Research Sample Saturation in Irish Tech SMEs: A Practical Case Study

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Abstract: Small and medium-sized companies significantly influence global and regional economies, providing a positive business climate and strengthening economic competitiveness. This research study explores the importance of purposive sampling, which has become a research strategy targeting business owners of technological start-ups and small companies, employees in tech giants, and representatives of digital educators and governmental bodies. A comprehensive Bibliometric - Systematic Literature Review (B-SLR) was conducted to identify common practices in the field, aiming to identify potential research gaps and enhance practices that support the development of qualitative research studies. The findings show that methodological choices for research in entrepreneurial development are supported by literature reviews and quantitative approaches. However, there is a lack of samples based on empirical qualitative data. Small purposive samples give valuable insights to researchers, policymakers and academia into an investigated problem despite all limitations and constraints in getting the interviews with CEOs and business owners.

Keywords: Case Study, Small Businesses Research, Technological Sector, Theoretical Saturation.

1. Introduction

Small and medium-sized companies significantly influence global and regional economies, providing a positive business climate and strengthening economic competitiveness (European Commission, 2023; OECD, 2023; Gennari, 2023). Within the business ecosystem, the technological sector is a paramount priority for the European Union, as SMEs help ease the current dependence on foreign companies represented by the world's leading economies, the USA and China (Alesina Marco Tabellini et al., 2022). However, investigating the methodological choices for research in entrepreneurial development shows us that it is mainly conducted through literature reviews and quantitative approaches, while additional systematisation and testing of samples based on the empirical qualitative data is required (Bassey, 1999; Hamilton & Corbett-Whittier, 2013; Yin, 2018). The significance of qualitative research in SME development helps to understand how to alleviate dependencies from multinational corporations and their unpredictable parent country policies. Further aspects to be considered relate to political and economic uncertainty emerging from the Trump's second Administration's approach to global international trade and the implications for business activities that are of particular interest in the case of Ireland. The US multinational enterprises (MNEs) hold a dominant position in Ireland, as per data from the CSO highlighting significant American presence in technological (2.5%), pharmaceutical (0.03%) and services (61%) sectors (CSO, 2025; FAME, 2025).

Ireland shows some level of resilience to geo-economic challenges due to stable consumer spending, supported by a strong labour market capable of decelerating inflation and providing further consumption growth (European Commission, 2024; CSO, 2023). To guarantee the resilience of Irish businesses and high competitiveness in the global market, small companies need to be able to cope with investment attraction, technology implementation, management skills improvement, and direct access to finance (OECD, 2019). Moreover, improving management development standards has become a priority for the Irish government, which is highlighted in Project Ireland 2040, which presents the country's overarching long-term strategy for economic and social development, as the existing competency level in Irish SMEs is insufficient (Ortiz-Martínez et al., 2023; Smith et al., 2022). Considering the importance of the technological sector and the knowledge intensity associated with it, the sector was identified as relevant to support a focused case study aiming to understand practical problems faced by SMEs to provide insights for practitioners, researchers, and policymakers to gain insights on measures and policies that could help reduce their high failure rates of approximately 50% compared to corporations (Bassey, 1999; Hamilton & Corbett-Whittier, 2013; Yin, 2018; OECD, 2019). The case of the technological sector allows industrial policy to integrate approaches aiming to reduce the pressure on small businesses for possible exits from the domestic market, redirecting their markets and supply chains and giving more freedom in using economic resources due to the significant sector growth (Rokhmawati et al., 2021). To achieve technological independence in this crucial sector, fair competitiveness, and zero-emission goals, the European Commission plans to invest heavily in strategic and critical economic

sectors, including climate initiatives and education, specifically green, digital, and technological skills to support the twin transition (European Commission, 2023). At the same time, the focus on the technological sector case grows due to constant automation and uncertainty in future tech leaders' strategies, putting pressure on entrepreneurs in their attempt to find a balance between technologies and human labour (Vrontis et al., 2022; Pereira et al., 2023).

This research study explores the importance of purposive sampling, which has become a research strategy targeting business owners of technological start-ups and small companies, employees in tech giants, and representatives of digital educators and governmental bodies (Grégoire, Barr and Shepherd, 2009; Miles and Huberman, 1994; Palinkas et al., 2015; Campbell et al., 2020). The proposed case study is a sample that integrates 12 interviews with small company owners and eight interviews with the sector representatives, covering predetermined sampling criteria and being in alignment with common practices in research studies focused on SMEs. A comprehensive Bibliometric - Systematic Literature Review (B-SLR) was conducted to identify common practices in the field, aiming to identify potential research gaps and enhance practices that support the development of qualitative research studies (Marzi et al., 2025). Additionally, the sample size was analysed through the studies in the field of social, business and health sciences to help offer critical insights on the relevance of choice of a small purposive sample to achieve data saturation in qualitative study (Eisenhardt, 1989; Saunders et al., 2017; Yin, 2018; Hennink et al., 2016; Weller et al., 2018).

2. Literature Review

In recent years, the role of small companies in the global market has significantly changed, converting them into crucial market players (Yuniarti, 2023). However, SMEs' success is heavily dependent on limited number of core decision-makers, represented by the management teams. Understanding that in many cases, entrepreneurs are self-made individuals without formal degrees, qualitative approach can allow more opportunities to determine guiding strategies for SMEs and approaches for organisational learning, to stay competitive and survive. Qualitative choice is also supported by the rationale of traditional scientific management, which helps in understanding of knowledge acquiring and retaining mechanisms in a simple way (Bhatia & Levina, 2020).

However, exploring entrepreneurship education from an ontology-based learning approach should focus on entrepreneurs' personal growth and development without missing the role of colleagues, practitioners, educators, and the overall environment (Bhatia & Levina, 2020). For sustainable development, SMEs have to operate in conditions of the shift to Industry 4.0 and 5.0 paradigms by emphasising the focus shifts from technical skills to human-centred, putting leadership skills, and the significance of entrepreneurial mindset as critical pillars of the company's development (Ortiz-Martínez et al., 2023; Smith et al., 2022; Reporting Lab, 2021). Thus, identifying different perspectives on effective team learning leads to the Constructivism learning theory for a theoretical framework and team construction and understanding the processes associated with knowledge-sharing and transferability practices (Kop & Hill, 2008; Corbett & Spinello, 2020). However, considering the effects of COVID-19 and the fact that most businesses across entire sectors were completely closed for a significant period, online learning has become a solution to mitigate these negative effects and bring existing learning approaches into the digital space (Mishra et al., 2021).

Considering the importance of the technological sector and the knowledge intensity involved, it was chosen as a case study to understand practical problems faced by start-ups to provide insights for practitioners, researchers, and policymakers (Bassey, 1999; Hamilton & Corbett-Whittier, 2013; Yin, 2018). Management development involves developing executives' cognitive abilities, aiming to change their behaviour afterwards, aligning online learning with experience-based and digital learning approaches that lead to successful company growth, and building and growing the management team as illustrated in Table 1 (Kuratko, 2005; Kuratko and Morris, 2018). Mapping the common practices in the field, the research has analysed the leading authors and experts in the entrepreneurial education field, synthesising the implemented methodologies to find the main patterns. Having analysed the methodological choices for research in entrepreneurial development (see Table 2), which are mainly conducted through literature reviews and quantitative approaches, additional systematisation of samples based on the empirical qualitative data was required.

Table 1: Concept Framework: from individual mindset to management team development.

Author	Journal [Citations]	Contribution to methodology
INDIVIDUAL Level - Entrepreneurial Mindset, Expertise		
Daspit, Fox, & Findley et al., (2023); Kuratko, Fisher, & Audretsch et al., (2021); Haynie, Shepherd, Mosakowski, & Earley et al., (2010); Kuratko, Hornsby, & Bishop et al., (2005)	*Journal of Small Business Management [188]* *Small Business Economics [387] Journal of Business Venturing [954] International Entrepreneurship Management Journal [311]*	Systematic literature review; Literature review; Integrating literature streams from social and cognitive psychology. Survey
Handayati & Narmaditya et al., (2020); Mawson, Casulli, & Simmons et al., (2023); Cui, & Bell et al., (2022)	*Heliyon [254]; Entrepreneurship Education and Pedagogy [27] International Journal of Management Education [198]*	Survey. Literature review and conceptual framework.
Management Development for Entrepreneurs		
Moshman et al., (1982); Pittaway & Cope, (2007b); Rae et al., (2009); Lackéus et al., (2016); Neck & Corbett, (2018)	*Developmental Review [516] Entrepreneurship and Regional Development [2625] Entrepreneurship Education and Pedagogy [1305]*	Literature review; Systematic literature review; Policy research;.
Pavlov, (1938); Skinner, (1958); Gagne, (1985); Thorndike, (1999); Baldwin, (2011); Jordan, (2008); Allen et al., (2022)	HBJ College; *Academy of Management Learning & Education [128]*; New York: Routledge; *Journal of Management Education [101]*	Survey . Literature review and application by integration.
Knowles, (1988); Rogers, (1969); Maslow, (1971); DeCarvalho, (1991); Bass, (2008); Johnson, (2014); Bates, (2015); Tjosvold et al., (2006).	SAGE Publications Ltd London: Constable; *Annals of Psychologist; Theory [687], Research and Practice Journal [117]*	Comprehensive literature review. Survey.
Bandura, (1986); Kop & Hill et al., (2008); Siemens, (2005); Dunaway, (2011); Brieger et al., (2020)	*International Review of Research in Open and Distance Learning [1615]; Elearnspace [155]; Refence Services Review [355]; European Journal of Training and Development [108]*	Critical analysis and theory positioning. Structured literature review. Theory exploration and conceptualisation of the main principles.
Dewey, (1938); Piaget, (1957, 1970); Kolb, (1984); Gopnik & Wellman, (2012); Mvududu et al., (2005); Chuang et al., (2021); Archambault et al., (2022)	*Psychological Bulletin [987]; An International Journal for Statistics and Data Science Teaching [79]; Performance Improvement [335]; Educational Psychologist [263]*	"Theory" grounded in the computational framework of probabilistic causal models. Literature review and knowledge contextualisation.
VENTURE Level - Company Growth		
McAdam, & Reid et al., (2001); Roffe et al., (2007); Decuyper, Dochy, & Van den Bossche et al., (2010); McKeown et al., (2012); Massaro, Handley, Bagnoli, & Dumay et al., (2016); Durst, Edvardsson, & Foli et al., (2023)	*Journal of Knowledge Management [647]; Journal of European Indusctrial Training [40]; Industry and Higher Education Journal [810]; Educational Research Review [317]; Journal of Knowledge Management [56]*	Questionnaires and participants workshop afterwards. Analysis of 9 case studies. 18 qualitative in-depth interviews. Integrative and interdisciplinary literature review. Structured and follow-up literature review.
Morrison et al., (2006); Cheng, Wang & Spector et al., (2014); Nambisan & Wright et al., (2017); Mishra, Sahoo, & Pandey et al., (2021); Troise, Corvello, Ghobadian & O'Regan et al., (2022); Kearney & Lichtenstein et al., (2023)	*Synergy [234]; Educational Research Review [226]; Strategic Entrepreneurship Journal [102]; Distance Education; Technological Forecasting and Social Change [494]; British Journal of Management [17]*	Bibliometric and scientometric analysis and normative framework. Survey of innovative SMEs. Interviews with 20 start-up CEOs.

Source: Authors elaboration (2025).

The study used purposive sampling techniques to achieve data saturation with a small sample, based on an Irish technological sector case study framework. Utilising extensively the semi-structured interviews framework, undertaken with start-ups, small company owners, experts from corporations, digital educators and policymakers, we aim to recognise the optimal and efficient sample that leads to data saturation within working

contexts that are defined for significant difficulties to access data and the limitations and constraints that define SMEs, microenterprises and start-ups when trying to achieve theoretical saturation (Eisenhardt, 1989; McAdam et al., 2007; Bratianu et al., 2020; Matić, 2022).

3. Methodology

3.1 Research Design and Data Collection

The qualitative approach was chosen for this study, aiming to capture entrepreneurs' views and opinions on strengthening their managerial skills and expertise (Creswell, 2005; Creswell, 2007). Among existing research designs, quantitative, qualitative and mixed methods, the research employs a qualitative approach due to its holistic approach to exploring how entrepreneurial teams can develop during their training by enabling researchers to be deeply involved in the process (Creswell, 2005). Qualitative research has an exploratory background and seeks the answer to "how" and "why" social phenomena to understand social reality; however, these aspects and insights are difficult to capture (Creswell, 2007). Table 2 below provides a comparative analysis of quantitative, qualitative, and mixed methods design that presents the main features: philosophical assumptions, approaches to theory development, research strategies, techniques and research choices.

Table 2: Research design comparison

Quantitative	Qualitative	Mixed method	Research choice
Philosophical Assumptions			
Positivism Interpretivism Realism Pragmatism	Constructivism Interpretivism Realism Pragmatism	Pragmatism Critical realism	Constructivism
Approaches to Theory Development			
Deductive approach (data collected and analysed to test theory); Inductive (analysis is done from the empirical data)	Inductive or Deductive	Deductive or Inductive	Inductive approach
Research Strategies			
Experimental Survey; Action research, Case study Grounded theory	Action Research Case Study Ethnography Grounded Theory Narrative Inquiry	Combination of both	Irish Technological sector case study
Techniques			
Questionnaires Structured interviews	Semi-structured interviews In-depth interviews Observations Reflections	Combination of quantitative and qualitative data collection and analysis techniques.	Semi-structured interviews

Source: adapted from Creswell (2007), Saunders (2017)

Purposive sampling has become a research strategy which targets business owners of technological start-ups and small companies, employees in tech giants, and representatives of digital educators and governmental bodies. Purposive sampling included the following criteria: 1) distinguishing companies for start-ups (less than 5 years in operation), older than 5 years were determined as established; 2) educational companies-providers of digital programs; 3) policymakers, involved in providing digital training support; 4) corporations, that actively

incorporate digital skills (Grégoire, Barr and Shepherd, 2009; Miles and Huberman, 1994; Palinkas et al., 2015; Campbell et al., 2020).

Considering the previous studies in entrepreneurship, which used a qualitative approach, semi-structured interviews with founders/CEOs were used as a primary data collection tool (Eisenhardt, 1989; Kearney & Lichtenstein, 2023). Interviews were chosen for their flexibility, ability to gather rich, empirical data and the possibility to adjust questions according to participants' responses (Eisenhardt & Graebner, 2007; Kallio et al., 2016). Interview questions were guided by previous topic research, and all participants were asked the same questions to ensure consistency (Kallio et al., 2016). The interviews were designed for 40 to 60 minutes.

Triangulation was utilised to strengthen the reliability, validity and trustworthiness of qualitative data (Lincoln and Guba, 1985) to compare findings from empirical data with the theoretical framework and insights from sectoral reports and website information (Tippmann et al., 2013; Lincoln & Guba, 1985). The data collection phase targeted receiving adequate data from the study to answer the research question and fulfil the criteria of data saturation (Eisenhardt, 1989; Saunders et al., 2017). The reviewed literature reveals no agreed method of what to consider data saturation, and different types of saturation techniques and perspectives can be applied, such as theoretical, thematic, meaning, and code saturation (Hennink et al., 2016; Weller et al., 2018). The reviewed literature suggests that theoretical saturation might be reached only when no new information is received (Guest et al., 2006). NVivo software management system was chosen for the data storage and analysis processes, as this software is designed for in-depth exploration and understanding of qualitative data, broadly used in the field of business and management studies (Eisenhardt, 1989; Hennink et al., 2016; Saunders et al., 2017; Weller et al., 2018).

The purposive sample resulted in 20 interviews covering all sampled criteria and being in alignment with the common practices, as presented in Table 3, giving insights into managerial development through digital learning from multiple perspectives. The sample included seven start-ups and five established small companies. Geographically, participants represented the following major Irish cities: Dublin technological hub (80%), Cork (15%), and Galway (5%). Dublin concentrates mainly on multinational subsidiaries of technological giants in line with start-ups, additionally providing supplemental services to various companies in their region and beyond (Sarraipa et al., 2023).

Table 3: Qualitative sample size for data saturation

Author, Date	Journal	H-index	Sample Size	Saturation Goal	Sample Size for Saturation
Ando et al. (2014)	*Comprehensive Psychology*	31	39	Codes & categories	12 interviews for 92% of codes
Coenen et al. (2012)	*Quality of Life Research*	170	21	Categories	9 interviews (inductive) 12 interviews (deductive)
Constantinou et al. (2017)	*Qualitative Research*	93	12	Categories	5 interviews (consecutive) 8 interviews (random)
Francis et al. (2010)	*Psychology and Health*	108	14	Categories	14 interviews
Francis et al. (2010)	*Psychology and Health*	108	17	Categories	17 interviews
Guest et al. (2006)	*Field Methods*	61	60 (2 countries)	Codes	12 interviews for 88% of codes
Guest et al. (2020)	*PLOS One*	435	40	Codes	11-14 interviews for ~90% of themes
Guest et al. (2020)	*PLOS One*	435	48	Codes	11-14 interviews for ~90% of themes
Hennink et al. (2017)	*Qualitative Research*	93	25	Codes	9 interviews for 91% of codes; 16-24 interviews for meaning saturation
Namey et al. (2016)	*American Journal of Evaluation*	68	40	Codes	16 interviews for 90% of codes

Author, Date	Journal	H-index	Sample Size	Saturation Goal	Sample Size for Saturation
Nascimento et al. (2018)	*Revista Brasileira de Enfermagem*	34	15	Categories	11 interviews
Turner-Bowker et al. (2018)	*Value in Health*	132	26	Categories	15 interviews for 92% of concepts
Young and Casey et al. (2019)	*Social Work Research*	60	15	Codes & categories	9 interviews for ~90% of codes
Kearney and Lichtenstein et al. (2023)	*British Journal of Management*	142	20	Codes were defined	Saturation was achieved through % of supported answers

Source: Author's elaboration, adapted from Hennink (2025)

The sample size was cross-checked through the studies in the field of business, social and health sciences, as most relevant to entrepreneurship, to support the methodological choice of achieving data saturation (Eisenhardt, 1989; Saunders et al., 2017; Yin, 2018; Hennink et al., 2016; Weller et al., 2018). As methodological choices for research in entrepreneurial development were illustrated in Table 2 with most studies being supported by literature reviews and quantitative approaches, however, there is a lack of samples based on the empirical qualitative data. Table 3 summarises 13 articles published in high h-index journals, with a qualitative methodological approach to assess the number of required empirical samples to achieve data saturation (Hennink et al., 2016; Weller et al., 2018). A careful analysis of the required interviews showed that an average of 13 interviews is enough to identify more than 90% of the codes and categories. Even though the standard deviation equals 5, meaning that variation can include 8 to 18 interviews, 20 representative samples are illustrated by the reviewed literature to cover this requirement.

3.2 Data Analysis

To start data analysis from individual entrepreneurs' understanding of management development and possibilities of online learning, broad definitions were applied as part of the coding methodology and to establish the research significance of each interview transcript (Strauss and Corbin, 1998; Kearney & Lichtenstein, 2023). In the first step, coding included breaking each interviewee's data into particular parts with a focus on the content and inductive qualitative techniques were used in developing 'in vivo' codes (similar to open coding) to analyse and reflect the respondents' language as it generates a very detailed representation of the data (Strauss & Corbin, 1998; Tippmann et al., 2013). Analysis of every interview involved comparing received codes for similarities and differences to include new information into an existing code or create a new one. As understanding of the data developed, similar, thematically under broader codes were defined, which were then summarised, clearly labelled, and defined to avoid ambiguity (Saldana, 2013). The final step was the clustering process to identify relevant themes under higher-level categories, guided by the theoretical framework and emerging themes from the data, helping to integrate and conceptualise the data (Miles & Huberman, 1994; Strauss & Corbin, 2008; Tippmann et al., 2013). The analysis focused on the data structures to support theory building and data analysis (Gioia et al., 2013). According to the previously chosen definition, theoretical saturation in this study was reached after 90% of the interview analysis when no new information and codes were received, supporting the idea of the possibility to achieve theoretical saturation in relatively small samples (Guest et al., 2006).

Small purposive samples give valuable insights into a researched problem despite the numerous limitations in data collection studies involving interviews with CEOS and business owners. Main problems in reaching top managers include owners' high time constraints, habit to act as "business theorist", position of power in their organisation, which affects the interviewing process, and concerns about their reputation (Mikecz, 2012). To cope with the above constraints, the study adapted a firm-based, solely interviews approach, as the study tends to get insights from a firm level. Therefore, this approach turned out beneficial in the context of a case-study design (Eisenhardt, 1989). Insights received from a small sample cannot be underestimated, as they shed light on the main constraints and difficulties in SMEs' stable growth, managing teams and retaining expertise. These insights can guide policymakers and academia in analysis and offering further support for small companies.

4. Conclusion

The development of SMEs is a crucial pillar for the economy, and understanding how entrepreneurs form their strategy to succeed in daily operational performance represents a challenge for researchers (Alesina et al., 2022; Mishra & Zachary, 2015). Analysis of common business and social research practices showed the dominance of various literature reviews and quantitative techniques (Hennik, 2016; Saunders et al., 2017; Yin, 2018; Marzi et al., 2025). However, getting more insights can be possible in a qualitative purposive sample approach (Gennari, 2023). Insights received from a small sample cannot be underestimated, as they shed light on the main constraints and difficulties in SMEs' stable growth, managing teams and retaining expertise. These insights can guide policymakers and academia in analysis and offering further support for small companies.

Ethical Considerations

The Research Ethics and Integrity Committee at TU Dublin approved our interviews (approval: Rec-20-05) on April 28, 2023. Respondents gave written consent for review and signature before starting interviews.

AI Declaration

During the preparation of this work, the authors did not use any AI tools.

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