presented with a good job offer, while 43% would not. The remaining 48% are undecided.

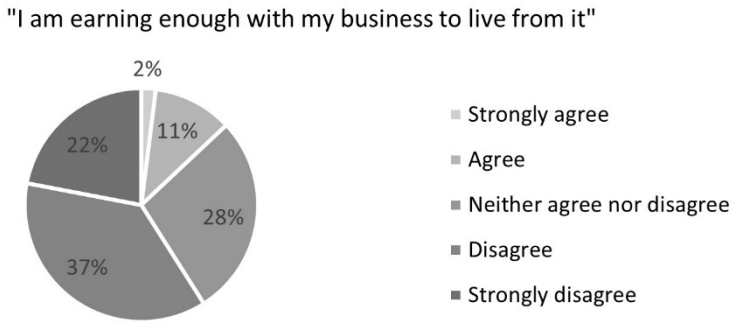

Figure 6: Proportion of Brazilian female entrepreneurs earning enough to live from their business.

Overall, personal satisfaction with being an entrepreneur is very high (89%). Only 11% of entrepreneurs rate their personal satisfaction as neutral, and none of the women rate their personal satisfaction as less than neutral. The vast majority, 57%, rate their personal satisfaction as successful and 31% as very successful. Personal satisfaction exceeds financial success and the founders' ability to live off their business.

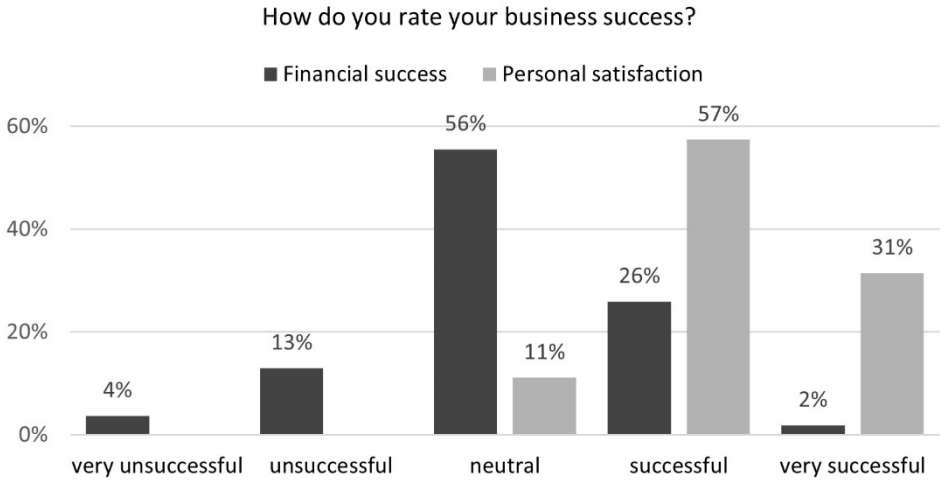

Figure 7: Business success of Brazilian female entrepreneurs in Switzerland.

5. Discussion

The results show that Brazilian women entrepreneurs' businesses are small and most have no employees other than themselves. Only a small number of women can make a living from their self-employment. Mittmasser (2022), who interviewed 34 migrant entrepreneurs in Switzerland, also found that only a minority were able to make a living from self-employment. This seems to be a problem for many minority groups.

One third of the women had been entrepreneurs before, which is higher than in the Swiss population (Meyer & Meyer, 2020). They were most active in Brazil, but also in Portugal and Spain. As the Global Entrepreneurship Monitor shows, Brazil is a very entrepreneurial country. Brazil ranks first in terms of entrepreneurial intention, with 53% of adults intending to start a business (GEM, 2023). 17.2% of women in Brazil are already entrepreneurs, compared to 6.3% of women in Switzerland (GEM, 2023). The lack of jobs is the main reason for self-employment in Brazil. The fact that more Brazilian women entrepreneurs have been active before can therefore be explained, at least in part, by these factors.

Self-realisation, implementing one's own ideas, independence and flexible time management were identified as the main motivators. These push motivations are similar to those of Swiss entrepreneurs and are also confirmed by other studies (Baycan-Levent & Nijkamp, 2011; Dheer, 2018; Meyer & Meyer, 2020). However, some motivations differ from the Swiss average, which may be related to structural factors. Firstly, better income is a key motivator. While Mazzarol (2021) showed that female minority entrepreneurs are less likely to be motivated

by money than men, this study shows that money is an important reason. It can be linked to the other structural challenges, that act as pull motivators. These are the lack of recognition of their Brazilian education, a way out of an unsatisfactory job and actual unemployment or the threat of it. Research has confirmed that female migrant entrepreneurs generally face these constraints, especially in the first generation of migrants (Baycan-Levent & Nijkamp, 2011; Nkrumah, 2016; Dheer, 2018; Surangi, 2022). These factors show that the Brazilian women have difficulties in finding jobs in Switzerland and try to earn a living through self-employment.

Marketing poses the greatest challenge (44%) and constitutes the area in which Brazilian women entrepreneurs seek support the most (31%). While marketing is a major challenge for any entrepreneur, there may be specific reasons for migrant entrepreneurs. Firstly, a lack of local language skills can be a barrier to effectively communicating marketing messages (Sithas & Surangi, 2021). This does not seem to be a major reason for the survey population, as only 9% listed language barriers as a challenge and most speak one of the local languages. This is to be expected though, as the average length of stay in Switzerland is quite long. Secondly, a lack of knowledge about local markets, customs and how to approach customers is unique to migrant entrepreneurs (Mittmasser, 2022). Thirdly, access to local networks may limit the access to clients. Thus, female migrant entrepreneurs face several additional challenges compared to native entrepreneurs.

Finance is the second biggest challenge, at 17%, the other challenges are very spread out. Surprisingly, legal challenges are not often mentioned. This is a factor that is usually difficult for migrants to deal with. Most of the Brazilian female entrepreneurs came to Switzerland for love or family reasons and presumably have support in handling these issues. The diversity of the challenges faced by the Brazilian female entrepreneurs' community attests that it is difficult to design generic support services and that individual coaching could be more effective and should be added.

Networking is very important for the Brazilian female entrepreneurs in Switzerland and one of their main support needs. A study by Neila (2014) on female entrepreneurs from the US and Brazil showed that networking is equally important for both groups to generate business; but networking to create a sense of belonging and togetherness is much more important for the Brazilian women. We can assume that the much more collectivist culture of Brazil is reflected in this factor. Switzerland has a similar individualistic culture to the US and for many respondents in our study, networking among Brazilian women was important. It can therefore be assumed that the social part of networking is also important for the group studied, as it is more difficult for them to find it locally in Switzerland.

The use of networks is also an important strategy for growing the business and overcoming inequalities. The surveyed businesses have strong ties to the Brazilian culture and community. The literature confirms that female migrant entrepreneurs have strong ties to communities and family members and that their minority communities are crucial for business success (Piperopoulos, 2012; Sithas & Surangi, 2021). Hence, connecting with people from the same minority appears to be an important coping strategy for entrepreneurs.

Most women came to Switzerland for love and family and not for entrepreneurship, yet the desire for recognition is an important motivator for becoming entrepreneurially active, much higher among Brazilian female entrepreneurs than among Switzerland-based entrepreneurs overall (Meyer, & Meyer, 2020). Not only are Brazilian female entrepreneurs driven by the desire for recognition, for 9% the lack of recognition constitutes a challenge. This could be an indication that the majority are gaining a higher reputation through their business. This is further supported by the high level of personal satisfaction founders experience with their businesses.

As shown, most women cannot make a living from their self-employment. This is also reflected in the success of their businesses. Only a small number of women are financially successful. By contrast, personal satisfaction is very high. Entrepreneurs achieve their motivations of self-fulfilment, the realisation of their own ideas and independence, however not a better income.

6. Implications and conclusion

This study focused on a specific area of entrepreneurship that is mostly neglected in media and politics. The results show both the importance of immigrant women's entrepreneurial activities (in terms of integration, financial aspects, and personal satisfaction) and the challenges they face. There is a need for the media to present a more diverse picture of Swiss entrepreneurship and for policymakers to address the specific needs of migrant entrepreneurs in their support activities.

Supporting organisations that focus on migrants (such as the Swiss section of Grupo Mulheres do Brazil in this case) are very important. Based on our findings, we see the following opportunities for such organisations:

- *Marketing:* Offering marketing support is essential. Sales and marketing training and individual coaching shall be key elements of such support.
- *Individual coaching:* Given the wide range of backgrounds from which women start their businesses, and the diversity of challenges and support needs that this brings, individual support through coaching seems appropriate and expedient.
- *Challenging current business models*: The results showed that market entry is the key challenge for many founders. One reason for this could be a weak value proposition. Many of the women questioned said that their business model has a strong link to their Brazilian culture. This can make their offering unique, but it may be more suited to the needs of their diaspora than to those of potential Swiss clients. Therefore, the business models should be critically reflected.
- *Networking with non-migrant groups and initiatives*: Strengthening the network within one's own diaspora is as important as with people outside of one's own diaspora. Therefore, we recommend joint activities with other start-up organisations and initiatives. These joint activities are also an opportunity for the many "traditional" start-up organisations and initiatives to gain access to the growing number of migrants.

This study has several limitations. Firstly, it focuses on only one minority group, which does not allow comparisons between different groups or over time. Secondly, only active women were surveyed. Failed and/or prospective entrepreneurs were not included.

Based on the findings and the limitations, several directions for future research were identified. A qualitative survey to explore motivations and challenges in more depth would be interesting. Conducting a similar survey with different minority or female migrant groups can show where similarities and differences are, to shape support offerings better. A longitudinal study, following these entrepreneurs over time, may also provide interesting insights.

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Do SMEs actually know what Business Model Innovation is? Evidence from Switzerland

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Abstract: Business model innovation (BMI) has received increasing attention from academics in recent years and its positive impact on companies has been demonstrated in the literature. However, there is a lack of research though on whether the managers of SMEs actually know what BMI means and how to implement it. This study is looking at this gap and analysed the know-how about the term in the Swiss canton of Schwyz. It is based on a survey among 418 managers of SMEs and shows that there is lack of knowledge on what BMI is and how to implement it; however, the importance of it is well-known. This research contributes to the existing literature in three ways. Firstly, awareness is the first needed step in increasing the number of BMIs in Switzerland, as many companies do not know the term. Secondly, managers claim to have no issues in generating new ideas and know about the importance of BMI, but nevertheless, do not implement it. Thirdly, only a small minority of SMEs work with universities on innovation and miss out on a large support structure. The study closes with recommendations for companies as well as universities and other state organisations to support BMI in Switzerland through the steps awareness, empowerment, implementation.

Keywords: business model innovation, small and mid-sized enterprises, SME, innovation, Switzerland, quantitative research, survey

1. Introduction

In 2021, Switzerland was named the most innovative country in the world by the World Intellectual Property Organisation (WIPO, 2021) and in Europe according to the European Innovation Scoreboard (Hollanders et al., 2021). The main reasons are its research system and institutions, its human resources, and the intellectual assets – Switzerland has one of the highest numbers of patents per million inhabitants. Despite being an innovation leader, technological and societal changes are also challenging companies in Switzerland. Studies show (e.g. Peter, 2017) that companies are transforming themselves in the digital age and are also active in the area of strategic business development. Business model innovation (BMI) is a frequently mentioned topic. Nevertheless, not enough companies actively address their business model, even though Peter (2017) showed that the digital transformation influences the business model of 85 % of the companies surveyed.

While companies have to actively challenge their business models, only a minority of newly established companies are actively innovating, with BMI being the least used form. A survey among companies that have been founded in the past five years show that 34% and 31% do product and process innovation respectively, while only 15% do BMI (Meyer and Meyer, 2020). Similarly, when looking at the innovations planned for the next two years, only 25% plan to do BMI, while 40% plan product and 31% process innovation. This is despite the fact that BMI is the most promising form, according to Pohle and Chapman (2006), who concluded that companies using BMI have significantly increased their operating margins, while companies using product or process innovation have maintained their margins at the same level.

BMI has received increasing attention from scholars over the last two decades (Foss and Saebi, 2017; Geissdoerfer, Vladimirova and Evans, 2018); however, as just shown above it does not appear to be actively addressed by companies, particularly SMEs. This raises the question of whether companies are aware of what BMI is and how important it can be for the survival of SMEs. Therefore, companies in the Swiss canton of Schwyz were surveyed about their innovation activities with the aim to find out, whether they know about business model innovation and how innovative they are. The results will support the design of support programmes for SMEs. The following research questions were answered:

1. How familiar are small and medium sized companies (SMEs) with the term business model innovation?
2. What innovation activities have the companies carried out in the last 10 years?
3. What is the current level of innovation in the companies?
4. How important are innovation activities to them?

The paper is divided into the following sections. Section 2 explains the theoretical basis of BMI and the state of innovation in Switzerland. Section 3 shows the methodological approach of the research. The research results are presented in detail in section 4, followed by a discussion in section 5. Finally, practical implications and an outlook on further research are given. This paper contributes to the academic discussion by being the first to our knowledge to analyse the know-how and the perceived importance on BMI among SMEs. This contributes to the development of programmes to support BMI.

2. Theoretical background

2.1 Business Model Innovation Defined

López-Nicolás, Ruiz-Nicolás, and Mateo-Ortuño (2021) define business models by advancing the following reasons why business models are paramount: they identify customer needs; they detail how organisations responds to customer needs and deliver the desired value; they allure customers to pay for the value; and they allow for meticulous operational designs that ensure profitability. Similarly, Hernández-Chea et al. (2021) contend that a typical business model is one that endeavours to attain customer satisfaction, enhance regulatory operational compliance, and provide a decent return on investment for its organisation. Put differently, a business model is an organisation's description of its value proposition, value creation, value creation conditions and value capture (Schaltegger et al., 2016).

Business model innovation has been defined differently by various scholars. López-Nicolás et al. (2021) set the tone by contending that BMI is the deliberate, unique, and major change ushered unto the key components of the organisation's operational architecture. Burhan et al. (2021) define BMI as the changes that are employed by established or new organisations to their value creation, value delivery, and value capture infrastructure in response to changing customer needs, changing times, and sustainability. From these definitions, it can be summarised that BMI is the change, whether holistic or atomistic, that is applied to the way organisations, whether existing or new, conduct their business. This change is deliberate and aimed at bettering all the facets of business operations throughout the value chain either in response to opportunities, challenges in the operational environment or as a medium for growth and expansion.

Compared to product or process innovation, BMI involves holistic company-wide changes, while the others involve less drastic changes to parts of the organisation and its procedures. Furthermore, whereas BMI focuses on increasing value for all stakeholders (shareholders, customers, employees, and society), product innovation focuses on value enhancement for customers and process innovation on the organisation's internal operations (Geissdoerfer, Vladimirova, Fossen, and Evans, 2018). Resultantly, the decision to pursue the different forms of business innovation (either product innovation, process innovation, or BMI) will mostly be influenced by the organisation's resources, objectives, customer needs, industry environment, as well as market position.

2.2 Importance of business model innovation

Companies that do not pay attention to their business models run the risk of underperforming that comes as a result of diminishing earlier strengths (Musandiwa and Ngwakwe, 2022; Xu and Vermeulen, 2021). Various reasons have been put forward that illustrate the importance of BMI. To begin with, BMI is critical to the survival of today's institutions as it not only provides a firm with a competitive edge but also improves organisational efficiency by creating and enhancing mechanisms that drive and maintain customer value (Hamelink and Opdenakker, 2019; Pieroni, McAloone, and Pigosso, 2019; Velu, 2015).

Furthermore, Ferreras-Méndez et al. (2021) assert that BMI provides firms with the means to translate their entrepreneurial orientation into innovative processes that drive organisational success. By improving value creation, BMI will ultimately drive organisational growth and market dominance.

Business model innovations, particularly those based on new technologies, generate immense positive gains for companies which result in the acquisition of competitive advantages, and the greater the use of technology in the BMIs, the greater the competitive advantage will be (Dymitrowski and Mielcarek, 2021). As BMI will introduce new operational infrastructure, the resulting changes will be difficult for competitors to duplicate.

In a research conducted to ascertain the benefits and hinderances associated with BMI on farmlands in Sweden, from which parallels can be drawn with SMEs, Hansson et al. (2022) single out the key benefits of BMI toward organisations. These are: realizing uncaptured value (BMI allows for companies to realize increased production and revenue and also allow for the tapping into new markets); creation of sustainable business responsibility

(through setting up of new robust business systems, organisations are better equipped to deal with various risk and grasping opportunities in more sustainable ways); reaching breaking point (BMI appeals to companies that seem to have reached a ceiling in profitability as it provides ways to reinvigorate business); and valuing organisational resources (due to the holistic nature of BMI, companies get to appreciate every component of the system, from employees, customers, infrastructure to stakeholders, and the role they play in the success of the organisation).

BMI has however not been adopted by SMEs due to numerous explanations (Mangematin et al., 2017; Stampfl, 2016). It is also worth noting that Hansson et al. (2022) identified the major deterrents for SMEs in instituting BMI. These included:

- Avoiding financial risk (changing a business model involves costs and loss of revenue, which most SMEs try to avoid by all means)
- Unclear targets and benefits (companies are often unsure of the level of change and expertise required before benefits can be realised)
- Restriction by old value creation activities (there is a fear that BMI will not be able to replicate the desired value that the old model was able to deliver)
- low tolerance for business change (there is reluctance among SMEs to move away from proven, effective methods in exchange for new, unfamiliar processes).

However, the benefits of the business model, which outweigh these concerns, should be compelling reasons for SMEs to adopt BMI.

2.3 Innovation in Switzerland

As shown in the introduction, Switzerland is by some measures the most innovative country in the world. However, there is very limited research on BMI in the country. Philippi and Hinz (2018) looked at the types of innovation from a Swiss innovation competition and found that 18.3% of the participants do BMI, while product and service innovations are still the dominant type with 60%. They conclude that many participants have the opportunity to innovate their business model but are not aware of it and its possibilities and that BMI will become more important in the future. Similarly, a survey of companies founded in the last five years found that only 15% had conducted a BMI in the last five years and 25% planned to do so in the next two years (Meyer and Meyer, 2020). BMI is therefore still in its infancy in Switzerland.

The State Secretariat for Education, Research and Innovation looks at the innovation landscape in general (Spescha and Wörter, 2020). The number of companies with R&D activities has fallen in recent years; however, the overall expenditure has increased. It can be concluded that the number of companies with innovation activities is decreasing, but the innovation expenditure of those companies with innovation management is increasing (Spescha and Wörter, 2020). The innovation report also shows the main obstacles for companies to innovate, which are high costs, missing equity or external capital, long duration of amortization, as well as the easy imitation of products and services. (Spescha and Wörter, 2020)

2.3.1 Canton Schwyz

The survey was conducted in Schwyz - one Switzerland's 26 Swiss cantons. Schwyz has a population of 163'176 with no major city within its borders. Thanks to its central location and favourable tax conditions, the canton has the third highest number of registered companies per 1000 inhabitants in the country. In 2020, there were 19'134 corporations, compared with only 8'060 in 2000. The company structure changed considerably over the last 15 years. The first (21.8% to 10.5%) and second economic sectors (19.4% to 15.6%) have lost some of their share of all companies in Schwyz, while the third sector (58.8% to 73.9%) has gained significantly. (Kanton Schwyz, 2022) This is in line with the general shift in the Swiss economy towards more companies in the third sector; however, Schwyz has a much higher share of companies in the first sector, which accounts for only 2.4% among all Swiss companies (Federal Statistics Office, 2022).

3. Methodology

3.1 Sample and data

A quantitative written survey was conducted to investigate the innovation status of SMEs in the canton of Schwyz. A representative sample of managers of SMEs registered in the Commercial Register and located in the

Canton of Schwyz was selected using a random sampling method. The data were provided to the University by the Swiss Federal Statistical Office. The survey was sent by mail in November 2021 to a total of 3,918 company managers, of which 237 could not be delivered. The managers had the option of completing the questionnaire in writing and returning it with a self-addressed stamped envelope or answering the questions online. A total of 418 responses were obtained. This corresponds to a response rate of 11.4%. 34% participated in the online survey and 66% chose to complete the paper survey.

3.2 Measures of Variables

The questionnaire used in this study was developed by the FHNW School of Business together with representatives from the Office of Economic Affairs of the Canton of Schwyz and the cantonal development organisation Schwyz Next. The survey contained nine questions divided into a demographic section and and an innovation section. In the innovations section, the companies were asked about their knowledge about BMI, and what innovation activities have been and will be carried out in the past respectively the future. Also the importance of different innovation activities was collected with a scale from agree, rather agree, rather disagree and disagree. None of the questions were compulsory, so the number of respondents per factor may vary. A sample of the questionnaire can be requested from the authors.

3.3 Data analysis procedure

The data obtained from the survey was analysed using the statistical software SPSS. The responses were statistically analysed to provide a picture of the innovation status of the SMEs. The results are presented and described in the next section 4. Participation was anonymous and managers who were interested in the results could leave their e-mail address. However, these were removed from the database for analysis so that no conclusions could be drawn about individuals.

4. Results

This section provides the results of the survey with 418 managers.

4.1 Demographics of the managers and the companies

The management of SMEs are dominated by men. 75% of the companies are managed by men, only 25% by women. The average age of the managers is 50 years with the biggest proportion, 40%, between 51 and 60 years old. The share of female managers is the highest in the age group under 30 (31.3%) and decreases with each age group until it reaches 13.3% among managers aged over 60. This data shows that there are more female manager in the younger generations, which could lead to an increase in the total number of female managers in the long-term.

38.3% have a university degree (bachelor, master, or PhD), while the others mostly have higher vocational degrees or a vocational baccalaureate. The companies tend to be small, which is also comparable to the average size of Swiss companies. 72% of the companies surveyed have fewer than 6 employees, 20% have between 6 and 25 employees, 5% between 26 and 50 and only 3% over 50. In the country as a whole, 1.8% have more than 50 employees (Bundesamt für Statistik, 2022)

4.2 Knowledge on Business Model Innovation

The majority of respondents do not know precisely what BMI is, as shown in figure 1. Almost a quarter do not know it at all and almost a third have heard the term, but are unlikely to be able to describe it accurately. Only a third know very well or quite precisely what BMI means.

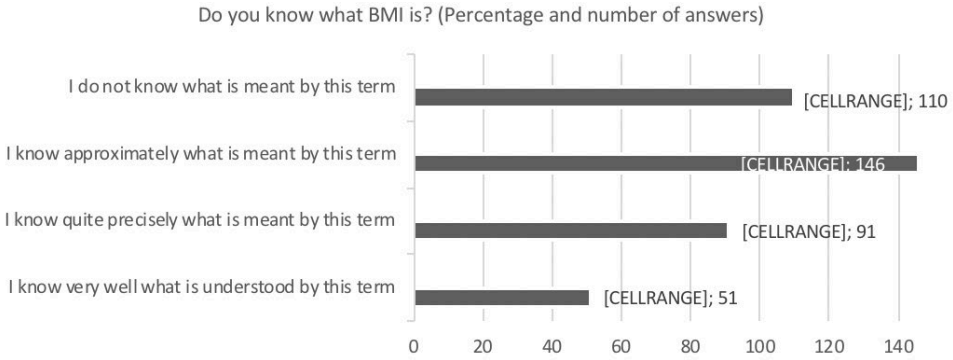

Figure 1: Knowledge of the term Business Model Innovation

These numbers also correspond well to the type of innovation that the SMEs have carried out over the past 10 years (figure 2). 60.9% of the respondents did at least one type of innovation. The most popular is product or service innovation, followed by process innovation. Less than a quarter (22.9%) have implemented new business models in the past 10 years.

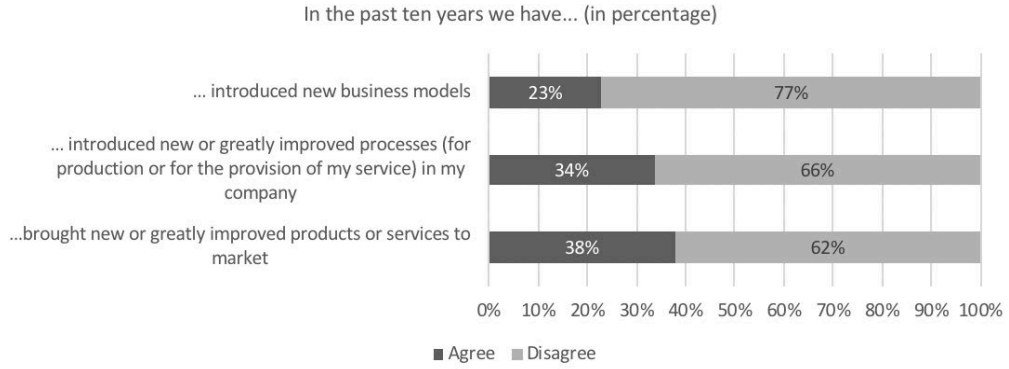

Figure 2: Innovation in the past 10 years

There is a connection between the education and the implementation of new business models. The higher the education of the manager, the more likely the company is to do BMI. The data also shows that the bigger the company is, the more BMI is done.

Interestingly and in contrast to not knowing the term, BMI are important for the businesses and the know-how is there as visible in table 1. 66% say that BMI is important or rather important for their business. While 61.8% say that the know-how to develop new business models is available in their company. There is a correlation between the perceived importance and the available know-how, the higher the know-how, the more the managers understand the importance.

While the know-how is available, tools and checklists to develop and test new business models are less known. Only 9.8% agree to have it, while 35.1% rather agree.

If we compare the responses of managers saying that BMI is important and those that have implemented it, we see that 41% of companies with high importance have done BMI in the past 10 years, while 26.1% of the companies which stated that BMI is rather important have implemented. Comparing this to the total percentage of 22.9%, it becomes visible that the companies that are aware of the importance also implement more BMI.

Table 1 shows the implementation and financing of innovations. 60.1% agree or rather agree that implementing innovations is no problem in their company, which corresponds with the 60.9% of companies that have done at least one type of innovation in the past ten years. Financing innovations is more difficult and only 47.8% agree or rather agree that it is no problem.

Also, the generation of new ideas is no problem for the companies. 84.3% of respondents say that the agree or rather agree with the statement. This shows that new ideas are not used to develop and implement innovations, as much lower percentages actually did implement one of the three types of innovation.

Table 1: Different aspects of business model innovation and the agreement among participants

	Agree	Rather agree	Rather disagree	Disagree	Don't know
Product innovation is very important for our business.	148 37.6%	134 34.0%	58 14.7%	46 11.7%	4 1.0%
Business model innovation are very important for our business	101 25.7%	157 39.9%	88 22.4%	37 9.4%	8 2.0%
The know-how for product innovations is available in our company.	116 29.7%	159 40.8%	63 16.2%	40 10.3%	10 2.6%
The know-how for business model innovation is available in our company	84 21.4%	156 39.8%	91 23.2%	46 11.7%	11 2.8%
Tools and checklists for developing and testing new business models are very well known in our company.	38 9.7%	136 34.6%	121 30.8%	85 21.6%	8 2.0%
Introducing innovative products or business models to the market is no problem for our company.	71 18.1%	162 41.2%	101 25.7%	40 10.2%	14 3.6%
Financing innovations is no problem	65 14.0%	120 30.7%	106 27.1%	80 20.5%	16 4.1%
Generating ideas is no problem in our company.	133 28.6%	194 49.4%	43 10.9%	13 3.3%	5 1.3%
There are relations / partnerships with universities / institutes of higher education	38 9.7%	42 10.7%	72 18.3%	226 57.5%	12 3.1%

In addition, SMEs do not have partnerships with universities or other institutions of higher learning. It can be assumed that over 75% have no partnerships (57.9% disagree and 18.5% rather disagree. Here, the higher the know-how about BMI, the more often they have partnerships. Also, the higher the education, the more often they have partnerships. Of the companies with a manager with a PhD, 56.3% have partnerships.

5. Discussion

While BMI has become increasingly important in the literature, it still has a niche existence among SMEs, which is confirmed by our findings. While SMEs recognise the importance of BMI and also claim to have the knowledge, only few actually implement BMI. The number of companies doing BMI (22.9%) is similar to the numbers found in other studies in Switzerland (Meyer and Meyer, 2020; Philippi and Hinz, 2018). It can therefore be assumed that between 15% and 25% of Swiss companies are working on BMI.

The main finding is that the majority of managers do not know what BMI is and therefore also do not think about doing BMI. Nevertheless, the benefits are manifold and have been shown in the literature (e.g. Hamelink and Opdenakker, 2019; Hansson et al., 2022; Pieroni, McAloone, and Pigosso, 2019; Velu, 2015) and interestingly, the managers themselves claim that BMI is important to them. Hansson et al. (2022) also state that unclear goals and benefits of BMI are a major barrier for SMEs. This may partly explain the discrepancy between know-how and importance. Managers may have heard of it and know that it is important for their business, but they do not know how to start and what the exact targets could be for their business. This highlights the need for more education. Economic development organisations and universities will play a crucial role in this.

Financing innovation was found to be a major obstacle for SMEs to innovate, with half of the participants stating that financing was indeed a problem. This is also confirmed by Hansson et al. (2022), who found that avoiding financial risks is one of the main barriers for SMEs to implement new business models. The Swiss Innovation Report (Spescha and Wörter, 2020) also mentions mainly financial barriers to innovation - high costs, lack of capital and long payback periods. Innovation agencies, such as Innosuisse in Switzerland, should play a stronger role in financing new business models in order to reduce the financial risks of SMEs. Traditional start-up financiers, such as venture capitalists, could also look to expand their business by investing in new business models of existing companies.

One aspect still overlooked by Swiss SMEs is collaboration with higher education institutions. Switzerland is ranked second in the world for university-industry collaboration in terms of innovation (WIPO, 2021). However, SMEs in particular are becoming less innovative, as the Swiss Innovation Report has shown. This could be changed by partnerships with universities. In their systematic literature review, Pereira and Franco (2021) found that the main barrier is a lack of knowledge about matching university programmes and how to access them. Similar findings are presented by Johnston (2021), who shows that the ability of companies to access and

understand university provision is crucial. Higher education institutions should therefore focus on their communication with SMEs in order to promote their programmes more effectively.

6. Implications and conclusion

BMI is crucial for any business, especially for SMEs that compete with large corporations and have a limited budget, but it is very difficult to achieve (Chesbrough, 2010). This paper has shown that the term BMI is not yet well known among business leaders and that the implementation of BMI is limited. However, it is interesting to note that a much larger proportion of managers are aware of its importance and claim to have the knowledge to implement it than actually do so. There is still a lot of ambiguity around the term BMI, as evidenced by the large proportion of managers who do not know exactly what it means.

Looking at these results, we formulated the following recommendations:

6.1 For companies that are already innovative:

Innovative companies should make even better use of the potential of BMIs. Product and process innovations are still carried out much more frequently than BMIs. Based on planned product or process innovations, these companies should also examine the potential for adjustments to the target group, the market entry, or the financial business model. Often it does not take many additional changes to create an even more attractive business model.

- Tools and instruments: The use of specific tools can simplify life in innovation management and accelerate implementation. Here, even already innovative companies state that they do not have a large repertoire of methods.

- Partnerships with universities: Although partnerships with universities are considered very useful, they are still pursued by a relatively small minority. There is still potential for implementation, even for already innovative companies.

6.2 For companies that have not been innovative:

They see innovation of all kinds as less important and have significantly less knowledge about how to approach and implement innovation. It is therefore not surprising that these companies are unlikely to innovate in the coming years. The challenge is to break this vicious circle. The first step is to recognise that innovation is important for your company. Then the necessary skills must be built up and concrete innovation projects planned and implemented.

A larger number of companies claim to have the know-how for innovation and BMI, but do not implement anything. Further research is needed to find the reasons for this, and to find ways to support these companies effectively.

6.3 Recommendations for regional economic development organisations or similar institutions:

Institutions, which help companies to make their businesses fit for the future, can use these findings to identify the following priorities in their range of services:

- *Awareness:* The term BMI and its importance is still unknown to many companies. This needs to be increased through further activities, information, and examples.
- *Empowerment:* Companies that have recognised the importance of (business model) innovation are motivated to acquire the necessary skills, either on the job or through workshops, training events or targeted reading. Here, institutions can offer appropriate programmes.
- *Implementation* with tools and instruments: Tools for the development and implementation of (business model) innovations are still too rarely used. It is important to promote selected tools and instruments and to offer support in their correct and targeted use.
- *Partnerships* with universities: The study identified these partnerships as a tool used by particularly successful and innovative companies. However, many SMEs are reluctant to approach universities for partnerships. Here, organisations could play a door-opening role by advising and encouraging regional SMEs and helping them to make contact with suitable higher education institutions.

6.4 Limitations and further studies

This paper has three major limitations. Firstly, the data are cross-sectional and cannot be compared over time. Second, the study area was limited to one canton in Switzerland. While we are confident that the results are valid for its neighbouring cantons with a similar economic structure, it needs to be analysed whether the economic powerhouses of Switzerland, such as Zurich, Basel, or Geneva, would show similar results. Thirdly, although the response rate of 11.34% is normal for a mass survey, it can lead to a non-response bias. Despite these limitations, our study provides valuable insights into the SMEs surveyed, laying the groundwork for further research in this area.

Further studies should look at the barriers to innovation and analyse why 56% of companies that claim to have no problems innovating have not innovated in the last 10 years. Understanding these reasons will help to provide them with more tailored support. In addition, the innovative companies' processes for implementing BMI should be studied in order to develop recommendations for other companies. Another interesting direction for further research is the differentiation between economic sectors.

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Romanian Youth Enhancing Innovation Mindset and Organizational Change in the Business Environment

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Abstract : This study explores how youth is involved and influence the business environment through their actions and practices. Many young people and youth organizations are framing a mindset to their members about openness to entrepreneurship, innovation, on the business environment. While these youngsters are learning and making efforts to collaborate with similar structures from the EU, most of the companies in Romania are not paying much attention to them. The number of youth organizations had an increased trend in recent years, more and more youngsters acting and interacting with the business environment. Entrepreneurship playing an important role in the changes in the business environment. Some organizational changes are happening within the business environment at the EU level, echoing also in Romania. The level of interest in innovation and entrepreneurship is high for youngsters forming non-governmental organizations, eager to create hubs of knowledge using EU-funded grants. The importance of studying this topic is vital to identify common characteristics, skills, and mindset of the young people involved in the organizational structures. The purpose of this paper is to discuss how Romanian youngsters are enhancing and recognizing the innovation mindset within their organizations and how they can impact the local business environment. Also, another point is to determine the organizational change in the business environment in Romania, impacted by the youth organizations. The methodology is based on primary and secondary data, analysing youth activities outputs and the approaches bringing change in the business environment in recent years. And on the other hand, studying how the business environment, firms, and companies are interacting with youth activities directly or indirectly. The study contributes to the literature review by highlighting local best practices implemented by youth and youth organizations to bring improvement to the business environment together with youth awareness for the business environment transformation.

Keywords: Youth, Innovation Mindset, Organizational Change, Business Environment

1. Introduction

Generation by generation, humanity is facing many challenges and as always, the young people are put into the spotlight, because as the stereotype goes, they represent the future. And the faith and hope of the old people is represented through them because they could change what the latter could not. But what happens when the young people are living in a time when a worldwide pandemic hits, or there are impactful natural disasters, or political disputes involving physical attacks in a time span shorter than 3 years? All over the world, there are local events which affect the world we know now and transforms bit by bit the future. In this case, youth must also adapt, maybe faster than nation's policy makers. Their behaviour and knowledge must coincide with the business environment demand and reactions.

The business environments face technological advancements faster than ever, markets and economies changing as well. Digital competence and soft skills are essential, this is why the topic of this article, analysing the youth innovation mindset in Romania and EU, is useful.

This paper tries to offer a perspective about Romanian youth and its innovation mindset. The past few years have been rather complicated for Romania. The economy was shaken by the pandemic and by the nearby border conflicts, hence increased inflation and changing business environment are the two most obvious effects. In this context, the innovation and entrepreneurial mindset could come useful for the youth decision makers.

The objective of this paper is to offer empirical research about the Romanian youth mindset and how it is recognised by youth. The main framework of the innovation mindset indicators for this research was depicted from The Entrepreneurship Competence Framework by Bacigalupo et. all (2016).

This year, the EU established a focus on digital competence and upskilling using the green and digital opportunities developed within the Union, labelling the year as the European Year of Skills (EU, 2023). This is highlighting the importance of youth knowledge and specialisation at the local level.

The current study investigates main aspects on the Romanian youth innovation mindset and organisational change in the business environment covering the following chapters: introduction, literature review,

methodology, results, and conclusions. Within the literature review can be found the research objective, the youth profile presentation and case studies framing the youth innovation mindset. Another point tackled was the link with the business environment. The results presented are the main outputs of the primary research, the findings, and limitations.

2. Literature Review

Youth mindset is evolving taking different turns, the young generations have different competence and skills when applying them to the business environment. Human inputs have enhanced and brought novelty and improvement to society, not only through the technological advancement, but also through the mindset in coexisting to that. There is no perfect recipe that has been used to improve the business environment, but rather an adaptation to the evolution in time.

Whether the youth involvement in society has an impact over the business environment, and if innovation mindset helps, this is a topic important to tackle. The competence and abilities of the Romanian youth have an impact over the business environment dynamics; therefore, this study wants to show how Romanian youth uses the innovation mindset to show involvement in the society and their inputs for a better experience at the workplace.

2.1 Innovation mindset

The OLSO Manual is defining the innovation as the *"implementation of a new or significantly improved product/process, a new organisational method in business practices…".* The notion of discovering something new or improving something, needs creativity, problem solving and thinking outside the box, this represents the process of innovation itself. Therefore, to develop skills, competence and mindset is part of the process. All the skills and competence shaping an entrepreneurial profile are also used to develop an innovation mindset (Sweeney, 2015).

According to Paxton (2015), the mindset is comprised by a mixture of beliefs, feelings, values, and attitudes. All these offer guidance towards decision making, contributing to the innovation process. The human mindset is the one keeping boundaries, closer or farther, for understanding and adapting in different context, nurturing transformation, and evolution.

From the psychological point of view there are two types of mindsets, the fixed one and the growth one. The fixed mindset is synonymous to traits and talent which are fixed and unchangeable over time. While the growth mindset offers a thirst for the unknown, seeing and seizing the opportunity to growth. According to Catherine Cote (2022), the growth mindset brings out positive traits for an entrepreneur, from fostering resilience to humbleness and adaptation to move to different fields of work.

Nowadays, youth is facing many challenges and maintaining a growth mindset gives the opportunity to learn new things constantly, supporting disruptive solutions and enhancing innovation.

One of the youth characteristics which fosters the growth mindset is creative collaboration. This ability can come in had when doing tasks and projects, at school, or while volunteering or even working. This creative collaboration involves working remotely and finding solutions to not get bored easily. This concept of creative collaboration it represents already a change in the traditional paradigm, an organisational change brought into light by the pandemic times. Another characteristic is design thinking which fosters willingness to learn and test new ideas, communication, and flexibility (Kahn, 2018).

Following the traditional types of learning which are known and used in Romania, as well as in the EU, the formal, non-formal and informal learning have different impact over the life of the youngsters.

In Romania, the formal education is represented by the education system, which timidly started to offer students the possibility to stimulate innovation skills, however, sometimes it fails due to lack of discipline and commitment.

Another formal education environment is the workplace, however depending on the age when the youngster starts the job and depending on the organisational culture and values, the growth mindset is achieved sooner or later.

An important framework for learning which contributes to the innovation mindset is the non-formal learning. From individual participation in competitions/contests, to Erasmus+ experience and volunteering activities, over

all extracurricular activities, all these bring an added value to the skills and competence, enhancing the young people to activities that get them out of their comfort zone, building their innovation mindset. In this moment, these non-formal learning activities represent the most accessible free option of youth to achieve an innovation mindset.

The volunteering activities are an alternative for the youngsters to gather skills and competence before entering the job market, the volunteering experience is one of the most complex way to acquire the innovation mindset, bringing experience and entrepreneurship competence for the tomorrow's professional.

According to *Guide for the Recognition of Competence Acquired Through Volunteering* (2011), volunteering is a community activity carried out by any person on his own initiative, offering his time, skills, and time for the benefit of others, usually with a scope and within an organisation, without receiving a material consideration. The activity can be carried out in areas such as: social services, protection of human rights, education, culture, scientific, humanitarian, religious, philanthropic, sports, environmental protection and so on.

According to FutVol (2017), there are 14 key abilities emerged from volunteering, from conflict resolution, critical thinking, problem solving, respect, communication, empathy and altruism, intercultural understanding, digital competence, teamwork, taking initiative, organisational skills, up to time management and adaptability. All the previous abilities emphasised for volunteering are relevant for the entrepreneurial and innovation competence.

This is why for the empirical analysis of this paper all these aspects were taken into consideration when building the survey structure.

2.2 Youth profile EU and Romania

According to EU framework the individuals between 15 and 29 years old are considered young people. In 2021 were approximately 73 million young people aged 15-29. And in Romania, the national average is slightly under the EU average with only 16% share of young people from a total population of approximatively 19 million inhabitants, in 2021. (EU, 2022)

Besides the importance of having a wider pool of young people, it is also important to understand the formal study and employment trends during and after the pandemic.

A bit under half of young people in the EU were employed and 5.9 % of them were self-employed. According to OECD, the self-employment young people's rate last year was between 3,4% in Germany, and up to 16.4% in Greece. And on the other hand, the share of young people not involved in any type of activity of employment, education, or training (NEET) is at the lowest in the Netherlands with 7.4%, and at the highest in Italy with 26%. There is no relevant statistic indicator about this topic for Romania.

According to the Romanian National Statistics Institute, in the 16-24 age group, no less than 24% of young people were unemployed at the end of 2022. And approximately 20% of the young people (15-29) are NEET.

According to Konle-Seidl and Picarella (2021) young people have been affected disproportionately by the pandemic. The nations were advised to implement mental health initiatives in educational settings to combat the pandemic effects.

All in all, the pandemic passed through, and the pandemic is over, the youth is still affected by the rapid changes. The adaptive learning process must continue, and policy makers should focus on improving the innovation skills in youth.

Youth organisations are helping youth to gain innovation competence and soft skills needed by the business environment. EU is giving the opportunity to youth organisations like the ones briefly mentioned below to use grants to develop digital, entrepreneurial skills and hubs of knowledge. The Erasmus+ programme is one of the frameworks offering grants with this scope. These three organisations have stakeholders from the business environment and provide volunteering opportunities.

GEYC

Group of the European Group of Change (GEYC, 2023) was founded in 2010 and stands out with the many initiatives and projects they have for youth. They want to empower young people to create a positive change in their communities. The target youth, youth workers and teachers to join their activities. The event SMARTERAcademy reached the 6th edition, starting in 2014, this is one of the many initiatives that brings youth,

the aim is to foster the mindset of social entrepreneur, to give necessary knowledge to make a change in the local level, thus developing young people capable of identifying the social needs around them and creating solutions for them. GEYC has a community of over 3000 young people, and it is continuously increasing.

AIESEC Romania

Association Internationale des Étudiants en Sciences Économiques et Commerciales (International Students Association of Economical and Commercial Sciences) in Romania was founded in 1990 (AIESEC, 2023). Being considered the first youth NGO in Romania. The aim of AIESEC is to develop the leadership qualities of youth through experiences. The experience are opportunities for personal development, facilitating international exchange programs, local volunteering, and events. Nowadays AIESEC is a global platform for young people to explore and develop their leadership potential.

ESN Romania

Erasmus Student Network (ESN) Romania was founded in 2004, when the section from Cluj-Napoca was accepted within the international network. Today ESN Romania has 14 local sections in 12 cities. The organisation has approximately 400 volunteers providing help to approximately 3500 international students who come to Romania each year. ESN believes in helping international students integrate and is providing opportunities for cultural understanding and self-development for students of Romania and not only (ESN, 2023).

3. Research Methodology

The methodology of this study is focused on two types of analysis, primary research and a secondary one. The primary research is based on a survey constructed in three sections applied on 55 young people. The secondary study is built on statistics and knowledge gathered from reports, scientific articles, guidelines, and other sources.

The authors conducted a pilot study concerning the profile of young people with innovative mindset and their interactions with the business environment. The topic of skills and adaptability nowadays is very important for the business environment.

The main variables shaping the questionnaire are linked with other studies emphasising the entrepreneurial and innovation competence and the extracurricular activities with emphasise on the volunteering aspects, which might influence the mindset. In table 1 are presented the research objectives and the operational variables.

Table 1: The study's research objectives and research variables

Research objectives	Research variables
O1. Defining the youth innovation mindset and capacity.	Common extra-curricular activities
	Volunteering involvement (type, purpose, department, period)
	Job organisation profile
	Organisation field
	Activity (department) type
	Average number of employees
	Role within the workplace
	Entrepreneurial intention
	Work experience
	Openness to hire young people
O2. Understanding the ways of interaction of youth with the business environment, the level of involvement and competence	Workplace mindset
	Ideas and opportunity
	Resource
	Into action
O3. Defining the demographic respondent's profile.	Age
	Gender
	City of residence
	Level of education (year, ongoing studies)

Source: authors' structure depicted from the literature review analysis.

The primary research was carried out on a sample of people between the age of 20 and 30, covering a wide range of workplaces within different industries and different education levels. All respondents agreed to give their permission for the research team to use the data for research purposes only. The results were used for statistical measurements and analysis.

The applied questionnaire was structured in three parts covering 27 mandatory closed questions and one non-mandatory open question. The first part was focused on identifying the importance and involvement in extracurricular activities for young people. This part was formed of 9 questions covering the variables mentioned in Table 1. The second part structured in 12 questions covered the connection of youth with the business environment and innovation mindset. The third part of the questionnaire involved general descriptors about the respondents, their profile regarding age, gender, and level of education.

The survey variables are using the scales as follows: 20 questions using the nominal scale and the rest using interval scale, and one using ratio scale. The interpretation and graphical elements were made in PSPP, Microsoft Excel and Google Forms. Figure 1 shows an extract from the variable database in PSPP, an open-source statistical instrument.

Variable	Name	Type	Width	Decimal	Label	Value Labels
1	age	Numeric	8	2	Choose yo	{1.00, 15-19}...
2	gender	Numeric	8	2	Choose th	{1.00, M}...
3	residence_	Numeric	8	2	What is yo	{.00, Bucharest}..
4	study_leve	Numeric	8	2	What is th	{5.00, HighSchool
5	study_yea	Numeric	8	0	When hav	None
6	still_enroll	Numeric	8	2	Are still e	{.00, NO}...
7	types_extr	String	30	0	What type	None
8	volunteeri	Numeric	30	0	For how lo	{1, Up to 20 hours
9	volunteeri	Numeric	8	2	Have you	{.00, NO}...
10	employed	Numeric	8	2	Do you ha	{.00, NO}...
11	owning_bu	Numeric	8	2	Do you ow	{.00, NO}...
12	number_jo	Numeric	8	2	How many	{.00, None}...
13	years_wor	Numeric	8	2	How many	{.00, None}...
14	hiring_you	Numeric	8	2	Is your co	{.00, NO}...

Figure 1: PSPP variables database

Source: authors' structure depicted from the literature review analysis.

4. Results and findings

The first step into the survey was to understand the involvement level in activities that would extend innovation competence and skills. This point can be related to the demographic profile. The pilot study was focused on two main age intervals 20-24 years old and 25-30 years within 55 responses, as it can be depicted from Figure 2. The interval 15-19 was not taken into consideration because there were no relevant responses. Over 80% of the respondents are from Bucharest, and the rest are from other cities of Romania.

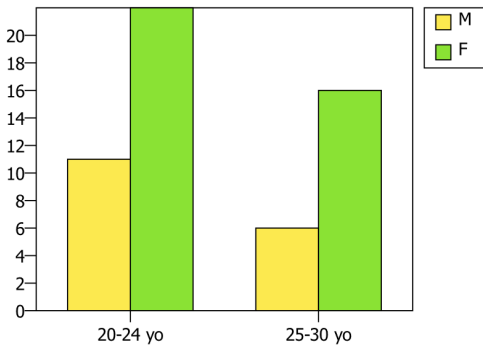

Figure 2: Age-Gender distribution

The two age intervals are related to the peak of education in Romania and common to the interval in which youngsters enter university and start preparing their professional activity.

In the first section several useful percentages were identified, for example over 70% of the participants at this survey are still studying in a private or public form of education, only one respondent of 40 is participating in a private form of education. Then the highest participation in non-formal activities were courses and workshops related to the individual interest, the contests and competitions and the internships together with the volunteering activities among the top four out of nine main activities.

Regarding the volunteering aspect, the most relevant volunteering activities were the ones at local level, inside Romania, only a small percentage of the respondents were involved in international volunteering activities, about 20% of the respondents did no volunteering at all until the moment of this survey completion.

From the rest of 80% of the respondents who carried out volunteering activities, 27,3% did volunteering between three and four years, 16,4% carried volunteering activities for up to one year and 16% said that they are carrying volunteering activities for more than five years, as presented below in Figure 3.

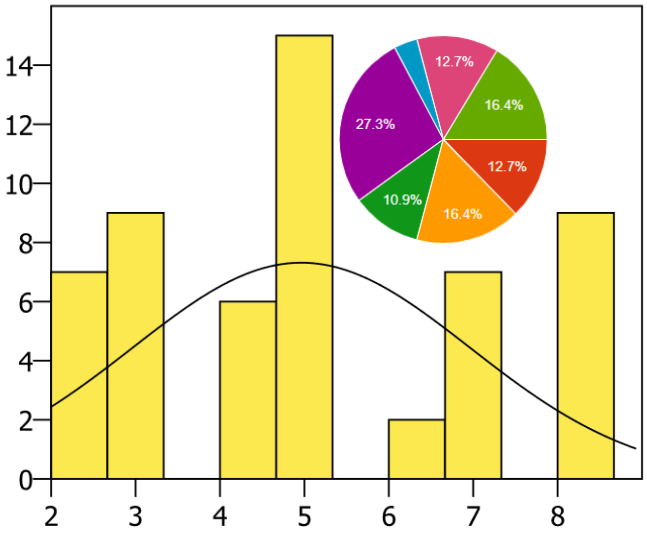

Figure 3: The distribution of time for volunteering involvement

Regarding the purpose of the volunteering and main areas, there was extracted from the literature review seven types of areas. Soomro et all (2015) studied these seven types of general services (educational, medical, welfare services), emergency services (ambulance, fire department, movements), environmental issues, recreational volunteering (sports, philanthropic, international), political, religious/faith and imposed volunteering. The respondents were asked to choose a maximum of three out of the seven areas which were representative of their experience. The top three young people's preferences with 87% were the general services, recreational volunteering, and the environmental issues.

In Figure 4 is presented an overview, in descending percentage order of the variables describing the organisations profiles depicted from the respondents. The 55 young people representatives covered the

following organisation types: corporations (66%), SME (16%), state institutions (10%) and non-governmental organisations (8%).

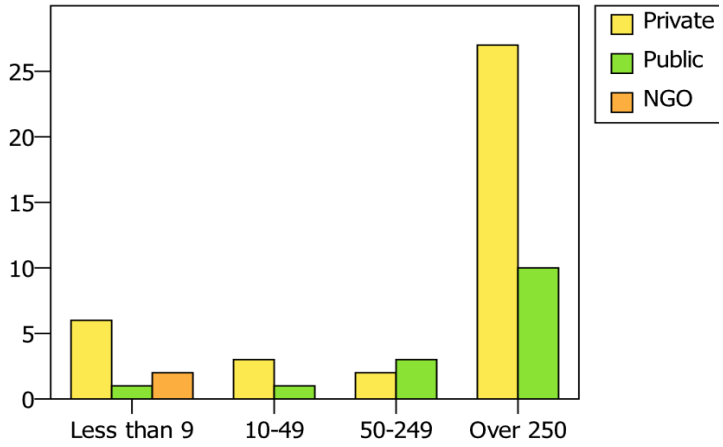

Figure 4: The organisations profile where the young people are working.

Besides setting the profile of the youngsters several correlations between the variables are presented, emphasising the data gather and the results.

While correlating the fact that a young person owns a business with the involvement in non-formal learning, it can be concluded that while the number of respondents is quite small, only 7.27% declared that they own a business, the respondents who declare that they own a business also confirmed that they were decision makers within their volunteering experience. The table 2 shows the crosstab analysis between the two variables.

Table 2: Crosstab Owning a business and Decision Maker volunteering activities variables.

Do you own a business × Have you been a decision maker in your volunteering/extracurricular activities?

			Have you been a decision maker in your volunteering/extracurricular activities?		
			NO	YES	Total
Do you own a business	NO	Count	23	28	51
		Row %	45.1%	54.9%	100.0%
		Column %	95.8%	90.3%	92.7%
		Total %	41.8%	50.9%	92.7%
	YES	Count	1	3	4
		Row %	25.0%	75.0%	100.0%
		Column %	4.2%	9.7%	7.3%
		Total %	1.8%	5.5%	7.3%
Total		Count	24	31	55
		Row %	43.6%	56.4%	100.0%
		Column %	100.0%	100.0%	100.0%
		Total %	43.6%	56.4%	100.0%

Source: authors' structure depicted from the literature review analysis.

Even though almost 70% of the respondents declared that they were volunteers for a period longer than 1 year, just over 65% from the respondents had a job at the moment of the survey completion in April 2023, and aproximatively 20% was looking for one. Hence there might be a relation between the two variables. Also for a better undestanding in Table 3, a Pearson correlation was realised, and can be deducted that between the three variables taken into consideration for the correlation: time spent to do volunteering, number of jobs changed by now and current role, there is a small degree of corelation.

Table 3: Pearson correlation duration volunteering activities/number of jobs/role

Pearson Correlation	V1. Duration of volunteering activities	V2. Current role within your organisation	V3. Number of jobs by now
V1	1.0	0.109	0.70
V2	0.109	1.0	0.240
V3	0.070	0.240	1.0

Source: authors' structure depicted from the literature review analysis.

Regarding the impact of extracurricular and study experiences, the respondants recognise that they were possitively impacted by both, as seen in Figure 5.

Another point tackled was how open is the business environment to hire youth and how they attract them. Almost 90% of the respondants stated that their companies have a open culture and prefer to hire young people. The most prefered ways to reach young people are participation at job fairs, short-term intership offers, financial incentives and grants.

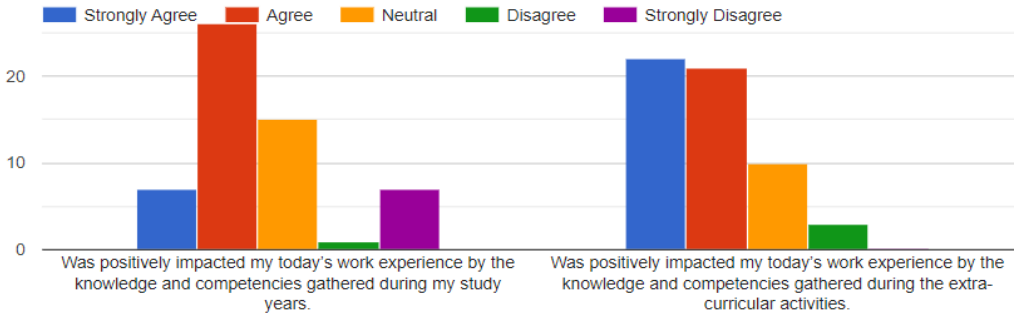

Figure 5: Distribution of education versus extra-curricular impact at the workplace

Regarding the innovation mindset acquired by the youth during their formation years, the respondents were asked in the questionnaire if they agree with statements related to the innovation competence. These statements were depicted from the EntreComp: The Entrepreneurship Competence Framework, a study from 2016, conducted within the EU JRC Science Hub (Bacigalupo et all, 2016) and adapted to the methodology of the study. Depicted were the ones which expressed the innovation and growth, highlighting the contribution of the young people to the development of their specific field of study and work.

The statements covered all three innovation competence areas which are tightly connected, as mentioned in Figure 6, in the conceptual map. There were 30 statements covering Ideas & Opportunities, Resources and Into Action, for each statement a scale of five levels was applied: Strongly Agree/Disagree, Agree/Disagree and the Neutral attitude.

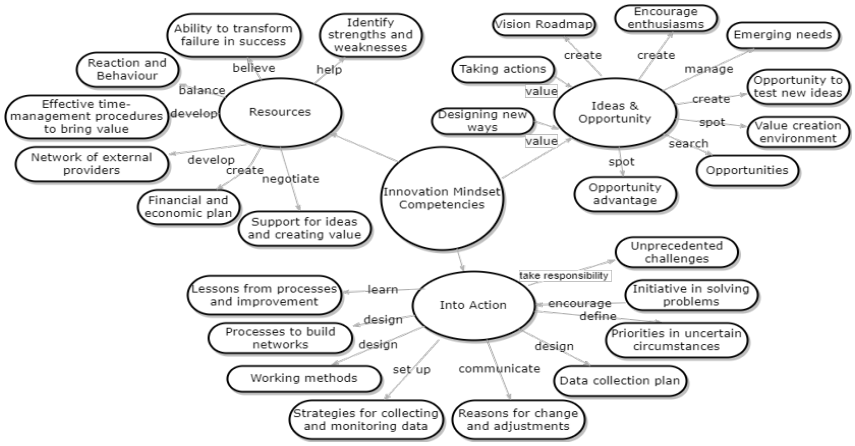

Figure 6: Innovation attitude and mindset conceptual map

Source: Bacigalupo et all, 2016

According to the EntreComp Progression Model and to the respondents, 35% of the youth consider they are still building the independence, and another 35% are taking responsabilities, as presented below in Table 4.

Table 4: Adapted EntreComp Progression Model

Foundation	Intermediate	Advanced	Expert
Relying on support from others	Building independence	Taking responsability	Driving tranformation, innovation and growth
16% respondents	35% respondents	35% respondents	14% respondents

Source: Bacigalupo et all, 2016

As main finding can be said that volunteering work is important for acquiring useful skills and competence for the job market, and it is impacting the innovation mindset. Figure 7 is reinforcing the Progression Model, here the respondents seem to agree that they take the responsibility, and they are closer to driving transformation and innovation at their workplace.

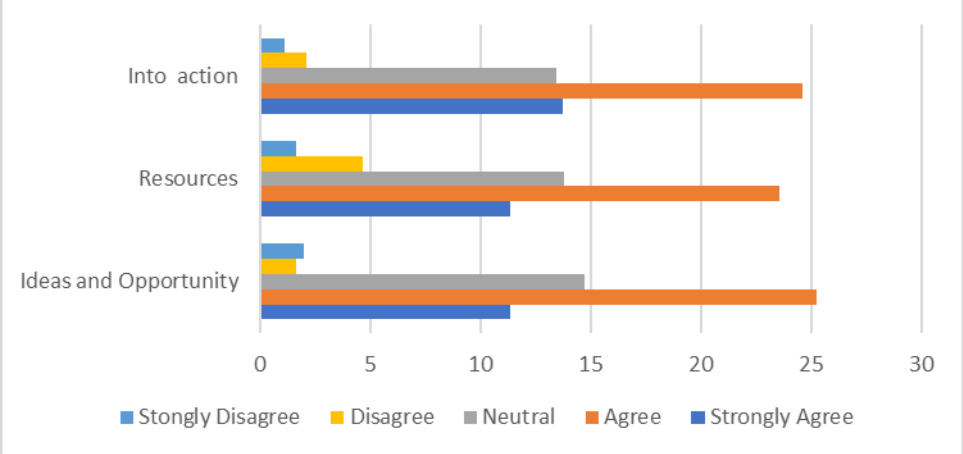

Figure 7: Average Distribution of answers Innovation Mindset Statements

Youth can bring change within an organisation with the skills and competence acquired during the study years. Though the number of years of volunteering is not strong related to the present role at the workplace, the skills do count for their experience.

Even though the sample was small, the insights are intriguing. The Romanian youth agrees with the fact that formal knowledge and work experience are impacting positively their career and long-term prospects, but they do not feel prepared to be make changes at their workplace. They prefer to do their tasks at work following guidelines and getting help from peers.

The number of years of volunteering experience raises the confidence of the youth and bring added value to the workplace. And the work position in most cases id not related to the volunteering topic or hobbies of the respondents. The entrepreneurial spirit is not emphasised enough, because only 8% of the respondents own a business.

5. Conclusions

The young people possessing entrepreneurial-innovation mindset, usually are the ones with competence gained from the studies done individually and doing non-formal learning they have done without being confined by the society, they are the ones curious and courageous enough to get out of their comfort zone.

Living nowadays, in an era where technology achieved a speed of development hard to keep up by most of the people, means to create new patterns of thought. Even though resistance to change is a natural part of the process, the same is innovation and creativity. In the case of the Romanian youth, the majority is trying to survive and get a job, only a few make efforts to thrive and change the workplace.

Even though the sample from this study could not be representative for all young people, the results can still be applied. Yes, the research is quite restrictive, therefore a broad analysis can be developed in future research. Using the framework from EntreComp brought extra value to the article and to the survey variables. For the analysis of the primary data PSPP was used as primary tool.

One of the limits of this paper was the sample, only 55 respondents. Also gathering relevant data from the 15-19 years old youngsters could bring forward improvements on the research.

Another limit was the questionnaire structure, being a pilot study, this first version can be improved through iteration. One last limitation can be connected to the lack of literature review on the topic, there are several highlighting the innovation mindset in companies but not related to the skills and competence of young people.

The topic of innovation mindset is quite extensive to cover. This research contributed to the topic scratching the surface about youth in Romania, regarding skills and involvement in the business environment.

Future directions of research: iteration of similar research, analysis of skills acquired depending on the non-formal learning, decision making barriers for innovative mindset and potential comparison between organisational culture in different existent industries in Romania.

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Emerging Technologies: A Catalyst for Sustainable Business Model Innovation

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Abstract: Grand Challenges are global problems requiring coordinated effort from stakeholders at different levels. For-profit businesses, as loci of innovation, can play a pivotal role in advancing Grand Challenges by fostering social impact collaboration. Business Model Innovation is a useful mean to combine the possibilities offered by emerging technologies with the needs of sustainable challenges. Blockchain is widely recognized as an emerging technology, rapidly growing, highly novel and with a prominent impact on different sectors. We adopt a Comparative Case Study in the field of the Voluntary Carbon Market, unregulated markets where organizations can offset their impact by compensating their negative externalities on the environment by buying carbon credits generated through certified mitigation projects following international standards. As climate change is a main Grand Challenges and a threat to humanity, as recognized by the United Nations Sustainable Development Goals, this research aims to explore the role of blockchain as a catalyst for Sustainable Business Model Innovation. This study makes two significant contributions to the field of business model innovation, emerging technologies and Grand Challenges. First, it highlights the importance of Business Model Innovation to address Grand Challenges and overcome their managerial problems, including valuating, coordination, trust, access and reach. Our study presents a novel conceptual model anchored in the Business Model as an activity system view, revealing three actionable characteristics of blockchain that can help to design novel activities configurations able to advance managerial problems encountered by for-profit organizations while advancing effort towards Grand Challenges: asset enabler, trust machine and coordinated and collaborative action enhancer. Second, from a technology-oriented perspective, it offers insights into how an emerging technology can be leveraged to foster complementarity by converging with existing assets and technologies, thereby generating new value. For practice, our findings provide a framework for both startups and established companies to leverage blockchain technologies to create meaningful and lasting impact.

Keywords: Business Model Innovation, Grand Challenges, Emerging Technology, Blockchain, Tokens, DAO.

1. Introduction

Resource scarcity, climate change, inequalities, poverty, inequal access to good health and quality education are among the most urging societal challenges the world is experiencing nowadays. These critical social and environmental issues have been called "Grand challenges" (GCs), which are wicked issues with complex, no clear and unequivocal solution (George, Howard-Grenville, Joshi, & Tihanyi, 2016; Voegtlin, Scherer, Stahl, & Hawn, 2022). In a globalized society, these threats are increasingly influencing public opinion; addressing them effectively requires a collaborative mobilization of governments, businesses and individuals (Grodal & O'Mahony, 2017; Howard-Grenville & Spengler, 2022).

Firms play a central role as a "locus of innovation", and an increasing number of organizations are seeking to achieve both profit, social and environmental impact (Porter & Kramer, 2011).

For this purpose, technology can be a useful tool to conjugate the possibilities offered by new technologies with the needs of the sustainable challenges (Foss & Saebi, 2017; George et al., 2016). This research adopts a technology-oriented perspective to investigate the properties of an emerging technology, blockchain, that has been identified form the literature as highly transformative for its contexts of application (Holotiuk, Pisani, & Moormann, 2019), trying to shed light on how it can generate new sustainable business models. To accomplish this purpose, we conduct an inductive multiple case study (Eisenhardt & Graebner, 2007; Gioia, Corley, & Hamilton, 2013; Yin, 1984) in the field of the Voluntary Carbon Market (VCM) and present a novel conceptual model, anchored in the business model as activity-system view (Zott & Amit, 2010). Our study proposes three blockchain actionable characteristics for sustainable business model innovation: asset enabler, trust machine

and coordinated and collaborative action enhancer. By adopting a technology-perspective towards sustainability, we advance the consolidated work on technology diffusion (Rotolo et al., 2015; Tushman & Anderson, 1986; Utterback & Abernathy, 1975), by "opening the black box" of an emerging technology while understanding how they can affects business models.

2. Literature Review

The most relevant definition of GCs has been done by George and colleagues (2016), that describe them as "*formulations of global problems that can be plausibly addressed through coordinated and collaborative effort*" (George et al., 2016; Howard-Grenville et al., 2019). Namely, GCs call for a coordinated and consistent effort from a wide range of stakeholders from different levels of organizations and society, for alterations in the way economic activities are planned and carried out and for advancements in tools and technology (George et al., 2016).

Business model innovation (BMI) is increasingly recognized as a key driver to deliver greater social and environmental sustainability in the industrial system, as it entails holistic changes to how business is conducted on multilevel and multistakeholder dimension (Klein, Spieth, & Heidenreich, 2021). To this extent, Zott and Amit (2010) define the business model as "*a system of activities, as well as the resources and capabilities to perform them, through which a focal firm creates and captures value*". A business model can be described in term of content of activities, their structure (how there are connected) and governance (who perform them). An activity system is also characterized by different dominant logics to achieve value creation: Novelty, efficiency, complementarities and lock-in (Zott & Amit, 2010). BMI regards changes to the key elements of a firm's business model and the architecture of the activity system (Zott, Amit, & Massa, 2011).

Sustainable business model innovation is defined as the incorporation of heterogeneous logic within business, considering the so-called economic, environmental and social "triple bottom line"(Bocken et al., 2014). To this regard, George and colleagues (2021) attempted to distill Grand Challenges into six managerial problems, that undermine firms' efforts to drive sustainable change: problems of knowing, valuating, communicating, coordination and trust, access and reach and institution.

According to recent literature, the use of technologies may enable BMI potentially with a sustainable-oriented purpose (Foss and Saebi, 2017). Emerging technologies, such as fifth generation (5G) cellular technologies, autonomous cars, blockchain, internet of things, and machine learning, have enormous value-creation potential in a broad range of applications (Snihur, Zott, & Amit, 2021; Teece, 2018). Emerging technology–enabled business model innovation simultaneously affects customers, suppliers, strategic partners, and others who participate in the ecosystem, creating new needs for stakeholders, so that novel resource configuration could arise (Amit & Han, 2017; George et al., 2021). Blockchain can be classified as an emerging technology, as it fulfills the characteristics of radical novelty, fast growth, coherence, prominent impact, uncertainty and ambiguity, identified by Rotolo, Hicks and Martin (2015). However, these characteristics are not fundamental technological traits, but rather factors that explain the diffusion and impact of a technology, allowing it to be classified as "emergent" and advancing the consolidated work on technology diffusion (Tushman & Anderson, 1986; Utterback & Abernathy, 1975; Rotolo-et-al, 2015).

It is instead left apart how the inner characteristics of the emerging technology may be used as levers for business model innovation (Foss and Saebi, 2017). Therefore, recognizing the emergent nature of blockchain and the possible consequent implications in terms of BMI and GCs, the research questions investigated in this study is *"How blockchain enables the design of Grand Challenge-oriented business models?".*

3. Methodology

The theoretical background on which the research is based allows to identify the research question at the intersection between GCs, BMI and emerging technologies literatures. The unit of analysis aim of this research are the technological features of blockchain that enable new sources innovation in the business model design elements proposed by Zott & Amit (2010) in their activity-system view, and how they tackle the managerial problems formulated by George and colleagues (2021).

Blockchain impact on sustainable business models is a research field still unexplored, from which new theory can emerge (Eisenhardt, 1989). As a result, it is advantageous to proceed with qualitative research. More specifically, it was chosen to conduct an inductive multiple case study, as more robust if compared to a single case study (Eisenhardt, 1989; Yin, 1984).

3.1 Empirical Setting and Case Sampling

Climate change is currently considered one of the most critical challenges to face in the next years, representing a proper threat for human as species (Pörtner & Roberts, 2022). The primary issue with climate change is the rising concentration of greenhouse gases in the atmosphere, which causes global warming. However, in most industries, there is no penalty for causing air pollution. Carbon markets can be an effective tool for internalizing the negative externalities associated with greenhouse gas emissions. Voluntary Carbon Markets (VCM) are non-regulated markets, in which organizations participate based on self-imposed emissions reduction goals. Here, actors can offset their impact by buying carbon credits that are generated through the development of mitigation projects that follow precise international methodologies and that are verified and certified by external accreditation entities. These projects usually allow the reduction or removal of emission production in the atmosphere (Ieta, 2021).

According to the Taskforce on Scaling Voluntary Carbon Markets, the demand for carbon credits could increase by a factor of 100 by 2050. However, the market is characterized by some problems that prevent it to scale up: measurement technical issues, heterogeneity and illiquidity of carbon credits, greenwashing concerns, opaqueness and fragmentation, entry barriers and lack of regulation (McKinsey, 2021). Practitioners are growing more confident in the use of Blockchain technologies to better collaborate in the fight against climate change and for decarbonizing the global economy. The growing interest in the area is evidenced by the astonishing number of new companies that are beginning to develop novel solutions adopting blockchain for carbon markets (Morgan Stanley, 2022).

Table 1: Sample selection

Company	Value-chain position	Blockchain protocol	Headquarter Basis	Maturity stage
Company A	Integrated	Polygon	Singapore	Low $ 530.000
Company B	Integrated	Azure Distributed Ledger	Australia	Low $ 1.400.000
Company D	Demand side	Polygon	USA	High $ 14.410.000
Company C	Integrated	Cosmos	USA	High $ 10.500.000

The sampling approach was thus theoretical, as high quality case study research needs to be based on cases chosen for appropriate theoretical reasons, chosen for the likelihood that they will offer theoretical insight (Eisenhardt & Graebner, 2007).

The main source utilized to gather blockchain-based startups for the selection process was Pitchbook, a subscription-based website that delivers data and research covering private capital markets, including venture capital and private equity. Companies were searched including keywords such as “Blockchain” AND “Sustainability” or “Blockchain” AND “Environmental services”. To produce a heterogeneous sample within the "region of homogeneity" subject of our analysis, we considered different cases considering value chain position in the market, adopted blockchain protocol, geographic location and maturity stage, as shown in table 1. Once the initial sample was sufficiently large, it was filtered to select the most notable cases. As a conclusion of the case selection phase, a final sample of 4 blockchain-based startups were extracted and investigated: Company A, Company B, Company C and Company D.

3.2 Data Collection and Analysis

The four cases were subjected to semi-structured interviews with founders and C-levels over two distinct waves. The results of this phase of the research were recorded, for a total of 380 minutes of material, and transcribed, for a total of 107 pages. According Eisenhardt (1989) and Yin (1984), who argue that the use of multiple sources of information improves the overall rigor of a case study, the final outcome of primary data was “triangulated” with secondary sources, coming from the companies’ websites, whitepapers and from third party articles, in order to generate more robust results for the qualitative research.

Following the data collection phase, data analysis was carried out to support the research discussion. Ground theory methodology (Strauss & Corbin, 1998) was adopted to study each case according to an open coding practice, allowing to investigate complex phenomena using labels, thus generating theory from interviews. Collected data allowed the generation of in-vivo codes dataset and the analysis following constant comparative method (Gioia et al., 2013). Subsequently, a comparison of codes from the different cases was carried out to obtain the formulation of first-order concepts. Following the identification of first-order concepts, second-order themes were created to achieve a higher level of abstraction by linking the previously identified concepts to more theoretical constructs. The second-order codes were then aggregated into two major overarching dimensions taken from the two theoretical constructs that underpin the research: (1) *Grand Challenges managerial problems*, based on George and colleagues (2021) work; (2) *Business model design themes* routed in Zott & Amit (2010) seminal work.

With reference to cross-case analysis, we looked for similarities and differences at different abstraction levels (first order concepts, second order themes and overarching dimensions) to compare the differences between the four cases, allowing for novel findings (Eisenhardt, 1989). Finally, a further analysis crossed similarities within first order concept and second order themes of the two overarching dimensions. In this way, the correlation between Grand Challenges managerial problems and design themes was investigated. The final result was graphically represented using coding trees (Gioia et al., 2013).

4. Results

The cross-case analysis, carried out triangulating primary data coming from interviews with secondary data, has been the foundation for the conceptual framework described in figure 1.

According to the findings, blockchain can successfully contribute by addressing the heterogeneity and illiquidity issues of carbon markets (*problem of valuating*) – while allowing to tokenize and fractionalize carbon credits.

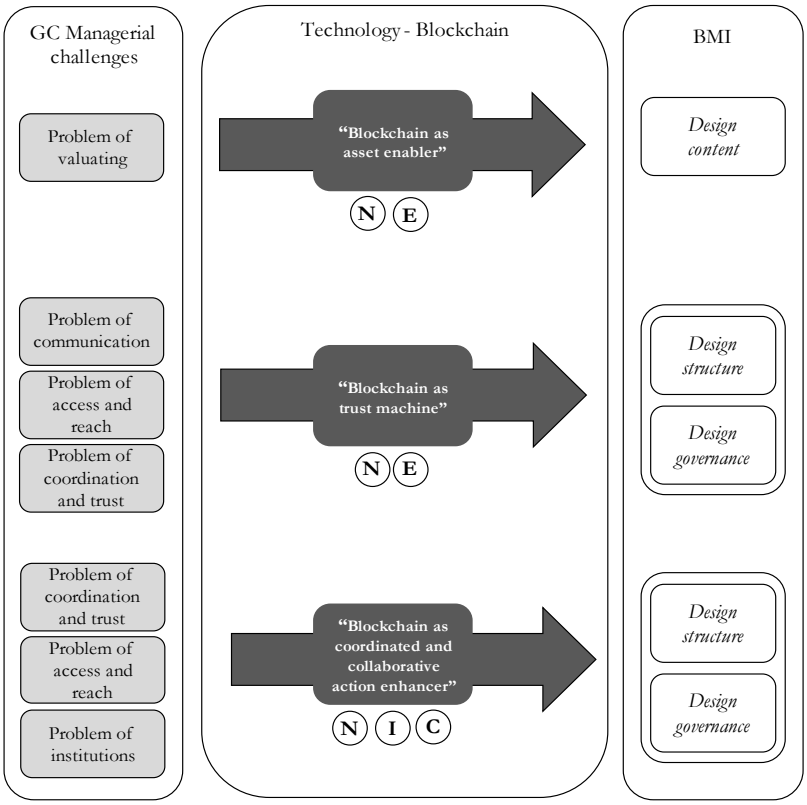
Carbon credit baskets aggregate credits from comparable carbon offsetting initiatives, boosting the homogeneity of the supply of carbon credits. Increased liquidity results in correct price discovery for each credit class. Concerning *problem of communicating*, blockchain may be a reliable mean to fight greenwashing as in the distributed ledger, all the transactions are immutably recorded in the ledger. All the startups evaluated addressed the opaqueness and fragmentation issues of voluntary carbon markets (*problem of coordination and trust*). Blockchain, due to its peer-to-peer nature, might promote higher degrees of disintermediation within the activity-system towards carbon credit brokers, traders, and merchants thus lowering transaction costs. Blockchain makes also possible to establish new roles or coordination mechanisms. For example, new methodologies can be proposed with open innovation approaches and validated through decentralized governance mechanisms, as in Company C, or peer-to-peer lending mechanisms enabled, as in Company A.

As a result, blockchain can help by providing the tools for removing entry barriers (*problem of access and reach*) both in the demand side and in the supply side. Finally, blockchain may fill institutional void or failures (*problem of institutions*), serving as a global distributed platform infrastructure for transacting carbon credits, without heavy reliance on trust intermediaries.

Regarding the design themes overarching dimension (Zott and Amit, 2010), the cross-case analysis suggests that blockchain promotes *novelty* mostly through tokens. It is critical to distinguish between governance tokens, which reflect the DAO's governance and consensus mechanism, and utility tokens, which represent on-chain carbon credit revival. Governance tokens enable new forms of decentralized governance, resulting in new forms of organizations (DAOs), where token holders can take part in the decision-making process. As such, tokenization may enhance the *efficiency* of carbon markets, demonstrating a strong association between value creation sources. The distributed ledger and the use of smart contracts to automate trustless transactions are also tied to efficiency. The improved openness and accountability of the decentralized ledger aid in the decrease of information asymmetry. Finally, transaction costs are drastically reduced by the possibility of decreasing the of reliance on intermediaries on both the demand and supply side.

Concerning the value source of *complementarity*, two main insights emerge. First, the application of blockchain is empowered with the usage of a combination of other emerging technologies (i.e., Sensors and satellites) to innovate the measurement, reporting and verification process. Second, it has been founded that blockchain enabled activity systems exhibit composability, enabling new organizational models (i.e., Decentralized Autonomous Organizations) that encourage open-source and cooperation logics. Finally, regarding the *lock-in* design theme, the use of governance tokens and the development of DAOs allow investors to become more closely associated with the businesses, allowing them to take part in decision-making and share in the profits.

Figure 1: Conceptual Framework.



5. Discussion and Conclusions

According to George and colleagues (2016) "*Grand Challenges are formulations of global problems that can be plausibly addressed through coordinated and collaborative effort"*. This study contributes to the call by Bocken, Heidenreich, Spieth, Tucci and Zott (2022), who asked researchers to investigate business model innovation as a mean to address Grand Challenges. By drawing on the case of voluntary carbon market, we get to explore how blockchain can contribute to the improvement of sustainable issues. In particular, our contribution is twofold.

First, we provide a theoretical contribution to the BMI and GCs literatures by studying business model innovation as a means of addressing Grand Challenges. Building on the business model construct proposed by Zott & Amit (2010) in their activity-system view, our framework (fig.1) illustrates three features that characterize blockchain as enabler of novel forms of design content, structure and governance; specifically, blockchain acts as *asset enabler*, as *trust machine* and as *coordinated and collaborative action enhancer*.

Blockchain acts as an *asset enabler* as it adds the fundamental attribute of "ownership" to the internet we use today, allowing new asset classes to emerge: Governance tokens, which are built natively on-chain, govern the consensus mechanism of blockchain protocols and projects, as well as offering new kinds of stake, rights, and participation (F. Glaser, 2017); Tokenized assets, that are digital twins of current real assets that are represented and transferrable on the distributed ledger (Gan, Tsoukalas, & Netessine, 2021; George et al., 2021).Tokens may serve as a new source of *design content*, as they entail new activities related to the design of tokens, such as defining the conditions under which participants can earn new tokens for contributing resources to the network, or defining the rights associated with token ownership (Catalini & Gans, 2020; Forman et al., 2019; F. Glaser, 2017). For sustainable development, tokens can contribute to the problem of valuation, as they might change the manner of how we assess and value ecological and social assets. Accordingly, individual may gain access to asset classes and risks that may have been otherwise beyond their capacity, as it is possible to slice or group data into compact packets to create wider fractionalization and distribution of risk and ownership (Santos, Pache, & Birkholz, 2015).

Blockchain as *trust machine* property is linked to the nature of its distributed ledger and consensus mechanism. Smart contracts enable multiple parties who do not trust one another to engage in exchanges of value when

certain conditions are met (Catalini & Gans, 2020; Forman et al., 2019; Murray, Kuban, Josefy, & Anderson, 2021). Our study suggests that blockchain technology enhance trust and transparency by reducing costs and time for validating trading partners, freeing actors to trade in a large-scale decentralized fashion, without the need for a trustworthy intermediary (Bailey & Bakos, 1997; Malone, Yates, & Benjamin, 1987; Zott et al., 2011). Thus, our research suggest blockchain may enable new forms of *design structure and governance*, by the mean of an increased efficiency in the activity system.

Trust is important in many areas of sustainability, especially where there is an exchange of goods or services that have a social or ecological impact; these must be transparently communicated to the stakeholders and no mechanisms of opportunistic behaviours due to information asymmetries should arise (George, 2021). In these situations, pure commercial transactions can fail, while blockchain allows these transactions to happen despite the existing obstacles, such as by lowering costs or providing novel means of access (Santos et al., 2015).

Blockchain as a "*coordinated and collaborative action enhancer"* owes its name to the definition of GCs provided by George and colleagues (2016), according to whom solving grand challenges requires "*coordinated and collaborative effort*". Blockchain protocols pave the way for new paradigms of distributed governance and open-source collaboration mechanisms, such as decentralized autonomous organizations (DAOs). Namely, new forms of *structure* and *governance* within activity systems may be driven by complementarity and lock-in value logics. GCs lack centralized control over their participants, and some researchers claim that current organizational structures are inappropriate (Ferraro et al., 2015; Howard-Grenville & Spengler, 2022). Decentralized governance enabled by blockchain technology can serve as a mechanism for achieving structural alignment in addressing Grand Challenges. This is consistent with Adner (2017), definition of "ecosystem-as-a-structure," which characterizes ecosystems as the structural alignment of multiple partners who must interact to realize a central value proposition. A social or environmental challenge may represent the focal value proposition the set of partners collectively tackle with their effort.

Our research also contributes from a technology-oriented perspective, by "opening the black box" of an emerging technology. Blockchain fulfills the characteristics of an emerging technology described by Rotolo and colleagues' (2015): radical novelty, fast growth, coherence, uncertainty & ambiguity, prominent impact. However, these features are mainly related to the characteristics leading to the wider diffusion and adoption of the technology itself, advancing the consolidated work on technology diffusion (Tushman & Anderson, 1986; Utterback & Abernathy, 1975), by understanding how they may be used as levers for business model innovation (Foss and Saebi, 2017). Our analysis also revealed that blockchain adoption is related to other technologies exploitation. Building upon Teece's (2018) argument on technological convergence, we observe that the composability within different Blockchain protocols, as well as their integration with other consolidated and emerging technologies (i.e., third-party information sources, called oracles, including remote sensing and satellites) play a crucial role in unlocking the emerging technology's full potential.

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Exploring Industrial Tourism's Potential: How Can It Contribute to Business Innovation?

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Abstract: This article delves into the potential of industrial tourism and emphasizes its significance as an innovative and sustainable product for industrial companies. The research question driving this exploration is, "How can industrial tourism contribute to business innovation?" In answering this question, the article provides valuable insights into the development of strategies that allow companies to leverage industrial tourism for their benefit, ultimately positioning it as a strategic factor for enhancing their competitiveness. As part of an ongoing research project, the study adopts the Delphi research methodology and presents the initial findings from the first round of questionnaires administered to a panel of 27 experts. The results demonstrate that industrial tourism can act as a catalyst for innovation within industrial companies, making a notable impact across various areas, including Operations, Marketing, and Human Resources. Moreover, the findings indicate that generating additional income, prioritizing environmental and social integrity, and preserving industrial heritage is closely associated with innovation through industrial tourism. The research underscores the pivotal role of the Financial, Operational, and Human Resources areas within industrial companies for the successful diversification into industrial tourism. However, the strategic alignment of the company's overall vision with industrial tourism is equally fundamental. Despite not being the primary focus of industrial companies, industrial tourism emerges as a potent source of innovation and competitiveness within these organizations. The results suggest that the Financial, Operational, and Human Resources areas of industrial companies are central to the success of diversification to Industrial Tourism. Still, it is fundamental that the company strategy is aligned with industrial Tourism. Although Industrial Tourism is not the focus of industrial companies, it can be a source of innovation and competitiveness within companies.

Keywords: Industrial Tourism; Industrial Companies; Innovation; Competitiveness; Delphi Methodology

1. Introduction

Industrial tourism is a burgeoning field that capitalizes on the exploration of industrial heritage for tourism purposes (Pardo Abad, 2017). This form of tourism can manifest in decommissioned production facilities, such as industrial museums, or in operational production sites, which, due to their unique nature, attract visitors as educational and tourist attractions (Moral-Moral & Fernandez-Alles, 2019). Regrettably, the latter variant of industrial tourism remains underexplored, with scarce analyses adopting the perspective of the industrial enterprise.

In the pursuit of competitive advantage, innovation emerges as a pivotal factor (Porter, 1990), and the tourism sector is no exception (Kozak, 2017). Nevertheless, research on industrial tourism remains in its infancy, with consistent attention to this subject matter commencing only from 2015 onwards. Regrettably, the limited focus has been dedicated to the strategies pursued by industrial companies that incorporate tourism within their portfolio of activities. Nevertheless, extant research suggests that industrial tourism represents a potential source of innovation and diversification for companies and regions, with the impact of embracing tourism hinging on the strategies deployed by industrial firms (Montenegro, 2020; Montenegro & Sousa, 2021). Strategically linking industrial tourism with consumer experience tourism facilitates the reinforcement of connections between consumers and brands, fostering personal bonds with consumers, employees, investors, residents, and other stakeholders (Mitchell & Mitchell, 2001).

While some scholars posit that Industrial Tourism caters primarily to niche markets (Kao et al., 2015; Morales et al., 2015; Harfst et al., 2021), others contend that it holds the potential to appeal to a diverse array of audiences. Younger generations exhibit curiosity towards the manufacturing industry, given their limited exposure to factory work. In contrast, older generations harbor nostalgia for the industrial era, evoking a desire to explore different industrial processes and reminisce about the "good old days" (Mitchell & Mitchell, 2001). Furthermore, factory visits can serve as a strategic recruitment approach for younger visitors, particularly college students (Nielsen, 2012), who are poised to enter the labor market shortly.

Industrial tourism is leveraged by companies as an integral facet of their business operations, yielding increased profits, expanded market share, and the mitigation of economic strains associated with the transition to a post-industrial society. Moreover, it bolsters industrial environmental integrity and nurtures a positive rapport between the enterprise and the physical environment (Rudd & Davis, 1998)

Tourist visits to industrial companies prove invaluable in maintaining or enhancing the company's image (Nielsen, 2012) and also contribute to the financial sustenance of these establishments (Saghafi et al., 2023).

The ongoing research endeavors to gather pertinent data concerning the integration of Industrial Tourism in industrial companies and how this novel tourism product can enhance the value proposition for these companies, notably bolstering business innovation and competitiveness. The article aims to present the preliminary findings derived from the initial round of questionnaires administered to a panel of experts. There is a mounting interest in this multidisciplinary theme, encompassing various research areas, with a prevalent adoption of qualitative methodologies such as case studies (Montenegro et al., in press). The originality of this work lies in its innovative approach, employing a qualitative methodology based on the collaborative input of numerous experts, using the Delphi methodology. This collaborative effort aims to enrich our understanding of the strengths and weaknesses inherent in the implementation of Industrial Tourism in small and medium-sized enterprises.

As an agent of regional development, industrial tourism brings forth economic, social, and ecological benefits. Nonetheless, it also presents certain challenges, such as concerns over excessive commercialization and the potential loss of authenticity in industrial heritage sites (Ermolaev et al., 2019). This research significantly contributes to the identification and understanding of the impacts of this tourism product and the formulation of development strategies for its successful integration within industrial enterprises. The comprehensive analysis of these aspects will undoubtedly enhance the overall knowledge base and pave the way for sustainable and responsible growth in the domain of industrial tourism.

2. Methodology

The Delphi Methodology has established itself as a widely accepted and utilized approach for collecting data from experts within their respective fields (Hsu & Sandford, 2007). Its value has been substantiated both scientifically and practically (von der Gracht, 2012), making it particularly useful in theory building. Specifically, the Delphi Methodology's outcomes prove valuable in the initial stages of theory development, aiding researchers in identifying relevant variables of interest and formulating propositions that hold applicability across various contexts and settings (Okoli & Pawlowski, 2004).

At its core, the Delphi Methodology seeks to attain a convergence of opinions on specific real-world issues (von der Gracht, 2012; Rowe & Wright, 1999; Hsu & Sandford, 2007). It has been effectively employed in diverse areas such as planning, needs assessment, policy design, and resource utilization to explore a comprehensive range of alternatives, elucidate underlying assumptions, and correlate judgments across multiple disciplines (Hsu & Sandford, 2007).

Consensus building using this method is accomplished by applying a series of questionnaires, using multiple iterations to collect data from a panel on specific topics (Hsu & Sandford, 2007). According to Landeta (2006), the main characteristics of this methodology are:

1. It is a repetitive process. Experts must be consulted at least twice on the same question to reconsider their answer with the help of the information they receive from the other experts.
2. It maintains the anonymity of the participants, allows working with experts in different locations, and avoids the negative influence that could be exerted between the personalities and status of the participating experts.
3. Controlled feedback. The information collected in each round of questions is processed, collated, and integrated into the next round so that the experts have feedback on the overall perspectives and opinions of the panel.
4. Statistical group response. All opinions are part of the final response. The questions are formulated to treat the answers quantitatively and statistically.

Following the preparation and review of a round of questionnaires, participants have the opportunity to either maintain their initial responses or modify them based on the group's response. This iterative process encourages participants to engage in in-depth discussions when their answers significantly diverge from the group response

(von der Gracht, 2012). The successive rounds of data analysis facilitate the measurement of consensus, its strength, and the convergence of opinions (von der Gracht, 2012).

The feedback mechanism in the Delphi process allows participants to reevaluate their initial judgments based on the information presented in previous rounds (Hsu & Sandford, 2007). This controlled feedback is designed to reduce the noise effect, providing a well-organized process that enables each participant to contribute additional knowledge and clarify data presented in earlier rounds (Hsu & Sandford, 2007).

When implementing a Delphi study, it is essential to ensure that the research serves a beneficial purpose for society, fostering collaboration among experts and generating pride in contributing to research that benefits the community (Landeta, 2006). Curating a diverse team with expertise in the studied area is crucial, and prioritizing experts' motivation is of utmost importance. The coordinator must consider factors that encourage active participation and sustained collaboration throughout the project, even if it means sacrificing certain questions and rounds to ensure the panel's continued engagement (Landeta, 2006).

Designing and implementing a Delphi study requires careful consideration of various aspects, such as selecting appropriate topics, establishing realistic time frames, addressing potential inadequate responses, and avoiding unintentional bias in the feedback from the respondent group (Hsu & Sandford, 2007).

The first round of the study, which is the focus of this paper, followed the traditional Delphi methodology, commencing with a questionnaire containing open-ended questions to serve as a guide for subsequent rounds of data collection (Hsu & Sandford, 2007). This initial questionnaire was employed as the instrument for the second round of data gathering.

The research commenced with an invitation to a select group of experts affiliated with Industrial Tourism at the national level. Following this initial phase and the careful assembly of a panel of 27 experts, a meticulously crafted questionnaire containing 12 open-ended questions centered around the subject matter of Industrial Tourism within companies and regions was distributed. The responses gathered were then meticulously collated, organized, and analyzed based on their frequency. The primary objective of this article is to unveil the most commonly cited insights and opinions offered by the experts during the first round of our study.

3. Results

The Delphi panel of experts for our study comprises 27 specialists hailing from diverse training areas, including History and Heritage, Business Sciences, Engineering, and Tourism. Notably, the panel represents several stakeholders of Industrial Tourism, encompassing City Councils, Industrial Companies, Travel Agencies, Tourism Associations, Regional Tourism Entities, Museums, and Universities. The first round of the study involved open-ended questions, prompting experts to share their knowledge and experiences concerning the advantages, disadvantages, strategies, and barriers associated with Industrial Tourism for industrial companies.

According to the experts, Industrial Tourism serves as a source of innovation for companies when they open their doors to external visitors. Through this form of tourism, companies can uniquely showcase their products and services, bolstering brand visibility. Additionally, adopting Industrial Tourism allows companies to pursue differentiation strategies and venture into new business areas.

The field of Human Resources benefits from Industrial Tourism as an innovative recruitment approach. By receiving different types of visitors throughout the year, industrial companies can establish early relationships of trust and pride with potential future employees. Each company can tailor attractive proposals during visits to suit the sought-after candidates and implement strategies to maintain these relationships beyond the visit, such as through social networks.

The benefits of Industrial Tourism extend to the company's supply chain as well. Visitors gain insight into the company's operations, including its supply chain, fostering greater public understanding and trust. This leads to a positive perception of the company among visitors, potentially transforming them into future brand ambassadors within their social circles.

Moreover, the sharing of information between the company and visitors during Industrial Tourism provides an opportunity for the company to highlight its environmental and social integrity, promoting responsible practices and garnering public support.

As Industrial Tourism emerges as a new business area for industrial companies, it has the potential to enhance company revenues through current sales or future sales in physical stores or online platforms, depending on each company's chosen strategy.

In addition to the various benefits for industrial companies, experts also acknowledge that dedicating a portion of Industrial Tourism revenues to support social causes can foster stronger relationships between the company and the local community.

For older companies with somewhat deteriorated tangible heritage, Industrial Tourism can serve as the necessary impetus for improvement, reconstruction, and adaptation. This drive toward restoration and adaptation promotes innovation in the company's physical resources and processes. Additionally, Industrial Tourism contributes to sustainability by repurposing industrial spaces and revitalizing post-industrial territories with environmental enhancements.

In summary, the insights provided by the panel of experts highlight the manifold advantages of Industrial Tourism for industrial companies, ranging from brand visibility and innovative recruitment strategies to fostering community relationships and promoting environmental sustainability. As this new business area continues to gain momentum, it holds the potential to transform industrial enterprises and contribute positively to the broader community and environment.

Table 1 summarizes the panel's expert opinions on the different areas in industrial companies where Industrial Tourism intervenes as a factor of innovation and competitiveness.

Table 1 - Areas of intervention of Industrial Tourism in industrial companies

Marketing	Valorization and promotion of the brand and its products. Promotion of emotional connection with customers. Visibility to the sector's professionals. Knowledge sharing with audiences outside the company.
Human Resources	Motivation and valorization of employees through internal Marketing. Recruitment strategy to attract potential future employees. Creation of employment opportunities.
Sales	Extra Source Revenue from entry tickets and factory store sales.
Environmental and social integrity	Openness and connection to society. Participation in the tourist and economic dynamics of the territory. The practice of social responsibility.
Supply Chain	Contact with new customers and stakeholders.
Renovation of the physical space	Access to finance for improving infrastructure and equipment.

Source: Elaborated by the author

Industrial Tourism has the potential to foster innovation and diversification within industrial enterprises, serving as a source of creative and innovative inputs and expanding the business into tourism-related activities. The different areas of intervention, as outlined in Table 1, encompass marketing, human resources, sales, environmental and social integrity, supply chain, and renovation of physical space. Through these areas, Industrial Tourism can contribute to enhancing the company's brand image, building strong emotional connections with customers, attracting talent, creating new employment opportunities, generating additional revenue streams, promoting social responsibility, and improving relationships with customers and stakeholders.

By leveraging Industrial Tourism in these key areas, industrial companies can enhance their competitiveness, unlock untapped growth potential, and align themselves with sustainable practices. The integration of Industrial Tourism as an innovative business strategy holds promise not only for the companies themselves but also for the broader societal and economic development of the regions in which they operate.

Indeed, while industrial tourism brings numerous benefits to industrial companies, experts have also identified several disadvantages associated with its implementation. These disadvantages highlight the potential challenges and considerations that companies must address when venturing into this form of tourism.

The primary disadvantage centers around the implementation cost, which can vary significantly among different industrial companies. While some may incur only residual expenses, for others, the cost may be substantial, potentially limiting their ability to embrace industrial tourism fully.

For active industrial companies, industrial tourism may lead to a loss of focus on their main activity. The influx of visitors and the logistical demands of accommodating tourists can create disturbances in the production chain and disrupt the company's overall operations.

Human Resources is another area of concern for the experts. The allocation of some employees to serve in the capacity of industrial tourism may divert their attention from their initial roles within industrial production. This change can pose challenges in workforce management and may impact productivity. Additionally, exposure to external viewpoints for manufacturing employees may serve as a source of motivation, but it may also lead to dissatisfaction if not managed effectively.

Seasonality and visiting hours present further drawbacks. The need for flexibility in daily logistics to accommodate tourist schedules can pose challenges for companies, requiring them to adjust their regular operations to cater to visitor demands.

Opening doors to external visitors necessitates additional measures for security and facility cleanliness. While this may spur innovation in some companies, others may view it as an extra obstacle to implementing industrial tourism within their facilities.

Overall, the most significant disadvantages that could hinder the implementation of industrial tourism in industrial companies primarily revolve around the Financial, Production Management, and Human Resources areas. These challenges call for careful planning, resource allocation, and strategy development to overcome potential hurdles and ensure the successful integration of industrial tourism as a strategic business endeavor. By addressing these concerns, companies can better capitalize on the benefits while mitigating the associated disadvantages of industrial tourism.

The experts were also asked to provide their insights into the implementation strategies of Industrial Tourism in industrial companies and identify potential barriers to the success of this partnership. Considering that business innovation is the focal point of this article, the primary strategies presented (without intervention from the government sector) that align with the previously mentioned benefits are as follows:

- Strategy - Reinforcing Industrial Tourism in the Strategy and Culture of the Company:

Experts emphasize the importance of integrating Industrial Tourism as a core component of the company's overall strategy and culture. By embedding this tourism concept into the fabric of the organization, industrial companies can ensure that it receives adequate attention, resources, and support from top management and employees alike.

- Human Resources - Carrying out Training Actions on Industrial Tourism:

To navigate the challenges associated with Human Resources, experts recommend conducting training sessions for employees directly involved in industrial tourism activities. These training initiatives aim to equip them with the necessary skills and knowledge to effectively engage with visitors, enhancing their overall experience and maintaining seamless integration with the company's industrial operations.

- Stakeholders - Partnerships with Tour Operators and Hotels:

Forming strategic partnerships with tour operators and hotels can significantly contribute to the success of industrial tourism ventures. Such collaborations can lead to increased visibility, reach, and marketing opportunities, allowing industrial companies to tap into established tourist networks and attract a broader audience.

- Marketing - Internal Investment of the Companies in the Promotion of their Proposals:

Experts advocate for companies to allocate internal resources for marketing efforts targeted at promoting their industrial tourism offerings. By investing in marketing activities, companies can effectively communicate their unique value propositions and attract a steady stream of visitors.

- Planning - Elaboration of an Annual Plan of Activities for Industrial Tourism:

A well-structured annual plan of activities tailored to industrial tourism is deemed essential by the experts. This proactive approach ensures that the company can effectively manage visitor flow, schedule tours, and plan immersive experiences, maximizing the overall impact of industrial tourism.

- Tourism Offer - Use of Technology to Create Immersive and Interactive Experiences; Creation of Storytelling about the Company; Creation of a Factory Store; Visits in More Than One Language; Offer Based on Experience Tourism:

To enhance the appeal of industrial tourism offerings, experts recommend embracing technological innovations to create immersive and interactive experiences for visitors. Additionally, storytelling about the company's history, achievements, and innovations can captivate visitors and foster a deeper emotional connection. The creation of a factory store can augment the visitor experience and generate additional revenue streams. Providing tours in multiple languages accommodates a diverse range of tourists, further expanding the company's reach. Finally, designing the tourism offer around Experience Tourism principles enhances the overall visitor experience and sets the company apart in a competitive market.

While these strategies present valuable opportunities for industrial companies, the experts also caution against potential barriers to the success of industrial tourism implementation. These barriers may include financial constraints, operational disruptions, resistance to change within the company's culture, and the need to strike a balance between industrial production and tourism activities. Addressing these barriers effectively is crucial for industrial companies to fully leverage the benefits of Industrial Tourism and drive business innovation in this emerging domain.

4. Conclusion

In conclusion, Industrial Tourism offers industrial companies the opportunity to drive innovation and enhance their competitiveness across various aspects of their operations, including products, services, and processes. Despite not being the primary focus of industrial companies, Industrial Tourism can serve as a valuable source of innovation and a strategic factor for enhancing their overall competitiveness.

This paper's objective is to explore how industrial companies can develop effective strategies to leverage Industrial Tourism and fully benefit from its potential advantages. To achieve this, the study adopted the Delphi research methodology, a rigorous and systematic approach that collects and analyzes expert perspectives and opinions to build a consensus on the subject of industrial tourism in industrial regions and enterprises. This paper represents the initial phase of a more extensive research project on industrial tourism.

The findings indicate that a healthy strategic alignment among the various areas of the industrial company is crucial for the success of Industrial Tourism. Failure to achieve this alignment can become a significant barrier to the successful implementation of this tourism product. The Financial, Operational, Human Resources, and Marketing areas are central to Industrial Tourism's success, and they play vital roles in shaping the overall experience for visitors and ensuring seamless integration with industrial operations. However, the strategic vision and organizational culture, represented by the company's manager, hold paramount importance in deciding whether to embrace Industrial Tourism and in ensuring its successful integration within the company.

This paper's preliminary results provide valuable insights into the potential of Industrial Tourism as a source of innovation and competitiveness for industrial companies. As the study progresses, subsequent rounds of the Delphi methodology will be conducted to refine the analysis and seek consensus among the participants. By delving deeper into the strategies and barriers related to Industrial Tourism, this research aims to offer practical recommendations for industrial companies to leverage this form of tourism effectively.

In summary, the exploration of Industrial Tourism in industrial companies has the potential to foster innovation and competitiveness. By focusing on strategic alignment, efficient resource management, and strong leadership support, industrial companies can fully harness the benefits of Industrial Tourism and enhance their overall competitiveness in today's dynamic business landscape.

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Influencers and the Purchase Decision: A Correlation in the Personal care Products Sector

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Abstract: Nowadays, influencers have become a fundamental part of innovative marketing strategies in global brands and companies. Since the emergence of social networks, they have become more relevant in these virtual spaces where Millennials have become the main protagonists, causing personal care brands to direct their efforts towards these new strategies. Within this context, the objective of this research is to determine whether there is a relationship between influencers and the decision to purchase products in the personal care market through the social network Instagram, in Lima, the capital of Peru. The research is applied with a quantitative approach, correlational in scope and non-experimental in nature. The survey was used as a research technique and the questionnaire as a data collection instrument with Likert scale questions, to assess reliability a Cronbach's Alpha of 0.810 was obtained, the sample consisted of young people aged 18 to 25 years and the fieldwork was conducted through social networks. The results show a significant correlation between influencers and the decision to purchase personal care products, with a Spearman's Rho of 0.309. In addition, it was also revealed that 38% of the respondents considered that a large number of followers was not enough to determine the credibility of an influencer. Finally, it was possible to verify that the alternative hypotheses were accepted and that there is indeed a relationship between influencers and the purchase decision. It can be concluded that influencers are considered an important source of information, they determine the purchase decision in well-positioned companies and enterprises, but this depends a lot on the impact of their speech; it is also concluded that many speeches reduce their relevance because they do not feel sincere and show only the purpose of selling.

Keywords: Marketing, influencers, influencer marketing, personal care

1. Introduction

Nowadays the world continues to change constantly with respect to new technologies, especially the Internet. Perez et al. (2014) state that the Internet has opened a new way by which people can communicate and interact, such as social networks. This evolution of social networks has allowed a new way of interaction of society as stated by Jimenez (2018) when explaining that social networks have generated a dynamism in society being an effective means of information, debate and boosting large social, cultural and political processes and movements in the world.

Within this context, it can be said that the Millennials have become the protagonists (Cordova-Buiza and Paredes-Vasquez, 2022). Aguilar (2016) describes them as a generation that moves like a fish in water with technology and that their attitudes or actions are mediated by a screen, which is why, to be connected to the network, they need tools such as smartphones to perform their work, socialization or leisure activities.

From the change, the opportunities offered by the market brought out a new type of trend "The Prosumer" (Rocha-Vallejos et al., 2022). Pérez and Luque (2017) define it as a person who not only consumes or receives content, but also produces units of content, achieving that their experiences or opinions can be disseminated or shared.

During this evolution the networks began to generate a trend that was increasing, it is there where according to Suazo (2018) television ceases to be the traditional format to which we were accustomed and the networks began to concentrate our attention and time and where these characters "The Influencers" begin to emerge. These characters who are considered opinion leaders or spokespersons denoting a lifestyle, showing transparency and trust with their followers; Santa María and Meana (2017) and Olavarria-Benavides et al. (2021)

add that they have the ability to influence people by modifying their opinions and being admired for the lifestyle they lead.

In addition, Carbajal & Gonzalez (2018) comment that influencers are changing the way in which companies communicate and try to reach their potential customers with an unforced advertising, but as a result of the recommendation through experience with a product, giving rise to reach new markets and obtain greater proximity to consumers. One of the most attractive markets is beauty or personal care since Patiño (2018) states that the industries that have felt the strongest impact of social networks have been health and personal care, where youtubers will play a crucial part in this industry since the vlogger phenomenon can define what products we will see on the shelf of our favorite store.

Regarding the personal care market, According to Alva (2021) in Latin America with the arrival of the COVID-19 pandemic; it meant a great concern in terms of health we are talking about, where the Personal Care category had its highest growth of +13% and beauty fell by -25% being the most critical. In addition, pharmacies became the channel with the largest purchases of personal care items.

With the arrival of Pandemic COVID 19 to Peru, the market was hit hard, Trigoso (2020) in his note to the president of the Peruvian Cosmetics and Hygiene Guild [COPECOH] stated that the restrictive measures affected trade and also the pocket of Peruvians where there was a fall in the categories of cosmetics and personal hygiene such as: makeup (48%), fragrances (39%) and facial treatment (23%); while the only one that increased was personal hygiene by 10%.

Also Flores (2019) comments through the Commercial Intelligence Study, that Peru is the fourth in the region with the highest per capita consumption of US$ 247, meaning that women spend approximately S/. 839 in these products per year. On the other hand, they also added that the distribution channels with respect to retail and direct sales have changed having between 51% and 48% respectively, with the remaining 1% corresponding to e-commerce.

In addition, the president of COPECOH Angel Acevedo, commented that what is expected for 2022 in the cosmetics and personal hygiene market is to achieve a turnover of 7,792 million representing a growth of 3.3% compared to 2021, considering of course that the framework of political and economic stability environment is optimistic. Indicators such as the development of mass consumption and inflation index present positive projections of +4% and +3.5% respectively (Trigoso, 2020).

Finally, all this information will allow us to know a little more about the area to be analyzed in this research. The facts described above lead us to formulate the following problem: What is the relationship between Influencers and the decision to purchase personal care products through the social network Instagram in Lima, the capital of Peru?

1.1 Objetive

The general objective of this research is to determine the relationship between Influencers and the decision to purchase personal care products through the social network Instagram.

2. Literature review

The foundation of this research is involved in the contribution and opinions of different authors. Ramos (2019) defines influencers as ordinary people who have managed to gain a large number of followers from their experience and transparency differentiating themselves from celebrities by the valuable information they share with their audience. One of the clearest theories is that of Two Step Flow Communication, where Lazarsfeld and Katz (1944 and 1955) comment that there are people who are more influential than others, stating that media influence occurs in two stages: First, the message delivered by the media to an opinion leader and second, the opinion leader shares his choice with others. Among their findings, they were able to see that opinion leaders were not necessarily people who held high positions (Weimann, 2015). Regarding the dimensions of this variable Serhat et al. (2022) comments on trustworthiness, explaining that when there is information that the consumer denotes as highly reliable, their comment will be positive and beneficial, so if they see the influencer in this way, the messages that they will transmit about a product or service can generate a change in the attitude of consumers. Regarding the expertise, he defines it as that which contains knowledge or different skills that allow you to make comments and / or statements on various topics. Finally, he explains that the attractiveness of the

influencer has required a harmony to have a positive impact on advertising; where the attractiveness is not limited only to the physical, but includes aspects such as familiarity, similarity and sympathy.

Astudillo & Bolaños (2021) comment that the purchase decision has its origin in the needs that people present, stating that there are internal and external factors that are based on the characteristics of the consumer and those that are alien to him. Among the theories, Maslow's pyramid is presented, where five different levels of needs were identified; where the basic needs were below and the higher ones at the top, where they will be activated as the lower levels are satisfied (Sergueyevna & Mosher, 2013).

Regarding the dimensions of the purchase decision we have Cultural, Social, Personal and Psychological factors. The first is defined as a set of values, perceptions, desires and behaviors that are learned from society, family and some institutions. Social factors focus on reference groups, which are divided into two; firstly, those that influence people, who are those of direct influence such as family, friends, acquaintances and co-workers and, on the other hand, the second is made up of professionals, religious and more formal actors, but with less interaction. Personal factors include self-image, health, beauty and physical condition, since when the consumer perceives a product or service in order to improve self-image, it is very likely that this will be a determining and lasting factor. Finally, psychological factors refer to discovering the relationship that exists between market strategies and this dynamic world that is constantly changing, giving rise to new needs that arise in the interaction with the environment (Ponce et al., 2012).

Among the previous research, we found that of Cueva et al. (2020) whose objective was to demonstrate that there is a correlation between influencer marketing and the purchase behavior of the millennial consumer. A cross-sectional correlational design and a questionnaire were used as a research tool with a Cronbach's Alpha coefficient of 0.93 demonstrating its validity. The results indicated that with a Spearman's rho coefficient of 0.582, a positive average correlation of influence marketing on the millennial consumer's purchasing behavior was affirmed. And with the results obtained, it could be affirmed that even millennials of adult age are influenced by these characters of the digital world.

In addition, in the research by Clemente and Atienza (2019) they investigated on determining that the dimensions perceived in influencers coincide with those of a traditional opinion leader. The information was collected with a survey of the population of Valencia, Spain, with ages between 16 and 34 years due to the fact that in that range there is a higher percentage of interaction in social networks. The sample was 205 respondents with a confidence level of 95.5% and stratified sampling by age and district was used. The conclusion was that the 3 dimensions of the influencer (Disinterest, Empathy and Experience) coincide with those of an opinion leader, in addition to the fact that advertising using an influencer is usually more successful, offering greater utility to the consumer in their purchase decision.

3. Methodology

The research approach is quantitative, using statistical methods to measure the results, and correlational in scope, seeking to determine the degree of relationship between the variables studied. The study has a non-experimental design, which means that the nature of the variables will not be modified in any way. The sample size was determined in 384 participants aged 18 to 25 years who use personal care products and are active users of the social network Instagram from Metropolitan Lima, Peru. This was determined by random probability sampling from a population of more than 10,000 people for which the statistical formula for an infinite population was used.

For data collection, the survey technique was used, which was developed in-house and was given through a questionnaire with filter questions in the first stage, followed by closed questions using the Likert scale. The questionnaire was validated by three marketing experts, resulting in a validity score of 94%. To ensure reliability, a pilot survey was conducted with 20 participants with similar characteristics to those of the study group, and a positive result was obtained with a Cronbach's Alpha coefficient of 0.811. In addition, it was applied in a period of one month with all the questionnaires duly completed in their entirety.

4. Data Collection

To collect data on the relationship between Instagram influencers and people's decision to purchase personal care products, a virtual survey was conducted using social media. Google Forms was used to create the questionnaire as it is a convenient and efficient tool for gathering information. The Likert scale was used as a measurement instrument, which presents the options of Strongly Disagree (1), Disagree (2), Neither Disagree

nor Agree (3), Agree (4), and Strongly Agree (5). To begin the statistical analysis, the Kolmogorov-Smirnov normality test was performed to determine if the data followed a normal distribution. If the Sig P-value is ≥ 0.05, it confirms the normality of the distribution, while Sig P-value < 0.05 indicates a non-normal distribution. As all the variables and dimensions had a Sig P-value < 0.05, non-parametric statistics, specifically Spearman's correlation, were used to develop the results.

5. Results and Discussion

5.1 Results:

In this stage of the research, we proceed to detail the results obtained on the Influencers and the Decision to purchase personal care products, where all the information was statistically processed through the SPSS 26 Software in order to obtain the results of the variables mentioned above.

Table 1: Spearman correlation coefficient grade

Rango	Relación
-0.91 to -1.00	Perfect negative correlation
-0.76 to -0.90	Very strong negative correlation
-0.51 to -0.75	Strong negative correlation.
-0.11 to -0.50	Medium negative correlation
-0.01 to -0.10	Weak negative correlation
0	No correlation
+0.01 to +0.10	Weak positive correlation.
+0.11 to +0.50	Medium positive correlation
+0.51 to +0.75	Significant positive correlation
+0.75 to +0.90	Very strong positive correlation
+0.91 to +1.00	Perfect positive correlation

Note: Information obtained from Montes et al., 2021.

General Objective: To determine the relationship between influencers and the decision to purchase personal care products in Lima, the capital of Peru.

Table 2: Relationship between influencers and the decision to purchase personal care products in Lima, the capital of Peru.

			Influencer	Purchase Decision
Spearman's Rho	Influencer	Correlation coefficient	1.000	,309**
		Sig. (bilateral)		0.000
		N	384	384
	Purchase Decision	Correlation coefficient	,309**	1.000
		Sig. (bilateral)	0.000	
		N	384	384
**. Correlation is significant at the 0.01 level (bilateral).				

As can be seen in the table, the Spearman's Rho correlation between the studied variables of influencer and purchase decision in Metropolitan Lima, the capital of Peru is 0.309; thus determining that there is a medium degree of correlation according to Table 2.

To test the hypothesis we proceeded to use Chi-square, detailing the following:

Table 3: Chi square - General Hypothesis

Chi-square tests	
	Asymptotic significance (bilateral)
Pearson's chi-square	0.000

Note: Relationship between influencers and purchase decisions

By presenting a significance level of less than 0.05, the null hypothesis is rejected and the alternative is accepted, thus concluding that there is indeed a significant relationship between influencers and the decision to purchase personal care products in Lima, the capital of Peru.

Specific Objective 1: To determine the relationship between the trustworthiness of Influencers and the decision to purchase personal care products in Lima, the capital of Peru.

Table 4: Relationship between influencer trustworthiness and the decision to purchase personal care products in Metropolitan Lima in 2022.

			Reliability	Purchase Decision
Spearman's Rho	reliability	Correlation coefficient	1,000	,208**
		Sig. (bilateral)	.	,000
		N	384	384
	Purchase Decision	Correlation coefficient	,208**	1,000
		Sig. (bilateral)	,000	.
		N	384	384
**. Correlation is significant at the 0.01 level (bilateral).				

This table shows the Spearman's Rho correlation between the reliability dimension and the purchase decision variable in Lima, the capital of Peru, with a coefficient of 0.208, thus determining that there is a medium degree of correlation according to table 4.

To test the hypothesis we proceeded to use Chi-square, detailing the following:

Table 5: Chi square - Specific hypothesis 1

Chi-square tests	
	Asymptotic significance (bilateral)
Pearson's chi-square	0.000

Note: Relationship between reliability and purchasing decision

With a significance level of less than 0.05 (0.00 < 0.05), the null hypothesis is rejected and the alternative is accepted, thus corroborating that there is a significant relationship between the reliability dimension and the decision to purchase personal care products in Lima, the capital of Peru.

Specific Objective 2: Determine the relationship between Influencers' expertise and the decision to purchase personal care products in Metropolitan Lima in 2022.

Table 6: Relationship between influencer expertise and the decision to purchase personal care products in Lima, the capital of Peru.

			Expertise	Purchase Decision
Spearman's Rho	Expertise	Correlation coefficient	1.000	,323**
		Sig. (bilateral)		0.000
		N	384	384
	Purchase Decision	Correlation coefficient	,323**	1.000

			Expertise	Purchase Decision
		Sig. (bilateral)	0.000	
		N	384	384
**. Correlation is significant at the 0.01 level (bilateral).				

The table shows the Spearman's Rho correlation between the expertise dimension and the purchase decision variable in Metropolitan Lima in 2022, with a correlation coefficient of 0.323, confirming that there is a medium degree of correlation according to Table 6.

To contrast the hypothesis we proceeded to use the Chi-square test, detailing the following:

Table 7: Chi cuadrado – Hipótesis específica 2

Chi-square tests	
	Asymptotic significance (bilateral)
Pearson's chi-square	0.000

Note: Relationship between expertise and purchasing decision

Presenting a significance level of less than 0.05 (0.00 < 0.05), the null hypothesis is rejected and the alternative is accepted, confirming that there is a significant relationship between the expertise dimension and the decision to purchase personal care products in Lima, the capital of Peru.

Specific Objective 3: To determine the relationship between the attractiveness of Influencers and the decision to purchase personal care products in Lima, the capital of Peru.

Table 8: Relationship between influencer attractiveness and the decision to purchase personal care products in Lima, the capital of Peru.

			Attractiveness	Purchase Decision
Rho de Spearman	Attractiveness	Correlation coefficient	1,000	,297**
		Sig. (bilateral)	.	,000
		N	384	384
	Purchase Decision	Correlation coefficient	,297**	1,000
		Sig. (bilateral)	,000	.
		N	384	384
**. Correlation is significant at the 0.01 level (bilateral).				

The table above shows the Spearman's Rho correlation between the attractiveness dimension and the purchase decision variable in Lima, the capital of Peru, with a correlation coefficient of 0.297, confirming that there is a medium degree of correlation according to Table 8.

To contrast the hypothesis, we proceeded to use the Chi-square test, detailing the following:

Table 9: Chi square - Specific Hypothesis 3

Chi-square tests	
	Asymptotic significance (bilateral)
Pearson's chi-square	0.000

Note: Relationship between attractiveness and decision to purchase.

With a significance level of less than 0.05 (0.00 < 0.05), the null hypothesis is rejected and the alternative is accepted, thus corroborating that there is a significant relationship between the attractiveness dimension and the decision to purchase personal care products in Lima, the capital of Peru.

5.2 Discussion

According to the results of the present research it can be stated that the Spearman's Rho correlation was used where we obtained a value of 0.309; thus accepting that the variables studied have an average positive correlation; in addition, the chi-square test was used for the hypothesis test, having a resultant of 0.000 where being less than 0.05, the null hypothesis is rejected and the alternative is accepted, concluding that there is indeed a significant relationship between Influencers and the decision to purchase personal care products in Lima, the capital of Peru.

These results coincide with the research of Chauca (2020) in demonstrating that there is a moderate positive relationship between both variables "Digital influencers and the purchase decision of fashion products" by presenting a Spearman's Rho of 0.707 and a significance of 0.000. In addition, Cueva et al. (2020) reinforces and agrees by commenting on the findings of their research applied to three different age strata, that even adult millennials are really influenced by these prescribers of the digital world.

Similarly, Davila & Victorino's (2022) research concurs in seeking to determine the relationship between digital influencers and makeup purchase decision. Here they commented that the customer usually takes as a recommendation what a digital influencer says but that this is not enough to be considered as a final factor but opt for reviews or same experiences of friends and / or family.

In the case of specific objective 1, the Spearman correlation test was used, which gave us 0.208, where it is stated that the variables that conform it present an average positive correlation and the significance level obtained through the Chi Square resulted 0.000 contrasting and determining that there is a significant relationship between trustworthiness and the decision to purchase personal care products through the social network Instagram in Metropolitan Lima in 2022.

Horny & Zubiaurre (2019) coincide with these results, but with a difference regarding the fact that part of their research takes as a strong point the trustworthiness dimension, which is presented as one of the strongest and most determinant, this due to the target audience to which it is directed; likewise, both researches obtained positive results. In addition, Cruz (2020) also agrees with these results since he sought through his research to analyze the perceived veracity of influencers and how this takes the quality of the message regarding products and brand awareness as important indicators for a non-forced purchase decision.

For the specific objective 2, the Spearman correlation test was used, where 0.323 was obtained, affirming that the variables that conform it present an average positive correlation and the level of significance obtained through the Chi Square was 0.000, contrasting and determining that there is a significant relationship between the expertise of the influencer and the decision to purchase personal care products through the social network Instagram in Lima, the capital of Peru.

In the same way, the research of Cruz (2020) coincides, given that he comments that Millennials consumers have knowledge of the brand they consume, being their decision reinforced by the advertising of the Social Media Influencer. In turn, Horny & Zubiaurre (2019) took in part of their results the influencer's expertise as one of the dimensions with the highest correlation in their research; this is due to the fact that the studied public prioritizes the knowledge and trust that the Influencer possesses, coinciding with our results.

Regarding specific objective 3, the Spearman correlation test was used where 0.297 was obtained, thus accepting that the studied variables (attractiveness and purchase decision) have an average positive correlation; in addition, the chi-square test was used for the hypothesis test, having a resultant of 0.000 where being less than 0.05, the null hypothesis is rejected and the alternative is accepted, concluding that there is indeed a significant relationship between Influencers and the purchase decision of personal care products in Lima, the capital of Peru.

Similarly, the research of Hoempler & Chipana (2019) coincides with our results by discovering within their research that respondents take into account the attractiveness of the source, since the status of the influencer makes the promoted product more attractive. In turn Cortegana et al. (2018) also agreed with the results by finding within their research a new component called "Attractive Trend" as a result of the readjustments in the

rotation of variables; where the influencer is presented as a factor of content creation and fashion trends, thus evidencing the relationship between the two.

As already known, the main focus of this research was to determine the relationship between Influencers and the decision to purchase personal care products in Lima, the capital of Peru, for which we proceeded to compare the similarities and discrepancies with the background previously reviewed in this study. For this, it was necessary to resort to sources of information such as Dialnet, Redalyc, Alicia, Scielo, among others; but there were limitations in terms of the personal care market, since there is still not much information linked to influencers. I recommend that in order to complement this lack of information, it is necessary to take as references certain researches that present similar categories such as makeup and fashion, which can provide the guidance needed to develop the research.

6. Conclusions:

This research analyzes the relationship between influencers and the purchase decision of personal care products. The study shows that there is a positive mean relationship between influencers and the purchase decision, since the Spearman correlation coefficient presents a value of 0.309 and the P-value obtained through Chi-square was 0.000 (0.000 <0.05), which shows a significant relationship between both study variables. Therefore, companies are recommended to include influencers in their marketing plans, as they are important in influencing consumers' purchase decision.

The study also shows a positive relationship between the trustworthiness of influencers and the purchase decision of personal care products, with a Spearman correlation coefficient value of 0.208 and a P-value of 0.000. In conclusion, it is recommended that companies thoroughly evaluate their influencers, in order to ensure that they have the same values; preferably that they have had experience in the same field and thus can make a more reliable judgment and image when promoting the company's products.

In addition, the study indicates a positive relationship between influencer experience and the decision to purchase personal care products, with a Spearman correlation coefficient value of 0.323 and a P-value of 0.000. Companies are advised to invest in influencers who have prior knowledge or experience with the product or service, as this can add value to their brand.

Finally, the study also highlights the importance of attractiveness in influencers, with a positive relationship between the attractiveness of influencers and the decision to purchase personal care products, as the Spearman correlation coefficient presents a value of 0.297 and the P-value obtained through Chi-Square was 0.000 (0.000 <0.05). It is recommended that companies choose influencers with personality and ease of communication that can attract attention and have an impact on consumers.

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Using AI to Create Content Designed for Marketing Communications

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Abstract: Innovation is a key success factor in every industry, including marketing communications. One of the most significant innovations in marketing is use of artificial intelligence (AI). Without a doubt, it has tremendous potential to become an essential content creation tool for marketing communications. In recent years, several AI-based tools have been created that simplify the content creation process in various ways. We are witnessing an enormous increase in these services and a significant increase in their quality. This qualifies them for use to a much greater extent than before. It is obvious that these tools will become key tools for marketers and related professions in the near future. Experience from the past months reveals that AI-based tools can significantly speed up content creation and increase its relevance by using optimal vocabulary, stylistics, or - in the case of image generators - visuals. The presented work analyzes the current state of using AI in marketing communication, through the possibilities and challenges related to it. The aim of this work is to provide a comprehensive overview of the possibilities of using AI in the creation of content. AI can automate some tasks, such as data analysis and information processing, freeing marketers to focus on other important tasks. The advantages of AI in the creation of marketing communication content can be speed and relevance, personalisation but also objectivity. AI in the creation of content may encounter a lack of creativity, lack of emotion and empathy. AI cannot fully understand the context in which the content is to be used, which can lead to the creation of inappropriate or ineffective content. Different types of AI tools usable in marketing communication. AI can assist in various stages of the content creation process, such as generating ideas, creating a story, personalising content. AI can use target group data such as interests, purchasing behavior, demographic information. This article discusses a contribution to research that uses qualitative and quantitative scientific methods to analyse the use of artificial intelligence (AI) in marketing and marketing communications. It highlights the uses of AI in marketing and identifies a list of selected AI tools that are considered advantageous in different areas of marketing. The conclusions of this work should provide important guidance for further research and application of AI in marketing communication, which could significantly contribute to the development of the entire mentioned field.

Keywords: AI, innovations, marketing communication, use of trends

1. Introduction

Success in any industry, especially in marketing communications, depends on innovation. The use of artificial intelligence brings significant benefits and is one of the fastest growing trends in marketing (Nguyen et al., 2021). It definitely has great potential to develop into an important tool for creating marketing communication materials. Recently, several AI-based solutions have been developed that make the content creation process more efficient in various ways (Peyravi et al., 2020). This is evidenced by the significant improvement in the quality of these services and how much better they are now, which allows them to be used significantly more than before. The point is that in the near future these technologies will be essential for marketers and other similar professions. Futurologists around the world talk about other world scenarios in which artificial intelligence appears (Yeğin, 2020).

1.1 Innovations in marketing communication

The importance of innovation in marketing communication results from the fact that consumers are constantly exposed to new communication and advertising media (Arrigo et al., 2021). Brands can benefit from innovation to capture customers' attention and stand out in a crowded market (Kollárová, D., Koliščáková, M., & Trnka, A., 2023). New methods of communication can increase the interest and engagement of clients, improve their experience and increase the conversion rate (Micheaux & Bosio, 2019; Krajčovič & Darázs, 2021). In addition, innovation can increase the effectiveness of a marketing initiative and help businesses adapt to rapidly changing consumer trends and preferences. Innovation in marketing communication is essential for a successful and competitive brand in today's digital era when marketing rivalry is fierce.

1.2 AI in marketing communication

It is very important to develop and adapt content creation to changing trends in marketing communication. Innovative marketing communications can improve customer experience and increase engagement levels.

Artificial intelligence and personalised content can increase conversion rates and the effectiveness of marketing initiatives. The mentioned details were already explored at the beginning of the potentially accelerating pace of development of artificial intelligence (Kumar et al., 2019). Customers can interact with companies about goods in a fun and engaging environment using virtual and augmented reality, which can increase attention and engagement. In a crowded market, creative ads can stand out and grab customers' attention. For companies that want to successfully communicate with their consumers and increase their competitiveness, innovation in marketing communication is crucial (Piatrov & Jurišová, 2022). The authors conducted a quantitative national study in 2020 with 2,689 European experts, from which it emerged that the understanding was still significantly limited before the mass expansion, but above all, organisations were struggling with different levels of competence with unclear responsibilities, and thus the opinion emerged about the need to educate managers and teams about the possibilities of technology (Zerfass et al., 2020). On the other hand, education is already underway, but it has limits in the form of a limited overview of the use and definition of the current basic predisposition and potential of artificial intelligence tools (Elhajjar et al., 2021). From the point of view of the possibilities of use, an important element from the point of view of education is missing in the research, and that is the choice of the right tool from the point of view of important marketing criteria aimed at the activities of marketers. It is also important to assess the price, which can be reflected in the decision that will affect whether the given company will use the given tool. The facts just mentioned became the basis for further research and expansion of the knowledge base on the mentioned topic. Jarek and Mazurek point out that AI will be applied in all areas of the marketing mix (the so-called 4P). The system is described in more detail in Table 1.

Table 1: Areas of the impact of AI on marketing mix

Product	Price	Promotion (Brand)	Place (Sales & distribution)
New product development Hyper personalisation Automatic recommendations Creating additional value Additional solutions beyond product category	Price management and dynamic price matching to customer profile	Creating a unique experience Personalised communication Creating the wow factor and offering benefits Elimination of the process of learning product categories Positive impact on the customer Minimised disappointment	Convenient shopping The faster and simpler sales process 24/7 customer service (chatbot) Purchase automation Service-free shops Consultant-less customer support New distribution channels Merchandising automation

1.3 AI tools and their advantages and disadvantages

The use of artificial intelligence (AI) tools is becoming increasingly common in the field of marketing (Haleem et al., 2022). These tools can help brands improve the effectiveness of their campaigns, enhance the customer experience, and improve data analytics. In this article, we will look at some of the main advantages and disadvantages of using AI tools in marketing (The Pros and Cons of Ai in Marketing, 2023).

Table 2: Advantages and disadvantages of artificial intelligence

Advantages	Disadvantages
Improved personalisation	High expenses
Improved management of advertising campaigns	Need for specialised skills
Improved data analysis	Risk of wrong decisions
Improved customer experience	Dependence on data

The table clearly shows that AI tools have many benefits, such as improved personalisation and customer experience, improved management of advertising campaigns and data analysis. However, there are also disadvantages, such as high costs, the need for specialised skills and the risk of wrong decisions. From the point of view of high costs, it is a complex development of artificial intelligence. Dependence on data is another drawback that can prevent organisations from using AI tools. Despite this, the sources indicated that the use of AI tools in marketing will continue to increase in the future.

1.4 Approaches to AI typology in marketing practice

There are many approaches to categorising AI tools, one of which can be based on the areas that dominate digital marketing today. The widely applicable use in marketing was defined by the authors, especially in the creation of content material (Stone et al., 2020). In this context, the authors present an apt typology of digital tools and platforms, which includes Search engine marketing, Email marketing, Social media marketing, Content

marketing and Display advertising (Peter & Dalla Vecchia, 2021). This approach enables a view of AI tools from the point of view of their application in individual areas, where, for example, tools for creating PPC ads can be applied in Search engine marketing and tools for writing articles in Content marketing. However, most of these tools can be used in different fields, as the output of the text generators can be an article outline, an article, a PPC ad or a Facebook post. Similarly, AI generated images can be used in Content marketing as well as in Social media marketing. However, from this point of view, this typology appears to be limited for our needs. The approach defined by the authors based on their analysis and which divides AI for marketing into the categories Text processing technologies, Voice processing technologies, Decision-making, Image recognition and processing technology and Autonomous robots and vehicles (Jarek & Mazurek, 2019) appears to be much more practical. . However, due to the rapid increase in the number of available tools after 2021, we decided to approach the problem from a different side - we focus on the activities that marketers perform on a daily basis, and summarised them in the following points:

1. Creating a communication mix
2. Creation of personas
3. Creation and management of PPC campaigns
4. PR copywriting
5. SEO
6. Blogging
7. Copywriting
8. Social media management
9. Email marketing
10. Creation of presentations
11. Market research and analysis
12. Communication with customers

The aim of the paper is to examine the current state of the use of artificial intelligence in the areas of marketing communication, based on theoretical principles and analysis of the possibilities of the digital environment of artificial intelligence tools. The goal includes identifying specific functional tools, defining their application in the strategies of marketing communication creation processes, and experimentally substantiating the functionality of said tools. Based on the theoretical starting points and the research topic, the following research questions and hypotheses were established, which relate to the use of artificial intelligence in the creation of marketing communication.

Research topic:

Use of artificial intelligence in marketing communication.

Research questions:

RQ1: What marketing directions and activities offer the use of artificial intelligence?

RQ2: What concrete tools of artificial intelligence can we use in marketing activities?

RQ3: Are artificial intelligence tools affordable for companies?

Hypotheses:

H1: We assume that tools for text-oriented tasks will be more numerous than narrowly represented specialised tools.

H2: Assumption that tools for creating content for social media are covered better than for strategic concepts.

H3: We assume that there will be a greater number of tools that are cheaper than more expensive tools.

2. Methodology

The research that is contained and specified in more detail in the contribution includes qualitative and quantitative scientific procedures. Qualitative methods are included within the framework of the theoretical starting points, where analysis, synthesis, induction, deduction and comparison are specifically included. In the aforementioned part of qualitative design, the focus is primarily on the analysis of texts from leading scientists and practitioners. Keywords that are an important element when searching for the mentioned materials are specifically "artificial intelligence", "use of artificial intelligence in marketing", "artificial intelligence in

marketing" and "artificial intelligence in marketing communication". Scientific contributions come primarily from scientific journals that are rated with a high quality mark. They also come from conference proceedings, literary and online sources. The verification of the hypotheses and the definition of the results of the research questions took place through the following work procedures and scientific methods. The analysis of the digital environment with artificial intelligence is carried out thanks to a systematic analysis, where individual keywords were gradually searched for in the Google search engine in the form of determining what artificial intelligence should be used for, the criteria themselves were defined on the basis of the theoretical starting points of the areas in which the creation of creative communication is used output with regard to the marketers' workload. Subsequently, suitable artificial intelligence tools were selected and a test was carried out, which artificial intelligence contains which functions from the previous definition.

Table 3: Selected assessment tools:

AdCreative	Jasper.ai
Alli AI	Mails.ai
Automizy	MidJourney
AutoSlide	Momentive
Beautiful.ai	NDigital
Copy.ai	RankiQ
Delve.ai	Rytr
Excelbot.io	SEM Rush
Excel Formula Bot	Shutterstock AI
Frase	SlidesAI
HypeWrite Email Responder	Surfer SEO
Chatbase	VidIQ AI Coach
ChatGPT	WriteSonic

As a result, we define the currently most advantageous or the most relevant artificial intelligence tools that contain the widest possible number of functions and are thus broad-spectrum tools.

3. The results

The following table contains several typical examples that resulted from the extraction of theoretical starting points and subsequent analysis. The table contains categories of marketing directions, activities and tools of artificial intelligence and thus clarifies the first research question. It is precisely thanks to the use of artificial intelligence that the given tasks can be performed potentially more effectively and the implementation of marketing tasks is faster and more trouble-free. In the same way, the tools that resulted from the analysis of the offer of the digital environment are also assigned to the activities.

Table 4: Areas and activities and tools for the use of artificial intelligence

Marketing direction	Activity	Tool
Creating a communication mix	• Coming up with topics • Searching for new approaches to the needs of the target group • Scheduling posts for individual platforms	**NDigital** **Jasper** **Copy AI**
Creation of personas	• Describing the characteristics of the target group	**Delve.ai** Profilepicture.ai
Creation and management of PPC campaigns	• Creation of advertisement headlines • Creating the body of advertisements • Creation of banners	AdCreative Copy AI WriteSonic NDigital
PR copywriting	• Creation of subtitles • Writing PR articles • Writing press releases • Coming up with CTAs • Creating summary materials for the media	**WriteSonic** **NDigital** **Jasper.ai** **ChatGPT**

Marketing direction	Activity	Tool
SEO	• Optimising the content structure of individual pages • Creating content according to the created structure • Writing HTML labels • Inserting keywords into the text • Creating internal and external links in published content	**SEM Rush** **Frase** **Alli AI** **Surfer SEO** WriteSonic NDigital Rytr
Blogging	• Creating an article outline • Creating subtitles • Writing an article • Finding suitable images	**Rytr** **WriteSonic** **RankIQ**
Copywriting	• Creation of subtitles • Writing texts for the required material according to AIDA, BAB, PAS, etc. • Finding product benefits • Coming up with CTAs • Unifying the tone-of-voice of different texts • Writing product descriptions of products for the e-shop • Inventing product names • Brainstorming ideas for YouTube videos • Preparation of materials for creating videos and podcasts	**WriteSonic** **NDigital** **Jasper.ai** **ChatGPT** VidIQ AI Coach Synthesia Descript Fliki
Social media management	• Writing posts • Inventing hashtags • Finding suitable images • Creating captions for YouTube videos	**WriteSonic** **Rytr** **NDigital** **Adcreative** Copy.ai ChatGPT Shutterstock AI MidJourney
Email marketing	• Content creation • Coming up with CTAs	**Mails.ai** **Automizy**
Creation of presentations	• Proposal of the outline of the presentation • Transformation of continuous text into bullet points • Finding suitable images	**SlidesAI** **AutoSlide** **Beautiful.ai** MidJourney PhotoSonic (súčasť WriteSonic ChatGPT)
Market research and analysis	• Summarisation of statistical data • Verbal interpretation of statistical data Summary of KPIs	**Crawl AI** **Momentive** **Remesh** **SEM Rush** Excel Formula Bot
Communication with customers	• Responding to messages on social media • Responding to customer reviews • Answering emails from customers and the public	**Chatbase** ChatSonic (súčasť WriteSonic) HypeWrite Email Responder Ellie

We obtained the answer to the first research question thanks to the analysis, which is specified in more detail in the previous table. A closer look at the table brings with it the introduction of various marketing directions and activities that can be oriented towards the creation of content with the help of artificial intelligence. The table deals with a wide range of artificial intelligence tools, which include the solution of various marketing tasks, especially when creating content in the areas of social media, email marketing, creating presentations, communicating with customers, market research and analysis, SEO, blogging and copywriting. The starting point for creating a list of applications was a detailed breakdown of marketers' workload, the results of which are captured in Table 1. Based on this analysis, we assigned appropriate tools to each area. We were based both on our own experience and on the other hand from a meta-analysis of approximately 14 professional articles, which aimed to draw attention to the most promising AI tools for marketers. All articles were from the years 2019 - 2023. When creating a list of areas of work content, we tried to focus on activities that the marketing departments of companies usually provide on their own. This is the reason why the list of activities does not include partial SEO activities (link building, keyword research, ...), creating product videos and some other activities that are very often provided by external agencies or freelancers. Therefore, popular tools such as Descript or Synthesia, etc., did not make it to the list. It should also be noted that the development of various AI tools has accelerated sharply in recent months. The speed of the emergence of new AI tools is indicated by the

Google trends graph (Illustration 1), on which a significant increase in the number of searches for the names of selected AI tools can be observed. For this reason, we had to significantly reduce the tools for our survey. That's why we've listed only two of the entire AI image generation tool industry - MidJourney, as a leader in the field, and ShutterStock AI, as a representative of a classic photo bank that understands that image generation can significantly change the stock image market that has been working decades. Of course, this does not exclude the fact that some tested tools (e.g. WriteSonic) do not use the algorithms of one of the image-oriented AI tools such as MidJourney, Dall-E, etc.) directly in their interface. Hypothesis H1 assumes that tools that are intended for solving text-oriented tasks will be represented in greater numbers than tools that are narrowly specialised in a specific field. We confirm the hypothesis; the majority of tools are intended for processing text-oriented tasks.

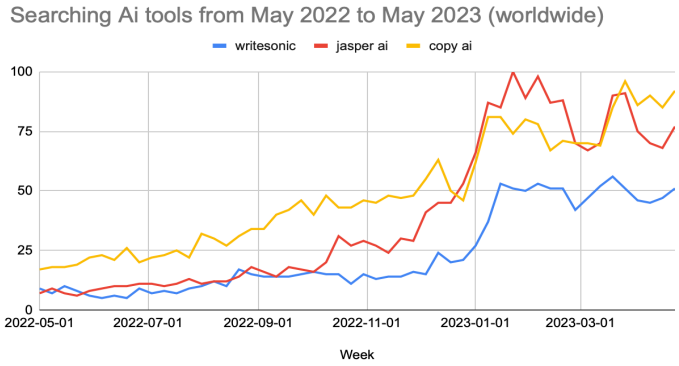

Figure 1: Searching for keywords in Google

Chat GPT as a reference point

As the first very important finding, it appears that Chat GPT forms the basis of many tools, which is why it has been ranked in the first ranks in terms of analysis and evaluation since the beginning of the research. On the other hand, other tools offer significant added value in the form of templates, wizards, some special functions that the marketer would have to access through very complicated prompts.

3.1.1 Quantity (competitiveness)

While compiling the list of test tools, we found that the coverage of individual areas is not uniform. It can be clearly observed that for certain areas of the field there is a very large number of similar tools, while in others AI tools are not yet developing much, or Ai works in them in a less visible way. The most numerous is a group of tools focused on copywriting and social media. We compared 5 different tools for these activities, while we did not include many others in the selection. On the other hand, tools e.g. for the creation of presentations or the creation of personas are represented in much smaller numbers.

Specialised vs. broad-based tools

Depending on the degree of specialisation, artificial intelligence tools can be divided into two categories - tools with a wide range of functions and tools narrowly specialised in one area. Typical representatives of broadly focused tools are text generators such as WriteSonic or Copy.ai. These generators often use Chat GPT algorithms, to which they add a graphical superstructure and specialised templates. With a certain degree of simplification, it can be said that what these tools can do, Chat GPT can do - and that's why it received the highest rating. But what makes these tools interesting is the added value they provide to the user. Producing specialised text output with AI at a certain level of quality requires 1) deep subject matter knowledge and 2) advanced knowledge of prompt engineering. The term prompt engineering is the name given to the field that is devoted to formulating instructions to artificial intelligence in order to perform the required task as best as possible. In simple terms, the AI user is expected to be able to set very strict rules according to which the AI should generate the desired output. Broadly targeted text generators benefit from the fact that a large group of marketing outputs are different types of text. Posts on Facebook, Google ads in search, SMS or the outline of an article - these are all texts that can only be generated by one advanced text model, such as e.g. GPT chat. In contrast, specialised tools often use their own UI, which places higher demands on program development. So it stands to reason that specialised tools will be fewer, slower to add, and more expensive than broadly focused text-based AI tools.

Overall, the use of AI tools brings benefits and opportunities to automate processes and increase efficiency in marketing and communication.

The second research question was responsible for the process where, based on Table 1, we created criteria for evaluating individual tools, whenever a tool was able to perform a given activity, which is derived from marketing activities; it was assigned a point in the table. As a result, the points were added up and a summary of points was created at the end. The maximum total rating was 54.

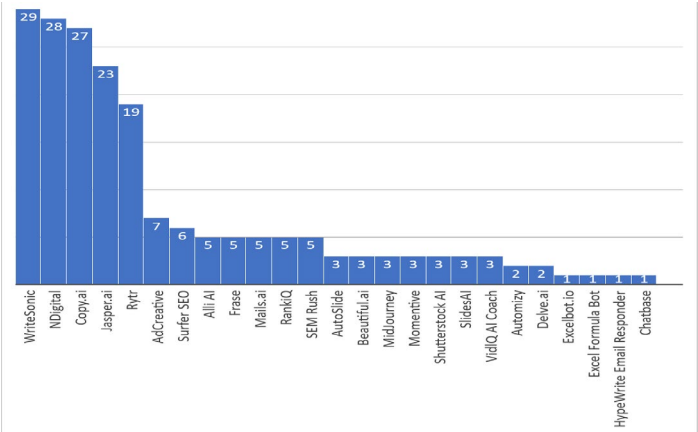

Figure 2: Feature range comparison

As a result, the number of points was the highest for the Chat GPT tool, which is the basis of many services and was thus excluded from the evaluation and included among the research propositions as mentioned above. The first is the WriterSonic tool with a score of 29, followed by NDigital with a score of 28, immediately followed by the copy.ai tool with a score of 27. The main difference is copywriting and PR copywriting, in which the WriterSonic and NDigital tools offer specialised extensions, which are intended for the mentioned type of marketing activity. It is important to note that the score achieved in the comparison table does not imply the quality or poor quality of the tool, but only indicates where the tool is located on the imaginary axis broad-focused - specialised. Most of the narrowly specialised tools offer very high quality in the area they are dedicated to, e.g. in data analysis. Hypothesis H2 assumes that tools for creating content for social media will be more numerous than tools for creating strategic concepts. We confirm the hypothesis even though the quantity is proportionally more balanced and within the framework of the tools, emphasis is placed on copywriting and PR copywriting in most tools. Our research suggests that in the near future, marketing practice will combine some of the broadly focused text-based tools with a few narrowly specialised tools. It should also be noted that the list of activities, as well as the list of functions of the compared tools in the table, is not exhaustive. Many specialised tools have additional functions, which, however, we had to exclude from the comparison to maintain clarity.

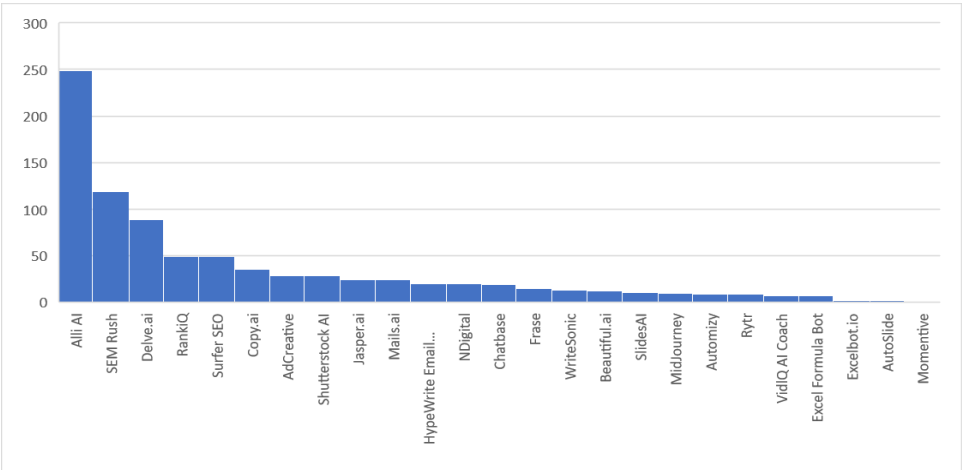

Figure 3: Price comparison ($/month) of individual tools

The third research question was analysed by looking at the prices of artificial intelligence tools per month. In terms of price, individual tools range from $2 (AutoSlide) to $249 (Alli AI). It is important to note that the price is not comparable with the use of tools, or with the functions that the tools can. On the one hand, the analysis found that specialised tools that have fewer functions but focus on a specific task are more expensive than general tools that are broad-spectrum. Hypothesis H3 assumes that cheaper tools will be represented to a greater extent than more expensive tools. We confirm the hypothesis; there are a larger number of cheaper tools. For this reason, it is important to note that the introduction of tools has a potential future, as education in this area is currently increasing, and organisations thus have the possibility of higher efficiency and processing of individual marketing outputs.

4. Discussion and conclusion

As other studies indicate, the potential of using artificial intelligence as an innovation is very high (Vlačić et al., 2021). In the framework of the previous study, the authors outlined the need to study and record the process of change over time. It is for this reason that the study of current possibilities and specific tools is very important to record and continue to record in the future (Malthouse & Copulsky, 2023). We are thus at the beginning of longitudinal research and capture in time. Currently, the tools of artificial intelligence in connection with the creation of marketing communications are at a high pace, and innovations come at regular intervals. On the one hand, we can look at artificial intelligence from the point of view of its output and interpretation, or the perception of consumers or users when creating marketing communication. As defined by Chan, Chan-Olmsted, Kim and Sanabria, at the time of the study, the perception of artificial intelligence was very limited, and it has improved and continues to improve as stated in the study (Chen et al., 2022). The available researched studies do not indicate a similar focus; therefore the contribution is unique in its focus and considerable help in both practical and theoretical terms. The presented contribution focuses on the use of artificial intelligence in marketing communication with regard to the process of creating outputs. Specifically, these are areas of marketing communication in which artificial intelligence tools can be applied, such as in social media, e-mail marketing, copywriting and other areas. The activities of marketers when working in these branches of marketing communication and functional tools from the point of view of artificial intelligence are also identified.

The conclusion of the first research question, what marketing directions and activities offer, the uses of artificial intelligence are specific directions in marketing communication. The results point specifically to directions such as creating a communication mix, creating personas, creating and managing PPC campaigns, PR, SEO, blogging, copywriting, social media management, email marketing, creating presentations, market research and analysis, communication with customers. The conclusion of the second research question, what specific artificial intelligence tools we can use in marketing activities, were collected tools such as NDigital, Jasper, Copy AI, Delve.ai, Profilepicture.ai, AdCreative, WriteSonic, SEM Rush, Frase, Alli AI, Surfer SEO, Rytr, RankIQ, Shutterstock AI, MidJourney, Mails.ai, Automizy, SlidesAI, AutoSlide, Beautiful.ai, PhotoSonic, Crawl AI, Momentive, Remesh, Excel Formula Bot, Chatbase, HypeWrite Email Responder, Ellie. The conclusion of the third research question, whether artificial intelligence tools are affordable for companies, is a positive finding. Availability for businesses from findings ranging from $2 (e.g. AutoSlide) to $249 (e.g. Alli AI) per month, it is clear that companies will be able to afford any of the tools that meet either financial or tool-specific criteria. The conclusion confirms the importance of using artificial intelligence tools such as increasing work efficiency. In the article, the ranking of artificial intelligence tools is also arranged according to the individual options that are available for each tool. As interpreted in the answer to the first research question, there are many possibilities for marketing directions, activities and tools. The limit of research and at the same time reflection for companies is precisely the orientation towards the optimisation of artificial intelligence for marketers in the form of extensions for the individual activities they perform. Currently, companies should consider the need for tools that best suit the goals and budget for a given marketing activity. At the same time, it is clear from the results that broad-spectrum focused artificial intelligences within the representation of marketers' activities are more advantageous in terms of price and performance of the given tool. Another limitation may be insufficient analysis of the possible negative consequences of using AI in marketing. One possibility is the potential for personal data breaches and ethical issues associated with consumer manipulation and the ever-changing AI market. Our investigation revealed other questions that would need to be clarified in further investigation. Further research can be focused on the possibilities of effective integration into marketing strategies and organisational structures. It would also be worth investigating the negative consequences and how to minimise them, as well as ethical issues of the use of artificial intelligence, trust and acceptance of information from the point of view of consumers, the specifics of segmentation, personalisation and impacts or impacts on society.

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