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DIGITIZATION, SUSTAINABILITY, AND COST-EFFECTIVENESS IN EUROPEAN UNIVERSITY BUSINESS EDUCATION: THE START DSP PROJECT

DIGITALIZACIÓN, SOSTENIBILIDAD Y RENTABILIDAD EN LA EDUCACIÓN EMPRESARIAL UNIVERSITARIA EUROPEA: EL PROYECTO START DSP

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RESUMEN

This research aims to know the level of use and application of the concepts of sustainability, digitalization and profitability as a triad - according to the principles of the European Union- for the development of business plans in the entrepreneurship professorship of different universities and countries, specifically by educators from Germany, Spain, Greece and Ireland. This study was carried out within the framework of the European START DSP project, funded by the European Union. The ultimate goal of this project is to develop a training platform for the acquisition of competencies in the field of entrepreneurship in relation to sustainability, digitalization and profitability, which is fully congruent with the existing and analyzed literature on the subject. The methodology used was qualitative, and the data were collected using an interview guide validated by expert criteria. Inclusion and exclusion criteria were applied to select only those educators who have real contact with real entrepreneurship and in academia. Among the main results of the research, it can be summarized that educators give more emphasis to the issue of sustainability than to that of digitalization because, the latter is something that is interpreted as a logical consequence of the growth of a business, therefore, the concept of profitability is something that is taken for granted because, in itself, it is the objective of any company in the capitalist system, but the difficulty is to develop ideas and business models that achieve the triad sustainability-digitization-profitability.

Palabras clave:
sostenibilidad, digitalización, rentabilidad, espíritu empresarial

RESUMEN

Esta investigación pretende conocer el nivel de uso y aplicación de los conceptos de sostenibilidad, digitalización y rentabilidad como tríada - según los principios de la Unión Europea- para el desarrollo de planes de empresa en la cátedra de emprendimiento de diferentes universidades y países, concretamente por educadores de Alemania, España, Grecia e Irlanda. Este estudio se ha realizado en el marco del proyecto europeo START DSP, financiado por la Unión Europea. El objetivo último de este

	proyecto es desarrollar una plataforma formativa para la adquisición de competencias en el ámbito del emprendimiento en relación con la sostenibilidad, la digitalización y la rentabilidad, que sea plenamente congruente con la literatura existente y analizada sobre el tema. La metodología empleada ha sido cualitativa y la recogida de datos se ha realizado mediante una guía de entrevista validada por criterios de expertos. Se aplicaron criterios de inclusión y exclusión para seleccionar sólo a aquellos educadores que tienen contacto real con el emprendimiento real y en el ámbito académico. Entre los principales resultados de la investigación, se puede resumir que los educadores dan más énfasis al tema de la sostenibilidad que al de la digitalización porque, este último es algo que se interpreta como una consecuencia lógica del crecimiento de un negocio, por lo tanto, el concepto de rentabilidad es algo que se da por sentado porque, en sí, es el objetivo de cualquier empresa del sistema capitalista, pero la dificultad es desarrollar ideas y modelos de negocio que logren la tríada sostenibilidad-digitalización-rentabilidad.

Introducción

European higher education faces several significant challenges related to entrepreneurship, particularly in its promotion. These challenges are compounded by a rapidly evolving labor market, ongoing digital transformation, increasingly specific customer demands, and the need to comply with legislation; above all, they involve guiding the European business ecosystem toward a vision that embraces sustainability, digitization, and profitability simultaneously.

In response to these challenges, the European project Start DSP was initiated to enhance the effectiveness of entrepreneurship education in higher education institutions. By offering innovative teaching materials and emphasizing digital, sustainable, and ethical business practices, the project seeks to better equip educators and, in turn, empower students to tackle contemporary global challenges through entrepreneurship. During its diagnostic phase, the Start DSP project will assess how well the concepts of digitization, sustainability, and profitability are integrated into business plans—the primary outputs of entrepreneurship courses—in order to develop a platform that reinforces these ideas and improves the quality of business proposals.

Business plans have changed over time. Historically, equal emphasis was placed on the details of every section—strategic, operational, administrative, financial, and marketing. Over the years, this approach has evolved toward more concise and streamlined documents, acknowledging that numerous variables and factors can alter the original plans once a business is launched. This evolution has led to the development of models that are as succinct and strategic as the CANVAS framework. However, it is concerning that in university business education, beyond the natural evolution of business proposal models, insufficient emphasis is placed on treating digitization, sustainability, and profitability as an integrated triad. Instead, these concepts are often addressed as isolated elements, with sustainability and digitization sometimes being misapplied.

Therefore, this research examines how educators in European universities use and apply the concepts of digitization, sustainability, and profitability in business education. Initially, the research will assess educators' familiarity with these concepts in their teaching practices, followed by an evaluation of how these concepts are applied in the business models of their students.

In today's world, business digitization has become imperative, fundamentally transforming how organizations operate and compete. The benefits of digitization include increased efficiency, improved customer experiences, enhanced competitiveness, reduced costs, and greater adaptability.

Conversely, prioritizing sustainability in companies is no longer just a trend—it is an essential requirement. Organizations that emphasize sustainability contribute to a more sustainable future while also reaping several competitive benefits. Sustainability is associated with critical factors such as enhanced reputation, cost reduction, innovation, talent attraction and retention, regulatory compliance, resilience, and access to new markets.

Profitability is the engine that drives the growth and survival of any company. It results from efficient management, resource optimization, and the ability to generate revenue that exceeds costs. Profitability is directly linked to survival, growth, attracting investment, financial stability, debt repayment, company valuation, and social responsibility.

According to the news portal Euronews, the more than 32 million companies in the European Union—which form the complete business fabric and are the project's target audience—have an opportunity to enhance their sustainability, digitization, or profitability processes, especially small and medium-sized enterprises. Although the project is funded by the European Union for European companies, its potential application may extend to companies located outside Europe.

The medium-term repercussions of not implementing this project relate to two critical aspects that must be highlighted. The first aspect involves environmental care and sustainable economic development, focusing on managing resources for future generations. The second aspect concerns helping companies achieve competitiveness through digitization and a dedicated focus on profitability. Both aspects align with the strategic objectives set by the European Union.

The study's feasibility is based on the assumption that, using the resources granted for the StartDSP project, a survey was developed to collect information on how professors in entrepreneurship courses use the concepts of sustainability, profitability, and digitization.

Literature Review

Existing literature suggests that sustainability—defined as the responsible management of production and resources—is a widely discussed topic in business start-up education, alongside business digitalization, a relatively new term driven by disruptive technologies, and profitability, a cornerstone guiding strategic decisions. The integration of these three concepts forms an ideal triad that should be achieved, rather than treating each as an isolate d factor without social significance.

In principle, incorporating sustainability into higher education is radically transforming how new businesses are conceptualized. Universities are increasingly training conscious entrepreneurs committed to building a more sustainable future (Enri-Peiró et al., 2024). Today's graduates are tomorrow's leaders. According to Arias-Valle (2024), by incorporating sustainability into the curriculum, universities are equipping students to tackle global challenges and create businesses that positively impact society and the environment. Conversely, Arrollo et al. (2023) argue that sustainability demands a multidisciplinary approach encompassing environmental, social, and economic aspects. Studying sustainability helps students develop essential skills such as critical thinking, problem-solving, creativity, and collaboration, which are crucial for entrepreneurial success. Similarly, Martínez-Martínez et al. (2024) note that companies increasingly value professionals with sustainability expertise because such insight influences business decisions at all levels and offers a competitive advantage as well as training efficiencies. Entrepreneurs who incorporate sustainable practices into their businesses are more likely to attract socially conscious investors and consumers. Likewise, Herce Lezeta (2024) states that sustainability fosters innovation by challenging entrepreneurs to find creative solutions to environmental and social problems. This can lead to the development of new products, services, and business models. Finally, de Oliveira Santos (2024) identifies four fields of application for sustainability in business creation: integration in curricula, business incubators and accelerators, research projects, and partnerships with companies. In short, sustainability has become a fundamental pillar of higher education, driving the emergence of a new kind of entrepreneur—one who combines a passion for business success with a commitment to building a more

sustainable future. By integrating sustainability into the curriculum, universities are preparing students to lead the transition toward a greener and more equitable economy.

Conversely, the inclusion of digitization in European education is relatively novel compared to sustainability, due to its recent emergence and rapid evolution. Existing literature indicates that digitization has revolutionized all sectors, including higher education. Its impact on business creation is increasingly evident, as it equips students with the tools and knowledge needed to succeed in an increasingly connected world. Digitalization is transforming higher education and creating an environment that encourages the emergence of new businesses. By providing students with the tools and knowledge required for entrepreneurship in a digital world, universities are fostering innovation and economic development. In this regard, Ndour & Alexandre (2020) emphasize that digitization in higher education for entrepreneurship is essential because it provides access to information and resources, develops digital skills, promotes personalized learning, encourages collaboration and networking, and simulates real-life scenarios. According to Medfouni et al. (2024), digitization is applied through online courses and programs, learning platforms, digital incubators and accelerators, hackathons and competitions, and virtual communities.

Profitability, unlike the other two concepts, has been inherent since the establishment of the capitalist system with private sector companies, and its teaching in higher education serves as the guiding maxim for all undertakings. In isolation, the concept of profitability does not differ from what common sense already indicates. The challenge lies in achieving profitability while complying with sustainability and digitalization standards as outlined by the European Union. Enri-Peiró et al. (2024) assert that the integration of profitability, sustainability, and digitalization in higher education is creating a new paradigm for business creation. Each concept individually drives transformation, but their combined synergy is leading to more resilient, innovative business models that are aligned with global challenges. Marín-García et al. (2023) explain that the pursuit of long-term profitability compels companies to adopt sustainable practices, which in turn generate cost savings, enhance reputation, and attract socially conscious investors. Similarly, digitalization optimizes processes, reduces resource consumption, improves efficiency, and expands market reach, thereby translating into higher profitability and a reduced environmental impact. Universities have the power to train entrepreneurs who merge the pursuit of profitability with a commitment to sustainability and digital innovation (Solaja et al., 2025).

Method

The methodology is qualitative, following the paradigm and assumptions established by Jiménez Mora et al. (2023), and is used to interpret responses and capture results. In-depth interviews were conducted with educators using open and exploratory questions designed to collect information without presupposed answers (Ignacio Berredy & Fernández Guillermet, 2024), focusing on their knowledge and use of the concepts of sustainability, digitalization, and profitability in teaching and in their students' enterprise creation. The interviewees were 18 educators from four countries: Germany, Spain, Greece, and Ireland. The results were obtained in the native languages of each country and were later translated into English. The interview guide was validated by expert consensus using a simple Likert scale for each response until all items received a positive score. Informed and signed consent was requested from all participants. The

questionnaires were structured around six topics covering a wide range of business aspects:

1) Familiarity of the interviewee,
2) Priority areas to focus on,
3) Challenges and gaps,
4) Good practices,
5) Impact on society and the environment,
6) Key points of GreenComp.

The interviews were conducted over a period of two months and served as the diagnostic phase of the project. The interviews included open-ended, non-directional, and flexible questions designed to provide a comprehensive view of the study's subject (Jiménez Mora et al., 2023).

The selection method was non-random purposive sampling, guided by specific inclusion and exclusion criteria.

a) Inclusion criteria:

- Professors who have previously taught entrepreneurship
- University professors (from both public and private institutions) with a current contract
- Professors of any nationality, provided they reside in one of the countries involved in the project

b) Exclusion criteria

- Professors without formal business training.
- Professors lacking positive recognition from the educational community, as evidenced by evaluations or public opinion.

For the overall analysis, responses were first analyzed by country and then categorized by the type of interviewee, acknowledging that some interviews were extensive while others were shorter. Interview transcripts were coded inductively and deductively to identify recurring patterns related to the integration of sustainability, digitalization, and profitability in entrepreneurship education. The analysis followed three stages: open coding, category development, and thematic interpretation.

Results and discussion

The present study used in-depth interviews to explore educators' perceptions regarding the integration of digitization, sustainability, and profitability in university entrepreneurship courses. The findings reveal a complex interrelationship between these concepts, alongside challenges and opportunities for their effective implementation in entrepreneurship training.

All interviews were transcribed and reviewed by two researchers independently. Codes were generated from the interview data and subsequently grouped into broader analytical categories. Discrepancies in coding were discussed until consensus was reached. This process enhanced the credibility and trustworthiness of the findings.

Many educators possess strong academic backgrounds in fields related to business, economics, and entrepreneurship. For instance, one interviewee holds a degree in IT and Economics, while others have earned PhDs in Business Administration, Environmental Science, or Economics. These details indicate that educators share a common academic foundation, particularly in disciplines connected to entrepreneurship. Moreover, the fact that several participants hold PhD degrees underscores the necessity, in some cases, of advanced education across various fields. Bonilla and Gutiérrez (2024)

suggest that a solid theoretical background in business and entrepreneurship is linked to improved learning outcomes in areas such as sustainability and competitiveness.

In addition to academic credentials, practical entrepreneurial experience emerges as an important theme among the educators. For instance, one participant founded his own agency and now applies his entrepreneurial experience in coaching. Another respondent co-owns an IT company. Yet another interviewee has developed personal entrepreneurship projects. These examples illustrate the connection between academic knowledge and real-world entrepreneurial practice. In fact, Vélez Falcones et. al. (2025) indicate that entrepreneurship teachers with real-life business experience tend to be better evaluated than those without such experience. Many respondents have engaged in or led entrepreneurial ventures—whether through personal initiatives, like founding agencies, or through university programs designed to foster startup growth.

Most respondents are involved in teaching entrepreneurship or related subjects. One respondent teaches courses related to IT and entrepreneurship. Another integrates entrepreneurship into courses on digital fluency. A respondent from the University of Halle works on raising entrepreneurial awareness through curricular modules and workshops. This demonstrates a shared commitment to fostering entrepreneurship through both formal curriculum settings and additional programs or workshops. This observation aligns with Vélez Falcones et al. (2025), which highlights a strong correlation between studying technology careers and the propensity to start one's own business.

Lastly, innovation is considered a key point by respondents and is seen as the pinnacle of entrepreneurship. Some educators support innovative research-based start-ups, while others attempt to integrate sustainability into business practices. Innovation and competitiveness are terms that, according to Sobko et. al. (2023) are highly correlated, although innovation is not always profitable in the long term.

The results are organized by analytical categories (Mendoza Ruiz et al., 2024), and the discussion follows the interpretation framework of Jiménez Mora et al. (2023) to highlight and contrast key literature aspects, thereby generating valid conclusions. Interview results are presented in detail and contrasted with available literature to facilitate an in-depth analysis of the responses.

Theme 1. Sustainability as the dominant dimension of entrepreneurship education

The interviews revealed that sustainability occupies a central position in entrepreneurship education across all participating countries. Educators consistently reported incorporating sustainability principles into their teaching through dedicated courses, case studies, project-based learning activities, and the use of international frameworks such as the Sustainable Development Goals (SDGs). Sustainability was not perceived merely as an environmental concern but increasingly as a strategic dimension encompassing social responsibility, ethical business conduct, and long-term value creation.

Several educators described sustainability as a transversal concept integrated into multiple courses rather than a standalone topic. This finding suggests that sustainability has achieved a relatively high level of institutional acceptance within entrepreneurship curricula. Participants emphasized that students are encouraged to consider environmental and social consequences when developing business ideas and business models.

These findings support previous research indicating that higher education institutions are increasingly adopting sustainability as a core educational objective (Arias-Valle et al., 2024; Falcão et al., 2024). The results also reinforce the argument of Arroyo et al. (2023), who maintain that sustainability education requires a

multidisciplinary perspective capable of integrating economic, social, and environmental considerations. In this regard, the participating educators appear to be moving beyond traditional profit-centered entrepreneurship education toward a more holistic understanding of entrepreneurial responsibility.

However, despite the widespread incorporation of sustainability into teaching practices, the interviews also revealed important conceptual limitations. Many participants associated sustainability primarily with environmental protection and resource conservation, while fewer explicitly referred to broader social and governance dimensions. This finding suggests that sustainability remains partially interpreted through a narrow ecological lens, indicating opportunities for a more comprehensive application of the concept in entrepreneurship education.

Theme 2. Digitalization as an implicit rather than strategic competency

Unlike sustainability, digitalization was often perceived by educators as a natural consequence of business development rather than a strategic entrepreneurial competence requiring explicit instruction. While participants frequently reported using digital tools in their teaching activities, digitalization itself was rarely described as a central objective during business model development.

Educators highlighted the extensive use of digital platforms and technologies, including Learning Management Systems, business analytics software, enterprise resource planning systems, prototyping tools, and artificial intelligence applications. These technologies were generally viewed as instruments that facilitate business operations, improve efficiency, and support innovation.

The findings suggest a distinction between technological usage and digital transformation. Participants demonstrated familiarity with digital tools but less emphasis on teaching students how digitalization fundamentally reshapes business models, value propositions, customer relationships, and competitive strategies. Consequently, digitalization appears to be treated more as an operational resource than as a transformative entrepreneurial capability.

This result partially contrasts with the literature on digital entrepreneurship, which positions digital competencies as critical drivers of innovation and competitiveness (Ndour & Alexandre, 2020; Medfouni et al., 2024). While educators recognize the practical importance of technology, the interviews indicate that digital transformation is not always systematically integrated into entrepreneurial thinking.

A possible explanation is that digitalization has become so embedded in contemporary business practices that educators assume students will naturally acquire these competencies. However, such an assumption may create educational gaps, particularly in relation to emerging technologies and digital business innovation. The findings therefore suggest a need to move beyond teaching digital tools toward teaching digital transformation as a strategic process.

Theme 3. Profitability as an assumed outcome rather than a teaching priority

One of the most significant findings of the study concerns educators' treatment of profitability. Across the interviews, profitability was generally regarded as a self-evident objective of entrepreneurship and therefore received less explicit attention than sustainability or digitalization.

Participants frequently described profitability as an inherent characteristic of any viable business venture. Consequently, profitability was often taken for granted during entrepreneurship education, under the assumption that entrepreneurs naturally seek

economic returns. This perspective differs from the treatment of sustainability, which educators considered necessary to teach deliberately and explicitly.

The findings reveal an interesting paradox. Although profitability remains the ultimate objective of most business activities, it is not always approached as a competence requiring systematic development. Instead, educators focus on teaching business planning, innovation, sustainability, and digital tools, expecting profitability to emerge as a consequence of successful implementation.

This observation aligns with Marín-García et al. (2023), who argue that long-term profitability increasingly depends on sustainability and innovation capabilities. However, the interviews suggest that educators rarely frame profitability as the outcome of strategic integration among multiple dimensions. Rather, it is frequently treated as an independent and almost automatic result.

The limited emphasis on profitability may create challenges for students attempting to balance economic viability with environmental and social objectives. Future entrepreneurship education may benefit from explicitly addressing the tensions and synergies among these dimensions rather than assuming that profitability will naturally follow from business success.

Theme 4. The challenge of integrating the sustainability–digitalization–profitability triad

The most important finding emerging from the interviews is that educators do not view sustainability, digitalization, and profitability as separate concepts but recognize the difficulty of integrating them simultaneously within entrepreneurial projects.

Participants consistently acknowledged that achieving balance among these dimensions represents one of the greatest challenges facing contemporary entrepreneurs. While sustainability initiatives may increase costs in the short term, digitalization often requires significant investments in technology and training. Consequently, educators recognize the need for business models capable of reconciling social responsibility, technological innovation, and economic viability.

This challenge reflects broader transformations occurring within the European business ecosystem. Entrepreneurship is no longer evaluated exclusively according to financial performance but increasingly according to its environmental and social contributions. At the same time, organizations must adapt to rapid technological changes to remain competitive.

The findings support the arguments of Enri-Peiró et al. (2024), who propose that sustainability, profitability, and digitalization should be understood as mutually reinforcing dimensions rather than competing objectives. Nevertheless, the interviews indicate that educators still struggle to operationalize this integration within teaching practices and business plan development.

The Start DSP project emerges as a direct response to this challenge. The project seeks to provide educational resources and tools capable of supporting entrepreneurship educators in fostering business proposals that simultaneously address digital transformation, sustainable development, and economic performance.

Theme 5. Educational innovation and the transformation of entrepreneurship teaching

A final theme emerging from the interviews concerns the significant transformation of entrepreneurship education itself. Educators reported extensive use of digital technologies, simulation tools, collaborative platforms, and experiential learning methodologies. Compared with traditional approaches based primarily on lectures and

business plan writing, contemporary entrepreneurship education appears considerably more interactive and technology-driven.

Participants emphasized the importance of real-world projects, internships, industry collaboration, mentoring programs, and interdisciplinary teamwork. These approaches aim to bridge the persistent gap between theoretical knowledge and practical entrepreneurial experience.

The findings suggest that entrepreneurship education is evolving from knowledge transmission toward competence development. This evolution reflects broader educational trends emphasizing experiential learning, problem-solving, innovation, and adaptability. As noted by Schlüter et al. (2024), digital technologies are increasingly becoming essential components of educational innovation.

Nevertheless, educators also identified persistent barriers, including resource limitations, unequal access to technology, difficulties maintaining curricular relevance, and challenges engaging students from non-business disciplines. These obstacles indicate that educational transformation remains an ongoing process requiring institutional support and continuous adaptation.

Integrative discussion

Taken together, the findings reveal an asymmetrical relationship among the three dimensions examined. Sustainability occupies a prominent and explicit role within entrepreneurship education, digitalization is widely practiced but often implicitly understood, and profitability remains largely assumed rather than systematically taught. The principal challenge identified by educators is not understanding these concepts individually but integrating them into coherent entrepreneurial models.

This finding constitutes the study's main contribution. Rather than demonstrating a lack of awareness regarding sustainability, digitalization, or profitability, the results indicate the existence of a pedagogical integration gap. Future entrepreneurship education should therefore move beyond teaching these concepts independently and focus on developing frameworks, methodologies, and learning experiences that enable students to simultaneously achieve sustainability, digital transformation, and economic viability.

Conclusions

The Start DSP project has illuminated the intricate relationship between digitalization, sustainability, and cost-effectiveness in European university business education, specifically regarding the use and application of these concepts in teaching. The findings reveal that effective integration of these three concepts is not only possible but also essential to prepare future business leaders for the challenges and opportunities of the 21st century. Digitalization is presented as a catalyst for innovation and efficiency in teaching and learning processes, providing access to cutting-edge resources and tools. Sustainability emerges as a fundamental value that should permeate the entire curriculum, fostering social and environmental awareness in students. Profitability, understood not only in economic terms but also in social and environmental terms, is the logical outcome of a business education focused on long-term value creation.

Among the main research results, educators place more emphasis on sustainability than on digitalization because digitalization is often interpreted as a logical consequence of business growth; therefore, it receives less focus during the development of business plans, even though it plays a crucial role in scaling and customer attraction. The concept

of profitability is generally taken for granted since it is the primary objective of any company in a capitalist system; however, the challenge lies in developing ideas and business models that achieve the sustainability–digitalization–profitability triad.

A novel aspect of this research is the evidence of the large number of computer tools and information technologies used by educators in their teaching practice. What used to be flat drafts and calculations on paper have now largely been replaced by simulators and educational technologies that enable extensive calculations even for less ambitious business proposals.

The relevance of these results lies in the fact that, although professors are familiar with the concepts of sustainability, digitalization, and profitability, there is a significant opportunity to enhance their application in higher education. This opportunity involves deepening and understanding the concept of sustainability, incorporating new technologies and applications for business and innovative models, and integrating these with profitability. In the area of sustainability, gaps exist in its interpretation, often limiting it to environmental issues; in digitalization, innovative business transformation methods are not yet fully considered by educators; and profitability is frequently treated as an isolated concept, disconnected from the other two.

On the other hand, some limitations of the study are related to the wide dispersion in teaching styles, despite operating within a common European framework. Additionally, the interviews varied in depth—some were very long and in-depth, while others were shorter, even though more detailed responses were encouraged.

The practical implications of this research include the need to develop platforms that assess the integrated application and compliance of concepts such as sustainability, digitization, and cost-effectiveness in higher education projects that adhere to European regulations.

Lastly, potential future research avenues could include: conducting similar studies focused on students as active participants in the teaching-learning process of entrepreneurship in European higher education; investigating the application of other concepts related to European regulations—such as inclusion and migration—that are closely linked to profitability.training.

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