

Boosting Digital Entrepreneurship in European Union Higher Education

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Abstract: Digital entrepreneurship creates varied options and new development perspectives for entrepreneurs, connects entrepreneurship with technological development, creativity, innovation, the accumulation of digital skills and more. Within it, e-business represents one of the fastest growing phenomena in the business world. Digital entrepreneurial education represents a new important challenge in education to prepare youth for technological changes, new requirements and digital skills necessary for choosing a career and finding a job. Nowadays, the development of technology-based entrepreneurship education programs is essential. To face new challenges, students must use digital tools to accumulate entrepreneurial skills. Starting from the priorities of The Digital Education Action Plan (2021-2027) of the European Commission, the article aims to investigate whether digital entrepreneurship education keeps pace with the pace of development of digital entrepreneurship. It presents the current state of the academic educational offer in the EU in the field of e-business and e-commerce and proposes a conceptual model of driving forces for boosting digital entrepreneurship education. This study can be of interest both for decision-makers in the field of education, researchers, teaching staff in the sense of proposing and developing new educational programs, as well as for youth who want to know the academic options for choosing a career in the context of the digital economy.

Keywords: Digital Skills, Digital Entrepreneurship, Digital Entrepreneurship Education, E-Business Program, E-Commerce Program, European Union.

1. Introduction - The European Framework for Digital Entrepreneurship Education

Digital transformation of the European Union by 2030, as a priority objective set by the Digital Decade policy agenda (European Commission, 2021a), requires, in an open and interconnected world, the creation and implementation of sustainable, people-centered digital policies that empower people and businesses (European Commission, 2021b). Europe needs digitally capable citizens, a digitally skilled workforce and many more digital experts than today (European Commission, 2021c).

In this context, was developed the Digital Education Action Plan (2021-2027) (European Commission, 2021d), which aims to make effective use of digital learning technologies and resources in education and training, places particular emphasis on the importance of including digital learning which can provide more personalized, interactive and learner-friendly learning (European Commission, 2021d).

1.1 Digital Skills and Traditional versus Entrepreneurship Education

Although over the last 4 years the level of digital skills has continued to rise slowly in the EU (54% of people with basic digital skills, 26% with higher basic digital skills) (European Commission, 2022a), digital skills indicators are strongly influenced by socio-demographics (e.g., 79% of highly educated people, 77% of students, and 71% of youth possess at least basic digital skills) (European Commission, 2022a). The situation is different for the age category 13-14 years, more than 33% do not possess the most elementary level of digital competence (Fraillon et al, 2020). A survey of more than 5,700 respondents aged 16-25 (71% aged 16-18), conducted in 17 countries, shows that education that builds future-oriented skills is more important than traditional school (69%) want more opportunities for career development and entrepreneurship and 67% want programs that develop digital literacy (Advani, 2021).

To meet the needs of the knowledge society and to use technology effectively to design rich and engaging learning experiences for young people, teachers need to develop their digital skills, and universities need to reshape their curricula, organizational structures and pedagogical practices (Islam et al 2018).

1.2 EntreComp and DigiComp can and Must create Entrepreneurial Digital Learning Environment

Entrepreneurship depends on creating cultural, social or economic value and encompasses a broad typology of entrepreneurship such as: inclusive entrepreneurship, social entrepreneurship, green entrepreneurship and digital entrepreneurship (European Commission, 2016a). EntreComp reflects the complexity of the field of entrepreneurial competences, and can be used as a reference for curriculum design in the formal education and

training sector, for activities and programs in non-formal learning contexts.

Entrepreneurial and digital skills (European Commission, 2016b) can be developed through entrepreneurial education and training that focuses on designing an entrepreneurial mindset and entrepreneurial behavior. The entrepreneurial learning environment needs to be complemented with digital tools that build digital skills. This creates an Entrepreneurial Digital Learning Environment, which can be used in both formal and non-formal learning and includes components such as: web platforms, MOOCs, e-testing, webinars, e-books, video sequences, business games and simulations, podcasts and social networks. (Malach and Kylis, 2019).

2. Purpose, Research Questions and Research Methodology

Taking into account, on the one hand, the EU general framework for digital education and entrepreneurship education, and on the other hand, the state of digital literacy and educational preferences of young people, the main objective of the article is to analyze the offer of university programs associated with digital entrepreneurial education in the EU universities, with the aim of proposing a conceptual model of the driving forces that can lead to the promotion and development of digital entrepreneurial education.

The article is structured as follows: digital entrepreneurship - theoretical back-ground, which, in addition to the concept of digital entrepreneurship, summarizes the main research fields identified in academic publications; follows the analysis of academic digital entrepreneurship from the perspective of digital entrepreneurial education with an emphasis on the formation of new digital skills; then identifying the pioneers of digital entrepreneurial education in the field of e-business and e-commerce to see examples of good practice from other universities in the world; the status of the e-business and e-commerce educational offer in Europe. Follows the conceptual model of the driving forces that could determine the development of digital entrepreneurial education in the EU. In the last part of the article, findings are followed by discussions, conclusions and future research directions.

Research questions

In order to achieve the above objectives, the following research questions (RQ) were formulated:

RQ1 Digital entrepreneurship research resources are used in the rethinking of digital entrepreneurial education?

RQ2 Are there specific university programs in EU that support digital entrepreneurship education?

RQ3 What are the main driving forces that could determine a boost of digital entrepreneurship education in the EU?

Research methodology

In order to get an overview of the current progress in digital entrepreneurship research and digital entrepreneurship education, we used bibliometric analysis through academic research databases and the most used search methods used by young people.

3. Digital Entrepreneurship – Theoretical Background

3.1 Digital Entrepreneurship – Typology and Research Areas

Digital entrepreneurship stimulates innovation, shapes consumer values, opens markets, reduces transaction costs, intensifies economic and social interactions through digital technologies, increases welfare, increases labor productivity and the efficiency of innovative entrepreneurial activities (Kraus and Marchenko, 2021).

Digital entrepreneurship can generally be defined as any entrepreneurial action that converts a physical asset, a digital service, or a significant portion of the firm. By bringing businesses online and using electronic means of communication to run them, digital entrepreneurship thereby fills the gap between traditional entrepreneurship and the digital domain.

An analysis of the number of studies on digital entrepreneurship conducted by Long, D et al (2022) shows an increase in researchers' attention to this area of study. Between 2003 and 2017, with an average of 2 papers published per year, digital entrepreneurship research began to grow in vitality, reaching 184 papers in 2021 (Long et al, 2022). There has been a lot of concern in the scientific literature in recent years about the study and conceptualization of digital entrepreneurship. The typology of digital entrepreneurship is outlined by Hull et al 2007, and includes: mild digital entrepreneurship (involves venturing into the digital economy as a supplement

to more traditional venues), moderate digital entrepreneurship, (focus on digital products, digital delivery etc.), extreme digital entrepreneurship (the entire venture is digital, including production, the goods or services themselves, advertising, distribution, and the customers) (Hull et al 2007). Studying how digital technology characteristics influence digital entrepreneurship (Nambisan, 2017), as well as analyzing and identifying themes related to digitization, namely - openness, affordance and generativity (Nambisan et al 2019), digital entrepreneurship needs to be investigated from the perspective of digital technologies as a facilitator, outcome or context of entrepreneurial actions (Recker and von Briel, 2019; Baskerville et al 2020, Giones and Brem, 2017). Digital entrepreneurship studied from the perspective of The New Venture Idea, Digital Artifacts (for software-based products and objects such as apps, artificial intelligence and machine learning, etc. and secondary software products such as media and other digital content) and Digital Platforms (software-based systems designed to host complementary offerings, matching between vendors and consumers) (Nambisan, 2017; Buckley et al 2022).

Based on a review of the scientific literature, Kraus et al (2018) analyses new digital business models and their success factors and propose a digital entrepreneurship research map. Entrepreneurship education and digital ecosystem are considered relevant research directions alongside digital business models and platform strategies (Kraus et al, 2018; Healy, 2021). Furthermore, we complement studies in digital entrepreneurship with those that propose a new framework for the digital entrepreneurial ecosystem, which integrates digital ecosystem literatures and entrepreneurial ecosystem literature (Sussan and Acs, 2017), extending this system to digital platforms and supporting digital innovations (Li et al, 2017).

3.2 Digital Entrepreneurship and Digital Platforms

The use of digital platforms in digital entrepreneurship is another distinct line of research identified, which examines the conceptual framework and quantifies the economy of the digital platform from the perspective of three interrelated concepts: digital technology infrastructure, multi-faceted digital platforms and platform-based ecosystems (Acs et al, 2021), digital platforms including social media channels, e-business, e-commerce websites and other similar information technology-based businesses (Sussan and Acs, 2017; Song, 2019; Oteng et al, 2021). The core digital platform trends that an entrepreneur needs to identify: platform-centric software, software and apps, database management through third-party servers, digital partnerships (Kooskora, 2021), Internet of Things (IoT) and business models, etc. (Grewal et al., 2020).

In the context of the current research, the question that arises is whether these digital entrepreneurship research resources: conceptualization, classification, analysis of functionalities, typology, development of new interconnection systems, new business models etc., are used in the rethinking of entrepreneurial education, more specifically of digital entrepreneurial education, in the creation and implementation of new curricula and new pedagogical methods to help the formation of future-oriented skills and abilities.

4. Academic Digital Entrepreneurship and Digital Entrepreneurship Education

Conceptualizing academic digital entrepreneurship includes: activities aimed at entrepreneurial education, incubators for students and start-ups, business plan competitions for students, the entrepreneurial garage, activities involving a wide variety of digital technologies (e.g., Mooc, MIT Fab Labs Fablab, Stanford Fab lab, Business analytics, Liveplan, business plan software, built for Entrepreneurs Patsnap, cloud platforms, big data, 3D printing); as well as activities that quantify the outcomes of university entrepreneurship, such as spinoffs and graduate start-ups, and various forms of entrepreneurial education development (not only digital) (Rippa and Secundo, 2019).

In this article we will only address academic digital entrepreneurship from the perspective of entrepreneurship education, more specifically digital entrepreneurship education.

Entrepreneurship education is a series of education and training activities that seek to develop the intention of entrepreneurial behavior, implement entrepreneurship among participants and promote some factors of entrepreneurial intention (Kakouris and Liargovas, 2021).

Digital entrepreneurship education can provide students with entrepreneurial knowledge, train them in the use of new technologies, increase the professionalism of digital entrepreneurship courses and help students identify entrepreneurial and employment opportunities offered by the online environment (Yu et al, 2022). Through specialized modules on digital entrepreneurship, digital transformation and entrepreneurship development, young people can acquire digital entrepreneurial skills, and are able to focus on identifying and pursuing digital

opportunities (Geissinger et al, 2019; Ratten and Jones, 2021; Secundo et al, 2021; Yu et al, 2022). However, many entrepreneurship education programs in Europe continue to ignore the idea of digital entrepreneurship (Shamsrizi et al, 2021).

5. Digital Entrepreneurship Higher Education Programs in EU - Current Status and a Conceptual Model of Driving Forces for Boosting Digital Entrepreneurship Education

5.1 Pioneers of Digital Entrepreneurial Education Programs

Many universities have implemented innovative teaching and learning methods in entrepreneurship education since the first digital entrepreneurship education programs were initiated in the early 2000s. The world's first e-commerce bachelor's degree program was offered by Acadia University, Canada in September 2000, whose philosophy was based on the fact that e-commerce requires an equal combination of business and computer science training; the University of California, San Diego was the first to offer a master's degree in e-commerce in 1998 (Weinstein, 1998). An interesting strategy is the adoption of e-commerce implementation strategy in Chinese universities, which basically comprises four stages in line with the pace of Internet popularization since 1995: Stage 1: Exploratory Stage (1995-1997); Stage 2: Piloting Stage (1998); Stage 3: Formalizing Stage (2001-2003) and Stage 4: Popularizing Stage (din 2003) (Zhang et al, 2005). As early as 2001, 13 e-commerce programs have been implemented in China's 597 universities (Huo et al, 2021). These programs have multiplied by 2019 to a total of 328 e-commerce programs offered by 831 universities, an impressive increase from 2001 (2.17% of all universities offered e-commerce programs) to 2019 (39.47%, 328 out of 831) (Huo et al, 2021).

In Europe, the first undergraduate program in e-Business was offered by The Management School of Liverpool University, UK, in 2001 (Wu et al, 2016), however, in 1999 the University of Portsmouth Business School, initiated the Master of Marketing with e-Commerce (Wu et al, 2016). Recently, we have identified an inventory of courses related to digital entrepreneurship in Europe, which includes programs, in various formats virtually live, synchronous, processed through the Zoom or Go-Live platform, or online in asynchronous format (Vorbach et al, 2019).

5.2 Curent Status of Digital Entrepreneurship Education Programs in Europe

In our attempt to establish the current status of digital entrepreneurship education offered by universities, we sought to identify the educational offers of universities in the European Union with bachelor's and master's programs in the field of business administration. We especially looked for programs specialized in e-business and e-commerce. The research methodology is direct documentation using search methods, namely Google, Bing, Bing AI, and ChatGPT search engines. The main reason for choosing this way of research was determined by the fact that young people who want to find out about potential study options use these search engines.

Table 1: Universities in Europe offering bachelor and master programmes in Digital Entrepreneurship

Country	University	Program	Degree
Denmark	Copenhagen Business School	Business Administration and Digital Business	Bachelor
	Copenhagen University	Analysis of Digital Media Faculty of Humanities	Course Bachelor
Netherlands	University of Twente	Digital Business & Analytics	Master
Germany	Technical University of Munich	Management for Digital Business Models	Bachelor
Sweden	Stockholm School of Economics	Digital Transformation	Course Master
Ireland	Dublin City University	Digital Business and Innovation	Bachelor
United Kingdom	University of Warwick	e-Commerce and Digital Analytics e-Business Management	Master
Switzerland	University of St. Gallen	Business Innovation	Master
	Geneva Business School	Entrepreneurship	Bachelor
Italy	Milano University (IT)	Entrepreneurship lab	Bachelor

Country	University	Program	Degree
	Facoltà di Scienze Politiche, Economiche e Sociali		
Germany	Tomorrow University	Responsible Entrepreneurship	Bachelor
		Sustainability, Entrepreneurship, and Technology	Master
	SRH Berlin University of Applied Sciences	Entrepreneurship	Master
		Sustainable Innovation and Entrepreneurship	MBA
France	KEDGE Business School	Entrepreneurial School	Bachelor
	MARSEILLE	Digital & Data Marketing Training	Bachelor
France	Grenoble Ecole de Management	Digital Business	Course
			Bachelor
	Sorbonne University	Student Entrepreneur Diploma	Bachelor
		CELSA Entreprendre	Master

Source: made by author

As can be seen, the career option for a young person by enrolling in a bachelor and master degree program in Europe in the field of digital entrepreneurship, especially in the field of e-business, is very limited or even non-existent if we try to identify strictly this field.

However, we have to acknowledge that there is an upward evolution of MOOCs (Massive Open Online Courses) on entrepreneurship, which contribute to the development of digital entrepreneurship education (Vorbach et al, 2019), e.g., EdX, Coursera which allow access to a wide range of information, support, facilitators and content, but in our opinion can only initiate, complement or up-date a basic training in the field.

5.3 A Conceptual Model of Driving Forces for Boosting Digital Entrepreneurship Education

Following the above results, we propose a conceptual model to clearly illustrate the driving forces that can determine an increase in the educational offer in digital entrepreneurship (Figure 1).

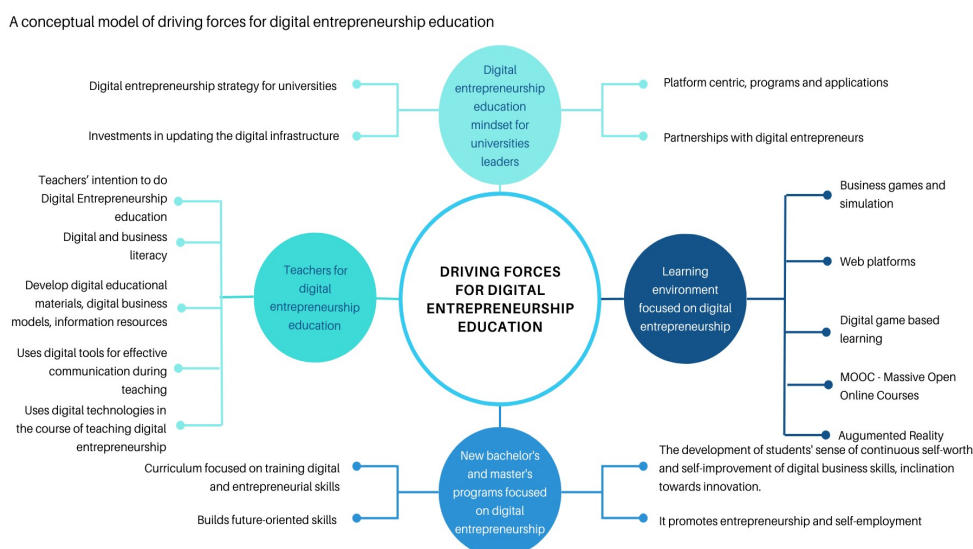


Figure 1: A conceptual model of driving forces for digital entrepreneurship education

Component 1 - Digital entrepreneurship education mindset for university leaders - which must take into account the evolution of the socio-economic and cultural environment, the requirements related to digitization, and the global evolution of businesses based on platforms and not only. Attention to these developments could change the outlook for educational offers, which can be more adapted and respond to the training of future-oriented skills. Component 1 - may include: Digital entrepreneurship strategy for universities; Investments in updating

the digital infrastructure; Platform centric, programs and applications; Partnerships with digital entrepreneurs etc.

Component 2 - Teachers for digital entrepreneurship education. Young people easily develop their digital skills, new technologies are easily used, therefore teachers must also keep up with the continuous formation and development of their digital skills. The technology exists, the digital economy has already demonstrated its functionality, therefore, the use of the newest teaching methods through the integration of digital technologies are strictly necessary, both to form digital skills and to develop digital entrepreneurial education. For this component, we consider the following: teachers' intention to do Digital Entrepreneurship education; teachers must continue to improve digital and business literacy; develop digital educational materials, digital business models, and information resources; must use digital tools for effective communication during teaching; use digital technologies in the course of teaching digital entrepreneurship.

Component 3 – New bachelor's and master's programs focused on digital entrepreneurship. Designing an attractive educational curriculum oriented towards the development of new skills. In this sense, we propose a curriculum focused on training digital and entrepreneurial skills, building future-oriented skills, developing students' sense of continuous self-worth and self-improvement of digital business skills, and inclination towards innovation, promotes entrepreneurship and self-employment.

Component 4 - Learning environment focused on digital entrepreneurship. In the teaching process, teachers must integrate learning by using components such as interactive whiteboard, business games and simulation, web platforms, such as: Adobe Connect, Zoom, Microsoft Teams, Google Meet, etc., platforms that allow simulations or the use of free modules, for example, WordPress for creating online stores, digital game-based learning; MOOC's, for example EdX; Augmented Reality (Camara et al, 2021, Sungkur et al, 2016), for example MergeCube, Immersive Learning Initiative, pioneering new approaches to learning and research for management and business (Kooskora, 2021).

6. Findings and discussions

The increased interest in research in this field in the last five years ensures a solid research base, including numerous scientific articles, studies and books published on the topic of digital entrepreneurship and digital entrepreneurial education. The answer to our first research question (RQ1), is that these documentation resources cover topics such as conceptualization, classification, analysis of functionalities, typology, development of new interconnection systems, new business models, etc., can be used for re-thinking of entrepreneurial education, more specifically for digital entrepreneurial education, for design and implementation of new curricula and new pedagogical methods to help the formation of future-oriented skills and abilities. Given that Generation Z has a strong desire for a new educational model that includes a combination of virtual and personal learning, through this article, we wanted to identify the academic programs in the field of digital entrepreneurship offered by universities in the EU. We investigated if European universities have similar concerns as Asia universities regarding Digital Entrepreneurship Education, especially for e-business and e-commerce (RQ2). We found that in the universities of the EU, there are no similar strategies to the universities from China. Given the formal framework supporting digital education, we found that there are very few university programs that can be assimilated to digital entrepreneurship education: 9 programs offered at bachelor level; 7 programs at master level and 4 training courses (of which 2 for undergraduate students).

Considering this fact, we have built a conceptual model that includes the driving forces that could determine the development of digital entrepreneurship education (RQ3).

7. Conclusions

Certainly, in the context of digital transformations, the use of artificial intelligence, the constant concern to integrate digital skills into professional activity in order to develop, increase productivity and employability, digital entrepreneurship and especially e-business and e-commerce has become an extremely important field for researchers, educators, investors and public administrations alike.

We believe that it is necessary for universities, to diversify much more their range of programs in the field of digital entrepreneurship and, to adapt their methods and tools for teaching entrepreneurship, but not only, to the new technological and economic reality. Although in the scientific literature we have identified European good practices in teaching digital entrepreneurship, the EU strategic context in the field of EntreComp and DigiComp, we consider these concerns to be rather timid. However, we admit that we may not have found all

the courses or bachelor's and master's programs available in European universities in the field of Digital Entrepreneurship.

Universities must pay attention to training in digital entrepreneurship primarily for teachers who must have entrepreneurial thinking and teaching skills and be promoters of entrepreneurship/digital entrepreneurship as well as innovators of creativity. Teachers need to follow training programs in digital entrepreneurship which will help them to understand the need, role, and responsibilities in teaching digital entrepreneurship through the integration of technology, innovation in teaching practice, and cooperation with professionals in the field. (Medrek, 2018; Keyhani, 2020; Kooskora, 2021; Rattes and Jones, 2021; Yu et al, 2022).

We are aware that, the article has limitations, first of all, for theoretical documentation our search has been limited to articles published in academic journals written in English, with access to full-text pdf, therefore the contributions of specialists who have published in other languages have not been studied. In order to identify programs in the field of digital entrepreneurship, e-business, e-commerce we limited our search to the use of keywords in English using: Google, Bing, Bing AI and ChatGPT, although there are other search engines. The explanation, although not justified according to the scientific methodology, is related to the fact that we wanted to "search" these programs from the perspective of a young person concerned with the choice of career path.

Future research directions in the field of digital entrepreneurship education focus on the design and implementation of a digital entrepreneurship program specializing in e-commerce at a university, development of an e-business and e-commerce laboratory.

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