

Article

EntreComp Questionnaire: A Self-Assessment Tool for Entrepreneurship Competencies

M^a Inmaculada López-Núñez ^{1,*}, Susana Rubio-Valdehita ¹, Cristina Armuña ² and Elena Pérez-Urria ³

¹ Department of Social, Work and Differential Psychology, Complutense University of Madrid (UCM), 28223 Madrid, Spain; srubiova@ucm.es

² RuleEleven, Universidad Nacional de Educación a Distancia (UNED), 28040 Madrid, Spain; cristina.armuna@ruleeleven.es

³ Department of Genetics, Physiology and Microbiology, Complutense University of Madrid (UCM), 28040 Madrid, Spain; elenapuc@ucm.es

* Correspondence: maria04@ucm.es

Abstract: The European Entrepreneurship Competence Framework (EntreComp) offers a comprehensive description of the knowledge, skills, and attitudes that people need to develop for an entrepreneurial mindset. The use of the framework as a self-assessment tool has garnered attention, but there is scarce presence of instruments that address the whole set of competencies proposed by Entrecomp. In view of the lack of specific tools, the objective of this research was to assess the evidence of validity and reliability of a new questionnaire. The sample was composed of 742 college students from several Spanish universities between 17- and 64-years-old, with 34.6% being men and 65.4% being women. To evaluate the validity based on relationships with other measures, the Entrepreneurial Intention and Entrepreneurial Self-Capital scales were also administered. Confirmatory factor analysis showed an internal structure made up of four dimensions: Ideas and Opportunities, Personal Resources, Specific Knowledge, and Into Action. The results showed satisfactory evidence of validity based on relationships with Entrepreneurial Intention and Entrepreneurial Self-Capital and good reliability. The questionnaire has good psychometric properties and can be an easy and useful tool for the self-assessment of entrepreneurial competencies within the EntreComp framework.

Keywords: entrepreneurial mindset; entrepreneurial skills; entrecomp; self-assessment; confirmatory factor analysis



check for updates

Citation: López-Núñez, M.I.; Rubio-Valdehita, S.; Armuña, C.; Pérez-Urria, E. EntreComp Questionnaire: A Self-Assessment Tool for Entrepreneurship Competencies. *Sustainability* **2022**, *14*, 2983. <https://doi.org/10.3390/su14052983>

Academic Editors: Lene Foss, Liz Browne and Norris Krueger

Received: 30 January 2022

Accepted: 28 February 2022

Published: 3 March 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Nowadays entrepreneurship has become a term linked to many positive values and concepts: opportunities, innovation, success, unicorns, venture creation, economic progress, modern economies, etc. Therefore, this magnetic capability to attract attention has impacted the conception, design, and implementation of entrepreneurship policies for the last few decades [1], with an ample range of policy efforts focused on fostering entrepreneurship activities and promoting entrepreneurial abilities. Considering the specific context of the present research work, the notion of competencies has emerged as a core pillar in building entrepreneurial capability among citizens [2], although there is not a common and clear definition about what entrepreneurship competencies are [3].

1.1. Entrepreneurship Competencies

Entrepreneurship competencies have usually been equated to management skills, but it is assumed that entrepreneurship activities cannot be narrowed to the management of business, since it requires a wider range of competencies [4–6]. In particular, the European Council adopted the concept of entrepreneurship competencies as a set of abilities with the potential of shaping society through value creation at a social, cultural, or financial level [7]

with the sense of entrepreneurship as one of the eight key competencies necessary for a knowledge-based society [2].

The categorization of these entrepreneurship competencies into comprehensive taxonomies to allow further understanding and insights has been a challenge [8] and previous studies mostly explore the competencies that are relevant for effective entrepreneurship in an isolated or partial way.

This relevant question has been addressed within the European Commission's strategy for entrepreneurship and focused on the concept of entrepreneurship competencies as a set of capabilities or abilities that can be trained to create learning outcomes; the *EntreComp* model [7] proposes 15 competencies that, all together comprise the capacity to turn ideas into action. The first block is called "Ideas and Opportunities" and the competencies included are: (1) spotting opportunities; (2) creativity; (3) vision; (4) valuing ideas; and (5) ethical and sustainable thinking. The second area is "Resources", which involves the following competencies: (6) self-awareness and self-efficacy; (7) motivation and perseverance; (8) mobilizing resources; (9) financial and economic literacy; and (10) mobilizing others. The third area is "Into Action" which includes (11) taking the initiative; (12) planning and management; (13) coping with uncertainty, ambiguity, and risk; (14) working with others, and (15) learning through experience. Assembling previous research about entrepreneurship competencies, the framework is built over a comprehensive review of academic and grey literature, case studies, desk research, and multi-stakeholder consultations.

Therefore, this framework emerges aspiring to be a potential common reference for education and training programs with an ambitious objective: providing citizens with the competencies that are considered useful and applicable to all spheres of life, specifically for personal and professional development, including the creation of new businesses. The categorization proposed follows the phases to transform ideas into reality: identification of ideas, resources management, and into action.

This theoretical conceptualization is considered a starting point that will be further developed to address the specific needs of potential target groups, as it aims at defining entrepreneurship as a competence, developing the reference framework by describing its components in terms of knowledge, skills, and attitudes, and providing European citizens with the appropriate tools to assess and effectively develop entrepreneurship as a key personal competence.

1.2. EntreComp in Youthwork, Education, Employment, and Enterprise

In this new approach, entrepreneurship is considered a lifelong skill. Being creative or thinking of new ways of doing things are equally relevant to tackling social problems or advancing your career. Understanding how to put a plan into action and use financial resources wisely is relevant to planning a business and for life in general. Taking initiative, having the ability to mobilize other people, or to involve them in an idea are also useful skills both in personal and professional life. *EntreComp* recognizes the opportunity to be an entrepreneur in any situation, from a school program to workplace innovation, and from community initiatives to applied learning in college.

The *EntreComp* framework can be used to map current needs, identify links with different skills, adapt and design new curricula, build competency-based selection models, identify the strengths of a team, and validate skills acquired through a learning experience. Based on this framework, a series of resources have been presented for the development of entrepreneurial skills. Among them we find the following:

EntreComp into Action [9] is a guide to promoting individual entrepreneurship and, within organizations, helps to explore why, when, and how they can use *EntreComp*. Through practical examples and learning outcomes, it aims to inspire pedagogical intervention inside and outside the world of formal education. Its aims to raise awareness of the importance of entrepreneurial learning and evaluate its progression.

EntreComp into Action presents the 15 entrepreneurship competencies, broken down further into threads developing the theoretical framework, clearly defined through learning

outcomes which are mapped across 8 different levels of progression from beginner to expert levels. Its application makes it possible to achieve a number of objectives: Mobilize interest in entrepreneurship and inspire action; create value by adapting the EntreComp framework to specific contexts; assess the levels of entrepreneurship competence; implement entrepreneurial ideas and projects; and recognize entrepreneurial skills.

As a companion to EntreComp into Action, *EntreComp at work* [10] has been published, presenting 10 illustrative case studies and including insights from a consultation with 25 public, private, and third-sector organizations. This work shares a wealth of lessons from practice and aims to show how EntreComp is used to provide services that help people progress and participate in labor market activities.

These cases highlight the diversity of ways in which EntreComp can be included in staff development, training design, start-up support and the design of personal development plans. It provides an in-depth analysis of the four steps within the employability path (skills analysis, skills assessment, training design and recognition/certification) to which it adds: mobilizing or promoting entrepreneurship using EntreComp. *EntreComp at Work* provides insights into real-world uses of EntreComp to address the challenges that labor market intermediary organizations face in helping people on their journey to sustainable employment.

Together with *EntreComp into Action*, the *EntreComp Playbook* [11] presents an innovative collection of practices, tools, and examples of how to activate EntreComp in the workplace through nine inspiring principles: Experience, Novelty, Triggers, Reflection, Ecosystem, Collaboration, Others, Mentoring, and Progression. These principles have the potential to become a new methodology for developing entrepreneurial skills and serve as a guide to inspire new entrepreneurial learning practices.

The development of enterprising employees is also an objective of EntreComp. The document “The entrepreneurial employee in the public and private sector: what, why, how” [12] presents a series of recommendations and practical activities for employees who aspire to be more entrepreneurial or for organizations that need more entrepreneurial employees through a model with four key dimensions: agency, novelty, value to others, and learning [13]. The model establishes that being an entrepreneur is not a linear process but rather a path that involves thinking, being, and doing.

Inspiring Practices from Across Europe [14] collects practices that have been implemented by educators and organizations with the aim of raising awareness of how EntreComp is used in Europe and inspiring others involved in entrepreneurial learning.

1.3. EntreComp Self-Assessment Tools

EntreComp framework can be seen as a practical and flexible tool, as it has been designed to be adapted and applied for promoting and enabling individuals and organizations to be entrepreneurial. The policy approach has followed developing tools and cases to illustrate the potential application [9], and among its practical objectives, it is conceived as a tool for self-assessment so that people can measure the level of their own competencies and monitor their progress. Nevertheless, this framework is a starting point that the authors suggest must be tested, developed, and potentially improved by further research.

This wider concept of entrepreneurship triggers different challenges connected to entrepreneurship education, about the measurement of their impact. Usually, the indicators are linked to the number of ventures that students launch but even when the purpose of them is focused on economic entrepreneurship activity, the developmental level of students on each learning outcome (e.g., problem solving, creative thinking, teamwork, information literacy and integrative, and applied learning, etc.) has been considered a meaningful assessment to evaluate the impact of programs, and more instruments are needed [15].

The use of the framework as a self-assessment tool gained attention when the framework was launched, but the review of different existing tools allows us to identify some weaknesses: the absence of instruments that assess self-perception of entrepreneurship competence, since they mostly focus on evaluating learning experiences, and no tool addresses

the whole set of competencies proposed by EntreComp and absence of psychometric validation [3]. From the academic perspective, Armuña [16] developed a questionnaire based on the EntreComp with 22 items and 4 factors: “Ideas and Opportunities”, “Personal Resources”, “Specific Knowledge”, and “Into Action”, which assessed each of the competencies of the EntreComp framework. Armuña’s model [16] modified some competencies of the EntreComp framework that could have different perceptions, and others were added (Table 1).

Table 1. EntreComp and Armuña models of entrepreneurship competencies based on Entrepreneurship competence framework [7,16].

EntreComp (Bacigalupo et al., 2016)	Armuña et al. (2020)
Ideas and Opportunities 1. Spotting opportunities 2. Creativity 3. Vision 4. Valuing ideas 5. Ethical and sustainable thinking	Ideas and Opportunities 1. Spotting opportunities 2. Creativity 3. Vision 4. Valuing ideas 5. Ethical and sustainable thinking
Resources 6. Self-efficacy 7. Motivation, perseverance 8. Mobility resources 9. Financial literacy 10. Mobility others	Personal Resources 6. Self-efficacy 7. Motivation, perseverance 8. Mobility resources 9. Leadership skills 10. Communication skills 11. Multidisciplinary skills
	Specific Knowledge 12. Digital know how 13. Legal know how 14. Financial and economic know how
Into Action 11. Taking initiative 12. Planning 13. Coping with ambiguity 14. Working with others 15. Learning through experiences	Into Action 15. Development of new products and Services 16. Defining priorities and actions plans 17. Making decisions dealing with uncertainty, ambiguity, and risks 18. Networking skills 19. Team working 20. Problem solving skills 21. Learn by doing 22. Learn from mistakes

1.4. Sustainability Competencies

To address the changing and complex world is crucial to include sustainability into education to develop the knowledge, skills, and attitudes to take action and protect it. Developing sustainability competencies through education is a policy objective for the EU. Sustainability is one of the European Commission’s key priorities in education for 2019–2024 [17]. For this reason, and similarly to previous work to promote education for lifelong learning (i.e., EntreComp), the European Commission has recently developed the European Sustainability Competence Framework, GreenComp [18].

Sustainability is a complex and ambiguous concept [19]. We use the European Commission definition: “Sustainability means prioritizing the needs of all life forms and of the planet by ensuring that human activity does not exceed planetary boundaries” [18]. In addition, GreenComp has adopted the following definition for sustainability competence: “A sustainability competence empowers learners to embody sustainability values, and embrace complex systems, in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures” [18]. The definition focuses on knowledge, skills, and attitudes to foster a sustainability mindset.

GreenComp consists of 12 competencies organized into 4 areas: embodying sustainability values, embracing complexity in sustainability, envisioning sustainable futures, and acting for sustainability. It is designed to be a non-prescriptive reference for learning sustainability as a competence.

1.5. The Current Study

To deal with these challenges, people need to strengthen their knowledge, develop relevant skills, and transform new ideas into sustainable solutions for the common good.

EntreComp offers a framework of transversal competencies that are applicable to various contexts and allows the promotion of entrepreneurial competencies to face challenges and find solutions in a sustainable way. In this regard, it should be noted that one of the competencies included in the EntreComp framework, in the Ideas and Opportunities dimension, is Ethical and Sustainable Thinking, defined as: assessing the consequences of ideas that bring value and the effect of entrepreneurial action on the target community, the market, society, and the environment. Reflects on how sustainable, long-term social, cultural, and economic goals are, and the course of action chosen. Act responsibly.

EntreComp aims to develop entrepreneurship competencies so the relevance of having an instrument that measures the self-perception (and consequently the potential evolution) of them is key. Subjective assessments of self-perceived competencies may not provide an accurate estimation of performance, but nevertheless, it is relevant for the objective of developing an entrepreneurial mindset. As far as research results in the field, it was noticed that actions were more influenced by what people believe they can do rather than with objective facts [20].

In view of the lack of specific tools to evaluate the self-perception of entrepreneurship competencies, the main aim of this research is to assess the validity and reliability of the self-perceptions of the entrepreneurship competencies questionnaire proposed by Armuña [16], which aims to help reduce the existing lack of psychometric measuring instruments.

Considering the above, we hypothesized the following: (1) the questionnaire proposed showed a four-dimensional model (Ideas and Opportunities, Personal Resources, Specific Knowledge, Into Action) according to the proposed model by Armuña [16]; (2) the questionnaire proposed has a good validity based on a positive relationship with Entrepreneurial Intention and Intrapreneurial Self-Capital, and (3) the questionnaire proposed has good internal consistency (reliability).

2. Materials and Methods

2.1. Participants

The study involved an incidental sample of 742 students at several universities from Spain (78% Complutense University of Madrid, 4.1% Carlos III University, and 5.6% Valencia University) and Chile (12.3% Pontificia Católica from Chile). No missing responses were obtained. Mean age of the total sample was 22.21 years ($SD = 5.18$), ranging from 17- to 64-years-old, and 34.6% were males and 65.4% were females. By areas of knowledge, 55% were studying health sciences, 34% social sciences, and 11% engineering.

2.2. Instruments

2.2.1. EntreComp Questionnaire

We used the questionnaire proposed by Armuña [16], which were generated following the EntreComp model and consists of 22 items. Four dimensions were evaluated: Ideas and Opportunities (five items, e.g., "Identify opportunities to create value and challenges that need to be met"), Personal Resources (six items, e.g., "Identify and assess my individual and group strengths and weaknesses"), Specific Knowledge (three items, e.g., "Digital know how"), and Into Action (eight items, e.g., "Defining priorities and action plans"). Items were answered according to a 7-point Likert scale, ranging from 1 (no aptitude at all) to 7 (very high aptitude).

2.2.2. Entrepreneurial Intention (EI)

It was evaluated through a Likert-type scale with 6 items (e.g., "My professional goal is to be an entrepreneur") ranging from 1 (Totally disagree) to 7 (Totally agree) that reflect behavioral intention in one factor [21]. The higher the score on the scale, the higher the

level of entrepreneurship intention. In our sample, a very good reliability was obtained for this instrument (Cronbach's alpha = 0.946).

2.2.3. Intrapreneurial Self-Capital (EC)

This construct is a set of positive self-concepts to identify key life goals, plan actions, and make decisions to achieve them [22]. We use the Spanish version [23]. The instrument consists of 28 items on a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree) (e.g., "I feel I'm able to produce innovative ideas"). The higher the score on the scale, the higher the level of the entrepreneurial self-capital. In our sample, a very good reliability was obtained for this instrument (Cronbach's alpha = 0.843).

2.3. Procedure

We conducted a cross-sectional survey. The survey was distributed through the virtual campus of each university. Participants were informed about objectives of the study and signed an informed consent document, explaining the anonymous and voluntary nature of their participation. The ethics committee of the authors' research center approved the study (Ref. 2020/21-005).

2.4. Data Analysis

To evaluate validity evidence based on the internal structure of the EntreComp questionnaire, the total sample was randomly divided into two subsamples ($n_1 = 220$; $n_2 = 522$), maintaining, in both, the same mean sociographic characteristics and the percentage of representation of the different knowledge areas and gender presented in the total sample. Exploratory factor analysis (EFA) with Varimax rotation and Kaiser normalization was performed with the first subsample and the resulted structure was cross validated with the second subsample using confirmatory factor analysis (CFA) with a maximum likelihood estimation method. The data's suitability for structure detection was tested by KMO (Kaiser-Meyer-Olkin) measure and Bartlett's test of sphericity. High values of KMO (close to 1.0 and > 0.50) indicate that a factor analysis may be useful with the data. Small p values (less than 0.05) for Bartlett's test indicate that a factor analysis may be useful with this data.

We use the Mardia coefficient, considering multivariate normality when its critical ratio is equal or less than 1.96 [24]. As goodness of fit indices, we examined the magnitude of χ^2 divided by its degrees of freedom ($\text{CMIN}/\text{DF} < 3$); Root Mean Square Error of Approximation (RMSEA < 0.05); Standardized Root Mean Residual (SRMR < 0.08); Corrected goodness index (AGFI); Goodness of Fit (GFI); and Normed Fit Index (NFI). The values of these indices should be close to 0.90 or above to be considered a good fit [25]. There were no missing cases in the sample, so it was not necessary to use any imputation method.

Evidence of validity based on relationships with other measures was analyzed by correlation between Entrepreneurship Intention (EI) and Intrapreneurial Self-Capital (IC) with the scores obtained for each EntreComp dimensions.

Reliability was examined as internal consistency. We considered reliability indices above 0.70 to be adequate [26].

All statistical analysis was carried out with SPSS 25.0. Confirmatory factor analysis was performed using AMOS 22.0.

3. Results

3.1. Exploratory Factor Analysis (EFA)

The KMO value was 0.92 and Bartlett's test showed a $p < 0.001$. Four components with eigenvalues greater than one were obtained, explaining 58.36% of total variance (35.86% the first, 10.11% the second, 7.20% the third and 5.20% the fourth component). The first component "Ideas and opportunities" consists of five items related to the capacity to recognize opportunity and ideas. The second factor, "Personal Resources", is comprised by six items that ask for abilities to follow up on an opportunity that has been identified. The third factor, "Specific Knowledge", is formed by three items related to digital, legal,

financial, and economic know how. The fourth factor “Into action” is formed by eight items and asks about the ability to transform ideas into reality. Table 2 shows the rotated solution for EFA.

Table 2. Rotated component matrix (EFA).

	Item	Component			
		1	2	3	4
1.	Spotting opportunities	0.63	0.38	0.20	0.05
2.	Creativity	0.59	0.41	0.10	−0.05
3.	Vision	0.75	0.15	0.10	0.17
4.	Valuing ideas	0.78	0.16	0.14	0.09
5.	Ethical and sustainable thinking	0.74	0.04	0.09	0.19
6.	Self-efficacy	0.47	0.27	0.05	0.31
7.	Motivation, perseverance	0.31	0.61	0.15	0.18
8.	Mobility resources	0.34	0.52	0.19	0.18
9.	Leadership skills	0.18	0.73	0.15	0.13
10.	Communication skills	0.09	0.72	0.02	0.22
11.	Multidisciplinary skills	0.25	0.51	0.29	0.28
12.	Digital know how	0.07	0.11	0.61	0.18
13.	Legal know how	0.07	0.00	0.79	0.05
14.	Financial and economic know how	0.07	0.05	0.82	−0.00
15.	Development of new products and services	0.23	0.24	0.71	0.06
16.	Defining priorities and actions plans	0.35	0.33	0.42	0.20
17.	Making decisions dealing with uncertainty, ambiguity, and risks	0.25	0.51	0.38	0.23
18.	Networking skills	0.09	0.40	0.59	0.07
19.	Team working	0.03	0.24	0.09	0.61
20.	Problem solving skills	0.26	0.40	0.13	0.55
21.	Learn by doing	0.15	0.16	0.09	0.73
22.	Learn from mistakes	0.14	0.06	0.07	0.77

To avoid doubts about the interpretation of the components, items with similar weights in various components were eliminated. Only those items with weights above 0.50 were considered for further analysis. Thus, items 6 and 16 were eliminated from the final version of the questionnaire, which was made up of 20 items and whose structure will be analyzed through the subsequent CFA with the second sample.

3.2. Confirmatory Factor Analysis (CFA)

The four-factor model obtained after EFA was tested by CFA using Maximum Likelihood estimation method. Critical ratio for Mardia coefficient was 1.49 showing the multivariate normality of the data. Through CFA we tested a model of four first-order factors with these all intercorrelated (Figure 1). Covariance between errors that showed a value greater than 0.20 were kept as free parameters in the model. This model (Figure 1) showed adequate goodness-of-fit indices: CMIN/DF = 2.37, RMSEA = 0.043 (LO90 = 0.037, HI90 = 0.049); SRMR = 0.0387; AGFI = 0.94, GFI = 0.95; NFI = 0.93. Therefore, hypothesis 1 was confirmed.

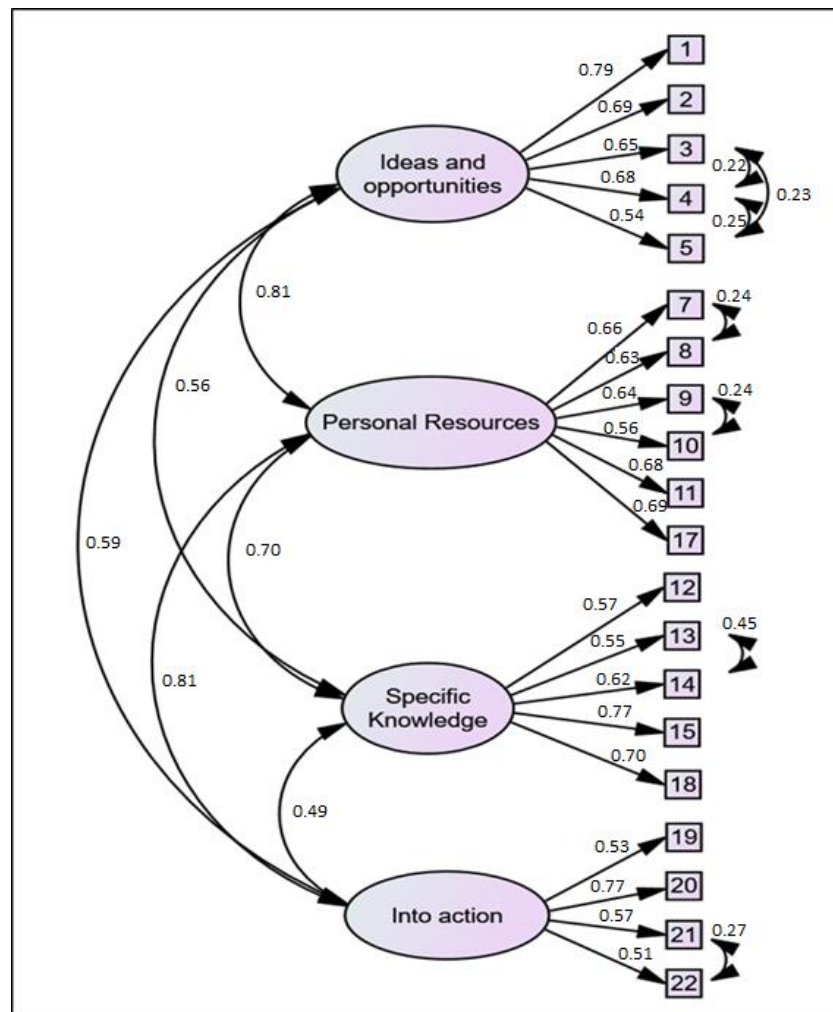


Figure 1. Results of FCA. Standardized solution.

3.3. Evidence of Validity Based on Relationships with Entrepreneurial Intention (EI) and Intrapreneurial Self-Capital (IC)

EntreComp scores for each dimension were calculated as the arithmetic mean of all items belonging to each factor. All Pearson correlation coefficients between EI and IC with EntreComp scores were significant ($p < 0.001$) (Table 3), although were higher for IC than for EI. The squared multiple correlation values (R^2) show that competencies explain 21% of the variance of the IE and 43% of the IC, which were significant in both cases ($p < 0.001$). Therefore, hypothesis 2 was confirmed.

Table 3. R^2 and Pearson correlation between entrepreneurial intention and entrepreneurial self-capital with competencies of EntreComp.

	R^2	Ideas and Opportunities	Personal Resources	Specific Knowledge	Into Action
Entrepreneurial intention	0.21	0.36	0.36	0.39	0.18
Intrapreneurial Self-Capital	0.43	0.55	0.60	0.32	0.48

3.4. Reliability

Cronbach’s Alpha was 0.896 for the whole scale and it decreased if an item was deleted (Table 4). For each subscale, good values of Cronbach’s Alpha > 0.70 were obtained. Composite Reliability (CR) for each subscale was adequate in all cases (CR = 0.81, for Ideas and Opportunities; CR = 0.81, for Personal Resources; CR = 0.78, for Specific Knowledge;

CR = 0.70, for Into Action). Therefore, hypothesis 3 was confirmed. Average Variance Extracted (AVE) was near but lower than 0.50 in all cases (AVE = 0.46, for Ideas and Opportunities; AVE = 0.42, for Personal Resources; AVE = 0.42, for Specific Knowledge; AVE = 0.37, for Into Action), showing a lack of discriminant validity.

Table 4. Descriptive and internal consistency of EntreComp.

Item	Mean	SD	Corrected Item-Total Correlation	Cronbach's α If Item Deleted	Subscales (α ; Mean; SD)
1	4.91	1.11	0.65	0.78	Ideas and opportunities (0.83; 26.16; 4.40)
2	5.23	1.26	0.57	0.81	
3	5.41	1.14	0.64	0.78	
4	5.27	1.14	0.68	0.77	
5	5.35	1.06	0.56	0.81	
7	5.03	1.34	0.62	0.78	Personal resources (0.82; 31.18; 5.79)
8	5.30	1.16	0.58	0.79	
9	5.18	1.54	0.62	0.78	
10	5.45	1.32	0.55	0.80	
11	5.39	1.16	0.59	0.79	
17	4.83	1.40	0.58	0.79	Specific knowledge (0.80; 19.55; 5.68)
12	5.03	1.43	0.49	0.79	
13	3.23	1.48	0.60	0.76	
14	3.42	1.58	0.64	0.74	
15	4.05	1.48	0.63	0.74	
18	3.82	1.63	0.55	0.77	Into action (0.72; 23.92; 3.05)
19	5.87	1.14	0.46	0.69	
20	5.74	1.06	0.54	0.64	
21	6.07	0.99	0.52	0.65	
22	6.25	0.93	0.52	0.65	

Total scale α = 0.90; Mean = 100.81; SD = 14.91.

4. Discussion

The conception of entrepreneurship as a competency, which is applicable to a wider range of activities than launching a new business, including general professional and personal development, has promoted the aspiration to integrate these capabilities as part of the horizontal students' curricula along the entire education cycle [7,27–30]. In this sense, the EntreComp framework can be seen as a practical and flexible tool, as it is designed to be adapted and applied for promoting and enabling individuals and organizations to be entrepreneurial.

Nevertheless, as stated, this framework is a starting point, because their authors suggest that it must be tested, developed, and potentially improved by further research. In this sense, although from both perspectives of policy and academic research, the basis of EntreComp has had an echo, with a primary focus on the development of tools to improve the competencies in classes [9,11] to adapt the framework to particular targets, such as public and private sector employees [12], or to inspire practices in specific sectors or entrepreneurship education programs [14], but there is a lack of specific tools to evaluate the self-perception of entrepreneurship competencies and the potential evolution.

This study assessed the psychometric properties of the EntreComp Questionnaire developed by Armuña [16] with a sample of students from different universities and

areas of knowledge. Results showed a four-dimensional model (Ideas and Opportunities, Personal Resources, Specific Knowledge, Into Action) according to the proposed model by Armuña [16].

The first factor, “Ideas and Opportunities”, is made up of the same five competencies indicated by Armuña’s [16] and EntreComp’s framework (spotting opportunities, creativity, vision, valuing ideas, and ethical and sustainable thinking).

The second factor, “Personal Resources”, was composed of six items (motivation, perseverance, mobility resources, leadership skills, communication skills, multidisciplinary skills, making decisions dealing with uncertainty, ambiguity, and risks competence). A difference with the results of Armuña [16] is that self-efficacy could not be included because it did not have sufficient load in any factor. Self-efficacy is the belief in one’s ability to be successful in specific situations or when performing a task [31]. Self-confidence, in specific tasks, is a relevant personal resource, as is widely documented by research in different spheres of functioning [32,33]. It is probable that self-efficacy weighs in several factors since it is a more global and non-specific factor. However, self-efficacy is a key cognitive predictor of entrepreneurial intention [34], so we consider that future studies should improve this item and include it in the questionnaire.

In the Armuña model [16] and EntreComp framework, the competency of “Making decisions dealing with uncertainty, ambiguity and risks” is an Into Action factor, but our results showed a higher loading on the “Personal Resources” factor. In fact, according to previous research, this item seems to be more related with individual variables, as they have shown that tolerance of ambiguity and decision making under uncertainty are individual differences and trait personalities, related with entrepreneurship [35,36].

The third factor, Specific Knowledge, included the three competencies from the Armuña model [16] in addition to “Development of new products and services”, and “Networking skills”. Other competencies of this factor were the perception of digital, legal, financial, and economic technical knowledge. Developing new products and services requires that people have the necessary technical knowledge, so it seems coherent that they all belong to the same factor. In the same way, Network skills could be considered as specific knowledge required to solve problems and deal with a complex environment. In recent years, the number of publications on online training and skills development has increased as a key element to enhance employability [37,38] so it is consistent that this ability can be perceived as specific knowledge.

The fourth factor, Into Action, is like the Armuña model [16] as it included five of the seven original competencies.

Despite some small differences, the structure of the questionnaire is very similar to the one proposed in the original Armuña model [16] and corresponds to the ideas of the EntreComp model, so we can conclude that the studied questionnaire presents strong evidence of constructed validity.

Evidence of validity based on relationships with Entrepreneurial Intention and Intrapreneurial Self-Capital showed high positive correlations, being higher in the case of the IC. These results support the findings of other studies about the relationship between individual variables, skills, and entrepreneurial intention [39–41].

Finally, analysis of EntreComp’s internal consistency showed appropriate values according to standard recommendations that were confirmed by Cronbach’s alpha and composite reliability (CR) indices for each subscale.

The AVE values were close, although less than, 0.50 for all subscales, except for Into Action, for which the AVE value was much lower. This implies a certain limitation of the instrument, since it indicates a lack of discriminatory validity of the subscales that may be due mainly to the high correlations between the factors. However, this result agrees with the theoretical framework of EntreComp, which highlights the interconnection between the competency dimensions and with previous studies that seek the grouping of competencies, and which obtained similar results regarding the high permeability of the limits between entrepreneurship competencies [42].

If we consider the comparative analysis of 12 existing entrepreneurial skills self-assessment tools [3], Armuña's model questionnaire is like other instruments in that it is a tool to meet the needs of entrepreneurial education and focus on students and graduates of higher education. In terms of purpose and content, it is the only instrument that assesses the self-perception of entrepreneurial competence. In relation to the theoretical framework of competencies, it has the advantage of being the only instrument that addresses the entire set of EntreComp competencies. Another advantage is that it presents is that it is an instrument that has psychometric validation, showing good reliability and validity of the data. It would be appropriate for future developments of the instrument to include illustrative diagrams, such as the spider diagrams used in other tools, to visualize strengths and areas for improvement.

5. Limitations and Futura Research

One limitation of the present study is related to the use of a sample of students. Although the sample was large, (and it is important to note that the EntreComp framework proposes a model focus on aiming to bridge the worlds of education and work and the development of a self-assessment tool for entrepreneurship competence for young adults aged 16–25 [3,7]) it is recommended to check if the instrument is also valid for application with samples from other populations, such as entrepreneurs, workers, etc. The entrepreneurship process can be very different depending on the country and culture, so it would also be convenient to replicate this study with samples from other places. In addition, future research could improve some aspects of the instrument, such as the evaluation of self-efficacy.

Future research should focus on developing more entrepreneurial competency self-assessment tools for young people to understand and develop their entrepreneurial strengths. To be useful tools for learning and development, they must include proficiency levels to detect areas for improvement. These tools would be of interest for entrepreneurial education and could help employers to assess the profile of their employees along the lines indicated by other European Commission documents on EntreComp (EntreComp: Into Action; "The entrepreneurial employee in the public and private sectors").

In addition, it would be recommended that they include a psychometric validation to improve reliability and validity that allow comparative studies of groups by demographic variables (sex, age), educational levels or countries. This can be of great value for policymakers and for the evaluation of public policies and good practices.

6. Conclusions

The EntreComp framework proposes a set of skills for the development of an entrepreneurial mind that allows people to act and transform ideas and opportunities into value in a sustainable way. This study has important practical implications since it fills the gap of specific tools to assess the self-perception of entrepreneurship competencies. The results provide evidence of factor structure and internal consistency of the EntreComp Questionnaire, which is an easy, useful self-assessment to identify young adults with high competencies to entrepreneurship. The questionnaire is available upon request to the author [16].

The questionnaire presented is a tool to assess the entrepreneurship competencies included in the EntreComp framework, and competencies to generate social, cultural, or economic value at work or in society and that allow personal and professional development. It is a useful resource for entrepreneurial education and employers that allow the identification of an entrepreneurial profile with a broad interpretation of what it means to be an entrepreneur. It allows us to identify a level of competency to be able to develop strategies and actions, and to be able to follow their progress.

Based on the results of this work and the challenges in promoting sustainability education and lifelong learning, future efforts should be aimed at consolidating the EntreComp Questionnaire and expanding it with areas that would allow sustainability competencies to be evaluated more specifically. Thus, the "Ethical and sustainable thinking", competence

of the “Ideas and opportunities” factor of the EntreComp framework could include the “Embodying sustainability” values (valuing sustainability, supporting fairness, promoting nature) from GreenComp. The “Personal resources” factor (EntreComp framework) could include the areas “Embracing complexity in sustainability” (systems thinking, critical thinking, problem framing) and “Envisioning sustainable futures” (future literacy, adaptability, and exploratory thinking) and finally, the “Into Action” factor could include the GreenComp’s area “Acting for sustainability” giving rise to a new area called “In Action for Sustainability” which reflects the abilities to transform ideas into reality and act as agents of change, inspiring others to try to achieve sustainability.

Developing entrepreneurship and sustainability competencies is one of the European Commission’s key priorities for education and lifelong training. This study and its conclusions are a hopeful starting point for the development of evaluation tools that allow the integration of the EntreComp and GreenComp frameworks to provide an education and training system that help learners to acquire knowledge, skills, and attitudes to develop sustainable entrepreneurship competencies.

Author Contributions: Conceptualization: M.I.L.-N. and S.R.-V.; methodology: S.R.-V.; formal analysis: S.R.-V.; investigation: M.I.L.-N. and E.P.-U.; data curation: S.R.-V.; writing—original draft preparation: M.I.L.-N. and C.A.; writing—review and editing: M.I.L.-N. and E.P.-U.; visualization: S.R.-V., C.A. and E.P.-U.; supervision: M.I.L.-N. and C.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Faculty of Psychology, Complutense University of Madrid.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Acknowledgments: The blinded for review. The authors are thankful to the Vice-rectorate of Quality of the Complutense University of Madrid (Spain) for the support through the 2020–2021 call for Proyectos Innova Docencia.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Arenal, A.; Feijoo, C.; Moreno, A.; Ramos, S.; Armuña, C. Entrepreneurship Policy Agenda in the European Union: A Text Mining Perspective. *Rev. Policy Res.* **2021**, *38*, 243–271. [CrossRef]
2. European Council. Recommendation of the European Parliament and the Council on Key Competencies for Lifelong Learning. *Off. J. Eur. Union* **2006**, 10–18. Available online: <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:394:0010:0018:en:PDF> (accessed on 7 November 2021).
3. Bacigalupo, M.; Kampylis, P.; McCallum, E.; Punie, Y. Promoting the Entrepreneurship Competence of Young Adults in Europe: Towards a Self-Assessment Tool. In Proceedings of the ICERI, Sevilla, Spain, 14–16 November 2016.
4. Bird, B. Toward a theory of entrepreneurial competency. *Adv. Entrep. Firm Emerg. Growth* **1995**, *2*, 51–72.
5. Lerner, M.; Almor, T. Relationships among strategic capabilities and the performance of women-owned small ventures. *J. Small Bus. Manag.* **2003**, *40*, 109–125. [CrossRef]
6. Man, T.W.; Lau, T.; Chan, K. The competitiveness of small and medium enterprises. *J. Bus. Ventur.* **2002**, *17*, 123–142. [CrossRef]
7. Bacigalupo, M.; Kampylis, P.; Punie, Y.; Van den Brande, G. EntreComp: The Entrepreneurship Competence Framework. In *European Commission Scientific and Technical Research Reports*; Publications Office of the European Union: Luxembourg, 2016. [CrossRef]
8. Gianesini, G.; Cubico, S.; Favretto, G.; Leitão, J. Entrepreneurial Competences: Comparing and Contrasting Models and Taxonomies. In *Entrepreneurship and the Industry Life Cycle*; Cubico, S., Favretto, G., Leitão, J., Cantner, U., Eds.; Springer: Cham, Switzerland, 2018; pp. 13–32. [CrossRef]
9. McCallum, E.; Weicht, R.; McMullan, L.; Price, A.; Bacigalupo, M.; O’Keeffe, W. EntreComp into Action: Get inspired, make it happen. In *European Commission Scientific and Technical Research Reports*; Publications Office of the European Union: Luxembourg, 2018. [CrossRef]

10. McCallum, E.; McMullan, L.; Weicht, R.; Kluzer, S. *EntreComp at Work. The European Entrepreneurship Competence Framework in Action in the Labour Market: A Selection of Case Studies*; Bacigalupo, M., Ed.; Publications Office of the European Union: Luxembourg, 2020. [CrossRef]
11. Bacigalupo, M.; Weikert García, L.; Mansoori, Y.; O’Keeffe, W. *EntreComp Playbook. Entrepreneurial Learning beyond the Classroom*; Publications Office: Luxembourg, 2020. [CrossRef]
12. Lackéus, M.; Lundqvist, M.; Middleton, K.W.; Inden, J. *The Entrepreneurial Employee in the Public and Private Sector—What, Why, How*; Publications Office: Luxembourg, 2020. [CrossRef]
13. Lackéus, M.; Lundqvist, M.; Middleton, K.W. Emancipating the ‘Who am I’? In Proceedings of the ECSB Entrepreneurship Education (3E) Conference, Gothenburg, Sweden, 8–10 May 2019; pp. 7–10.
14. EntreComp Europe. Inspiring Practices from across Europe 2020. Available online: https://entrecompeurop.eu/wp-content/uploads/2020/11/EntreComp_Europe_Inspiring_Practices.pdf (accessed on 10 November 2021).
15. Schneider, C.G. The Leap Challenge: Transforming for Students, Essential for Liberal Education. *Lib. Educ.* **2015**, *101*, 1–2.
16. Armuña, C.; Ramos, S.; Juan, J.; Feijóo, C.; Arenal, A. From stand-up to start-up: Exploring entrepreneurship competences and STEM women’s intention. *Int. Entrep. Manag. J.* **2020**, *16*, 69–92. [CrossRef]
17. European Commission. Strategy. Available online: https://ec.europa.eu/info/strategy_en (accessed on 10 November 2021).
18. Bianchi, G.; Pisiotis, U.; Cabrera Giraldez, M. *GreenComp—The European Sustainability Competence Framework*; Bacigalupo, M., Punie, Y., Eds.; EUR 30955 EN; Publications Office of the European Union: Luxembourg, 2022. [CrossRef]
19. Molderez, I.; Ceulemans, K. The power of art to foster systems thinking, one of the key competencies of education for sustainable development. *J. Clean. Prod.* **2018**, *186*, 758–770. [CrossRef]
20. Markman, G.D.; Baron, R.A.; Balkin, D.B. Are perseverance and self-efficacy costless? Assessing entrepreneurs’ regretful thinking. *J. Organ. Behav.* **2005**, *26*, 1–19. [CrossRef]
21. Liñán, F.; Chen, Y.W. Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrep. Theory Pract.* **2009**, *33*, 593–617. [CrossRef]
22. Di Fabio, A. Intrapreneurial self-capital: A new construct for the 21st century. *J. Employ. Couns.* **2014**, *51*, 98–111. [CrossRef]
23. Puigmitja, I.; Robledo, E.; Topa, G. Cross-cultural validity and psychometric properties of the ISC Intrapreneurial Self-Capital Scale in Spain. *Personal. Individ. Differ.* **2019**, *151*, 109296. [CrossRef]
24. Bian, H. Structural Equation Modelling with Amos II. Office for the Faculty of Excellence. 2011. Available online: <https://www.scribd.com/doc/283895591/SEMwith-AMOS-II-pdf> (accessed on 10 November 2021).
25. Tabachnick, B.; Fidell, L. *Using Multivariate Statistics*; Pearson: Boston, MA, USA, 2013.
26. Nunnally, B.H.; Bernstein, J.C. *Psychometric Theory*; McGraw-Hill: London, UK, 1994.
27. European Commission. Rethinking Education: Investing in Skills for Better Socio-Economic Outcomes. 2012. Available online: https://www.cedefop.europa.eu/files/com669_en.pdf (accessed on 16 November 2021).
28. European Commission. A New Skills Agenda for Europe. Working Together to Strengthen Human Capital, Employability and Competitiveness. Com (2016)381/F1. 2016. Available online: <https://community.oecd.org/docs/DOC-131502> (accessed on 16 November 2021).
29. Lackéus, M. *Entrepreneurship in Education: What, Why, When How*. Background paper for OECD-LEED. 2015. Available online: https://www.oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf (accessed on 10 November 2021).
30. Wilson, K.; Vyakarnam, S.; Volkmann, C.; Mariotti, S.; Rabuzzi, D. Educating the Next Wave of Entrepreneurs: Unlocking Entrepreneurial Capabilities to Meet the Global Challenges of the 21st Century. In *World Economic Forum: A Report of the Global Education Initiative*; World Economic Forum: Geneva, Switzerland, 2009. [CrossRef]
31. Bandura, A. Cultivate self-efficacy for personal and organizational effectiveness. In *Handbook of Principles of Organization Behavior*, 2nd ed.; Locke, E.A., Ed.; Wiley: New York, NY, USA, 2009; pp. 179–200.
32. Stajkovic, A.D.; Luthans, F. Self-efficacy and work-related performance: A meta-analysis. *Psychol. Bull.* **1998**, *124*, 240–261. [CrossRef]
33. Zimmerman, B.J. Self-efficacy: An essential motive to learn. *Contemp. Educ. Psychol.* **2000**, *25*, 82–91. [CrossRef] [PubMed]
34. Newman, A.; Obschonka, M.; Schwarz, S.; Cohen, M.; Nielsen, I. Entrepreneurial self-efficacy: A systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research. *J. Vocat. Behav.* **2019**, *110*, 403–419. [CrossRef]
35. López-Núñez, M.I.; Rubio-Valdehita, S.; Aparicio-García, M.E.; Díaz-Ramiro, E.M. Are entrepreneurs born or made? The influence of personality. *Personal. Individ. Differ.* **2020**, *154*, 109699. [CrossRef]
36. McMullen, J.S.; Ingram, K.M.; Adams, J. What makes an entrepreneurship study entrepreneurial? Toward a unified theory of entrepreneurial agency. *Entrep. Theory Pract.* **2021**, *45*, 1197–1238. [CrossRef]
37. Badoer, E.; Hollings, Y.; Chester, A. Professional networking for undergraduate students: A scaffolded approach. *J. Furth. High. Educ.* **2021**, *45*, 197–210. [CrossRef]
38. Batistic, S.; Tymon, A. Networking behaviour, graduate employability: A social capital perspective. *Educ. Train.* **2017**, *388*. [CrossRef]
39. Bhatti, M.A.; Al Doghan, M.A.; Saat, S.A.M.; Juhari, A.S.; Alshagawi, M. Entrepreneurial intentions among women: Does entrepreneurial training and education matters? (Pre-and post-evaluation of psychological attributes and its effects on entrepreneurial intention). *J. Small Bus. Enterp. Dev.* **2021**, *28*, 167–184. [CrossRef]

40. Di Fabio, A.; Gori, A. Developing a new instrument for assessing acceptance of change. *Front. Psychol.* **2016**, *7*, 802. [[CrossRef](#)] [[PubMed](#)]
41. Rodrigues, R.; Butler, C.L.; Guest, D. Antecedents of protean and boundaryless career orientations: The role of core self-evaluations, perceived employability and social capital. *J. Vocat. Behav.* **2019**, *110*, 1–11. [[CrossRef](#)]
42. Mitchelmore, S.; Rowley, J. Entrepreneurial Competencies of Women Entrepreneurs Pursuing Business Growth. *J. Small Bus. Enterp. Dev.* **2013**, *20*, 125–142. [[CrossRef](#)]