



SEINÄJOEN AMMATTIKORKEAKOULU
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

**This is an electronic reprint of the
original article (final draft).**

Please cite the original article:

Joensuu-Salo, S., Viljamaa, A., & Varamäki, E. (2022). Testing the EntreComp framework and its relation to start-up behaviour in seven European countries. *Journal of small business and enterprise development, ahead-of-print*(ahead-of-print).

<https://doi.org/10.1108/JSBED-04-2021-0156>



Testing the EntreComp Framework and its Relation to Start-Up Behaviour in Seven European Countries

Abstract

Purpose - The European Commission has published a general framework of entrepreneurship competence, EntreComp, to create a shared definition and support its development. This study proposes and tests a scale to measure entrepreneurship competence based on the EntreComp framework and examines its relation to start-up behaviour using data from seven European countries.

Design/methodology/approach - The data was gathered from seven European countries and consists of 1128 answers from both secondary and higher education level students. We use explorative factor analysis, analysis of variance, and logistic regression analysis as data analysis methods.

Findings - The results show that entrepreneurship competence is related to start-up behaviour and sensitive to role models and prior experience of entrepreneurship but is not sensitive to gender or level of education. The results also show that although the framework proposes three distinct areas, entrepreneurship competence is unidimensional.

Originality/Value - The study tests the EntreComp framework and introduces a scale for measuring EC based on the framework. The results show that EC can be addressed as unidimensional construct, and that it explains start-up behavior and develops through enterprising activities. The study also shows the impact of role models on EC. No difference in EC between genders is observed, suggesting the gender differences in entrepreneurship arise from factors other than competence.

Keywords Entrepreneurs, Entrepreneurship Competency, Entrepreneurship Education, Start-up Activities

Paper type Research paper

1. Introduction

Entrepreneurship competence has received considerable attention in Europe, particularly after the European Commission published the EntreComp framework in 2016 (see Bagicalupo *et al.*, 2016). The objective was to create a shared definition of entrepreneurship competence and to have a framework to develop this competence among citizens. European higher education is largely competence driven, due to the widespread implementation of the National Qualifications Frameworks compatible with the European Qualifications Framework EQF (see e.g. Cedefop, 2019). Despite the complexities of defining competencies and competence (e.g. Bohlinger, 2007), learning outcomes lie at the bottom of most agendas of higher education planning and delivery. While still in higher education, a student's learning outcomes are generally assessed via exam results or other student outputs. In entrepreneurship education, however, there is a long history of trying to assess the outcomes of entrepreneurship education with secondary measures such as entrepreneurial intentions and behaviours (see Longva and Foss, 2018). Both entrepreneurial intentions and behaviours, however, arguably also involve other contributing factors beyond competence itself. A direct measure of entrepreneurship competence would better determine whether entrepreneurship education does in fact develop the desired competence. This is particularly important as entrepreneurship competence is now considered a transversal competence with implications for life and citizenship in general (Bagicalupo *et al.*, 2016).

Prior research uses both concepts *entrepreneurship competence* (Bagicalupo *et al.*, 2016; Lilleväli and Täks, 2017), and *entrepreneurial competence/competencies* (Schelfhout *et al.*, 2016; Mitchelmore and Rowley, 2010; Oosterbeek *et al.*, 2010). In addition, Bird (2019) uses a term *entrepreneurial competency*. In this study, we use the term entrepreneurship competence and apply the EntreComp framework to provide a basis for our research.

McCallum *et al.* (2018) describe the entrepreneurship competence envisaged in EntreComp as “*a competence for life, relevant to personal development and fulfilment, finding and progressing in employment, as well as initiating new ventures ranging from community campaigns, social enterprises to new start-up businesses*”. Thus, the framework is not solely relevant to entrepreneurship, but also to other aspects of life. EntreComp frames entrepreneurship competence as consisting of three interrelated and interconnected competence areas of *ideas and opportunities, resources, and into action*. Each of these areas include different sub-competencies that are described in the framework (see Bagicalupo *et al.*, 2016). The EntreComp framework is widely used in educational institutions in the European Union; however, as McCallum *et al.* (2018) state, the framework is new and would benefit from being shaped by more user experiences. In addition, the EntreComp framework has so far rarely been used to guide entrepreneurship research. Exceptions include an exploration of the level of enterprise language within undergraduate programme documentation in one UK University (see Dinning, 2019), and a curriculum analysis conducted by Strauti *et al.* (2018). Czyzewska and Mroczek (2020) published a study examining entrepreneurship competence levels among students in Poland using a questionnaire based on the EntreComp framework. The same authors concluded that despite the effort made, the EntreComp methodology requires further verification and testing in different contexts.

This study aims to test an entrepreneurship competence (EC) scale based on the EntreComp framework and to compare the levels of EC between genders and educational levels using a

student population from the secondary and higher education level in Finland, Belgium, Netherlands, Spain, Germany, Italy, and the UK. In addition, we compare the differences in EC between groups ordered by entrepreneurial role models, start-up experience, and start-up behaviour. Finally, we test how well EC can explain start-up behaviour using logistic regression analysis.

Our study contributes by testing the EntreComp framework and introducing a reliable scale for measuring EC based on the framework. Our study also shows that EC is not a gender-related concept nor one related to educational level. However, EC is closely related to start-up behaviour and entrepreneurial role models.

2. Literature review

2.1 Entrepreneurship and competence

The concept of competence has a long and varied history with diverse meanings associated with it. In the 1990s, competence became a popular concept in European education, despite various difficulties in the implementation of competence-based education in different countries (Mulder *et al.*, 2009). Lahti (1999) distinguishes between organizational level core competencies and individual level core competencies and argues that it is essential to recognize that competency is essentially a construct and therefore not directly observable. According to Lahti (1999), individual-level core competencies are the key strengths that an individual possesses and demonstrates in a context (see also Mitchelmore and Rowley, 2010).

According to Shane and Venkataraman (2000) entrepreneurship is a process of discovering, evaluating, and exploiting opportunities by a set of individuals that have a tendency to do so. There is also a strong association between entrepreneurship and business; traditionally, it is in the context of business activities that we think of entrepreneurship. In Wenneker and Thurik's (1999) framework linking entrepreneurship to economic growth, crucial elements of entrepreneurship on the individual level are attitudes, skills, and actions. Gustomo *et al.* (2017) view entrepreneurial competencies as a constellation of characteristics, ranging from personality traits to specific knowledge and skills, associated with successful business development. Bird (2019: 115) defines entrepreneurial competencies "*as underlying characteristics such as generic and specific knowledge, motives, traits, self-images, social roles, and skills which result in venture births, survival, and/or growth*". Mitchelmore and Rowley (2010) conclude that a direct link exists between competencies, value creation and the firm's growth. All the concepts involved – entrepreneurship, entrepreneurial, and competence – are somewhat context-specific in their precise interpretation, but the overall logic seems clear: entrepreneurship entails value creation and value creation is more likely to succeed if the actors involved possess the necessary competencies.

2.2 Entrepreneurial competencies

Prior research views entrepreneurial competencies as those traits that help the entrepreneur to succeed (Man *et al.*, 2002; Bird, 2019). Chandler and Jansen (1992) argue that entrepreneurs need competencies related to management, technology, and entrepreneurship if their entrepreneurial ventures are to succeed. Entrepreneurial competencies are possessed by individuals (Mitchelmore and Rowley, 2010) and include both deeply rooted components (e.g.

traits, personality, attitudes) and components that can be acquired at work or through education (skills, knowledge, and experience) (Man and Lau, 2005). Entrepreneurs' competencies can also to a degree be context-specific (Capaldo *et al.*, 2004; Ahmad *et al.*, 2010).

Le Deist and Winterton (2005) argue that entrepreneurial competence encompasses three different areas, namely cognitive competence, functional competence, and behavioural competence. Cognitive competence refers to knowledge, functional competence refers to entrepreneurial skills, and behavioural competence to "know how to behave". Moro *et al.* (2014) demonstrate the importance of behavioural competence in observing that loan providers' perceptions of applicants' entrepreneurial competence affect the interest rates assigned to business loans. Some studies have also tackled the measurement of entrepreneurial competencies. Oosterbeek *et al.* (2010) used a measurement tool with 114 items to examine entrepreneurial competencies. The items measure the following traits and skills that constitute entrepreneurial competencies: the need for achievement, need for autonomy, need for power, social orientation, self-efficacy, endurance, risk-taking propensity, market awareness, creativity, and flexibility. Schelfhout *et al.* (2016) developed an evaluation instrument for entrepreneurial competence using behavioural indicators. The aforementioned study conducted a literature review and included the following sub-competencies in entrepreneurial competence: performance orientation, creativity, taking initiative, taking calculated risks, perseverance, leadership, communication skills, planning and organizing, decisiveness, collaboration, and reflection. Rasmussen *et al.* (2015) argued that a successful new venture creation process involves a distinct set of entrepreneurial competencies related to opportunity refinement and resource acquisition.

However, Ferreras-Garcia *et al.* (2019) argue that despite the findings of prior research on entrepreneurial competencies, it is still difficult to recognize distinct competencies related to entrepreneurship. The study of Reis *et al.* (2021) describes this problematic well, as they identified up to 98 entrepreneurial competencies used in prior research. The problem is not simplified by the fact that entrepreneurship is associated with more diverse educational and professional backgrounds (Kurczewska and Mackiewicz, 2020). Lilleväli and Täks (2017) note that views on entrepreneurial competencies also vary according to the view taken on entrepreneurship education: a narrow approach focuses on entrepreneurship as business creation and management whereas the broad approach targets development and support of an entrepreneurial mindset, enabling value creation in different fields of life. Recent work further suggests that entrepreneurial mindsets are varied (Lynch and Corbett, 2021) and their manifestation is connected to environmental stimulus (Pidduck *et al.*, 2021).

2.3 Entrepreneurship Competence and the EntreComp framework

In Mulder *et al.*'s (2009) view competence is a series of integrated capabilities consisting of clusters of knowledge, skills, and attitudes necessarily conditional for task performance and problem-solving and effective functioning in a certain profession, organization, job, role, and situation. Following their line of thought, Lilleväli and Täks (2017) define entrepreneurship competence as a series of integrated capabilities such as knowledge, skills, and attitudes, which are important when taking entrepreneurial action in the form of opportunity identification, evaluation, and pursuit and to creating value for others and society. This definition fits well

with the approach of the EntreComp framework, in which entrepreneurship is defined as an act upon opportunities and ideas, and transforming them into value for others (financial, cultural, or social) (Bagicalupo *et al.*, 2016). The core of the framework is thus the domain-neutral value creation process; value can be generated for others through ideas and opportunities in any value chain. Thus, entrepreneurship is viewed as a transversal competence, important in all spheres of life (Bagicalupo *et al.*, 2016).

The EntreComp framework was developed to provide a shared understanding of entrepreneurship competence as a concept. The development of the framework included a review of literature, case studies, desk research, and multi-stakeholder consultations applying a mixed-methods approach. The framework takes a broad approach to entrepreneurship and consists of three competence areas with 15 competencies, a progression model, and a list of learning outcomes (Bagicalupo *et al.*, 2016).

The three competence areas in EntreComp are (1) ideas and opportunities, (2) resources, and (3) into action. Each area consists of five sub-competencies, which together constitute entrepreneurship competence (Bagicalupo *et al.*, 2016). Ideas and opportunities include sub-competencies of spotting opportunities, creativity, vision, valuing ideas, and ethical & sustainable thinking. Resources include self-awareness & self-efficacy, motivation & perseverance, mobilizing resources, financial & economic literacy, and mobilizing others. The third area, into action, includes sub-competencies of taking the initiative, planning & management, coping with ambiguity, uncertainty & risk, working with others, and learning through experience. The framework elucidates on those sub-competencies through hints that were utilized in this research to develop a scale for measuring entrepreneurship competence. Following the EntreComp framework, we propose the following hypothesis:

H1: EC is a three-dimensional concept.

2.4 Educational level

Context is an important issue in entrepreneurship research (Welter *et al.*, 2016). Especially regarding entrepreneurial competence development, context-specific issues should be taken into account (Thomassen *et al.*, 2020). Competence refers to integrated capabilities consisting of clusters of knowledge, skills, and attitudes, and is related to being able to perform tasks or to function effectively in certain roles and situations (Mulder *et al.*, 2009). It is an unspoken assumption that all education contributes to a student's competence in some respect, and also that competence should contribute to employability (Abelha *et al.*, 2020). This would suggest that all competence, including entrepreneurship competence, can be developed in the process of education, and hence, that the higher the level of education, the greater the competence. Prior research has shown that special entrepreneurship education and entrepreneurship training programmes contribute to entrepreneurial competence development and other entrepreneurship-related outcomes, and this impact is stronger than the impact of general business education (Bae *et al.*, 2014; Martin *et al.*, 2013). However, Dickson *et al.* (2008) conducted a literature review to establish a connection between general educational attainment and various measures of entrepreneurial success and concluded that educational attainment by entrepreneurs is significantly and positively associated with entrepreneurial performance, albeit the relationship is not linear. This connection between general educational attainment and entrepreneurial performance would also suggest higher education students have greater

entrepreneurship competence than students in secondary education. We propose the following hypothesis:

H2: Entrepreneurship competence is higher among higher education students than among secondary level students.

2.5 Gender

Prior research has shown entrepreneurship to be strongly gendered (Joensuu *et al.*, 2013; Kelley *et al.*, 2017; Nikou *et al.*, 2019). According to the GEM of 2020, men are more likely to engage in entrepreneurial activity than women in most countries. In addition, Bogatyreva *et al.* (2019) showed that women were 57 % less likely to start a business. Female entrepreneurs differ from their male counterparts in many respects. Nikou *et al.* (2019) employed social feminist theory and role congruity theory to establish that women have different attitudes, beliefs, and approaches to entrepreneurship than men do. Salindo (2018) found that female entrepreneurs had a lower risk-taking propensity than their male counterparts.

Kelley *et al.* (2017) suggest that women see more barriers to becoming an entrepreneur due to their lower level of confidence that they possess the skills required in entrepreneurship. Self-efficacy may differ between genders, and thereby mediate the gender effect on entrepreneurial intentions (Cardon and Kirk, 2015; Ladge *et al.*, 2019). Kickul *et al.* (2008) showed that self-efficacy had a stronger effect on the entrepreneurial intentions of women than on those of men. Thus, we expect that women may view their entrepreneurship competence more negatively than men do, and propose the following hypothesis:

H3: Men have higher entrepreneurship competence than women.

2.6 Role models

According to Bandura's (1977) social learning theory, individuals learn through their own experiences and the process of observation. That means individuals can imitate the behaviours of models in their environment. In entrepreneurship, an entrepreneurial role model can be someone from the individual's close family, for example, parents or close relatives with experience of an entrepreneurial career can act as role models. The aforementioned can be viewed as strong ties in contrast to weak ties, which refer to interaction with more distant acquaintances (Granovetter, 1973; Sundararajan, 2020). While weak ties can play an important role in entrepreneurial processes (e.g. Sequiera *et al.*, 2007), strong ties are perhaps more strongly oriented with the emergence of entrepreneurship (Evald *et al.*, 2006; Chereau and Meschi, 2021) and are also arguably more readily available to students in both secondary and tertiary education. Thus, we concentrate here on strong ties that can act as role models. Prior research on role models and entrepreneurship has shown that parental role models positively correlate with the intention to, and the decision to, become an entrepreneur (Varamäki *et al.*, 2016; Chlosta *et al.*, 2010), and the similarity between the entrepreneur and the role model strengthens the relationship (Bosma *et al.*, 2012).

Markowska (2011) examined the importance of role models in entrepreneurial competence development and suggested that the impact of role models is significant in the entrepreneurial learning process especially with learning-oriented individuals. The same study concluded that there is a relationship between goal orientation, role models, and acquisitions of entrepreneurial

competence. Uygun and Kasimoglu (2013) also demonstrated a positive relationship between entrepreneurial role models and self-efficacy. Hence, based on prior research on role models in entrepreneurship we propose the following hypothesis:

H4: Individuals with entrepreneurial role models have higher entrepreneurship competence than individuals with no role models.

2.7 Entrepreneurial behaviour

Entrepreneurship competence includes entrepreneurial competencies; those traits that help the entrepreneur to succeed (Man *et al.*, 2002; Capaldo *et al.*, 2004). According to the theory of planned behaviour (Ajzen, 1991), intention predicts behaviour, and perceived behavioural control, that is, an individual's perception of the ease or difficulty involved in performing a given behaviour is an antecedent of intention. Arguably then, individuals with higher levels of entrepreneurship competence perceive entrepreneurship as more feasible (see Joensuu-Salo *et al.*, 2020b), and therefore are more likely to engage in entrepreneurial activities. Hence, we argue that entrepreneurship competence has a positive relationship with entrepreneurial behaviour (e.g. start-up behaviour) and propose the following hypotheses:

H5: Individuals with prior start-up experience have higher entrepreneurship competence than individuals with no experience.

H6: Nascent entrepreneurs have higher entrepreneurship competence than other students.

H7: EC explains the start-up behaviour of students.

1. Research design

3.1 Data Collection

Data informing this research was gathered from seven countries in Europe: Finland, Belgium, Italy, Netherlands, Spain, the United Kingdom, and Germany. Despite their shared western values, the countries differ with regard to entrepreneurship, for example, the percentage of the population involved in business start-ups in 2019 was 10.4 % in Netherlands, 9.3 % in the UK, and 2.8 % in Italy (Statista undated). The latest global entrepreneurship monitor (GEM) (2020) states that national framework conditions affect entrepreneurship; for example, it is easier to start and develop a business in Switzerland and in Netherlands than in other countries. Thus, the data offers an opportunity to test the scale with data obtained from different entrepreneurial contexts.

The respondents comprise both secondary level and higher education students. The original questionnaire was in English and translated by teachers for each language. Some of the countries used the English version. To ensure validity, we translated the questionnaire back into English. Data were gathered during an Erasmus + project *Sustainability-Driven Entrepreneurship* in 2019 via a web-based survey. The data were analysed using SPSS 26 programme.

There are 1128 respondents in the data (Finland 646 respondents; Belgium 192 respondents; Spain 110 respondents, Italy 50 respondents; Germany 46 respondents, the United Kingdom

45 respondents; Netherlands 39 respondents). Due to the small samples from Italy, Germany, UK and Netherlands, we could not make comparisons between all the countries. However, the data enabled us to test the model separately for countries with at least 100 observations (Finland, Spain, and Belgium), and use international data for scale validation.

Among the respondents, 56 % were male and 44 % female. The youngest respondent was 16 years old and the oldest 58 years old; Secondary school level respondents comprised 23 % and 77 % were from the tertiary level. Of the whole group, 64 % of the respondents had an entrepreneurial role model in the family. Seven percent (77 students) had prior start-up experience, and 13 % (142 students) were currently starting their own business. Students represented different study fields (Technology 32 %, Social Sciences, Business and Administration 16 %, the Natural Sciences 9 %, the Natural Sources and the Environment 8 %, Social Services, Health and Sports 7 %, Tourism, Catering and Domestic Services 7 %, Culture 6 %, Humanities and Education 2 %, and the remaining 13% were not classifiable).

3.2 Variables

We used the EntreComp framework when creating the variables for the study. The framework has not been extensively utilized in research, possibly due to its width and depth: the full framework contains altogether 442 descriptive statements of learning outcomes (Bagicalupo *et al.*, 2016). Any measure based on it is necessarily a contraction of the whole, as is also the case here. The framework is divided into three areas: (1) Ideas and opportunities, (2) Resources, and (3) Into Action, each of which has five sub-competencies. These five sub-competencies are described by “hints” in the original EntreComp framework (see Bagicalupo *et al.*, 2016). Those 15 hints formed the basis of our variables measuring entrepreneurship competence. The variables are presented below:

Ideas and opportunities

EC1: I use my imagination and abilities to identify opportunities for creating value.

EC2: I develop creative and purposeful ideas.

EC3: I work towards a vision of my future.

EC4: I make the most of ideas and opportunities.

EC5: I assess the consequences and impact of ideas, opportunities, and actions.

Resources

EC6: I believe in myself and keep developing.

EC7: I know how to stay focused and don't give up.

EC8: I gather and manage the resources I need.

EC9: I have a good understanding of financial and economic issues.

EC10: I inspire, enthuse, and get others on board.

Into Action:

EC11: I initiate processes that create value and can take up challenges.

EC12: I know how to prioritize, organize, and follow-up.

EC13: I make decisions, thus dealing with uncertainty, ambiguity, and risk.

EC14: I know how to team-up, collaborate, and network.

EC15: I reflect and learn from both success and failure, my own, and other people's.

Students were asked to evaluate their skills by answering these questions on a 7-point Likert scale anchored with *completely disagree* (1) and *completely agree* (7).

To measure prior start-up experience, we used the question "Have you started your own business before" (Yes/No), and to measure nascent entrepreneurship we used the question "Are you currently starting your own business (e.g. you are working on a business idea or other plans or finding out about different things to establish an enterprise)" (Yes/No). This question was also used as a proxy for start-up behaviour.

Gender was requested and responses of female were labelled 1, male labelled 2, and other / prefer not to say labelled 3. Entrepreneurial role models in the family were elicited through the question: "Have any of the closest people to you (parents, sisters, friends) worked as an entrepreneur?" (Yes/No).

3.3 Analyses methods

We used explorative factor analysis (EFA) to discover patterns in the EC scale. Child (2006) describes EFA as a statistical technique to uncover complex patterns in the dataset and suitable for testing predictions. The analysis technique is well suited to situations when the number of factors influencing variables is investigated. The EntreComp framework suggests three competence areas in entrepreneurship competence and it seemed likely each would emerge as a distinct factor in any EFA.

Conducting EFA places some requirements on the data including that they are normally distributed with no univariate and multivariate outliers (Child, 2006; Field, 2009). We used the Shapiro–Wilk test to examine the normal distribution. The test showed that all the variables were normally distributed with no univariate and multivariate outliers. Additionally, Gorsuch (1983) indicated that there should be a linear relationship between the factors and the variables. The data should include at least 300 observations (Comrey and Lee, 1992), and the correlation between the variables should be .30 or greater (Tabachnick and Fidell, 2007). Kline (1998) also recommended using a heterogeneous sample rather than a homogeneous one. Our sample provided over 1000 observations and was gathered from seven countries, thus ensuring it was heterogeneous, thus, these recommendations were followed. Multicollinearity and singularity were also checked (see Tabachnick and Fidell, 2007).

Table 1 presents the correlation table for the variables. It shows that all correlations are above the recommended correlation level of .30 but not over .70, which could indicate multicollinearity issues.

<Table 1 near here>

We used *t*-tests to compare entrepreneurship competence in relation to educational level, gender, role models, prior experience of entrepreneurship and nascent entrepreneurship. *t*-test can be considered a special case of the one-way ANOVA comparing means of two groups (Park 2009).

In the last phase, we used logistic regression analysis to examine the effect of EC on start-up behaviour. Logistic regression analysis is suitable for situations where the dependent variable is dichotomous like starting a company or not doing so (Hilbe, 2009). Menard (2010) recommended logistic regression analysis be used to examine the classification of cases into categories of the dependent variable (starting up a company or not) based on the independent variable(s). This is called predicting the odds of being classified to a specified case. Hilbe (2009) suggests using Pseudo-R² when assessing the model. In addition, a Hosmer–Lemeshow test and the omnibus test of model coefficients can be used in the evaluation of the statistical significance of the model (O’Connell, 2006).

2. Results

4.1 EFA

Conducting the EFA was supported by Principal Axis Factoring with Varimax rotation. The Kaiser–Meyer–Olkin Measure and Bartlett’s test of sphericity both indicated our data were suitable for factor analysis (KMO.958; Bartlett’s test $p < .000$). First, we examined the commonalities of the variables (see Table 2). According to Park (2009), low communalities (less than .20) are often eliminated from the analysis as the aim of the factor analysis is to explain the variance through the common factors (Child, 2006). All of the communalities were above this value (lowest initial value .31, extraction .28; highest initial .60, extraction .60).

<Table 2 near here>

The results of the EFA show that only one factor was extracted with an eigenvalue of greater than 1. This factor explains 53 % of the variance. Interestingly EFA did not identify three factors as might have been assumed based on the entrepreneurship competence framework. This one-factor solution indicates that entrepreneurship competence is unidimensional instead of three-dimensional. Table 3 presents the rotated factor matrix. The factor loadings vary from .53 to .77. The cut-off value for factor loadings depends on the sample size (Park, 2009). Tabachnick and Fidell (2007) recommend factor loading of at least .32 for a sample size of at least 300 observations. Therefore, all the factor loadings were high enough to include in the unidimensional solution for entrepreneurship competence. Our results do not offer support for the first hypothesis. Entrepreneurship competence is not a three-dimensional concept. The results of the EFA indicate a unidimensional solution.

< Table 3 near here >

We computed a mean variable for entrepreneurship competence from 15 items. The reliability of the scale was excellent based on Nunnally’s (1978) recommendation (Cronbach’s alpha .94). As an additional check, we ran separate Cronbach’s alpha computations for the different countries, which produced results of Belgium .87; Spain .94; the UK .94; Germany .93; Italy .91; Netherlands .88; and Finland .95. The mean values of entrepreneurship competence were as follows: Belgium 4.6; Spain 5.2. Netherlands 4.6; Finland 4.5; United Kingdom 5.1; Germany 5.1; Italy 5.0.

Next, we compared entrepreneurship competence for secondary and tertiary level students, for the genders, for individuals with entrepreneurial role models and individuals with no role

models, for individuals with prior experience of entrepreneurship and individuals with no experience, and for nascent entrepreneurs and others.

4.2 *T-tests*

The results from the *t*-tests show there is no statistically significant difference between secondary and higher education students. The mean value for the secondary level is 4.6 and for higher education 4.7. Hence, our second hypothesis was rejected. Higher education students do not have a higher level of entrepreneurship competence than secondary level students.

The results of the *t*-tests also reveal no differences between men and women in entrepreneurship competence. The mean value is 4.7 for both genders; thus, our third hypothesis is rejected. The fourth hypothesis relates to entrepreneurial role models. The results of the *t*-test show that individuals with entrepreneurial role models have a higher level of entrepreneurship competence (mean value 4.8) than individuals with no role models (mean value 4.5). The F-statistics measure produces a significant p-value ($< .000$); thus, the fourth hypothesis is supported.

Prior experience of entrepreneurship has an effect. Individuals with start-up experience have a higher level of entrepreneurship competence (mean value 5.1) than individuals with no experience (mean value 4.6); a finding supporting hypothesis five. The F-statistics measure produces a significant p-value ($< .000$); hence, the fifth hypothesis is supported.

The sixth hypothesis relates to nascent entrepreneurship. The results of the *t*-test show that nascent entrepreneurs have a higher level of entrepreneurship competence (mean value 5.4) than other students (mean value 4.6). The F-statistics measure produces a significant p-value ($< .000$). The sixth hypothesis is therefore supported. Table 4 summarizes the *t*-test results.

<Table 4 near here>

4.3 *Logistic regression analysis*

To test the relationship between EC and start-up behaviour, we built a model using EC as an independent variable, and start-up behaviour as a dependent variable. We also included control variables in the model. Based on prior research on entrepreneurial behaviour (Bogatyreva *et al.*, 2019; Joensuu-Salo *et al.*, 2020a; Bosma *et al.*, 2011; Politis, 2008), we included gender, role models, and prior entrepreneurial experience as control variables. Table 5 presents the results. EC has a significant effect on start-up behaviour (Exp (B) 2.512***). This finding offers support for our final hypothesis. Only prior experience of entrepreneurship is a significant control variable in the model (Exp (B) 4.999***). The results indicate that students with prior start-up experience are almost five times more likely to start businesses than other students. Other control variables are not significant; gender or role models do not explain start-up behaviour. This is a surprising result in light of prior research and international data, which have shown that men are more likely start companies than women are, and role models impact start-up behaviour (Bogatyreva *et al.*, 2019; Bosma *et al.*, 2011; GEM, 2020). The Hosmer–Lemeshow test indicates a good fit of the data to the model (chi-square 13.557, non-significant). In addition, the omnibus test of model coefficients shows that the model has a significant predictive value (chi-square 125.650***). The overall percentage of correct cases predicted is 87.8. The Nagelkerke R^2 value is .20.

For additional analysis, we also applied cross-validation to the data. The data were split in two; with one sample comprising 80 % of the cases and the other 20 % of the cases. The contents of both samples were randomly selected. The model was built with 80 % of the cases and validated with the remaining 20 % of the cases. The results verified our original model. We also tested the model separately for those countries with at least 100 observations (Finland, Spain, and Belgium). The model was significant in all the countries with the same significant and non-significant independent variables.

<Table 5 near here>

5. Discussion

The purpose of this study was to test a scale for measuring entrepreneurship competence (EC) based on the EntreComp framework and its relation to start-up behaviour. In addition, we show how EC differs between students from seven European countries in relation to gender, role models and entrepreneurial behaviour. The hypothesis and results are summarized in Table 6.

<Table 6 near here>

First, our study shows that EC has a unidimensional structure; the areas within the EntreComp framework (*ideas and opportunities*, *resources*, and *into action*) do not form three distinct factors. All the scale items load to one single factor representing the entrepreneurship competence of the individual, which suggests that the areas are not separate. Thus, the results do not support H1. The internal reliability of the scale was found to be good or excellent; Cronbach's alphas for different countries varied between .87 and .95. We therefore suggest that the EC scale based on the EntreComp framework is a suitable instrument for measuring EC, and that EC is single concept in which the three areas are deeply interlinked. The proposed scale contains items measuring the different aspects of entrepreneurship competence suggested by Le Deist and Winterton (2005), that is, cognitive factors (I have a good understanding...), functional factors (I initiate...I inspire...), and behavioural factors (I know how to...), and yet these areas apparently reflect the same construct of entrepreneurship competence. The result both offers support for this prior definition and calls to question the separability of the different aspects: high cognitive competence goes together with high functional and behavioural competence. The results lend support to Ferreras-Garcia *et al.*'s (2019) argument that it is difficult to recognize distinct competencies related to entrepreneurship, and offer an alternative view to the approach taken by Schelfhout *et al.* (2016), who suggest a total of eleven sub-competencies to entrepreneurial competence, and by Reis *et al.* (2021), who identified up to 98 entrepreneurial competencies, and ended up suggesting 33 core entrepreneurial competencies. Such sub-competencies and core competencies may indeed exist and can be a relevant object of study, yet it is worthwhile to note that a unidimensional, relatively simple measure of self-assessed EC with good internal reliability is now available, and that it explains start-up behavior and demonstrably develops through enterprising activities. As Bird (2019) states, despite of the problems in defining entrepreneurial competency, it provides policy makers and educators with an important predictor of venture outcomes.

The EntreComp framework describes what EC consists of, but it bypasses the issue of whether EC and entrepreneurship are inherent in a person or something that is learned. The measure of EC proposed in this study is based on self-assessment of certain components of competence. A person with strong self-efficacy is likely to have more positive appraisal of their competence as a whole and is therefore more likely to provide confident answers when responding to the statements provided. This is in line with the overall logic of the framework, which posits the possession of mental resources and the ability to employ both internal and external resources in goal-oriented action as crucial elements of EC. There was no statistically significant difference in EC between secondary level and higher education students, and hence H2 is not supported. This suggests that self-assessed EC is not very sensitive to knowledge resources per se; despite a cognitive component it appears to be more an action- and potential-oriented concept that emphasises attitude and orientation to the social environment. This supports the ideas of Bird (2019) in competency development. She argues that for example family background and work experience have influence on motives, traits, self-concept, social roles and skills, which all contribute to new venture start-up success. The fact that the formal level of education is not reflected in EC can also be interpreted as support for Johannisson's (2016) position on the difficulty of learning entrepreneurship in universities. The result runs contrary to our expectations based on the connection between educational attainment and entrepreneurial performance (Dickson *et al.*, 2008).

There was also no difference between men and women in terms of EC. Thus, H3 is not supported, despite previous studies concerning entrepreneurial intentions and entrepreneurial self-efficacy (see Joensuu *et al.*, 2013; Kickul *et al.*, 2008) and activity in starting businesses (e.g. Joensuu-Salo *et al.*, 2020a; Bogatyreva *et al.*, 2019). The equality found in self-assessed EC is therefore an interesting and positive result. It calls to question some common assumptions based on earlier studies concerning women's entrepreneurial competence, attitudes, intentions and actions (see Kelley *et al.*, 2017; Nikou *et al.*, 2019). Few studies have examined EC rather than entrepreneurial intentions, and those that have, have often applied a narrow measure of entrepreneurial ability (e.g. Thébaud, 2010). The overall view provided by existing research is that of negative association between entrepreneurship and the female gender, and our results contradict this. We have, based on the EntreComp framework, constituted EC as a transversal competence, and found no difference between genders. Further, in our analysis gender as control variable for start-up behavior was not significant. The result can be interpreted as suggesting that the observed gender differences in entrepreneurship arise from factors other than competence, such as cultural values and cultural constructions of entrepreneurship. Various gendered practices and cultural expectations of Western societies may deter women from entrepreneurship. The fact remains that studies on entrepreneurial intentions and actual entrepreneurship show a clear gender difference, and our single study cannot overturn the results of previous decades. The results do however give a tantalizing glimpse of the possibility of change. While the result may be explained by the transverse nature of the tested scale, an alternative explanation would be that the cultural structures inhibiting women's sense of agency are weakening, leaving more space for also entrepreneurial self-efficacy. If that is the case, our young respondents may yet escape the full impact of the factors that generally suppress women's entrepreneurial potential and may come to live up to the promise of their EC.

Individuals with entrepreneurial role models have a higher level of EC than those without role models, confirming H4. Role models can contribute to EC both directly, as individuals develop their EC by learning from example (Markowska, 2011), and indirectly, by stimulating interest in competencies that constitute EC. Earlier studies (Kolvereid, 1996; Van Auken *et al.*, 2006; Engle *et al.*, 2011) have shown that having role models is associated with entrepreneurial intentions and that there is a connection between role models and entrepreneurial attitudes (e.g. Fellnhöfer and Puumalainen, 2017). The fact that individuals with entrepreneurial role models have higher EC suggests that EC can be learned, but that apparently universities are not providing enough, or the right kind of, learning opportunities. If we accept the position of Bagicalupo *et al.* (2016) and view entrepreneurship competence a transversal competence with implications for life in general, the implication is extended to all education, not just that which is explicitly named as entrepreneurship education. Although start-up behaviour is clearly a manifestation of EC, development of EC should be viewed as development of not just the competence to start or manage a firm successfully but as development of a wider competence to have an impact on the world. Providing students with opportunities to experience the process of changing their social and physical environment is to empower them for life. Still, it is important to notice that our results also tie EC strongly with entrepreneurial actions in the more traditional sense.

Prior experience of entrepreneurship also affected EC, confirming H5. Individuals learn from experience and clearly, entrepreneurship is no exception, although Winkler *et al.* (2021) propose that learning from experience calls for self-regulation from entrepreneurs. The result provides added support for relevance of the measure. Moreover, H6 is also confirmed: nascent entrepreneurship, as exemplified by engaging in start-up behaviour, is associated with higher levels of EC. This supports the findings of Joensuu *et al.* (2015). They showed that entrepreneurial characteristics of the student explained start-up behavior better than any other variable in the Theory of Planned behavior by Ajzen (1991), which is the most used model explaining entrepreneurial intentions and behavior in prior research (Maalaoui *et al.*, 2018). Entrepreneurial characteristics included innovativeness, tolerance of ambiguity, creative problem solving, and the ability to organize. These are all in the core of entrepreneurship competence.

As a final step, we tested how well EC can explain start-up behaviour using logistic regression analysis. In a model with gender, role models, prior entrepreneurship experience and EC, both EC and prior entrepreneurship experience had a significant effect on start-up behaviour, confirming H7. This indicates that EC is strongly linked with entrepreneurial behaviour and has predictive power over start-up behaviour. The result also supports the findings of Politis (2008) that prior start-up experience enhances entrepreneurial learning, and the findings of Joensuu *et al.* (2015) as discussed earlier.

6. Conclusions

This study contributes to entrepreneurship literature by proposing a relatively simple way of measuring entrepreneurship competence, based on the widely discussed EntreComp framework (Bagicalupo *et al.*, 2016). Despite its wide use in many educational institutions in the EU, the EntreComp framework has not been widely used in research, possibly due to the

width and depth of the competence it portrays. While we acknowledge that the measure presented here loses much of the detail of the original framework, the loss is perhaps acceptable considering the benefits. The study provides a validated scale of 15 items that can be easily applied to for example measuring development over students' study years. The results also demonstrate that EC can be addressed as a unidimensional construct and connect it to start-up behavior. Further, the study shows the impact of role models on EC. Bird (2019) suggests that family background contributes to entrepreneurial competency development, however, the linkage between EC and role models has not been extensively studied. No difference in EC between genders is observed, suggesting the gender differences in entrepreneurship arise from factors other than competence.

The results have practical implication particularly for entrepreneurship education. First, the study provides a unidimensional, relatively simple measure of self-assessed EC with good internal reliability. This is a tool that can be used in testing entrepreneurship competence in secondary and tertiary educations, supporting pedagogical development. Second, the results show that imparting relevant knowledge to students is not enough: to develop EC, experiential learning is needed. This emphasizes the need for safe environments to try out entrepreneurial behaviors and the role of teachers in developing student's EC. Joensuu-Salo et al. (2020) showed that a teacher's innovativeness and risk-taking ability influence how the teacher encourages the development of students' EC.

The study has some limitations that should be noted and addressed in future research. First, the data were cross-sectional; hence the causal effect of EC on start-up behaviour cannot fully be validated as the measurement of EC and start-up behaviour was measured simultaneously. However, the data do provide some evidence of the positive relationship between those two factors. Longitudinal models would offer more opportunities to estimate the causal relationship between EC and start-up behaviour. The second limitation is the possible non-response-bias in the study, and the fact that from some countries there were only a small number of participants. This limits somewhat the wider application of the results. Due to the small samples from Italy, Germany, UK and Netherlands, we were not able to compare the levels of EC between countries. However, the country-specific mean values of EC indicate some differences between countries exist. Prior research has argued that there are connections between culture and EC (Sajilan and Tehseen, 2015; Man and Lau, 2005), and this aspects needs further research. Despite this limitation, the dataset with over a thousand respondents from both secondary and higher education levels, and from seven European countries, is considerable. Cross-validation was used for the tested model. Future research should test the model in a longitudinal setting. Also, further studies with wider student populations would help confirm our tentative conclusion that EC can be strengthened with experiential learning opportunities and learning from role models. Future research should also test the scale on other types of populations and other contexts, for example in life-long learning. Worthwhile future directions also include investigating the impact of weak tie role models in addition to the strong tie role models considered here as well as testing the importance of implicit beliefs (Mai and Dickel, 2021) relative to the explicit beliefs of the EntreComp framework.

The gender perspective is also interesting, and further studies could shed more light on this, e.g. by establishing whether the issue lies with the definition of EC (wide or narrow) or whether there is in fact a change taking place in the society at large. In addition, As Bird (2019) states,

competency is a variable that crosses levels of analysis, and this offers new possibilities across disciplines of business management in future research.

References

- Abelha, M., Fernandes, S., Mesquita, D., de Seabra Borger, F. and Ferreira-Oliveira, A. (2020), "Graduate employability and competence development in higher education – A systematic literature review using PRISMA", *Sustainability* 2020, Vol. 12, doi:10.3390/su12155900
- Ahmad, N. H., Ramayah, T., Wilson, C. and Kummerow, L. (2010), "Is entrepreneurial competency and business success relationship contingent upon business environment?", *International Journal of Entrepreneurial Behaviour and Research*, Vol. 16 No. 3, pp. 182-203.
- Ajzen, I. (1991), "The Theory of Planned Behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.
- Bacigalupo, M., Kamyli, P., Punie, Y. and Van Den Brande, L. (2016), *EntreComp: The Entrepreneurship Competence Framework*, Publication Office of the European Union, Luxembourg.
- Bae, T.J., Qian, S., Miao, C. and Fiet, J.O. (2014), "The relationship between entrepreneurship education and entrepreneurial intentions: a meta-analytic review", *Entrepreneurship Theory and Practice*, Vol. 38 No. 2, pp. 217-254.
- Bandura, A. (1977), *Social Learning Theory*, Prentice-Hall, New Jersey.
- Bird, B. (2019), "Toward a theory of entrepreneurial competency", Katz, J.A. and Corbett, A.C. (Eds.), *Seminal ideas for the next twenty-five years of advances, Advances in entrepreneurship, firm emergence and growth*, Vol. 21, Emerald Publishing, Bingley, UK, pp. 115-131.
- Bogatyreva, K., Edelman, L., Manolova, T., Osiyevskyy, O. and Shirokova, G. (2019), "When do entrepreneurial intentions lead to actions? The role of national culture", *Journal of Business Research*, Vol. 96, pp. 309-321.
- Bohlinger, S. (2008), "Competences as the core element of the European Qualifications Framework", *European Journal of Vocational Training*, Vol. 2007/3-2008/1 No. 42/43, pp. 96-118.
- Bosma, N., Hessels, J., Schutjens, V., Van Praag, M. and Verheul, I. (2011), "Entrepreneurship and role models", *Journal of Economic Psychology*, Vol. 33 No. 2, pp. 410-424.
- Capaldo, G., Iandoli, L. and Ponsiglione, C. (2004), "Entrepreneurial competencies and training needs of small firms", Paper presented at 14th Annual IntEnt Conference,

Napoli, Available at:

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.114.8461&rep=rep1&type=pdf> (accessed 18th January 2021).

- Cardon, M. and Kirk, C. (2015), "Entrepreneurial passion as mediator of the self-efficacy to persistence relationship", *Entrepreneurship Theory and Practice*, Vol. 39 No. 5, pp. 1027-1050.
- Cedefop (2019), *Overview of National Qualifications Framework Developments in Europe 2019*, European Centre for the Development of Vocation Training, Publications Office of the European Union, Luxembourg, DOI: 10.2801/827112
- Chandler, G. and Jansen, E. (1992), "The founder's self-assessed competence and venture performance", *Journal of Business Venturing*, Vol. 7 No.3, pp. 223-236.
- Chereau, P., and Meschi, P. X. (2021). "Deliberate practice of entrepreneurial learning and self-efficacy: the moderating effect of entrepreneurial parental environment as role modeling", *Journal of Small Business and Enterprise Development*, Vol. ahead-of-print No. ahead-of-print. DOI: 10.1108/JSBED-07-2021-0277.
- Child, D. (2006), *The essentials of factor analysis*, (3rd ed.), Continuum International Publishing Group, New York, NY.
- Chlosta, S., Patzelt, H., Klein, S. and Dormann, C. (2010), "Parental role models and the decision to become self-employed: The moderating effect of personality", *Small Business Economics*, Vol. 38 No.1, pp. 121-138.
- Comrey, A. L. and Lee, H.B. (1992), *A first course in factor analysis*, 2nd ed., Lawrence Erlbaum Associates, Hillside, NJ.
- Czyzewska, M. and Mroczek, T. (2020), "Data Mining in Entrepreneurial Competencies Diagnosis", *Education Sciences*, Vol. 10 No.196, DOI 10.3390/educsci10080196
- Dickson, P., Solomon, G. and Weaver, K.M. (2008), "Entrepreneurial selection and success: does education matter?", *Journal of Small Business and Enterprise Development*, Vol. 15 No. 2, pp. 239-258.
- Dinning, T. (2019), "Articulating entrepreneurial competencies in the undergraduate curricular", *Education + Training*, Vol. 61 No.4, pp. 432-444.
- Engle, R.L., Schlaegel, C. and Delanoe, S. (2011), "The role of social influence, culture, and gender on entrepreneurial intent", *Journal of Small Business and Entrepreneurship*, Vol. 24 No. 4, pp. 471-492.
- Evald, M. R., Klyver, K. I. M., & Svendsen, S. G. (2006). "The changing importance of the strength of ties throughout the entrepreneurial process", *Journal of Enterprising Culture*, Vol. 14 No. 1, pp. 1-26.
- Fellnhöfer, K. and Puumalainen, K. (2017), "Can role models boost entrepreneurial attitudes?", *International Journal of Entrepreneurship and Innovation Management*, Vol. 21 No. 3, pp.274–290.

- Ferreras-Garcia, R., Hernández-Lara, A.B. and Serradell-López, E. (2019), “Entrepreneurial competences in a higher education business plan course”, *Education + Training*, Vol. 61 No. 7/89, pp. 850-869.
- Field, A. (2009), *Discovering Statistics Using SPSS: Introducing Statistical Method*, 3rd ed, Sage Publications, Thousand Oaks, CA.
- Global Entrepreneurship Monitor. (2020), *Global Report 2019/2020*, Accessible: <https://www.gemconsortium.org/file/open?fileId=50443>
- Gorsuch, R. L. (1983), *Factor analysis*, 2nd ed, Lawrence Erlbaum Associates, Hillside, NJ.
- Granovetter, M. S. (1973), “The strength of weak ties”, *American Journal of Sociology*, Vol. 78, pp. 1360-1380.
- Gustomo, A., Herliana, S., Dhewanto, W. and Ghina, A. (2017), “Building a Conceptual Framework of Entrepreneurial Competencies: The Ontological, Epistemological, and Methodological View”, *International Journal of Applied Business and Economic Research*, Vol. 15 No.10, pp. 191-201.
- Hilbe, J. M. (2009). *Logistic Regression Models*, CRC Press, Taylor & Francis Group, London, U.K.
- Joensuu, S., Viljamaa, A., Varamäki, E. and Tornikoski, E. (2013),” Development of entrepreneurial intention in higher education and the effect of gender – a latent growth curve analysis”, *Education + Training*, Vol. 55 No. 8/9, pp. 781-803.
<https://doi.org/10.1108/ET-06-2013-0084>
- Joensuu, S., Varamäki, E. and Viljamaa, A. (2015),”Beyond intentions – what makes a student start a firm?”, *Education + Training*, Vol. 57 No. 8/9, pp. 853-873.
<https://doi.org/10.1108/ET-11-2014-0142>
- Joensuu-Salo, S., Viljamaa, A. and Varamäki, E. (2020a),” Do intentions ever die? The temporal stability of entrepreneurial intention and link to behavior”, *Education + Training*, Vol. 62 No. 3, pp. 325-338. <https://doi.org/10.1108/ET-03-2019-0053>
- Joensuu-Salo, S., Viljamaa, A. and Varamäki, E. (2020b), “The Impact of Entrepreneurship Competence on Entrepreneurial Intentions”, Paper presented in RENT XXXIV Conference, November 18-19, 2020, Online Conference.
- Joensuu-Salo, S., Peltonen, M., Hämäläinen, M., Oikkonen, E. and Raappana, A. (2020), “Entrepreneurial teachers do make a difference – Or do they?”, *Industry and Higher Education*, First Published Online December 24, 2020,
<https://doi.org/10.1177/0950422220983236>
- Johannisson, B. (2016), “Limits to and prospects of entrepreneurship education in the academic context”, *Entrepreneurship & Regional Development*, Vol. 28 No. 5-6, pp. 403-423.
- Kelley, D. J., Baumer, B.S., Brush, Patricia, C., Greene, G., Mahdavi, M., Cole, M.M.M., Dean, M. and Heavlow, R. (2017), “*Global Entrepreneurship Monitor 2016/2017 Report on Women’s Entrepreneurship*”, Babson College, Wellesley, MA.

- Kickul, J., Wilson, F. and Marlino, D. (2008), "Are misalignments of perceptions and self-efficacy causing gender gaps in entrepreneurial intentions among our nation's teens?", *Journal of Small Business and Enterprise Development*, Vol. 15 No. 2, pp. 321-335. <https://doi.org/10.1108/14626000810871709>
- Kline, R. B. (1998). Principles and practice of structural equation modelling, Guilford Press, NY.
- Kolvreid, L. (1996), "Prediction of employment status choice intentions", *Entrepreneurship Theory and Practice*, Vol. 21 No. 1, pp. 47-57.
- Kurczewska, A. and Mackiewicz, M. (2020), "Are jacks-of-all-trades successful entrepreneurs? Revisiting Lazear's theory of entrepreneurship", *Baltic Journal of Management*, Vol. 15 No. 3, pp. 411-430.
- Ladge, J., Eddleston, K.A. and Sugiyama, K. (2019), "Am I an entrepreneur? How imposter fears hinder women entrepreneurs' business growth", *Business Horizons*, Vol. 62 No. 5, pp. 615-624.
- Lahti, R. K. (1999), "Identifying and integrating individual level and organizational level core competencies", *Journal of Business and Psychology*, Vol. 14 No. 1, pp. 59-75.
- Le Deist, F. D. and Winterton, J. (2005), "What is competence?", *Human Resource Development International*, Vol. 8 No. 1, pp. 27-46.
- Lilleväli, U. and Täks, M. (2017), "Competence Models as a Tool for Conceptualizing the Systematic Process of Entrepreneurship", *Education Research International*, 2017, Article ID 5160863, <https://doi.org/10.1155/2017/5160863>
- Longva, K.K. and Foss, L. (2018), "Measuring impact through experimental design in entrepreneurship education: A literature review and research agenda", *Industry and Higher Education*, Vol. 32 No. 6, pp. 358-374.
- Lynch, M. P., & Corbett, A. C. (2021), "Entrepreneurial mindset shift and the role of cycles of learning", *Journal of Small Business Management*, 1-22. DOI: 10.1080/00472778.2021.1924381
- Maalaoui, A., Perez, C., Bertnand, G., Razgallah, M. and Germon, R. (2018), ""Cruel intention" or "entrepreneurial intention": what did you expect? An overview of research on entrepreneurial intention – an interactive perspective", Brännback, M. and Carsrud, A. (Eds.), *A Research Agenda for Entrepreneurial Cognition and Intention*, Edward Elgar, Cheltenham, UK, pp. 7-46.
- Mai, R., & Dickel, P. (2021), "What we say= what we think? How implicit beliefs shape nascent entrepreneurial behavior", *Journal of Small Business Management*, 1-41, DOI: 10.1080/00472778.2021.1956505
- Man, T.W.Y., Lau, T. and Chan, K.F. (2002), "The competitiveness of small and medium enterprises a conceptualization with focus on entrepreneurial competencies", *Journal of Business Venturing*, Vol. 17 No. 2, pp. 123-142.

- Man, T.W.Y. and Lau, T. (2005), "The context of entrepreneurship in Hong Kong. An investigation through the patterns of entrepreneurial competencies in contrasting industrial environments", *Journal of Small Business and Enterprise Development*, Vol. 12 No. 4, pp. 464-481.
- Markowska, M. (2011), *Entrepreneurial Competence Development. Triggers, Processes & Consequence*, Dissertation, JIBS Dissertation Series No. 071, Jönköping International Business School, Jönköping University, Jönköping.
- Martin, B.C., McNally, J.J. and Kay, M.J. (2013), "Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes", *Journal of Business Venturing*, Vol. 28 No. 2, pp. 211-224.
- McCallum, E., Weicht, R., McMullan, L. and Price, A. (2018), *EntreComp into action - Get inspired, make it happen: A user guide to the European Entrepreneurship Competence Framework*, Publications Office of the European Union, Luxembourg.
- Menard, S. (2010), *Logistic regression. From Introductory to Advanced Concepts and Applications*, SAGE, Thousand Oaks, California.
- Mitchelmore, S. and Rowley, J. (2010), "Entrepreneurial competencies: a literature review and development agenda", *International Journal of Entrepreneurial Behavior & Resesarch*, Vol. 16 No. 2, pp. 92-111.
- Moro, A., Fink, M. and Kautonen, T. (2014), "How do banks assess entrepreneurial competence? The role of voluntary information disclosure", *International Small Business Journal: Researching Entrepreneurship*, Vol. 32 No. 5, pp. 525-544.
- Mulder, M., Gulikers, J.T.M., Biemans, H.J.A. and Wesselink, R. (2009), "The new competence concept in higher education; error or enrichment?", *Journal of European Industrial Training*, Vol. 33 No. 8/9, pp. 755-770.
- Nikou, S., Brännback, M., Carsrud, A. and Brush, C.G. (2019), "Entrepreneurial intentions and gender: pathways to start-up", *International Journal of Gender and Entrepreneurship*, Vol. 11 No. 3, pp. 348-372.
- Nunnally, J. C. (1978), *Psychometric theory*, 2nd ed., McGraw-Hill, New York.
- O'Connell, A. A. (2006), *Logistic Regression Models for Ordinal Response Variables*, Series: Quantitative Applications in the Social Sciences, SAGE publications, Thousand Oaks.
- Oosterbeek, H., van Praag, M. and Ijsselstein, A. (2010), "The impact of entrepreneurship education on entrepreneurship skills and motivation", *European Economic Review*, Vol. 54 No. 3, pp. 442-454.
- Park, H. M. (2009), *Comparing Group Means: T-tests and One-way ANOVA Using STATA, SAS, R, and SPSS*, Working Paper, The University Information Technology Services (UITs) Center for Statistical and Mathematical Computing, Indiana University, Available at: <http://www.indiana.edu/~statmath/stat/all/ttest>

- Pidduck, R. J., Clark, D. R., & Lumpkin, G. T. (2021), "Entrepreneurial mindset: Dispositional beliefs, opportunity beliefs, and entrepreneurial behavior", *Journal of Small Business Management*, 1-35. DOI:10.1080/00472778.2021.1907582
- Politis, D. (2008), "Does prior start-up experience matter for entrepreneurs' learning? A comparison between novice and habitual entrepreneurs", *Journal of Small Business and Enterprise Development*, Vol. 15 No. 3, pp. 472-489.
- Rasmussen, E., Mosey, S. and Wright, M. (2015), "The transformation of network ties to develop entrepreneurial competencies for university spin-offs", *Entrepreneurship & Regional Development*, Vol. 27 No. 7-8, pp. 430-457.
- Reis, D.A., Fleury, A.L. and Carvalhi, M.M. (2021), "Consolidating core entrepreneurial competences: toward a meta-competence framework", *International Journal of Entrepreneurial Behavior & Research*, Vol. 27 No. 1, pp. 179-204. DOI 10.1108/IJEBR-02-2020-0079
- Sajilan, S. and Tehseen, S. (2015), "Cultural Orientations, Entrepreneurial Competencies and SMEs Business Success: The Contingent Roles of Environmental Turbulence and Network Competence", *Review of Integrative Business & Economics Research*, Vol. 4 No. 2, pp. 20-35.
- Salindo, R.V.N. (2018), "Differences Between Male and Female Entrepreneurs in The Kingdom of Bahrain: Does Gender Matter?", *International Journal of Engineering and Management Research*, Vol. 8 No. 3, pp. 120-128.
- Schelfhout, W., Bruggeman, K. and De Maeyer, S. (2016), "Evaluation of entrepreneurial competence through scaled behavioural indicators: Validation of an instrument", *Studies in Educational Evaluation*, Vol. 51 No. December 2016, pp. 29-41.
- Sequeira, J., Mueller, S. L., & McGee, J. E. (2007), "The influence of social ties and self-efficacy in forming entrepreneurial intentions and motivating nascent behavior", *Journal of Developmental Entrepreneurship*, Vol. 12 No. 3, pp. 275-293.
- Shane, S. and Venkataraman, S. (2000), "The promise of entrepreneurship as a field of research", *Academy of Management Review*, Vol. 25 No. 1, pp. 217-226.
- Statista. (No date), *Percentage of population involved in business start-ups in Europe in 2019, by country*, Accessible: <https://www.statista.com/statistics/315502/percentage-of-population-involved-in-business-start-ups-in-europe/>
- Strauti, G., Dumitrache, V-M. and Taucean, I.M. (2018), "Entrepreneurial Competences in Economical Engineering Curriculum in Romania", *Procedia – Social and Behavioral Sciences*, Vol. 238, pp. 737-742.
- Sundararajan, L. (2020), "Strong-Ties and Weak-Ties Rationalities: Toward an Expanded Network Theory", *Review of General Psychology*, Vol. 24 No. 2, pp. 134-143.
- Tabachnick, B. G. and Fidell, L.S. (2007), *Using multivariate statistics*, 5th ed, Allyn & Bacon, Boston, MA.

- Thébaud, S. (2010), "Gender and Entrepreneurship as a Career Choice: Do Self-assessments of Ability matter?", *Social Psychology Quarterly*, Vol. 73 No. 3, pp. 288-304.
- Thomassen, M.L., Middleton, K.W., Ramsgaard, M.B., Neergaard, H. and Warren, L. (2020), "Conceptualizing context in entrepreneurship education: a literature review", *International Journal of Entrepreneurial Behavior & Research*, Vol. 26 No. 5, pp. 863-886.
- Uygun, R. and Kasimoglu, M. (2013), "The emergence of entrepreneurial intentions in Indigenous entrepreneurs: The role of personal background on the antecedents of intentions", *International Journal of Business and Management*, Vol. 8 No. 5, pp. 24-40.
- Van Auken, H., Fry, F. and Stephens, P. (2006), "The influence of role models on entrepreneurial intentions", *Journal of Developmental Entrepreneurship*, Vol. 11 No. 2, pp. 157-167.
- Varamäki, E., Joensuu, S. and Viljamaa, A. (2016), "Starting up a firm or not: Differences in the antecedents of entrepreneurial intentions", *Industry and Higher Education*, Vol. 30 No. 3, 239-249.
- Welter, F. (2011), "Contextualizing entrepreneurship – conceptual challenges and ways forward", *Entrepreneurship Theory and Practice*, Vol. 35 No. 1, pp. 165-184.
- Wennekers, S. and Thurik, R. (1999), "Linking Entrepreneurship and Economic Growth", *Small Business Economics*, Vol. 13 No. 1, pp. 27-56.
- Winkler, C., Fust, A., & Jenert, T. (2021), "From entrepreneurial experience to expertise: A self-regulated learning perspective", *Journal of Small Business Management*, 1-26.
DOI: 10.1080/00472778.2021.1883041