Digital Technologies and Student Entrepreneurship: Insights from the University of Calabria

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Abstract

The rapid advancement of digital technologies has elevated the importance of innovation, paving the way for digital entrepreneurship. This study contributes to the analysis of digital entrepreneurial intentions among university students by examining micro-level factors (autonomy, self-efficacy, pro-sociality) and meso-level factors (family context, education) using a sample of students from the University of Calabria. The findings indicate that autonomy, self-efficacy, and innovative education significantly enhance the intention to launch digital businesses. While gender and age do not appear to be significant factors, positive family perceptions play a supportive role in fostering digital entrepreneurship. This paper highlights the value of innovative teaching methods and pro-social values, offering valuable insights for future research and practical guidance for universities and policymakers seeking to build robust digital entrepreneurial ecosystems.

Keywords: Digital Entrepreneurship, Entrepreneurial Intention, University Students, Self-Efficacy, Pro-sociality, Digital Entrepreneurial Intention.

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Tecnologie digitali e imprenditorialità degli studenti: l'esperienza dell'Università della Calabria

Sommario

La rapida diffusione delle tecnologie digitali ha incrementato l'importanza dell'innovazione che ha aperto la strada all'imprenditorialità digitale. In questo contesto, si vuole contribuire all'analisi delle intenzioni imprenditoriali digitali fra studenti universitari, individuando fattori micro (autonomia, autoefficacia, pro-socialità) e meso (contesto familiare, formazione) su un campione di studenti dell'Università della Calabria. I risultati evidenziano come autonomia, autoefficacia e formazione innovativa favoriscano l'intenzione di avviare imprese digitali. Genere ed età non risultano significativi, ma percezioni familiari positive supportano l'imprenditorialità digitale. Il contributo sottolinea l'importanza di metodi didattici innovativi e dei valori prosociali, offrendo spunti per ricerche future e suggerendo come università e decisori politici possano sviluppare ecosistemi imprenditoriali digitali.

Parole chiave: Imprenditorialità Digitale, Intenzione Imprenditoriale, Studenti Universitari, Autoefficacia, Pro-sociale, Intenzione Imprenditoriale Digitale.

1. Introduction

In recent years, rapid developments in digital technologies have created new challenges and underscored the importance of innovation for start-ups[1]. Digitalization is considered «the single most important force in entrepreneurship and innovation» (Berger *et al.*, 2021, p. 436). Digital Entrepreneurship (DE) enables the discovery, evaluation and exploitation of novel opportunities to launch innovative goods and services, develop new business models, and create organizational systems by leveraging digital resources as enablers, context, or outcomes (Nambisan, 2017; Bachmann *et al.*, 2024). DE has gained growing attention in both academia and practice, referring to enterprises built on IT-based ideas in the digital economy (Hull *et al.*, 2007; Kollmann, 2008; Nambisan, 2017). It involves starting businesses online, conducting transactions and exchanging data via IT platforms (Tajvidi and Tajvidi, 2020).

Compared with traditional entrepreneurship, DE is typically cheaper, less limited by geography, easier to enter and exit, and more IT-intensive (Nambisan *et al.*, 2019; Wang *et al.*, 2019). Although DE research is still emerging

[1] According to research conducted by the MIT Center for Digital Business, companies that apply digital transformation are 26% stronger than their competitors and have a 12% higher growth factor.

(Wang *et al.*, 2016), the concept of digital entrepreneurial intention (DEI) is increasingly relevant (Zaheer *et al.*, 2019). DEI describes the intention to create entrepreneurial activities involving digital goods, services, or other forms of digital work (Younis *et al.*, 2020). Student entrepreneurs are individuals who develop a business plan for a new or existing growth-oriented venture (Nabi *et al.*, 2018; Ferrante *et al.*, 2019). In Italy, university-based start-ups have gained scholarly and policymaking interest because they can drive knowledge transfer and regional growth. Programs like Enactus, Start Cup, and Contamination Labs have emerged to support these goals[2].

The World Economic Forum[3] argues that school systems should prepare students to work in dynamic, rapidly changing entrepreneurial and global environments. This vision requires a complete paradigm shift for academia, including changes in both the fundamentals of how schools operate and their role in society. Equipping students across all faculties with entrepreneurial skills can help them create value where uncertainty and resource limitations prevail (Fini *et al.*, 2009). Recent transformations in society and institutions are influencing students' lifestyles and career plans, asking for changing teaching methods and tools along with academic performance. The literature is rich of theoretical reviews (Sitaridis and Kitsios, 2024; Passarelli and Bongiorno, 2025), while empirical articles using data from students were limited (Secundo *et al.*, 2020; Rêgo *et al.*, 2024). Accordingly, this paper proposes an empirical investigation on the main factors influencing DEI among students. Specifically, the case of the University of Calabria is proposed.

This article is structured as follows: Section 2 outlines the theoretical framework for digital entrepreneurial intention among students (DEIS) and the factors that influence it. Section 3 presents the research design, while Section 4 explains the empirical analysis and results. The final section discusses conclusions, implications, and limitations.

2. Theoretical Framework

The growing adoption of digital technologies has heightened the appeal of entrepreneurship as a career (Youssef *et al.*, 2021). Over the past decade, disruptive advances have allowed entrepreneurs worldwide to adopt novel digital solutions (Bachmann *et al.*, 2024; Lungu *et al.*, 2024). Hull et al. (2007) describe DE as "a subcategory of entrepreneurship in which some or

[2] https://www.enactusitaly.org/; https://www.pnicube.it/startcup; https://clab.cineca.it/;

[3] https://www.weforum.org/stories/2015/08/how-digital-technology-is-transforming-global-education/https://www.weforum.org/stories/2023/07/why-quality-education-is-the-foundation-of-entrepreneurship-and-economic-growth/

all of what would be physical in a traditional organization has been digitized". Meanwhile, Zhao and Collier (2016) define it as "creating new ventures and transforming existing businesses by developing novel digital technologies and/or novel usage of such technologies".

The role of digital media and ICTs in enabling entrepreneurial opportunities is particularly significant, as is the importance of digital infrastructure and entrepreneurial agents within ecosystems (Sussan and Acs, 2017). Platforms and infrastructures that utilize global computing power further underscore the potential of DE (Nambisan, 2017). Moreover, new technologies such as the Internet and ICTs enhance digital capabilities and entrepreneurial performance at every stage of a venture's life cycle (Paul *et al.*, 2023). Although digital platforms and environments offer new perspectives, they also disrupt traditional business operations (Sitaridis and Kitsios, 2024; Lungu *et al.*, 2024). These changes underscore the need to understand how digital tools are reshaping innovation and entrepreneurship. This starts with the entrepreneurial intention (EI) that represents «the conscious mental state before an action that directs attention toward starting a new business and becoming an entrepreneur» (Esfandiar *et al.*, 2019). In this study, we focus on digital entrepreneurial intention (DEI) represents individuals' plans to start new ventures using digital platforms and technologies (Garcez *et al.*, 2023). DEI and EI share many characteristics; however, DEI focuses more strongly on digital tools and can boost EI (Younis *et al.*, 2020). Various theories, including career anchor, career psychology, personality trait, social cognitive career, entrepreneurial attitude orientation, personality-motivation, planned behavior, goal-setting, and positive psychology, help explain technology-driven entrepreneurial intentions (Yeh *et al.*, 2020).

Li *et al*. (2024) show that continuous learning and entrepreneurship education can transform DEI into actual entrepreneurial behavior. Although the general research on entrepreneurial intentions is broad, studies dedicated to DEI among students remain relatively scarce (Secundo *et al.*, 2020). Digitalization allows students to launch ventures even while still studying. Consequently, universities, infrastructure, resources, and digital ecosystems support students' willingness to establish businesses (Garcez *et al.*, 2023). Thus, digital entrepreneurial intention among students (DEIS) involves aspiring to use digital tools and ICT to create new ventures, potentially based on digital goods, services, or activities (Younis *et al.*, 2020).

Based on this body of work, this study identifies the factors influencing the DEIS and explores their relationships and effects. These factors include micro aspects such as personality traits (e.g., neuroticism, agreeableness, extroversion, responsibility, self-efficacy, locus of control, need for achievement, openness to new experiences) (Costa and McCrae, 1992; McGee *et al.*,

2009; Singh Mehdi, 2022; Neneh, 2022), as well as pro-social behaviors directed toward individuals or society (Tiwari *et al.*, 2022). Meso aspects encompass family background and education (Criaco *et al.*, 2017; Badri and Hachicha, 2019; Do Nguyen and Nguyen, 2023). Some researchers argue entrepreneurship is innate (Silva, 2017), while others contend it can be nurtured through education, soft-skill acquisition (Arranz *et al.*, 2017), or a focus on sustainability-driven entrepreneurship (Liang *et al.*, 2019). Table A1 in the Appendix A summarizes these factors.

3. Research Design and Empirical Analysis

3.1 The Case of the University of Calabria

The sample for this study consisted of students from the University of Calabria (UniCal), a medium-sized public university in southern Italy founded in 1972 to promote regional development. UniCal remains dedicated to this mission by facilitating debate and creating an academic community focused on knowledge, cultural education, civic progress, and local economic growth. In terms of technology transfer, UniCal leverages its research output through patents, academic spin-offs, and innovative start-ups. Historically, the university relied on traditional teaching methods with limited online components. Over time, adopting digital resources has significantly influenced students' learning processes, creativity, idea generation, and career aspirations.

3.2 Research Design and Variables

We disseminated a questionnaire to the entire student body at the University of Calabria in the 2023/24 academic year. Appendix A (Table B1) details the three main sections of the questionnaire: (1) socio-demographic information, (2) digital entrepreneurial intention, and (3) micro- and meso-level factors. We received 162 valid responses from undergraduate, master's, and doctoral students. Guided by the factors in Table A1 (Appendix A), we applied an exploratory quantitative approach to investigate DEIS during a period of heightened digital adoption (Vodă and Florea, 2019).

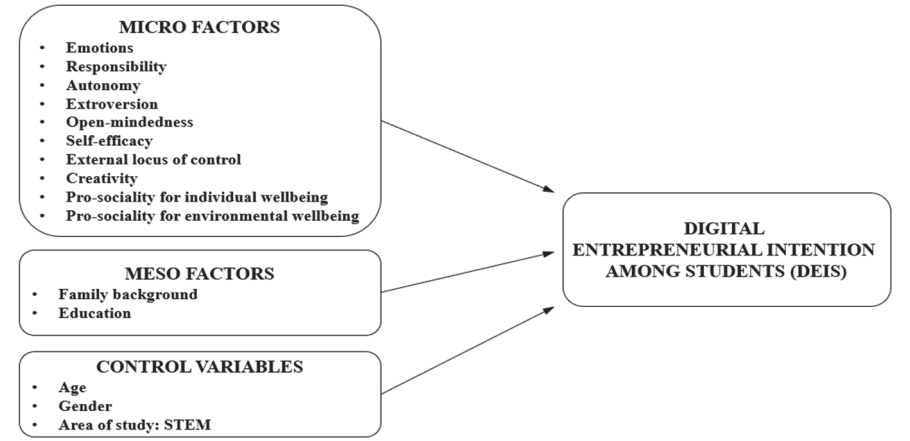
We conducted factor analysis on items measured with 7-point Likert scales. The Kaiser-Meyer-Olkin (KMO) index was 0.7, indicating an adequate sample size. The Bartlett Sphericity Test was significant ($p = 0.00$), confirming the data were suitable for factor analysis. We retained factors with eigenvalues greater than 1 and used Varimax rotation.

Twelve factors emerged and are presented in Table A2 (Appendix A). The dependent variable (DEIS) measures a student's likelihood of launching a digital business. Building on Valliere (2015) and Rueda *et al*. (2015), it was operationalized as a dichotomous variable (0/1) indicating intent to pursue a digital-based business (Al-Mamary and Alraja, 2022; Krueger and Carsrud, 1993). The independent variables include the factor-analysis scores and control variables.

3.3 Method and Technical Check

We employed a logistic regression model to estimate each student's probability of aiming to start a digital venture (DEIS = 1) or not (DEIS = 0). Before running the regression, we assessed multicollinearity among continuous and categorical variables. Tolerance and Variance Inflation Factor (VIF) values were within acceptable limits (Tolerance > 0.826; VIF < 1.21). For categorical variables, a Spearman correlation analysis removed items with correlations above 0.5. We excluded provinces of residence due to significant correlations ($p < 0.05$). For further details, refer to the "Data Collection and Statistical Validation Procedures section" of Appendix A (Tables A2, A3), which includes methods and tables with references to the tests and variables used.

Figure 1 – Conceptual model



After these checks, 15 variables remained out of the original 20: 2 categorical (gender, area of study: STEM) and 13 continuous (age, educational background, pro-sociality for individual wellbeing, family background, emo-

tions, responsibility, autonomy, extroversion, open-mindedness, self-efficacy, external locus of control, creativity, pro-sociality for environmental wellbeing). The following figure shows the conceptual model.

4. Results

4.1 Descriptive Statistics

Of the respondents, 50% were female, and the average age was 26. Roughly 15.4% had only a high school diploma, 44% held a bachelor's degree, 32% had a master's, 1.2% had a specialization, and 7.4% were doctoral students. About 35% studied business administration, 15.4% economics, 50% STEM disciplines. Approximately 19% reported having a self-employed father, and 15.4% said their father was an entrepreneur. Among mothers, 32% were unemployed, 29.6% employed, and 7% had started a business. Most students were from and resided in the province of Cosenza (50.6%), followed by Catanzaro (19.1%).

4.2 Binary logistic regression

Table 1 shows the logistic regression results. The omnibus test for the model with predictors was statistically significant ($p < 0.05$), indicating satisfactory explanatory power. The model correctly classified about 78.4% of cases. Cox-Snell and Nagelkerke pseudo-R-square measures were 0.436 and 0.582, respectively both above 0.3, suggesting solid predictive ability. According to the Wald test, all included variables were significant (Table 1).

Personal factors, such as autonomy (odds ratio = 4.025), boosted the likelihood of launching a digital business. Self-efficacy (odds ratio = 1.577) also had a positive relationship with DEIS. Pro-sociality for individual wellbeing showed a positive impact on DEIS, indicating that a motivation to use digital technologies for societal benefit can encourage digital entrepreneurship. Education and family background were also significant. Students who took courses featuring innovative teaching methods were more likely (odds ratio = 6.452) to pursue digital entrepreneurship than those in traditional courses. The "area of study: STEM" variable had a strong negative effect on DEIS, possibly because of differences in curriculum design, probably due to lack of cross-disciplinary courses on entrepreneurship. Having parents with business experience also positively influenced students' intent to start digital ventures (odds ratio = 1.507). Neither gender nor age had a significant impact on DEIS.

Table 1 – Model, coefficients and goodness-of-fit

Variables		*B*	*S.E.*	*Wald*	*df*	*Sig.*	*Exp (B)*	*95% C.I. for EXP(B)*		
								Lower	*Upper*	
Micro factors	Constant	3.111	1.753	3.15	1	0.076	22.438			*
	Emotions	0.234	0.248	0.889	1	0.346	1.263	0.777	2.053	
	Responsibility	0.125	.232	0.289	1	0.591	1.133	0.719	1.784	
	Autonomy	1.392	0.286	23.763	1	0	4.025	2.299	7.045	***
	Extroversion	0.055	0.235	0.054	1	0.816	1.056	0.666	1.674	
	Open-minded-ness	0.359	0.225	2.547	1	0.111	1.432	0.921	2.225	
	Self-efficacy	0.455	0.226	4.062	1	0.044	1.577	1.013	2.455	**
	External locus of control	0.246	0.229	1.157	1	0.282	1.279	0.817	2.003	
	Creativity	0.194	0.236	0.674	1	0.412	1.214	0.764	1.927	
	Pro-sociality for individual wellbeing	0.45	0.24	3.526	1	0.06	1.569	0.981	2.511	*
	Pro-sociality for environmental wellbeing	0.157	0.228	0.476	1	0.49	1.171	0.748	1.831	
Meso factors	Family back-ground	0.41	0.223	3.398	1	0.065	1.507	0.974	2.332	*
	Education	1.864	0.331	31.659	1	0	6.452	3.37	12.351	***
Control variables	Age	-0.08	0.06	2.143	1	0.143	0.916	0.814	1.03	
	Gender	0.342	0.521	0.43	1	0.512	1.407	0.507	3.906	
	Area of study: STEM	-1.63	0.604	7.341	1	0.007	0.195	0.06	0.636	***

*Sign. p < 0.001 '***'; 0.05 '**'; 0.1 '*';*

Omnibus Tests Chi-square = 92.844; Sig = 0.000
-2 Log likelihood = 131.118
Cox and Snell Pseudo R Square = 0.436
Nagelkerke Pseudo R Square = 0.582
Percentage Correct (Classification) = 78.4

5. Discussion, Conclusion and Implications

This study investigated the main factors shaping DEIS at an Italian public university. Autonomy and self-efficacy stood out as key individual-level (micro) factors. Educational elements also played a substantial role: innovative teaching methods motivated students to create digital-based businesses (Martínez-Gregorio *et al.*, 2021). This aligns with previous research showing that entrepreneurship education fosters entrepreneurial mindsets (Badri and Hachicha, 2019; Cucino *et al.*, 2022; Passarelli and Bongiorno, 2025) and supports entrepreneurship as a viable career path (Do Nguyen and Nguyen, 2023). Pro-sociality for individual wellbeing also proved influential, suggesting that "positive" digital technology usage can lead to socially beneficial digital ventures (Ghatak *et al.*, 2020). The University of Calabria's longstanding "pro-social mission" may thus reinforce its students' interest in digital entrepreneurship. Digital media and ICT have a measurable effect on students' intentions to pursue digital-based start-ups.

From a pedagogical standpoint, innovative teaching approaches that integrate new technologies can simulate real-world entrepreneurial experiences and foster both hard and soft skills (Tiberius *et al.*, 2023). Universities might introduce standalone courses on soft-skill development or embed these competencies across existing programs (Succi and Canovi, 2020). Methods such as training, case studies, behavioral modeling, metaphor games, storytelling, action learning, design thinking, and role-playing could be effective (Arranz *et al.*, 2017; Passarelli and Bongirono, 2025).

Future academic offerings could emphasize more human-centered and ethically driven practices, promoting socially oriented entrepreneurship through digital tools (Singh and Mehdi, 2022). By integrating these values into both teaching and individual attitudes, universities can expand digital entrepreneurship. Adjusting teaching and outreach activities (the "third mission") can help create ecosystems that yield broader societal value (Amaral *et al.*, 2020).

Moreover, several practical implications can be identified. Universities should foster independent decision-making and problem-solving by incorporating hands-on experiences, start-up simulations, and real-world challenges into their programs. They should also encourage socially responsible digital ventures by supporting hackathons, accelerators, and funding opportunities for impact-driven innovations. To boost entrepreneurial intentions, it is essential to move beyond traditional lectures and integrate experiential learning, case studies, and digital entrepreneurship training into the curriculum. Additionally, Policymakers should ensure that entrepreneurial education is embedded in all university programs, particularly in STEM fields, to foster

innovation and business creation. Policies should also encourage cross-disciplinary courses that integrate business, technology, and digital skills, preparing students for digital entrepreneurship. Facilitating partnerships between universities, tech hubs, and industry leaders, to provide students with real-world entrepreneurial exposure, could be a winning strategy. Moreover, create a supportive ecosystem for digital entrepreneurship, can ensure that students receive the education, resources, and opportunities needed to launch and sustain successful ventures.

5.1 Limitations and Future Research Directions

This paper contributes to the literature on student digital entrepreneurship by highlighting the chief factors driving digital entrepreneurial intention. However, several limitations must be noted. First, because we used a single-university sample, the findings may not be fully generalizable. Future studies that include multiple universities or regions, even internationally, would provide richer comparative insights. Further research focusing specifically on STEM students could provide valuable insights and enhance the existing literature. Pushing the boundaries further, future research could explore factors such as stress, health, biological influences, and neuroscience perspectives (Nicolaou and Shane, 2014; Cucino *et al*., 2021) to better understand how students develop digital entrepreneurial intentions.

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