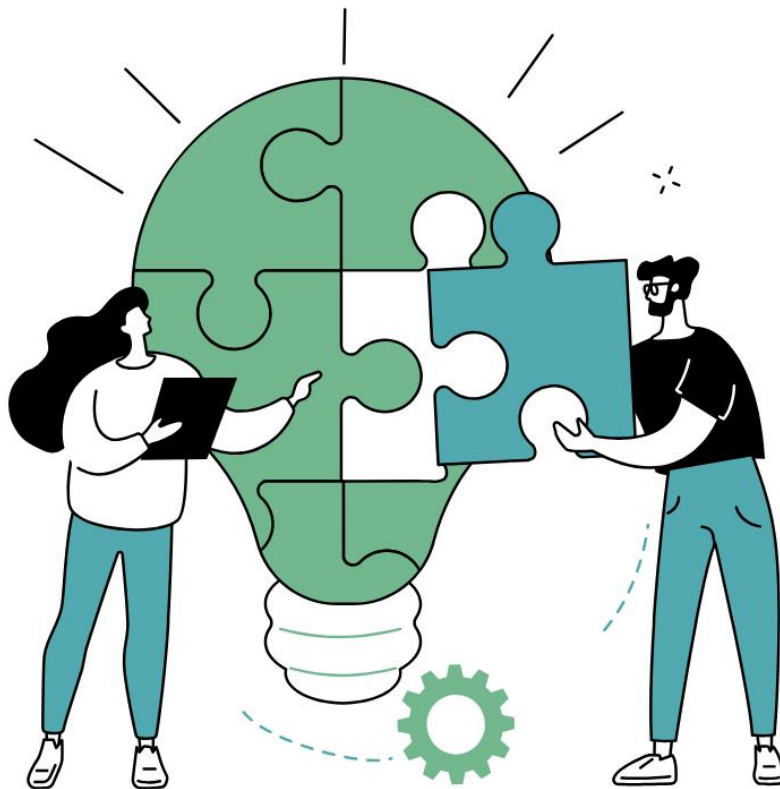




ENTREHUBS Model

Creating Value Co-creation Hubs between Universities and Enterprises to foster the infusion of Entrepreneurship Education in Europe



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Table of Contents

I. Introduction	3
A. A few words about the ENTREHUBS project.....	3
B. Methodology behind the ENTREHUBS Educational Model	3
C. Objectives of the Framework	4
D. Insights from the ENTREHUBS Transnational Report on the state-of-the-art of Entrepreneurship Education across Germany, Greece, Cyprus and Turkey	5
E. Future directions shaping the ENTREHUBS Education Model.....	7
II. Theoretical Foundations of Entrepreneurship Education and Value Creation Approaches... 8	
A. Definitions of Entrepreneurship Education	8
B. Theoretical Aspects of Entrepreneurship Education	9
C. Value Creation in Entrepreneurship Education	13
D. Design Thinking and Co-Creation Methodologies.....	14
III. ENTREHUBS Educational Model	16
A. Design principles of the ENTREHUBS Educational Model.....	16
B. ENTREHUBS Value Co-Creation Hubs	18
A. Definition and Purpose	18
B. Role of HEIs and Businesses	19
C. Activities and Initiatives Supported under the Value Co-Creation Hubs (VCHs)	19
D. Benefits for Students, HEIs, and Businesses	19
IV. ENTREHUBS Model Implementation	20
Preparation Phase	20
Implementation Phase.....	21
Evaluation Phase	22
REFERENCES.....	27

I. Introduction

A. A few words about the ENTREHUBS project

“ENTREHUBS: Creating Value Co-creation Hubs between Universities and Enterprises to foster the infusion of Entrepreneurship Education in Europe” project aims to provide concrete support for increasing the offer of Entrepreneurship Education (EE) in Higher Education Institutions (HEIs), especially in departments outside of business and economic faculties. The project through its training programme aims to support HEI educators in understanding and integrating effectively Entrepreneurship Education in their teaching activities enabling entrepreneurship with each wider meaning to find its place among and within the disciplines and become genuinely mainstream.

To this end, the project has set four strategic objectives:

- To develop an interdisciplinary and collaborative educational model for embedding Entrepreneurship Education in Higher Education Institutions based on value co-creation processes and the establishment of strong links between academia-industry.
- To develop and deliver a flexible and easily adaptable Entrepreneurship Education training programme for Higher Education Institutions educators that will stimulate their entrepreneurial understanding and skills.
- To develop teaching and learning resources for supporting Higher Education Institutions educators to foster the entrepreneurial attitudes, skills and potential of their students.
- To support the development of student-oriented Entrepreneurship Education curricula that will empower students develop their entrepreneurial mindsets and competences.

B. Methodology behind the ENTREHUBS Educational Model

The ENTREHUBS Educational Model will be co-designed based on HEI educators and students' needs, while taking into account the contextual environment (i.e. current teaching approaches, entrepreneurship initiatives, business sector's needs). On this basis, partners from four different European (Germany, Greece, Cyprus) and non-European countries (Turkey) conducted a thorough literature review on the current state-of-the-art of Entrepreneurship Education in their tertiary education systems, in order to explore innovative teaching approaches, educators' and students' needs, educational resources utilized, the EE course in existing curricula, as well as synergies between tertiary education institutions and the business sector. In addition, a mixed methodology approach was followed by combining qualitative with quantitative data collection mainly through online surveys and focus groups with HEI educators and students, as well as business owners and/or employees across the four countries of the ENTREHUBS consortium (Germany, Greece, Cyprus, Turkey). More than 380 participants, including educators, students, and representatives of the business sector, participated in the research activities (i.e. online survey, focus groups) across the partner countries, providing valuable and robust research conclusions for setting up the ENTREHUBS Educational Model.

The aim of the research activities was twofold:

- To explore on how Entrepreneurship Education is perceived and how (and if) is delivered in different disciplinary areas apart from the business or economic ones.
- To tap into the depth of knowledge of HEI educators and business representatives in each country, as well as to put emphasis on identifying the already established cooperation links between universities and the business community with the aim to capture the nature and impacts of current collaborations towards EE diffusion.

All the findings are compiled in a cross-country study report available on the project's website showcasing the most important findings, to be able to categorize how Entrepreneurship Education is delivered in different disciplinary areas, and if there are cooperation links between universities and the business sector. This is a key result because this research procedure informed with the most relevant data the design of the ENTREHUBS Educational Model aiming to respond to HEI educators' and students' needs.

C. Objectives of the Framework

The ENTREHUBS Educational Model for Higher Education Institutions (HEIs) is designed with specific objectives aimed at fostering a comprehensive and impactful entrepreneurship education across different disciplines. These objectives are crafted to address various aspects of entrepreneurial learning and collaboration between Higher Education Institutions (HEIs) and businesses. More specifically, the ENTREHUBS Educational Model aims to:

- **Promote holistic Entrepreneurship Education** by integrating theoretical knowledge with practical application, emphasizing real-world problem-solving and innovation.
- **Facilitate the establishment of a Collaborative Learning environments**, where students, educators, and business professionals collaborate, share ideas, and co-create solutions, promoting a rich exchange of knowledge and experiences.
- **Cultivate students' design thinking and co-creation skills**, enabling them to identify opportunities, empathize with end-users, and collaboratively innovate solutions that add value to society and businesses.
- **Strengthen industry-academia partnerships through Value Co-Creation Hubs (VCHs)**, fostering a symbiotic relationship where academic knowledge meets industry expertise, creating a mutually beneficial ecosystem.
- **Enhance practical entrepreneurial skills**, such as business planning, market analysis, financial management, and pitching ideas, enabling them to launch and manage successful ventures.
- **Nurture a culture of entrepreneurial innovation and creativity** among students, encouraging them to think critically, explore diverse perspectives, and develop innovative solutions to real-world challenges.
- **Enable continuous evaluation and improvement** by establishing mechanisms for continuous evaluation of the entrepreneurship education programs, gathering feedback from students, educators, and industry partners, and using this feedback to enhance the curriculum, teaching methods, and overall learning experience.



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D. Insights from the ENTREHUBS Transnational Report on the state-of-the-art of Entrepreneurship Education across Germany, Greece, Cyprus and Turkey

The research activities and data analysis conducted under the ENTREHUBS project, as part of the Work Package 2, show that while Entrepreneurship Education (EE) is increasingly gaining traction across various disciplines, the level of integration and the structure of existing programs vary significantly between Germany, Greece, Cyprus, and Turkey. Germany leads with well-structured programs, extensive university-business collaborations, and strong support for value co-creation through real-world projects and incubator involvement. In contrast, Greece and Cyprus are still in the process of expanding EE into non-business faculties, focusing primarily on project-based learning and extracurricular activities. Turkey, while offering strong practical components through community-based and industry collaborations, lacks the formal curricular integration of EE, especially in non-business disciplines.

The comparative analysis of the research findings of the online survey and focus groups conducted across Germany, Greece, Cyprus and Turkey (for more information, check the WP2 ENTREHUBS Transnational Report on the [ENTREHUBS project website](#)) focuses on four key aspects: 1) the perception and delivery of Entrepreneurship Education (EE) across disciplinary areas, 2) the structure of existing Entrepreneurship Training Programmes, 3) the state of value co-creation in EE, and 4) the collaboration between universities and the business sector across Germany, Greece, Cyprus, and Turkey.

➤ Perception and Delivery of EE Across Disciplinary Areas

The perception of EE varies significantly across the four countries studied. In Germany, EE has a long-standing presence in higher education, though it remains predominantly concentrated in business-related faculties. However, the integration of EE into non-business faculties is growing, especially in interdisciplinary fields such as technology, design, and social sciences, where entrepreneurship is seen as crucial for innovation and problem-solving. Germany's EE initiatives emphasize hands-on learning through incubators, accelerators, and partnerships with industry, though non-business faculties are still less exposed to formal EE programs.

In Greece, EE is still primarily associated with business and economic faculties, although efforts to expand its reach are increasing. Interdisciplinary programs in engineering and other sectors are being introduced, reflecting the country's focus on entrepreneurship as a tool for economic growth and regional development. However, in non-business faculties, EE remains in its nascent stages, and there is a need for more formal structures to integrate entrepreneurial thinking into diverse disciplines.

Cyprus shows a similar trend to Greece, with EE primarily housed within business faculties but slowly expanding into other areas. Focus group participants emphasized the importance of EE in fostering creativity and problem-solving across various sectors. In Turkey, EE is more varied, with some non-business faculties engaging in entrepreneurial education through collaborations with local businesses and project-based learning, although the implementation remains inconsistent across institutions

➤ Structure of Existing Entrepreneurship Training Programmes



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The structure of entrepreneurship training programmes differs across countries, reflecting varying levels of institutional support and curriculum integration. In Germany, EE programmes are well-structured and include both formal curricular activities and extracurricular options such as workshops, internships, and real-world business projects. Programs often focus on practical skills like financial management, marketing, and leadership, with a strong emphasis on experiential learning. German universities also integrate incubators and accelerators, providing students with opportunities to apply entrepreneurial concepts in real-world settings.

In Greece, entrepreneurship training is often integrated into graduate-level programs, with a focus on formal education such as lectures and case studies. While extracurricular activities like hackathons and business competitions are becoming more common, there is a lack of cohesive structures that embed entrepreneurship into non-business curricula. Greek universities are increasingly relying on project-based learning and mentorship programs to bridge this gap.

On the other hand, Cyprus has developed a flexible approach to EE, offering both curricular and extracurricular programs that focus on practical skills such as project management and opportunity identification. However, as in Greece, there is a need for more formalized structures that support entrepreneurship in non-business fields. In Turkey, EE programs tend to focus on practical experience, with students engaging in real-world projects and collaborations with businesses. However, these programs are often optional or extracurricular, and their integration into the formal curriculum is still limited.

➤ **State of Value Co-Creation and Entrepreneurship Education**

Value co-creation is increasingly recognized as an important element of entrepreneurship education in all four countries, though its implementation varies. In Germany, value co-creation is a key focus of EE programs, with students encouraged to develop projects that create social, cultural, and financial value. This is often achieved through collaborations with industry partners, where students apply their entrepreneurial skills to real-world challenges.

In Greece, value co-creation is less prominent but growing, particularly in sectors like engineering and agriculture. Greek universities are beginning to emphasize the importance of creating value beyond traditional business outcomes, such as fostering innovation in local economies and addressing social challenges. Cyprus shows a similar trend, with EE programs incorporating value co-creation, though it is still not a central component of most curricula. In Turkey, value co-creation is recognized, especially in programs that engage students in community-based projects and collaborations with local businesses, though its integration into the broader EE framework remains limited.

➤ **Collaboration Between Universities and the Business Sector**

Collaboration between universities and the business sector is a central element of entrepreneurship education in all four countries, though the extent and nature of these collaborations vary. In Germany, such collaborations are well-established, with universities



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Partnering with industry to provide students with internships, real-world projects, and mentorship opportunities. These collaborations are often formalized through incubators and accelerators, where students can develop their entrepreneurial skills while contributing to industry innovation.

In Greece, university-business collaborations are less formalized but growing, particularly through initiatives like entrepreneurship competitions and internships. However, there is still a gap in integrating these collaborations into the formal curriculum. Cyprus follows a similar pattern, with a strong emphasis on project-based learning and partnerships with businesses, though the collaboration is often extracurricular. In Turkey, collaborations between universities and businesses are varied, with some institutions offering well-established partnerships that provide students with hands-on entrepreneurial experience, while others lack formal structures to support these collaborations.

E. Future directions shaping the ENTREHUBS Education Model

Looking forward, several future directions emerge for the evolution of EE in these countries. A key priority should be the formal integration of EE into non-business curricula. While entrepreneurship is recognized as a valuable skill across disciplines, most programs outside of business faculties are still offered on an extracurricular basis. Integrating entrepreneurship-related modules into core curricula for disciplines such as engineering, social sciences, and the arts can help foster a more holistic understanding of entrepreneurship and its applications beyond traditional business contexts.

Furthermore, there is a strong case for expanding the concept of value co-creation within EE programs. The ability to create social, cultural, and financial value is becoming increasingly important in modern entrepreneurship, particularly with the rise of social enterprises and impact-driven businesses. This would not only equip students with the skills needed for modern economies but also align EE with the broader goals of higher education institutions, such as promoting social responsibility and community engagement.

Collaboration between universities and the business sector will continue to be a cornerstone of EE development. However, there is a need to move beyond traditional models of collaboration, such as internships and business competitions, toward deeper partnerships that involve co-designing curricula with industry experts and real-time problem-solving projects. This will ensure that students are exposed to cutting-edge industry practices and can develop entrepreneurial solutions that are directly applicable to the challenges faced by businesses and society. Additionally, fostering international collaborations between universities and businesses can offer students a global perspective on entrepreneurship, preparing them to navigate the complexities of an increasingly interconnected world economy.

In terms of educator training, there is a growing need for professional development opportunities that help university staff understand and implement entrepreneurial pedagogies. By equipping educators with the tools and frameworks needed to foster entrepreneurial mindsets in students, universities can more effectively integrate EE across disciplines. This includes training on value co-creation, project-based learning, and interdisciplinary innovation, all of which are critical for future EE programs.

In summary, the future of EE across these four countries lies in a holistic, interdisciplinary, and value-driven approach, supported by strong industry partnerships and innovative teaching methodologies. By focusing on these findings and areas for improvement, ENTREHUBS partners have co-designed the ENTREHUBS Education Model that will set the foundation for the ENTREHUBS Training Programme for educators (WP3) and the ENTREHUBS Online Summer School for university students (WP4).

II. Theoretical Foundations of Entrepreneurship Education and Value Creation Approaches

A. Definitions of Entrepreneurship Education

The definition of Entrepreneurship Education is considered a complex issue with many efforts having been made to include both the theoretical and practical aspects and the underlying principles in one comprehensive definition that will facilitate its integration in educational systems by educators. A definition of entrepreneurship education proposed by Danish Foundation for Entrepreneurship (Moberg et al., 2012, p.14) includes the following: *“Content, methods and activities supporting the creation of knowledge, competencies and experiences that make it possible for students to initiate and participate in entrepreneurial value creating processes”*. This definition integrates the three different types of entrepreneurial competences developed in the context of entrepreneurship education: i) knowledge, ii) skills/competences, iii) attitudes that result from experiences that shape students’ mindset. Also, this definition of entrepreneurial education leans on the following underlying definition of entrepreneurship: *“Entrepreneurship is when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural, or social.”* (Moberg et al., 2012, p.14).

Another widely accepted notion, as stated by Gartner (1990), posits that entrepreneurship involves innovative individuals establishing organizations that grow and add value, whether for profit or otherwise. However, entrepreneurship is not confined to the inception of new entities; it can also manifest within existing organizations, as noted by Shane and Venkataraman (2007). It encompasses not only the entrepreneurial individual but also entrepreneurial opportunities and the dynamic relationship between the individual and the opportunity, often referred to as the individual-opportunity nexus (Shane, 2003). Bruyat and Julien (2001), adopting a constructivist approach, introduced a definition that encompasses not only the entrepreneur but also the novel value created, the contextual environment, the entrepreneurial process itself, and the interconnections between these elements over time. Furthermore, they advocate the use of "individual" and "entrepreneur" terminologies to represent teams whenever applicable, expanding the understanding of entrepreneurship beyond individual actions to collaborative endeavors.

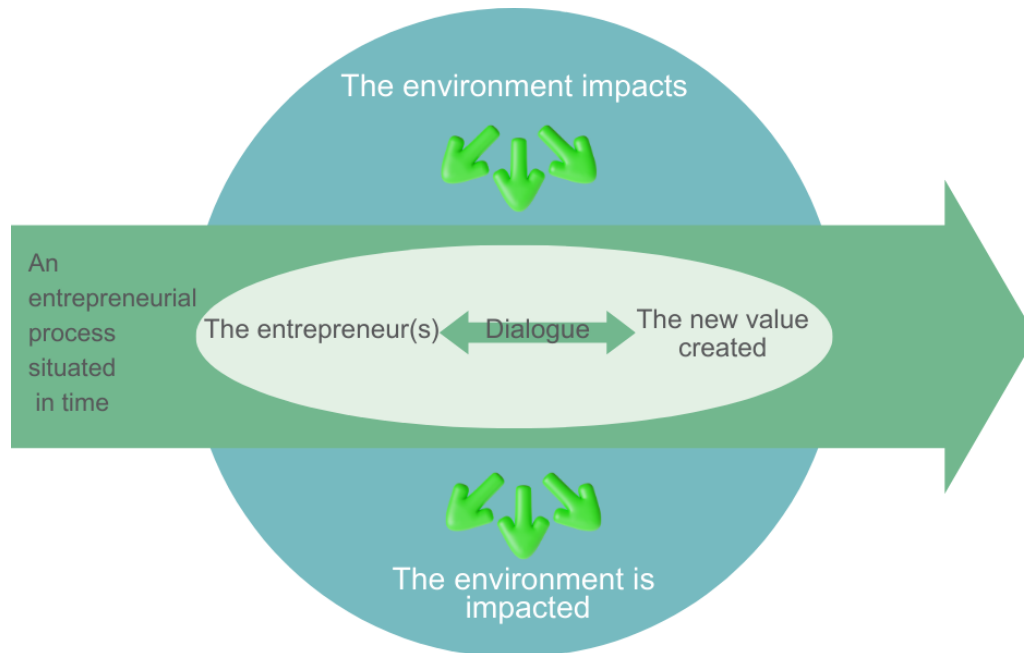


Figure 1 The entrepreneurial process located within its environment and time. The dialogue between the individual and the new value created is shown in the middle, and constitutes the core of entrepreneurship (adapted from Bruyat et Julien, 2001, p.170).

B. Theoretical Aspects of Entrepreneurship Education

Entrepreneurship education is a dynamic field that combines theoretical frameworks with practical applications to prepare individuals for establishing or supporting existing entrepreneurial endeavors. One crucial theoretical aspect of entrepreneurship education is the recognition of the entrepreneurial mindset as a foundational concept. According to Sarasvathy (2001), entrepreneurs exhibit effectual reasoning, which involves leveraging existing resources and exploring various opportunities rather than following a predetermined plan. This theoretical perspective emphasizes the importance of creativity, adaptability, and resilience in the face of uncertainty, providing a basis for designing educational programs that nurture these traits (Sarasvathy, 2001).

Another significant theoretical aspect of entrepreneurship education is the social constructionist view, which suggests that entrepreneurship is not solely an individual endeavor but a socially embedded process (Steyaert & Hjorth, 2006). This perspective highlights the role of social networks, cultural contexts, and institutional environments in shaping entrepreneurial activities. By integrating this theoretical framework into education, students can gain insights into the social dynamics of entrepreneurship, enabling them to develop meaningful relationships, navigate diverse cultural settings, and comprehend the influence of institutions on entrepreneurial behavior (Steyaert & Hjorth, 2006).

Furthermore, the resource-based view (RBV) of entrepreneurship emphasizes the strategic importance of resources and capabilities in creating competitive advantage (Barney, 1991).



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RBV posits that enterprises can achieve sustained success by acquiring and leveraging valuable, rare, and non-substitutable resources. Integrating this theoretical perspective into entrepreneurship education helps students understand the significance of resource identification, acquisition, and utilization in the entrepreneurial process. By applying the RBV framework, educators can guide aspiring entrepreneurs in assessing the resource requirements of their ventures and formulating strategies to gain a competitive edge (Barney, 1991).

Lastly, the effect of entrepreneurial education on opportunity identification and exploitation is a vital theoretical aspect. Studies such as those conducted by Shane and Venkataraman (2000) suggest that entrepreneurship education enhances individuals' ability to identify and capitalize on opportunities. By understanding the cognitive processes underlying opportunity recognition, educators can design curricula that stimulate students' creativity, problem-solving skills, and market awareness, thereby empowering them to recognize and exploit entrepreneurial opportunities more effectively.

In conclusion, entrepreneurship education incorporates various theoretical aspects to equip individuals with the knowledge and skills necessary for entrepreneurial success. By integrating the entrepreneurial mindset, social constructionist perspective, resource-based view, and the impact of education on opportunity recognition, educational programs can provide comprehensive and holistic learning experiences that address the needs of tertiary education students in general, not solely on those studying in economic- or business-related faculties. These theoretical foundations not only enrich students' understanding of entrepreneurship but also empower them to navigate the complexities of the entrepreneurial landscape, fostering innovation, resilience, and strategic thinking at social, personal and professional level.

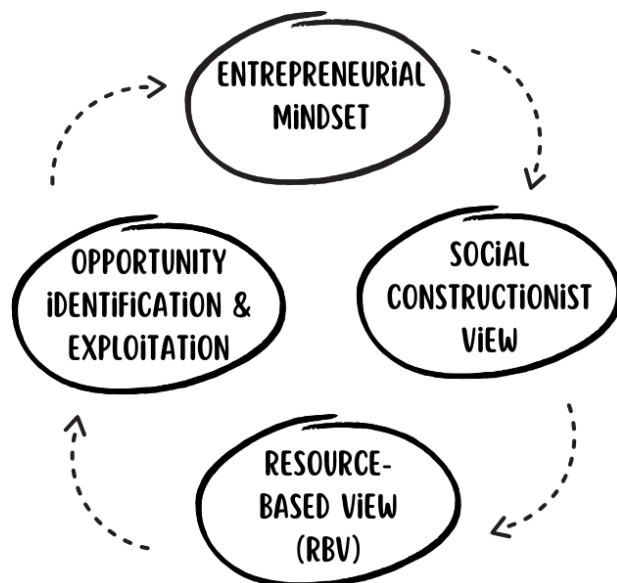


Figure 2 Aspects of Entrepreneurship Education for educational programmes development

Educating about, for and through entrepreneurship

Entrepreneurial education is commonly divided into three distinct approaches, as outlined by O'Connor (2013). The first approach, teaching “about” entrepreneurship, adopts a content-focused and theoretical perspective with the objective of providing a comprehensive understanding of the entrepreneurial phenomenon. This method prevails in higher education institutions and serves as a foundational approach (Mwasalwiba, 2010). The second approach, teaching “for” entrepreneurship, takes on a pragmatic orientation by equipping aspiring



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entrepreneurs with the necessary knowledge and skills (Kakouris et Liargovas, 2021). In contrast, the third approach, teaching “through,” emphasizes a process-oriented and experiential method where students actively engage in entrepreneurial learning experiences (Kyrö, 2005). This approach aligns with a broader definition of entrepreneurship, integrating it into various subjects within general education. It establishes connections between entrepreneurial attributes, processes, and real-life experiences, enriching the core subjects.

While the “about” and “for” approaches are pertinent primarily to specific student groups in secondary and higher education levels, the embedded approach of teaching “through” entrepreneurship holds relevance for all students across various educational disciplines (Handscombe et al., 2008; Chaker et Jarraya, 2021). However, challenges arise when attempting to integrate entrepreneurship into education using this method. These challenges encompass limitations in resources and time, resistance from educators, complexities related to assessment, and cost implications (Smith et al., 2006). Addressing these challenges is pivotal to ensuring the effective integration of entrepreneurial education, facilitating a holistic and enriching learning experience for students across all levels of education. To address these challenges the ENTREHUBS Educational Model will set a clear educational approach for the diffusion of Entrepreneurship Education across various disciplines, while providing step-by-step guidelines and training to educators for integrating it to their curricula, and developing a robust assessment approach that will evaluate students’ level of knowledge and competences.

Comparing entrepreneurial education to other pedagogical approaches

Several pedagogical methods often associated with entrepreneurial education include problem-based learning (Tan and Ng, 2006), project-based learning (Jones and English, 2004), and service-learning (Desplaces et al., 2009). While these approaches share similarities, they are distinct in their implementation. Project-based learning, for instance, involves students tackling authentic problems and generating a tangible output like reports, models, or videos (Blumenfeld et al., 1991). In contrast, problem-based learning begins with authentic issues but focuses on discussing potential solutions and guiding further study, without necessarily producing a final artifact (Helle et al., 2006). Service-learning integrates classroom instruction with community service, wherein students engage in activities like park cleaning, assisting the elderly, or providing aid to those in need (Spring et al., 2008). For service-learning to be effective, students' active participation in project planning, longer project durations (at least a semester), and facilitated student reflection are vital (Spring et al., 2006).

Entrepreneurial education, as demonstrated in the Table below, encompasses distinctive aspects not found in other pedagogical methods. It emphasizes not only problems but also opportunities and encourages iterative experimentation in collaboration with external stakeholders (Saravathy and Venkataraman, 2011). Furthermore, entrepreneurial education places a strong emphasis on the newness or innovativeness of created artifacts and value (Shapero and Sokol, 1982). Unique features, such as a focus on value creation for external stakeholders (Bruyat and Julien, 2001), interaction with the real-world environment (Fayolle and Gailly, 2008), and the creation of tangible artifacts (Lackéus, 2013), distinguish entrepreneurial education from other educational approaches.



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These rare or unique characteristics significantly contribute to why entrepreneurial education often generates higher levels of motivation, perceived relevance, engagement, and deep learning compared to other pedagogical methods (Lackéus, 2013). The incorporation of these distinctive features into entrepreneurial education not only enriches students' learning experiences but also prepares them for the complexities of real-world entrepreneurial endeavors.

Table 1: Comparison of pedagogical approaches (Retrieved from Lackeus,2015,p.16)

Major focus on...	Entrepreneurship Education	Problem-based learning	Project-based learning	Service-learning
...problems	X	X	X	X
...opportunities	X			
...authenticity	X	X	X	X
...artifact creation	X		X	
...iterative experimentation	X			
...real-world (inter-)action	X			X
...value creation to external stakeholders	X			X
...team-work	X	X	X	
...work across extended periods of time	X		X	X
...newness.innovativeness	X			
...risk of failure	X			

Nurturing an entrepreneurship culture

Badri and Hachicha (2019) underscore the imperative of cultivating an entrepreneurship culture, a process facilitated through institutional support, consisted of governmental bodies or educational institutions. According to Fritsch and Wyrwich (2017), this entrepreneurial culture comprises a set of norms, values, and codes of conduct that foster social acceptance and approval of entrepreneurial activities, leading to elevated rates of self-employment. Several scholars, including Bassey (2020) and Jabeen et al. (2019), advocate for heightened attention to entrepreneurship culture within Higher Education Institutions (HEIs). They emphasize its comprehensive impact on society and the nation, encompassing aspects such as employment, business growth, and economic advancement.

Capelleras et al. (2019) contend that building entrepreneurship culture necessitates the involvement of experienced individuals from the business sector who can serve as influential role models. Additionally, Bakheet (2018) proposes the formulation of specific policies geared towards enhancing students' skills and fostering a positive attitude toward entrepreneurship, thereby contributing to the development of entrepreneurship culture. Several studies, including those by Ahmed et al. (2020) and Oo et al. (2018), establish a crucial link between entrepreneurship education and the cultivation of entrepreneurship culture. They assert that HEIs and public research organizations play pivotal roles in promoting effective entrepreneurial activities, emphasizing the symbiotic relationship between education and culture in fostering a thriving entrepreneurial ecosystem.

The progression model proposed by Blenker et al. (2011) hinges upon two fundamental concepts. Firstly, it acknowledges that entrepreneurial activity can yield diverse forms of value, extending beyond mere economic worth. Secondly, it emphasizes the presence of an entrepreneurial mindset and a universally applicable methodology across various spheres of life, denoted as "entrepreneurship as everyday practice" (Blenker et al., 2012). This perspective closely aligns with the expansive definition of entrepreneurship. According to Blenker et al. (2011), integrating this entrepreneurial approach into life is an essential element of all entrepreneurial education, regardless of whether the intended outcome is the establishment of a venture, fostering growth, or driving social change.

Contrary to the prevalent business plan focus on entrepreneurial education (Honig, 2004), which primarily emphasizes creation rather than value creation, Blenker et al. (2011) advocate for a value creation approach. They argue that conventional business plans often lack genuine value to external stakeholders as they often serve merely as teacher-assigned deliverables, lacking practicality when exposed to real-world customers (Jones and Penaluna, 2013). Similarly, project-based learning exemplifies a creation approach wherein artifacts are primarily evaluated by teachers rather than generating value for external stakeholders. However, the rare exception to this is service learning, which indeed embodies a value creation approach by generating value for the surrounding community (Lackeus, 2015).

Moreover, Blenker et al. (2011) highlight that the concept of an "artifact" encompasses anything crafted through human artistry and skill (Hilpinen, 2011). They stress the significance of creating value for external stakeholders, indicating that this approach not only fosters the joy of creation, as per Schumpeterian terms (Goss, 2005), but also imbues the act with a higher level of meaningfulness. Activities within the value creation approach include generating business model canvases (Osterwalder, 2004), pitching ideas to external stakeholders, engaging in co-creation with partners, participating in traineeships or internships, employing drama or film pedagogy involving external audiences, and employing customer development methodologies (Blank, 2005). These activities, outlined by Blenker et al. (2011), exemplify the essence of entrepreneurship as everyday practice, emphasizing the creation of tangible value for the broader community.

VALUE CREATION APPROACH ACTIVITIES

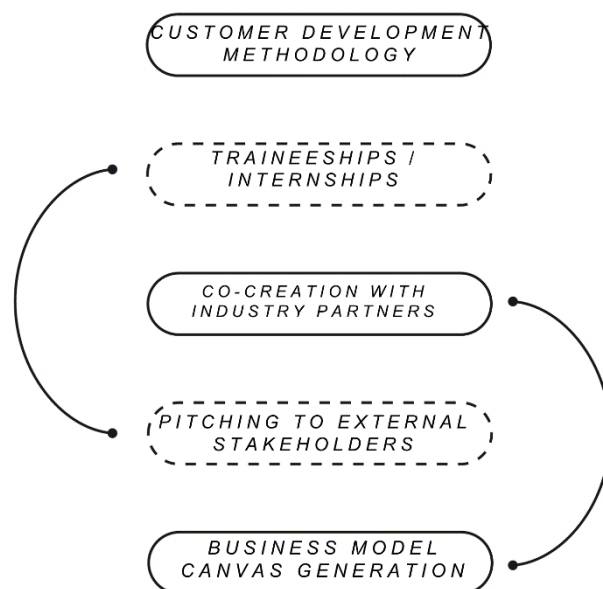


Figure 3 Value-Creation Approach activities

D. Design Thinking and Co-Creation Methodologies

Design Thinking in Entrepreneurship Education

Design thinking, a human-centered and iterative problem-solving approach, has gained significant prominence in entrepreneurship education. Rooted in empathetic understanding, ideation, prototyping, and testing, design thinking aims to solve complex problems while considering user needs and experiences (Brown, 2008). Design thinking, as a problem-solving approach, encompasses five key stages: empathy, define, ideate, prototype, and test. In the empathy stage, designers seek to deeply understand the perspectives and needs of the end-users, engaging in immersive research methods like interviews, observations, and surveys (Brown, 2008). This stage emphasizes the importance of empathy in the design process, allowing designers to gain valuable insights into user experiences and preferences. By empathizing with users, designers can uncover hidden problems and design solutions that truly meet user needs (Brown, 2008). The empathy stage serves as the foundation for the subsequent stages, guiding designers to develop a genuine understanding of the users they are designing for.

Following the empathy stage, the define stage involves synthesizing the gathered information to define the core problems and challenges faced by users (Brown, 2008). This stage aims to articulate the problem statement in a clear and concise manner, ensuring a focused direction for the design process. Through careful analysis of the user data, designers can pinpoint specific pain points and challenges, facilitating a precise definition of the problem to be addressed (Brown, 2008). By defining the problem accurately, designers can align their efforts and creativity toward generating solutions that directly tackle the identified issues, thereby increasing the likelihood of creating impactful and meaningful designs.

In entrepreneurship education, design thinking is employed as a powerful methodology to foster innovative thinking and problem-solving skills among students. By encouraging students to empathize with end-users/customers, define problems, ideate potential solutions, prototype concepts, and iterate based on feedback, design thinking equips aspiring entrepreneurs with the ability to create products or services that genuinely address user needs (Liedtka, 2014). This approach emphasizes collaboration, creativity, and a deep understanding

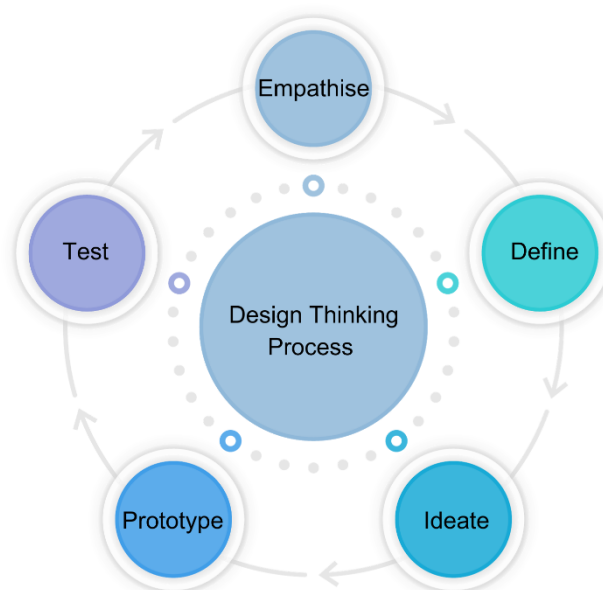


Figure 4 Design Thinking process



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of user perspectives, preparing students to navigate the dynamic challenges of the entrepreneurial landscape.

One key aspect of design thinking in entrepreneurship education is its role in nurturing entrepreneurial mindset and skillset. Design thinking processes align closely with entrepreneurial methodologies, emphasizing iteration, rapid prototyping, and user validation—crucial elements of successful entrepreneurship. By integrating design thinking into entrepreneurship education, students not only learn to develop innovative solutions but also acquire essential entrepreneurial skills such as problem identification, market research, and user validation (Brenner & Uebernickel, 2016). This holistic approach not only enhances students' creative abilities but also equips them with the practical skills required to transform innovative ideas into viable entrepreneurial ventures.

Moreover, the design thinking approach contributes significantly to enhancing the experiential aspect of entrepreneurship education. Through hands-on exercises, students engage in real-world problem-solving scenarios, allowing them to apply theoretical concepts in practical contexts (Brown & Wyatt, 2010). Design thinking workshops and projects provide students with opportunities to collaborate, experiment, and iterate, mirroring the challenges faced by entrepreneurs in the field (Liedtka, 2015). This experiential learning approach helps students internalize entrepreneurial principles, enabling them to develop a proactive mindset and the ability to identify and seize entrepreneurial opportunities effectively (Brenner & Uebernickel, 2016). By fostering a culture of innovation and resilience, design thinking empowers students to become agile entrepreneurs capable of navigating the uncertainties of the business world.

Co-creation in Entrepreneurship Education

The concept of co-creation plays a pivotal role in various stages of entrepreneurial endeavors, spanning from identifying or crafting business prospects to executing the business model and aggregating resources for daily operations and future expansion in the fledgling venture. The resource-based view of an enterprise, a theory commonly used in analyzing strategic decisions of established businesses and international entrepreneurial prospects, offers insights into the nature of business knowledge and resources that potential business partners can contribute during the early phases of a new venture (Peng, 2001). For emerging entrepreneurs, it becomes crucial to evaluate the alignment of their resources with the identified business opportunities. This evaluation guides them in discerning whether collaboration with close business partners or engaging in co-creation within a broader network is necessary.

Embracing a co-creative mindset necessitates a willingness for networking, sharing knowledge, and establishing mutual trust within a business setting where the ownership of ideas is not always fixed or protected, akin to the dynamics of a brainstorming session. Engaging in formal and informal entrepreneurial networks has been recognized as a significant factor in the success of entrepreneurship since the late 20th century (Breschi and Malerba, 2005). Co-creative entrepreneurship can be realized by involving a multitude of business owners in the startup process and/or by utilizing crowdfunding platforms (Kuppuswamy and Bayus, 2013) to secure financial backing for entrepreneurial initiatives. This collaborative approach emphasizes the power of collective ideation and resource mobilization, highlighting the transformative potential of co-creation in the entrepreneurial landscape.

In entrepreneurship education delivered through tertiary educational institutions, co-creation methodologies have emerged as valuable pedagogical tools. Co-creation involves collaborative

efforts between educators, students, and external stakeholders, such as industry experts, business owners or community members, in the creation and delivery of educational content and experiences (Pralhad & Ramaswamy, 2004). Through co-creation, students engage in active participation, sharing their ideas and insights, while educators facilitate a dynamic learning environment that mirrors real-world entrepreneurial collaborations (Konstantinidis et al., 2021). This approach encourages students to work alongside external partners, allowing them to apply theoretical knowledge in practical contexts and fostering entrepreneurial skills such as teamwork, communication, and problem-solving. Co-creation methodologies, therefore, transform traditional classroom settings into vibrant hubs of collaborative learning, where students and external stakeholders jointly contribute to the educational process, enhancing the depth and richness of entrepreneurship education. Finally, through this dynamic co-creation of entrepreneurial knowledge students achieve to create value for external stakeholders (e.g. business world, social community, etc.) by creating sustainable entrepreneurial ventures, artifacts or services that reflect external needs that go beyond to dipole student-educator, while creating an impact beyond the traditional university classroom.

III. ENTREHUBS Educational Model

A. Design principles of the ENTREHUBS Educational Model

ENTREHUBS Educational Model is designed upon five fundamental building blocks that can cultivate entrepreneurial mindsets among learners of different disciplines, offering practical suggestions for educators:

- Firstly, encouraging students to set entrepreneurial narratives rooted in their personal experiences enables entrepreneurial initiative by nurturing their skills in recognizing opportunities.
- Secondly, prompting students to contemplate challenges and discordances within their own lives facilitates the development of everyday value creation abilities.
- Thirdly, encouraging students to envision themselves as entrepreneurs in a future context fosters the transformation of their identity, shaping a more entrepreneurial self-concept.
- Fourthly, designing an open and innovative learning environment, where students develop entrepreneurial knowledge by co-designing educational materials and co-creating entrepreneurial projects with the direct involvement of stakeholders from the business industry.
- Fifthly, enabling students to collaborate in interdisciplinary teams, conceptualizing and then actualizing entrepreneurial opportunities, assists in the cultivation of effective teamwork, known as "*team-efficacy*" (Blenker et al., 2011, p. 425).

Integrated approach for an action-oriented curriculum

The integrated approach, where students actively address social challenges that they have identified based on their background and interests, set the foundation for a more oriented towards skills entrepreneurial culture by integrating entrepreneurship into existing curricula of different disciplines without delivering it as a separate subject. This explicit connection enables students to contemplate the theoretical foundation of their entrepreneurial actions, fostering the development of entrepreneurial enthusiasm and potentially even an entrepreneurial identity among some learners. The value generation, formally integrated into



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the curriculum, can be so substantial that it occasionally translates into genuine economic expansion for the collaborative partners beyond the educational institution. Consequently, the ultimate outcome of the integrated approach manifests as individuals possessing heightened entrepreneurial initiative, innovatively generating various forms of value across societal sectors and diverse spheres of life.

Teaching “through” entrepreneurship

Teaching “through,” emphasizes a process-oriented and experiential method where students actively engage in entrepreneurial learning experiences (Kyrö, 2005). This approach will foster the diffusion of Entrepreneurship Education to various subjects, especially of non-business related departments, as research has shown (Handsombe et al., 2008; Chaker et Jarraya, 2021) that it holds relevance for all students across different educational disciplines. Finally, by establishing connections between entrepreneurial actors, processes, and real-life experiences of students, enriching the core subjects and nurturing a sustainable entrepreneurial culture.

Co-creation Approach

Co-creation involves collaborative efforts between educators, students, and external stakeholders, such as industry experts, business owners or community members, in the creation and delivery of educational content and experiences (Prahalad & Ramaswamy, 2004). Regarding the implementation phase of such a programme, through co-creation, students engage in active participation, sharing their ideas and insights, while educators facilitate a dynamic learning environment that mirrors real-world entrepreneurial collaborations (Konstantinidis et al., 2021). However, the involvement of external stakeholders from the business industry is not constrained in guest lectures or participating in hackathon and pitching competitions; on the contrary, they actively co-design and co-implement a set of educational materials or entrepreneurial projects along with educators and students offering the practical insights of the business industry, while bringing up the needs of the current business industry (economic value) and society (social value). In terms of evaluation, external stakeholders – instead of what is applied in the traditional entrepreneurship education – are involved in this process assessing more the attitudes and values of students in respect of developing an entrepreneurial identity, rather than on acquiring skills on developing a business plan.

Design Thinking for opportunity identification and exploitation

In the ENTREHUBS Educational Model, design thinking will be utilised as a potent methodology employed to cultivate innovative thinking and enhance problem-solving skills among students. By urging students to empathize with end-users and delineate issues, brainstorm potential solutions, create prototypes, and refine their ideas based on feedback, design thinking will empower students – in close collaboration with educators and external stakeholders – to develop products or services that genuinely meet user needs (Liedtka, 2014). This approach places significant emphasis on collaboration, creativity, and a profound understanding of user perspectives, equipping students with the necessary tools to tackle the ever-changing challenges within the entrepreneurial sphere.



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The processes inherent in design thinking closely align with established entrepreneurial methodologies, underscoring the importance of iteration, rapid prototyping, and user validation – essential components of the ENTREHUBS Model. By embracing these principles, design thinking not only enhances students' ability to generate innovative solutions but also prepares them to navigate the complexities of entrepreneurship by fostering adaptability and a keen understanding of user needs. As a consequence, students of different disciplines will be able to empathise with the end-users of their 'field', understanding their needs and designing entrepreneurial solutions-projects to address them; leading, therefore, to nurturing an entrepreneurial culture and identity to students of tertiary education regardless of their professional background.

Value Creation Approach

The Value Creation Approach – as generating (tangible) value for the broader community – is at the core of the ENTREHUBS Educational Model fostering the view of entrepreneurship 'as everyday practice' to address social challenges by co-creating social, cultural or economic value for the broader community. Activities, such as generating business model canvases, pitching ideas to external stakeholders, engaging in co-creation with partners, and customer development methodologies (Blank, 2005) will be ultimately employed in the ENTREHUBS Educational Model, always under the direction of creating value for the broader community. In this context, project-based learning will be utilized by educators only if creates a tangible artifact for the broader community, not just an assignment for students' assessment. On the other hand, service learning embodies a value creation approach by generating value for the surrounding community, and – therefore – it will be integrated into the ENTREHUBS Educational Model.

B. ENTREHUBS Value Co-Creation Hubs

A. Definition and Purpose

Value Co-Creation Hubs serve as collaborative spaces within the educational ecosystem where the synergy between Higher Education Institutions (HEIs) and businesses thrives (Kumari et al., 2019). These hubs are physical or virtual environments designed to facilitate the co-creation of innovative solutions and foster meaningful partnerships. Their primary purpose is to bridge the gap between academia and industry by providing a platform for students, educators, and business professionals to collaborate, share knowledge, and work on practical projects. In addition, the transdisciplinary collaboration and complementary expertise fosters the value creation for external stakeholders, while reflecting the needs of the social community and business market and creating a ripple effect of creativity, growth and innovation that go beyond the traditional university classroom. In these hubs, creativity and entrepreneurial spirit flourish, leading to the development of cutting-edge ideas and solutions. The essence of Value Co-Creation Hubs lies in their ability to create an environment where theoretical knowledge is transformed into practical applications, fostering a culture of innovation and entrepreneurship among participants.



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B. Role of HEIs and Businesses

In the context of Value Co-Creation Hubs, Higher Education Institutions (HEIs) play a pivotal role as facilitators and knowledge providers. They offer academic expertise, mentorship, and access to a pool of talented students. HEIs curate a conducive learning environment, ensuring that theoretical knowledge is integrated seamlessly with real-world challenges.

On the other hand, businesses bring industry-specific insights, practical experiences, and real-market demands to the table, bridging the gaps of the abstract theoretical knowledge with context-specific application in a targeted business sector. They act as mentors, guiding students with practical knowledge and market trends. Businesses also offer resources, funding, and networking opportunities, enriching the educational experience. The symbiotic relationship between HEIs and businesses within these hubs creates a collaborative ecosystem where innovative ideas are nurtured, refined, and transformed into viable ventures.

However, as the research activities conducted under the ENTREHUBS project in Germany, Greece, Cyprus and Turkey revealed that the collaboration between Higher Education Institutions (HEIs) and stakeholders of the business sector are constrained to the implementation of hackathon events, pitching sessions for funding identification, and traineeships/internships through universities bring in contact students with the business sector related to their studies. On the contrary, there are scarce initiatives of collaboration between educators and business sector representatives in terms of designing or implementing the curriculum, which sometimes results in educational programmes that do not reflect the current needs of the labor or business market (ENTREHUBS Study Report, 2023). On this basis, the ENTREHUBS Model will propose an innovative and “out-of-the-box” framework for facilitating the collaboration between universities and business sector representatives in each step of the learning process, starting from the designing of the curriculum (i.e. stating learning objectives and outcomes, developing learning materials, etc.) to the implementation and evaluation of the curriculum.

C. Activities and Initiatives Supported under the Value Co-Creation Hubs (VCHs)

Value Co-Creation Hubs (VCHs) have the potential to host a diverse array of activities and initiatives aimed at nurturing an entrepreneurial culture and fostering innovation across different disciplines, especially expanding and establishing entrepreneurship education to non-business or economic-related faculties. These activities include ideation workshops, prototype development sessions, hackathons and industry-specific challenges. Entrepreneurship bootcamps and mentoring programmes are organized to provide students with hands-on experience in business planning, market research, and pitching ideas to potential investors. Collaborative research projects and interdisciplinary initiatives are encouraged, promoting cross-disciplinary learning and innovative problem-solving. Additionally, Value Co-Creation Hubs (VCHs) facilitate networking events, allowing students to connect with industry leaders, potential investors, and fellow entrepreneurs. The VCHs also support initiatives such as product incubation, startup accelerators, and pitch competitions, providing a platform for students to showcase their entrepreneurial ventures.

D. Benefits for Students, HEIs, and Businesses

Value Co-Creation Hubs offer a multitude of benefits to all stakeholders involved. For students, VCHs provide a platform to apply theoretical knowledge in real-world scenarios, enhancing their problem-solving skills and boosting their confidence. Especially for students of non-business-related faculties, their involvement in VCHs and the active co-design and co-creation



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of entrepreneurial artifacts/products, ventures or services with business representatives of their professional field reinforces their entrepreneurial intention (Students gain exposure to industry practices, mentorship from experienced professionals, and opportunities for internships and employment. For Higher Education Institutions (HEIs), VCHs fosters a culture of innovation and entrepreneurship, while bridging the gap between tertiary education policies and practical application reflecting the labor market's and community's needs. They create valuable partnerships with businesses, leading to research collaborations, funding opportunities, and enhanced curriculum relevance constantly updated based on the current entrepreneurial trends and business industry's needs. Businesses benefit by gaining access to fresh talent, innovative ideas, and potential future employees. They also have the opportunity to mentor and guide the next generation of entrepreneurs, fostering a culture of innovation within their industry. Overall, Value Co-Creation Hubs serve as catalysts for the holistic development of students, the advancement of HEIs, and the growth of businesses in the ever-evolving entrepreneurial landscape.

IV. ENTREHUBS Model Implementation

Preparation Phase

I. Engaging Business Stakeholders

Educators are tasked with initiating relationships with the business sector; there is no restriction in engaging business stakeholders from different fields under the prerequisite that this interdisciplinary collaboration is interlinked with adequate learning outcomes. It is important to clearly articulate the benefits of collaboration, the need for their active involvement (their tasks and responsibilities), emphasizing the mutual advantages for businesses, students, and the institution. Local business networking events can be utilised as an opportunity for identifying potential partners and creating a platform for dialogue.

II. Setting the learning outcomes

Setting the learning outcomes and delivery an entrepreneurship education course has to align with the context of components of entrepreneurship programs (Maritz and Brown, 2013). The literature is abound with content around business plans, although many scholars believe business plans not to be an entrepreneurial approach (Maritz et al., 2011). Content and pedagogy varies among entrepreneurship programs, but Fayolle (2010) identifies various topics and initiatives: opportunity evaluation, new venture marketing, leadership, managing the growing business, new venture finance, new venture plans and exit strategies.

Educators can build upon existing topics of entrepreneurship education under the prerequisite that the learning outcomes being set are aligned with the principles of the ENTREHUBS Educational Model, especially with creating value for the broader community, co-creating with business stakeholders, opportunity identification and exploitation. It is also important to highlight that under the 'integrated approach', the entrepreneurial learning outcomes should be aligned with the learning outcomes of the specific subject of the curriculum.

III. Co-Creation of Educational Materials

Educators facilitate brainstorming and co-creation sessions, where they collaborate with students and business professionals, focusing on aligning the curriculum with industry and



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society needs, integrating real-life case studies, and developing practical assignments that will have (tangible) value on the surrounding community. Feedback loops are established by educators, where business stakeholders provide insights into the relevance and applicability of educational materials, while iterating on these materials to ensure they meet the evolving demands of the business world.

Given that the ENTREHUBS Educational Model will follow the 'integrated approach', it is crucial for educators to adjust resources employed in their subjects or bring in the 'classroom' entrepreneurial 'assignments' and projects by connecting them with the specific subject (e.g. The educator will bring an activity on Business Planning in a course about History and Archaeology).

VI. Resource Selection and Integration

Educators will work closely with business stakeholders to identify relevant educational resources to be integrated in the existing subject of the curriculum. Resources that align with current industry needs and technologies will be prioritised, as they will offer students with real-life context for value identification and exploitation. Educators have to integrate these resources into the curriculum, supplementing theoretical knowledge with practical insights. It is also important to include business case studies and success stories to provide context and inspiration for students, enabling them to understand real-world applications of entrepreneurship principles across different disciplines, and recognising entrepreneurial identity as part of professional across different sectors.

Implementation Phase

I. Establishment of Value Co-creation Hubs

Educators design collaborative projects that involve both students and business stakeholders. These projects should reflect real-world challenges and encourage students to work closely with industry professionals to identify opportunities for value creation and resources for exploitation and sustainability of their 'entrepreneurial venture'. The creation of multidisciplinary teams comprising of students and industry stakeholders from various fields will foster diverse perspectives and creative problem-solving. It is crucial to establish clear project goals, milestones, and deliverables, ensuring alignment with both educational objectives and business requirements; these aspects of the projects will be co-design by educators, business stakeholders and students reflecting the perspectives and needs of all members.

II. Leveraging Online Platforms

Smooth collaboration and communication are key for the successful implementation of the ENTREHUBS Value Co-Creation Hubs. Therefore, educators will set up user-friendly online collaboration platforms and project management tools that will enable communication between students, educators, and business stakeholders; the platforms will host also project documentation, discussion forums, and progress tracking features. Utilization of virtual meeting spaces for collaborative sessions and feedback meetings can facilitate the hybrid implementation of the process, when some of the involved parties cannot be physically present. Educators are responsible for fostering a digital environment that encourages

seamless information exchange, enabling all stakeholders to participate actively, especially in the case of hybrid or remote learning setups.

III. Continuous Evaluation and Adaptation

Establishing structured feedback mechanisms involving students, educators, and business stakeholders are of paramount importance of gradually nurturing an entrepreneurial culture among tertiary education students. Feedback should be regularly collected through surveys, interviews, and discussion sessions, while its analysis will identify areas of improvement. It is important that the educators will establish an open communication between all stakeholders, allowing for continuous adaptation of projects and learning materials based on students' progress and needs. The feedback provided will be utilised to refine the collaborative projects, ensuring they remain relevant, engaging, and valuable for all participants, and especially for the community or the target group for whom the 'entrepreneurial project' creates value.

Evaluation Phase

The evaluation approach for the ENTREHUBS Model is designed to achieve two main goals: ensuring continuous improvement of entrepreneurship education through regular feedback and measuring the impact on students' entrepreneurial mindsets, values, and behaviors. By integrating multi-level evaluation strategies, this framework provides a holistic and nuanced understanding of the Model's effectiveness and supports the development of a student-centered, value-driven entrepreneurship education.

1. Multi-stakeholder feedback mechanisms

The ENTREHUBS Model promotes continuous improvement loop through structured and systematic feedback from key stakeholders—students, educators, and industry partners. Feedback will be collected at multiple stages of the project, such as post-research activities, post-workshops, and post-project, to adaptively refine the training programme and teaching strategies.

- **Student feedback:** Students will complete surveys and participate in focus groups to provide insights into their learning experiences – as it happened in ENTREHUBS research activities, identifying areas where the educational programme meets their needs and areas where improvements could be made. These sessions will particularly focus on student perceptions of entrepreneurship, opportunity identification, co-creation processes, and real-world applicability.
- **Educator reflections:** Educators will participate in reflective sessions to assess their experiences implementing the ENTREHUBS Model. They will evaluate the effectiveness of pedagogical tools, engagement levels, and students' progress, providing valuable insights into the Model's and training programme refinement.
- **Industry partner input:** Regular interviews and roundtable discussions with industry partners will ensure that the ENTREHUBS training programme remains aligned with current industry needs. Partners will assess the relevance of skills and competencies imparted to students and suggest enhancements based on real-world application requirements. To formalize this process, **feedback workshops** will be conducted at the end of core project activities and milestones (e.g. International Training

Workshop, Online Summer School, etc.), enabling stakeholders to collectively analyze data, share perspectives, and propose actionable improvements for the next cycle.

2. Comprehensive attitude and value-based assessment

The ENTREHUBS Model aims to go beyond traditional knowledge and skill assessments by evaluating students' attitudes and values toward entrepreneurship. This attitudinal focus aligns with the core principles of the Model, including co-creation, opportunity identification, and value creation.

- **Reflective portfolios:** Students may maintain a reflective portfolio documenting their entrepreneurial journey, including personal reflections on opportunity recognition, team collaboration, and the impact of their projects on external stakeholders. These portfolios could be kept as personal documents or be evaluated based on qualitative indicators, such as depth of reflection, growth in entrepreneurial values, and demonstration of a proactive mindset.
- **Self and peer assessments:** Through self-assessment and peer reviews, students will evaluate their contributions to team projects (e.g. throughout the Online Summer School), their problem-solving approaches, and their development of entrepreneurial attitudes. Peer assessments will reflect the ENTREHUBS values, emphasizing collaborative effort, resilience, and innovation.
- **Attitude and value surveys:** To quantitatively track shifts in students' entrepreneurial mindsets, attitudinal surveys will be conducted at key points during the program (e.g., entry, midpoint, and end). These surveys will measure shifts in risk tolerance, resilience, creativity, and social value orientation, providing a longitudinal view of attitudinal change.

3. Real-world project assessment and impact evaluation

In keeping with ENTREHUBS' emphasis on value co-creation, students will work on real-world projects with industry partners, focusing on generating tangible impact. The assessment of these projects will include both process-oriented and outcome-based evaluation to reflect the entrepreneurial journey holistically.

- **Project-based rubrics:** Specialized rubrics can be designed to assess students on criteria such as innovation, feasibility, scalability, and societal impact. These rubrics will prioritize creative problem-solving, opportunity identification, and adaptability, emphasizing how well students have incorporated stakeholder feedback and industry insights into their projects.
- **Industry panel evaluation:** Students will present their entrepreneurial solutions to panels of industry stakeholders who will evaluate the projects' market relevance, practicality, and potential to address real-world challenges. This direct feedback will reinforce learning by showing students how their work is perceived by experienced professionals.
- **Value creation metrics:** Metrics will assess the extent to which students' projects create economic, social, or cultural value. For instance, students working on community-focused projects may be evaluated on indicators such as community engagement, project sustainability, and positive social impact. These metrics will help gauge the projects' reach and effectiveness in contributing to society.

4. Longitudinal Tracking of Entrepreneurial Impact Post-Completion

A unique element of the ENTREHUBS evaluation approach is its longitudinal tracking of students' entrepreneurial outcomes after the implementation of the training programme or initiative, such as an Online Summer School of Hackathons. This tracking aims to capture the lasting influence of the ENTREHUBS Model on students' professional journeys and entrepreneurial engagement.

- **Alumni surveys and interviews:** Surveys and interviews with alumni will gather data on the number of graduates who have pursued entrepreneurial ventures, joined startups, or applied entrepreneurial principles in traditional career paths. Alumni will also provide feedback on how well the concept of the ENTREHUBS Model and/or the ENTREHUBS training programme prepared them for real-world entrepreneurial challenges.
- **Employment and entrepreneurship outcomes analysis:** Data on employment in entrepreneurial roles, business creation, and career progression could be collected to evaluate the ENTREHUBS Model's impact on graduates' career paths. This information will be analyzed in collaboration with university career services and relevant industry bodies.
- **Continued industry engagement:** Industry partners involved in the training sessions and initiatives (e.g. Online Summer School, Hackathons, etc.) falling under the concept of the ENTREHUBS Model could be invited to share feedback on graduates who have transitioned into the workforce, assessing their preparedness, adaptability, and entrepreneurial spirit. This feedback will help ensure that the program remains aligned with industry needs and continuously improves.

5. Process improvement through data-driven insights

The ENTREHUBS Model places a strong emphasis on using data-driven insights for continuous program improvement. By systematically analyzing feedback and assessment data, ENTREHUBS aims to ensure that the ENTREHUBS Model-approach remains responsive to stakeholder needs and evolving educational and industry trends.

- **Data dashboards and reports:** Educators may regularly use updated dashboards to capture key indicators such as student satisfaction, project outcomes, attitudinal shifts, and alumni career progress. These dashboards will provide real-time insights for educators and administrators, enabling them to monitor program effectiveness and make timely interventions where needed.
- **Annual evaluation reports:** Each year, a comprehensive evaluation report will consolidate the findings from feedback loops, assessment metrics, and alumni tracking. This report will highlight successful elements, identify areas for refinement, and outline actionable recommendations for program adjustments. The report will be shared with all stakeholders, fostering transparency and collaboration in the program's evolution.
- **Review workshops and stakeholder meetings:** At the end of each academic year, educators applying the ENTREHUBS Model-approach may convene a workshop with educators, industry partners, students, and alumni to discuss evaluation findings.

These workshops will serve as a platform for co-creating solutions, where stakeholders can collaborate on refining curriculum elements, enhancing assessment tools, and aligning the Model more closely with emerging needs.

- **Benchmarking and best practices integration:** Insights gained from ENTREHUBS' evaluation activities will be compared with other leading entrepreneurship education programs globally. By benchmarking against best practices, partners involved in the ENTREHUBS project can identify innovative approaches, incorporate new teaching methodologies, and set ambitious targets to further enhance the Model's institutional impact in the long-run.
- **Adaptive curriculum design:** Based on feedback and assessment data, ENTREHUBS will adopt an adaptive curriculum approach. This means that new teaching methodologies, industry-relevant case studies, and innovative assessment techniques can be smoothly integrated, ensuring that the curriculum remains cutting-edge and aligned with current entrepreneurial practices.

In summary, by establishing a robust data-driven improvement process, the ENTREHUBS Model will continuously evolve to meet the needs of students, educators, and industry partners. This adaptive, collaborative approach will help maintain the Model's relevance and effectiveness, reinforcing its commitment to developing entrepreneurial attitudes, values, and skills among students in higher education. Through regular data analysis, stakeholder engagement, and adaptive strategies, ENTREHUBS will ensure its position as a pioneering model in Entrepreneurship Education.

VI. Conclusion

The ENTREHUBS Educational Model lays a robust foundation for advancing Entrepreneurship Education in higher education, serving as the basis for two pivotal initiatives: the ENTREHUBS Training Programme addressed to educators and the Online Summer School addressed to university students. By embedding interdisciplinary and collaborative approaches, the ENTREHUBS Model fosters a dynamic environment where students, educators, and industry partners work together to co-create value. Through core principles like design thinking and real-world problem-solving, students are empowered to develop entrepreneurial mindsets and practical skills. The establishment of Value Co-Creation Hubs at the core of the ENTREHUBS Model bridges academia and industry, providing spaces for experiential learning and enabling students across disciplines to collaborate directly with professionals, gaining insights that are crucial for modern entrepreneurial success.

A key feature of the ENTREHUBS Model is its commitment to continuous, stakeholder-driven evaluation, ensuring the ENTREHUBS approach remains responsive to the evolving needs of students, educators, and industry stakeholders. The feedback mechanisms embedded within the ENTREHUBS Model — including reflective sessions, attitudinal surveys, and industry feedback panels — provide a rich source of insights to refine both curriculum content and pedagogical approaches. This innovative evaluation methodology, focused on assessing students' entrepreneurial attitudes, values, and real-world project outcomes, goes beyond conventional assessment practices. Such insights inform the ENTREHUBS Training Programme for educators, equipping them with the tools to foster entrepreneurial mindsets, design co-creation activities, and engage students effectively. Educators trained within this framework will be equipped to implement Entrepreneurship Education that emphasizes value creation, collaborative problem-solving, and adaptive thinking.

On top of that, the ENTREHUBS Online Summer School for students directly builds on the ENTREHUBS Model's principles by offering a hands-on, immersive learning experience. This program will engage students in real-world entrepreneurial projects, facilitated through Value Co-Creation Hubs and guided by educators and industry mentors trained in the ENTREHUBS approach. Through the Online Summer School, students will enhance their skills in opportunity identification, co-creation, and community impact, developing solutions that reflect the ENTREHUBS values and contribute to broader societal challenges. Together, the ENTREHUBS Educational Model, Training Programme for educators, and Online Summer School provide a comprehensive ecosystem that not only supports entrepreneurship education but also cultivates a sustainable, interdisciplinary culture of innovation across European Higher Education Institutions.

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