

The EICAA Competence Framework: A Suggestion for EntreComp 2.0

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Abstract

Validated Taxonomy of Entrepreneurship Competences

This paper presents a validation and revision of the European Entrepreneurship Competence Framework (EntreComp) based on a systematic literature review and two rounds of empirical validation. While preserving the main structure and all competences of EntreComp, we suggest adding four new competences related to the process view of entrepreneurship, digitalization and design as well as minor modifications on the level of threads. The resulting framework is called the EICAA¹ Competence Framework. The paper also presents an empirically validated and domain neutral self-assessment instrument for entrepreneurship competence for large groups. The instrument has been designed to contribute to coherent competence assessment among learners within and across the EU.

Contributors

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1. INTRODUCTION

With the publication of the European Entrepreneurship Competence Framework (EntreComp) in 2016, the European Commission stated the case for a broad conceptualization of entrepreneurship (Bacigalupo et al., 2016). The authors of EntreComp adopted the definition established by the Danish Foundation for Entrepreneurship (FFE-YE, 2012) describing entrepreneurship as “when you act upon opportunities and ideas and transform them into (financial, cultural, social) value for others”. This definition and its development into the EntreComp framework resonates with seminal definitions of entrepreneurship as revolving around the exploration and exploitation of ideas and opportunities and of the resources needed to realize value (Shane & Venkataraman, 2000).

Thus, such broad understanding does not limit entrepreneurship to the creation of start-ups or new organizations. Rather, it considers entrepreneurship to be a “transversal key competence applicable by individuals and groups, including existing organizations, across all spheres of life” (Bacigalupo et al., 2016: 10). While this implies an expansion of the fields of application for entrepreneurship education (EE), the broad scope also poses many challenges for educators, especially with regard to the set of competences and learning outcomes that can be taught through EE. In fact, the proper identification of entrepreneurship competences sets the framework for the design of contents and methods in EE and provides a guideline for the assessment of the competence attainment as well. EntreComp intends to provide such guidance for educators by defining three interlinked competence areas, with 15 competences. However, an empirical validation of the frameworks’ structure and content is missing – leaving its appropriateness for the design, content, and assessment of EE vague.

This paper challenges the contents and structure of EntreComp through a systematic literature review and an empirical validation study. The findings are exploited to offer an evolution of EntreComp as well as a self-assessment instrument for entrepreneurship competence, both being key outputs of the EU funded project Entrepreneurial and Intrapreneurial Competences Assessment Alliance (EICAA, <https://www.eicaa.eu/>).

2. BACKGROUND

Over the past years, several entrepreneurship competence frameworks have been developed, mainly coming from empirical or theoretical approaches (Silveyra et al., 2021). The empirical approaches derive from the study of the behaviour of successful entrepreneurs and its relationship with the personal characteristics of the entrepreneurs (Bird, 1995/2019; Mitchelmore & Rowley, 2010). The theoretical approaches are mainly built within educational contexts (Morris et al., 2013; Rasmusen & Nybye, 2013). Within the latter type, the European Commission developed EntreComp as the reference framework of competences for entrepreneurship education (Bacigalupo et al., 2016). EntreComp was designed using a mixed-method approach consisting of literature review, study cases, focus groups, and consultations with experts (Komarkova et al., 2015). As it was recognised by its authors, the framework may need amendments or refinements when it is tested by practitioners and end-users. Since its publication in 2016, EntreComp has been used in a variety of contexts, such as the design and evaluation of entrepreneurship education programs (Grigg, 2021; Morselli & Gorenc, 2022) and the analysis of EU policies (Seikkula-Leino et al., 2021). Although EntreComp is increasingly adopted by educators, there has been no revision of the framework based on those experiences. Moreover, the authors of EntreComp only generally describe the methodology that was applied for establishing the framework along a twelve-step process. More specifically, steps 1-3 can be thoroughly assessed by consulting the study “Entrepreneurship Competence: An overview of existing concepts, policies and initiatives” (Komarkova et al., 2015). However, it remains unclear how the final content and structure of EntreComp evolved incrementally from steps 4-12 as no information is available on the findings of these multi-stakeholder consultations. Research that empirically validates EntreComp ex-post is also scarce. Cubico et al. (2017) found evidence of EntreComp-like competences related to entrepreneurial intention in a sample of college students.

Thus, no empirical validation of EntreComp with regard to its contents and structure was done yet. Additionally, the translation of EntreComp into practical course contents and methods is still complex due to its exhaustivity. EntreComp defines three competence areas, with 15 competences and 60 threads, which unfold in eight progression levels, resulting in a total of 442 learning outcomes.

During the EICAA project, a research study was carried out in order to set the first steps towards the design of an entrepreneurship assessment tool, the EICAA’s Competence Monitor, by identifying and analysing best practices and potential limitations of existing entrepreneurship competence surveys. As a result, eight competence assessment tools were analysed in depth: Entrepreneur Scan (E-Scan, n.d.), Berkeley Innovation Index (BII, n.d.), Entrepreneurial Profile Test (EPT; Lindström, n.d.; Lindström 2021), GET2 for enterprising potential (Caird, 2006), Measurement Tool for Entrepreneurship Education (MTEE; LUT University, n.d.), Enterprise Catalyst (E-CAT, Venture to think, 2023), BDC Entrepreneurial potential self-assessment Test (Bdc, n.d.), EPIC (Baggen & Kaffka, 2022). Most of these tools were developed in educational institutions or by consulting companies aiming at providing tailored coaching or training services. Only one of them (EPIC) used the EntreComp as the reference entrepreneurship competence framework, while the others were based on self-tailored frameworks of entrepreneurship competences. Furthermore, it was found that only a limited number of studies in the field had published validations of their surveys, thereby hindering the assessment of the dimensional structure of the tools. Consequently, the study highlights the critical necessity of conducting research that

focuses on evaluating entrepreneurship competences and establishing a shared framework. In this regard, the outputs of the EICAA project offer valuable contributions, including an updated framework and a validated assessment tool, among other resources.

3. APPROACH

First, we performed a systematic literature review of entrepreneurship competences. The review was conducted on a set of 138 documents, both academic and non-academic literature. The sample of research papers was obtained with a systematic search in databases Web of Science, Scopus and Inform/ProQuest. The search terms were combinations of terms *entrep** or *intrap**, appearing as topic of the paper. The search was performed as of December 2021, and no limits were set on the year of publication. We narrowed down the search by selecting papers of type review and having more than 100 citations. After removing duplicates, 84 relevant academic papers were finally retained. We also added up-to-date literature, including grey literature that was either cited in the academic articles or referred by the team of reviewers as recommended by Briner & Denyer (2012). This allowed us, among others, to include information from the European Commission which has published a rich set of documents on entrepreneurship education and competences. In total, we added 54 other documents to the initial sample, ending up with a final sample of 138 documents.

The content analysis employed a combined approach of deductive and inductive coding. Initially, a set of 15 codes was established, representing the 15 competences of EntreComp, which were grouped - analogically to EntreComp - into three competence areas: "Ideas & opportunities", "Resources", and "Into action". In instances where a competence identified in the literature was not addressed by any of the EntreComp competences, a new competence category could be created by the researcher. These new categories were subsequently discussed with other researchers for inclusion in the code book. To ensure intercoder reliability, discrepancies were addressed and resolved through multiple meetings. Upon completion of the coding, the synthesis phase involved reviewing the fragments of coded text associated with each competence. A synthesis protocol was written and agreed upon by the three coordinating senior researchers. The insights gathered throughout the analysis underwent several rounds of discussion and were eventually finalized and agreed upon.

As a result of this study, we designed an evolution of the EntreComp framework, which contains an updated set of competences and threads within. This framework was named EICAA Competence Framework (EICAA-CF). It was then deployed in a rubric system, which consisted of the definitions of the competences and their detailed description in several threads along four proficiency levels (Foundation, Intermediate, Advanced, and Expert), similar to the four proficiency levels in EntreComp, but not including the two sub-parts within each level. This approach provided a solid basis for identifying areas of overlap, incremental changes, and radical changes between EICAA-CF and EntreComp. Within the context of this study, incremental changes refer to modifications that involved the re-formulation or re-shaping of specific competences or threads within the framework. These adjustments were made to refine and enhance the existing elements. On the other hand, radical changes signify substantial alterations that entailed either the addition or deletion of competences or threads within the framework.

Within the rubric system, we observed incremental changes predominantly in the "Ideas and opportunities" and "Resources" areas. Notably, no incremental changes were made in the "Into action" area. However, radical changes were introduced across all three areas, as new competences and threads were incorporated. For instance, the addition of the "design" competence (which was later split further into two competences) to the "Ideas and opportunities" area, the inclusion of the "enterprising literacy" thread in the "Financial and Economic Literacy" competence in the "Resources" area and the addition of "digital competence" in the same area, and the split of the Entrecomp competence "planning and management" in two competences in the "Into action" area. To ensure clarity and coherence in the rubric statements, we engaged in multiple online Delphi rounds involving all partners² of the consortium, supplemented by offline inputs. Each change was put through a round of deliberation, discussion, and voting. Ultimately, decisions were made through majority voting or were left to the analysis of the upcoming pre-test (PT1). By following a rigorous methodology and harnessing the expertise of various stakeholders, including esteemed senior researchers, we successfully developed and enhanced the rubric system. The rubric system served as a foundation for the design of a self-assessment survey of entrepreneurship competences (named EICAA Competence Monitor, CM), which was refined in several iterations following a Delphi process and several pre-tests, as described below.

Once the rubric system was subjected to face validation, its rich descriptions then served as a basis to develop alternative survey versions which were validated with a broad set of 31 educational and entrepreneurship researchers, teachers, and experts. In total 5 versions of the survey were developed: with the first one using shortened versions of the rubric as answer options and employing 5 EntreComp inspired proficiency levels (None, Basic, Intermediate, Advanced, Expert). Each version was developed through a combination of at least one focus group with the experts, and a Delphi process with asynchronous review rounds. In the second last version, item statements from the third version were reduced in length and lexically simplified and where necessary, a responsive hint was added to clarify the meanings of the terms used.

The next two versions of the Competence Monitor (CM) were then subjected to two pre-test rounds with different sample sizes from students across Europe (N=72 and N=202), particularly from Belgium, Spain, Hungary, Germany and Austria. This online survey adopted a 5-point Likert scale with 79 items covering all entrepreneurship competences. Reliability, Normality, Exploratory Factor Analysis, Confirmatory Factor Analysis, and Average Variances Extracted

were conducted using the platforms SPSS, AMOS, and R (Hair et al., 2013). The evolution through these 5 iterations can be seen in Figure 1. The confirmatory analysis informed us about the validity of the framework structure. Based on this analysis, we revised the structure and designed the final version of the EICAA Competence Framework.

Figure 1: Evolution of EICAA Competence Monitor

Version 1	Version 2	Version 3	Version 4	Version 5
• Scale: Rubric system • Process: Online and offline Delphi processes • Question Type: Multiple choice • Number of Questions: 71 • Average Time: 1 hour 21 minutes • Experts involved: 15 • Number of Iterations: 3	• Scale: Rubric system • Process: Online and offline Delphi processes • Question Type: Multiple choice • Number of Questions: 71 • Average Time: 40 minutes • Experts involved: 15 • Number of Iterations: 3	• Scale: Likert scale with 5 levels of progression • Process: Expert reviews and benchmarking with other surveys • Question Type: Single choice • Number of Questions: 79 • Average Time: 30 minutes • Experts involved: 8 • Number of Iterations: 4	• Scale: Likert scale with 5 levels of progression • Process: Statistical analysis based on pre-test 1 followed by item reformulation • Question Type: Single choice for survey items; multiple choice and single choice (drop-down) for demographics • Number of Questions: 77 • Average Time: 12 minutes • Experts involved: 13 • Number of Iterations: 4	• Scale: Likert scale with 5 levels of progression • Process: Statistical analysis based on pre-test 2 followed by structural changes • Question Type: Single choice for survey items; multiple choice and single choice (drop-down) for demographics • Number of Questions: 79 • Average Time: 12 minutes • Experts involved: 13 • Number of Iterations: 3

4. RESULTS

Systematic Literature Review

The systematic literature review revealed that almost all of the relevant competences identified in the literature were effectively covered by EntreComp, either at the competence level, within specific threads, or through the defined learning outcomes. The thorough integration of the 15 competences across various threads, further expanded into 442 detailed learning outcomes, showcases the exhaustive nature of EntreComp. Its comprehensive approach ensures that a wide range of entrepreneurship competences and their associated components are adequately addressed.

However, we also identified three new competences that were thoroughly documented in the literature and were not covered in full in EntreComp. The first one, "design", consists of the ability to design solutions for society in collaboration with different stakeholders and using innovative methods such as design thinking and co-creation. The second competence, "digital management," entails the proficient, critical, and responsible utilization of digital technologies to create value. Lastly, the third addition, "process management," conceptualizes entrepreneurship as a dynamic, iterative, and feedback-oriented process, emphasizing the ability to effectively manage this process. The inclusion of these 3 new competences is the result of several rounds of a Delphi process, which were conducted by the team of researchers that also jointly worked on the systematic literature review. Thus, the decision to add a particular competence was carefully assessed each time and only when the analysis of the literature provenly suggested such addition. Additionally, minor adjustments were made to the arrangement of threads among the existing but also within the existing and new competences. This was necessary to ensure coherence and alignment with the revised framework. Subsequently, a rubric system was developed that leans on the progression model of EntreComp but utilizes a reduced scale of four proficiency levels, to facilitate an operationalisation each entrepreneurship competence. The latter was done by transforming the rubric content into a self-assessment survey for university students. The survey was carefully designed to align with the defined rubric criteria with the intention to capture relevant information regarding students' online self-assessment of their entrepreneurship competence. Finally, the self-assessment was given the name EICAA Competence Monitor and put to practice among a representative sample of European university students. The data gathered allowed to statistically re-assess the alignment of the underlying competence framework as well as to ensure the survey's validity and reliability. This validation process is described in detail below.

Statistical Validation of EICAA Competence Framework and Competence Monitor

The statistical validation of both the competence framework structure and the self-assessment survey was done within two pre-test rounds in February 2022 and August 2022. Reliability was measured using all three of its parameters: Cronbach's Alpha, Split Half, and Omega, with Omega being the main indicator given its high level of stringency. Tests of Normality were done using the Shapiro Wilk and Kolmogorov Smirnov tests.

The first pre-test (PT1) revealed reliability issues with the competence "valuing ideas" and normality issues with five other competences. Other than "valuing ideas", reliability ranged between 0.67 and 0.93 for Cronbach alpha, between 0.61 and 0.92 for split half consistency, and between 0.72 and 0.93 for Omega. The factor analysis was performed with 72 data points and was done for every competence area separately due to the small data set. We observed that under each area, many items (survey questions based on threads) did not lie in the competence they were a part of, demonstrating that either the framework was weak, or the formulation of the survey questions could be enhanced in order to better represent their thread. In order to act on these results, item reformulation was performed by the researchers of AMS and the survey was put through one more round of face validity by the consortium.

After the second pre-test (PT2, N=202), one competence still exhibited reliability issues and six competences exhibited normality or one-dimensionality issues. Moreover, an analysis of the average variance extracted (AVE) resulted in issues for the competences “creativity” (AVE=0.48) and “self-awareness and self-efficacy” (AVE=0.48). Variable Inflation Coefficients (VIF) for all factors were all below 0.64, showing no collinearity. Through the utilization of confirmatory factor analysis, specifically employing structural equation modelling (SEM) in AMOS, the initial model exhibited a weak fit, indicating the potential need for the removal or division of certain competences. A sample of an initial model for the area “Ideas and opportunities” is shown in Figure 2. However, by implementing targeted improvements such as eliminating covariations and addressing underperforming factors, the resulting model achieved a level of fit that surpassed mere satisfaction, demonstrating a robust and compelling fit to the data. This statistical analysis suggested trimming or splitting of competences, which led to structural changes in the competence framework. For example, we observed two different factors in the competence “design”, which we solved by splitting it into two separate competences: “design orientation” and “design validation”. Based on the literature, design validation was found to be better suited in the last area, Into Action, and was hence moved there.

In total, the findings of the SLR and the statistical validation numerically added 4 competences in the EICAA Competence which are not featured at all (e.g., design orientation, design validation, digital competence, process management – as split from planning and management from EntreComp). 2 competences (e.g., enterprising literacy, mobilising (financial) resources) which originally featured differently in EntreComp were altered in EICAA based on the findings of the above steps. The final structure is shown in Figure 3 which also visually depicts the EICAA Competence Framework in comparison to its predecessor EntreComp.

Figure 2: Model for confirmatory factor analysis for competence area “Ideas and opportunities”

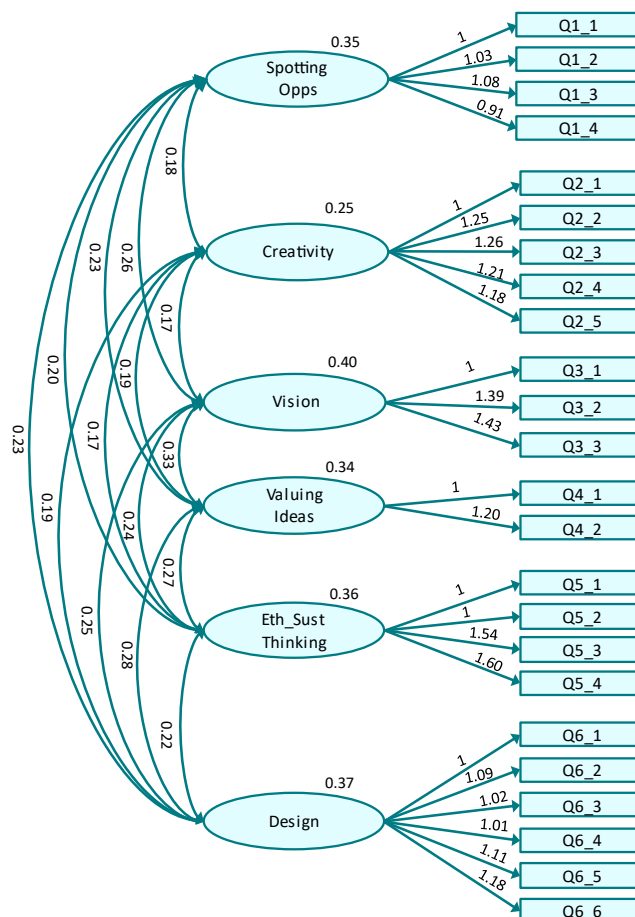
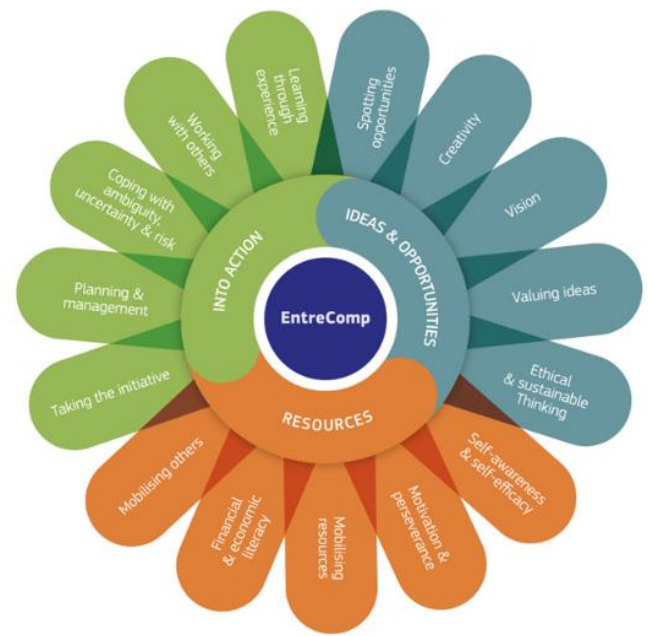
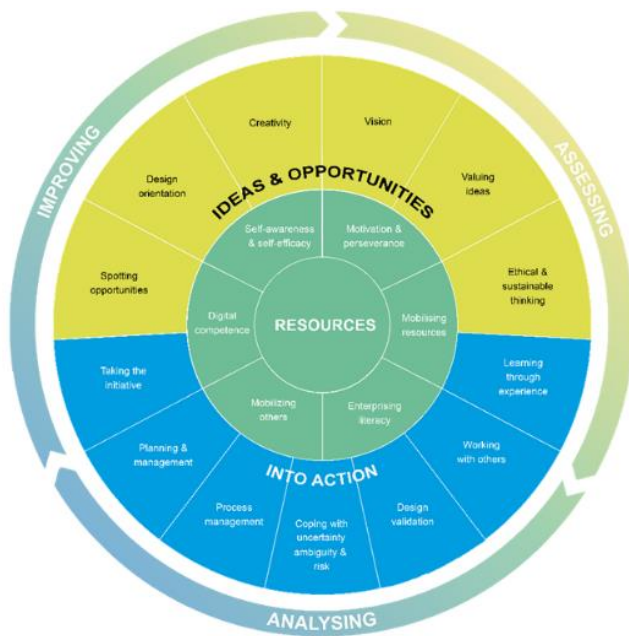


Figure 3: Visual representations of EICAA Competence Framework and EntreComp



Based on the changes resulting from the statistical analysis, we reached another version of the self-assessment survey which is now being pilot-tested in different institutions across the 5 aforementioned countries.

EICAA Competence Framework

The resulting EICAA Competence Framework maintains the same three competence areas as EntreComp while incorporating the aforementioned competences (see above). The competence area "Ideas & opportunities" encompasses competences related to identifying needs and opportunities, utilizing a design mindset and skills, generating ideas, and validating ideas, taking into account their sustainability and ethical implications. The competence "vision", also included in this competence area, enables entrepreneurs to develop a clear vision for themselves as entrepreneurs and for their new ventures.

Table 1: Ideas and opportunities

Area	Competence	Definition	Threads
1. Ideas and Opportunities	1.1 Spotting opportunities	Ability or capacity to perceive changed conditions and overlooked possibilities in the environment that represent potential sources of value to a venture.	- Analyse the context/Scan the environment - Identify, recognise challenges - Identify, create and seize opportunities
	1.2 Design orientation	Ability to interact and immerse with customers (and other stakeholders) to identify their needs and design an offer that satisfy the identified needs.	- Design focus - Immerse with your users - Identify needs
	1.3 Creativity	Ability to discover and create ideas and opportunities; to combine knowledge, experience and personal resources from different areas in new ways.	- Act creatively - Solve problems creatively - Generate ideas - Be innovative
	1.4. Vision	A projected mental image or visualized representation that an entrepreneur or intrapreneur creates for themselves and their new venture. It serves as a guiding framework that shapes their aspirations, goals, and actions.	- Imagine/build a vision for the new venture and oneself - Think strategically - Guide action
	1.5 Valuing ideas	Process of evaluating and selecting high quality opportunities and ideas and acting on them to provide value to others.	- Recognise the value of ideas - Share and protect ideas
	1.6 Ethical and sustainable thinking	Ability to conduct oneself and the new venture at hand in a social and environmental conscious manner.	- Behave ethically - Think sustainably - Assess impact - Be accountable

The competence area "Resources" encompasses the essential elements required to initiate a new venture. These resources include both personal and cognitive aspects. Personal resources such as "self-awareness and self-efficacy" and "motivation and perseverance" contribute to the entrepreneur's ability to understand themselves, their strengths, and their capacity to navigate challenges. Cognitive resources, such as "enterprising literacy," encompass the knowledge and understanding of entrepreneurship concepts, principles, and practices. In addition to personal and cognitive resources, behavioural skills play a crucial role in mobilizing resources. This includes the capacity to secure financial resources and engage others through effective communication and collaboration. Furthermore, within the EICAA Competence Framework, the competence of "digital competence" is emphasized. This involves the fundamental skills necessary for any entrepreneur or intrapreneur to effectively operate in the digital realm. It encompasses general digital capabilities, specific skills required to manage and run a venture in the digital age, information and data literacy, as well as safety and cybersecurity practices.

Table 2: Resources

Area	Competence	Definition	Threads
2. Resources	2.1 Self-awareness and self-efficacy	The individuals' conscious belief in their own ability to bring about desired results in the performance of a particular task (Bandura, 1997).	– Follow your aspirations – Identify your strengths and weaknesses – Believe in your ability – Shape your future
	2.2 Motivation and perseverance	Motivation: Perseverance: Ability to sustain goal-directed action and energy when confronting difficulties and obstacles that impede goal achievement (Morris et al., 2013).	– Maintain focus – Stay motivated and passionate – Persevere/Tenacity/Don't give up – Be resilient
	2.3 Mobilising resources	Ability to acquire and systematize the operating resources needed to start and grow an organization (Baum & Locke, 2004).	– Acquire resources (material and non-material) – Make the most of limited resources – Budget – Find funding – Understand taxation
	2.4 Enterprising literacy	Knowledge about the business functions and processes to develop the value creating activity efficiently.	– Understand economic and financial concepts – Understand marketing and sales concepts – Enterprising literacy – Technical-legal aspects
	2.5. Mobilizing others	Ability to involve others in the entrepreneurial project (stakeholders) in a way that generates participation and adherence to the initiative.	– Inspire and get inspired – Persuade and negotiate – Communicate effectively – Use media effectively
	2.6. Digital competence	Confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society.	– General digital competences at work – Digital competences for the new venture – Information and data literacy – Safety and cybersecurity

The competence area "Into action" encompasses the competences that are primarily activated during the implementation and execution of a new venture. It involves the ability to take initiative, adapt to and navigate through uncertain events and outcomes, and effectively manage the various stages of the venture. Initiating action requires the drive and motivation to move forward, take calculated risks, and proactively pursue opportunities. Coping with uncertain events and results involves the resilience and adaptability to respond to unexpected challenges, setbacks, and changes. The competence of "planning and management" entails setting goals, developing action plans and orchestrating the necessary activities and processes to drive the venture forward. Managing the process of the new venture across its different stages is another important aspect of the "Into action" competence area. This includes navigating through the phases of ideation, development, launch, and growth, adapting strategies and actions as the venture evolves, and effectively managing the associated challenges and opportunities. Competence "design validation" entails the systematic validation of the ideas along the implementation of the new venture, through prototyping, co-creation and experimentation. Finally, this area also entails the competences "working with others" and "learning through experience".

Table 3: Into action

Area	Competence	Definition	Threads
3. Into Action	3.1 Taking the initiative	Ability to initiate and sustain the actions required to operate and manage the new venture, while taking	– Take responsibility – Work independently – Take action

		full responsibility for one's own actions.	
	3.2 Planning and management	Process of systematically developing a strategic roadmap and implementing effective organizational practices to ensure the successful launch, operation, and growth of the venture.	– Define goals – Plan and organise conscientiously – Define priorities – Make the most of your time (time management) – Define and develop sustainable business plans
	3.3 Process management	Ability to lead, monitor and redirect the strategy of the new venture as it evolves in response to internal and external factors.	– Monitor progress – Be flexible and adaptive to changes – Redirect your strategy – Manage transitions – Work agile
	3.4 Coping with uncertainty, ambiguity and risk	Ability to effectively manage and navigate situations that involve unknown outcomes, unclear information, and potential hazards or challenges.	– Cope with uncertainty and ambiguity – Calculate risk – Manage risk
	3.5 Design validation	Implementing strategies to prototype, test and experiment with the users, including strategies to include the users in the design processes (users as co-creators).	– Prototype – Experiment and test – Co-create
	3.6 Working with others	Ability to understand and work with other people, both individually and in groups.	– Accept diversity (people's differences) – Develop emotional intelligence – Listen actively – Team up – Work together – Manage instrumental relationships – Get support and build a network – Expand your network
	3.7 Learning through experience	Process of acquiring knowledge, skills and attitudes about something from practice and experience, including learning from failures.	– Reflect – Learn to learn – Learn from experience

5. REFLECTION AND DISCUSSION

EntreComp is widely used - across all EU countries and beyond (McCallum et al., 2018). Even though the SLR included the entire field of entrepreneurship competences, the resulting competence model's similarity with EntreComp indirectly validates it. In fact, no competence of EntreComp was found to be obsolete or superfluous. The EICAA Competence Framework establishes a framework to gauge and evaluate entrepreneurship competences in both higher education programs and business training. By utilizing a rigorously validated structure, we can obtain a more thorough understanding of students and develop curricula with greater scientific precision.

The European Union considers entrepreneurship competence as one of the 8 key competences for lifelong learning ever since 2006 (Council of the European Union, 2018). The publication of EntreComp by the EC in 2016 suggests educators to endorse a broad conceptualization of entrepreneurship integrating a holistic set of competences beyond the scope of qualifying for start-up creation. The development of EntreComp has also been a contribution for streamlining and understanding underlying entrepreneurship education inside the EU which has been and still is fragmented among educators and practitioners. However, while EntreComp is increasingly adopted in education and training, its genesis cannot be fully assessed from a scientific point of view. The available information to do so is incomplete. Moreover, the educational exploitation of EntreComp since 2016 has not yet led to a critical revision of the framework from a practice-oriented perspective as originally called for by the developers of the framework. To further the development and practical legitimacy of EntreComp as a reference framework for entrepreneurship education, especially in the evidence-based world of academia, a statistical validation was deemed as a logical next step. In addition, competence frameworks need to stay up to date if they want to continuously matter for educators and learners over time. They can provide good guidance for aligning curricula to the competence demand of today and tomorrow's world of work - and of the society at large - only if new competence trends or requirements are carefully and regularly considered.

Our study is a contribution to both validating EntreComp and keeping its entrepreneurship competence portfolio up to date. We do so on the basis of a systematic literature review and two rounds of empirical validation whose findings are exploited to suggest an evolution of EntreComp – the EICAA Competence Framework. While the latter preserves the main structure of EntreComp and all of its competences, it also adds four competences that are not featured by its predecessor, namely: “design orientation” (area: “Ideas and opportunities”), “digital competence” (area: “Resources”) as

well as “design validation”, and “process management” (both in area: “Into action”). These radical changes are complemented by a set of incremental changes that modify EntreComp on the level of threads.

Similar to EntreComp, the EICAA Competence Framework not only provides guidance for the design of start-up focused education or training programs. Rather, it endorses and internalizes a transversality of entrepreneurship competences and by that, facilitates the preparation and integration of entrepreneurship education in any domain of education. While the maxim of domain neutrality is central to both frameworks, the general nature of the language used in EntreComp (e.g., “value creating activity”) can cause difficulties when using it within a specific domain context. This is also true for the complexity of the EntreComp rubric which is particularly challenging for larger scale competence assessment. Our study also contributes to overcoming these challenges by offering a statistically validated entrepreneurship competence self-assessment instrument - the EICAA Competence Monitor - that is domain neutral but also concise in language, and reasonable in terms of the time needed to fill it out. In fact, an empirically validated instrument able to examine the entrepreneurship competence proficiency of learners on large scale and based on the broad conceptualization of entrepreneurship was missing so far in the EU. Therefore, the self-assessment offered by the EICAA Competence Monitor is a needed step forward for enabling coherent competence assessment within as well as across the EU and, ultimately, the building up of a database that allows to better investigate the status quo of entrepreneurship competence development of European citizen cross-domain and cross-border.

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