

Are women's entrepreneurial intentions and motivations influenced by financial skills?

Josep Lladós-Masllorens and Elisabet Ruiz-Dotras
*Economics and Business Department, Universitat Oberta de Catalunya,
Barcelona, Spain*

Entrepreneurial
intentions
among women

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Abstract

Purpose – This study aims to determine the contribution of financial skills to entrepreneurial intentions among women involved in university education.

Design/methodology/approach – Clustering and logistic regression analyses were used to infer the determinants and motivators of entrepreneurial intention in a sample of women students at a Spanish online university.

Findings – Financial and numerical skills could play a significant role in boosting entrepreneurial culture, overcoming reticence and increasing awareness of business opportunities, particularly when women are motivated to increase their autonomy and income. The study offers meaningful implications for policymakers.

Research limitations/implications – Further research will be needed before these conclusions may be inferred to other settings and circumstances. Comparison with a similar sample of potential male entrepreneurs may also be necessary to deduce the influence of gender.

Practical implications – The introduction of certain financial content into the education system by governments and policymakers would produce remarkable results on entrepreneurship intention among women.

Social implications – Relational capital and positive social influences also contribute to mitigating the effects of risk aversion, one of the main barriers for potential female entrepreneurs.

Originality/value – The role of financial literacy in entrepreneurial intention among women has scarcely been addressed in academic research. The literature also has paid little attention to the analysis of what motivates women into entrepreneurship, and whether women who decide to embark on a business venture show different profiles. The aim of this study is to contribute to closing these gaps, exploring the effect of cognitive skills, personality traits, contextual factors and motivations.

Keywords Self-employment, Entrepreneurship education and training, Womens' entrepreneurship, Social entrepreneurship

Paper type Research paper

Introduction

A growing body of entrepreneurship research is focussing on gender and seeking to determine the underlying factors that encourage women to be engaged in entrepreneurial activity. In the wake of seminal reference works on business creation by women such as Schwartz (1976) and Kessler and Mackenn (1987), gender is increasingly being adopted as a relevant factor in studies designed to analyse entrepreneurial motivation (Solesvik *et al.*, 2019).

Venture creation motivation has tended to be related to the search for opportunities in the market (Shane and Venkataraman, 2000; Kautonen and Palmroos, 2010), dissatisfaction with current employment, lack of employment opportunities (Elfvig *et al.*, 2009; Kautonen and Palmroos, 2010) and the need for achievement (Aschuler, 1967). More recently, the desire to



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improve society has been included as another motive for entrepreneurship (Smith and Woodworth, 2012; Omorede, 2014).

Regarding female entrepreneurs, it seems appropriate to expand the scope of explanatory factors beyond economic conditions (Mcgowan *et al.*, 2015; Stephan *et al.*, 2015; Cardella *et al.*, 2020). Like their counterparts, women create businesses for a wide range of reasons (Akehurst *et al.*, 2012). Previous research highlights the need to go beyond the traditional differentiation between opportunity and necessity motivation because entrepreneurs can be motivated by other drivers. In particular, work–family balance can be an important factor which motivates women to start a business. Venture creation can offer women more flexibility in work schedules, avoiding work–family conflicts (Kirkwood and Tootell, 2008; Thébaud, 2015; Rembulan *et al.*, 2016).

Cognitive and behavioural factors are also becoming increasingly relevant in research into the emergence of entrepreneurial action, with self-efficacy playing a key role when it comes to entrepreneurial undertakings. However, entrepreneurial intentions are shaped, not only by personality characteristics (Zhao *et al.*, 2005), but also by education (Liñán *et al.*, 2011). An appropriate set of skills for financial management is one of the most critical competencies in new venture creation and development (Timmons and Spinelli, 2004; Rasheed and Siddiqui, 2019). More numerate individuals may also be better equipped to process information and make complex optimal decisions. Therefore, individuals with the intention to start up a business should be prepared to embrace financial and numeracy skills effectively.

The literature has paid little attention to the analysis of what motivates women into entrepreneurship, and whether women who decide to embark on a business venture show different profiles. Studies reveal that the percentage of women who decide to pursue an entrepreneurial career is still lower than that of men and that the higher the level of education, the greater the gender gap in entrepreneurial undertakings (Elam *et al.*, 2019; Guzman and Kacperczyk, 2019; Neumeier *et al.*, 2019). Moreover, the report from the Organisation for Economic Co-operation and Development (Atkinson and Messy, 2012) points to a gender difference in terms of numerical and financial skills, concluding that men have greater numerical and financial capability compared to women.

The main research objective of this study is to contribute to closing these gaps, exploring the effect of financial literacy in entrepreneurial intention among women. We examine a sample of 205 female university students and faculty members with entrepreneurial intentions to determine how financial and numerical skills, personal traits and contextual factors influence these intentions. We also test whether different types of motivation lead to different profiles in potential female entrepreneurs and we identify the common characteristics that define these different profiles. In this way, we contribute to the existing literature by providing the significant role of financial and numerical skills in boosting entrepreneurial culture, overcoming reticence and increasing awareness of business opportunities, particularly when women are motivated to increase their autonomy and income.

The paper is organized as follows. After the introduction, section 2 provides the background, a review of the related literature and the hypotheses to be tested; section 3 describes the sample and measures used; and section 4 presents the findings of the study. Finally, section 5 provides a summary of the conclusions drawn and a discussion of limitations and future directions.

Literature review

The influence of cognitive skills, behavioural traits and contextual factors on entrepreneurial intentions

Contextual factors. Prior research has shown that the drivers of entrepreneurial motivation among women are differentiated according to individual and contextual factors (Alam *et al.*, 2011).

Individual drivers are connected to potential entrepreneurs' skills, family background and personality traits (DeMartino and Barbato, 2003; Zhao *et al.*, 2005; Bernardino *et al.*, 2018); while contextual factors refer to the influence of environmental elements such as culture, institutions and local availability of resources and role models (Shane *et al.*, 1991; Mueller and Thomas, 2001; Viveiros de Castro Krakauer *et al.*, 2018; Dileo and García Pereiro, 2019; Nowiński and Haddoud, 2019). Empirical evidence exists to show that women's decisions to embark on business ventures depend on their sociocultural background (Ahl, 2006; Moreira *et al.*, 2019). Entrepreneurial intention is also affected by barriers such as lack of support, lack of competence and fear of failure. Copious empirical evidence points to the discouraging influence of these obstacles on women (Shinnar *et al.*, 2012; Noguera *et al.*, 2013; Wieland *et al.*, 2019).

Cognitive skills. Previous studies reveal a lower propensity to start a business among women (Reynolds and Curtin, 2008; Verheul *et al.*, 2009). Entrepreneurs require confidence, leadership and managerial skills to enable them to access new markets (Okafor and Amalu, 2010). Since businesses are constantly engaged in complex decision-making activities concerning the acquisition and use of financial resources (Norton and Moore, 2006; Drexler *et al.*, 2010), entrepreneurs need to exhibit a high level of financial literacy and certain numerical ability. They face financial decisions nearly every day, such as purchasing new equipment, hiring new employees or acknowledging the possibility of project failure. Many studies have shown that cognition is an important feature of successful entrepreneurship (Allinson and Hayes, 1996; Busenitz and Barney, 1997; Allinson *et al.*, 2000; Mitchell *et al.*, 2002; Grégoire *et al.*, 2011; Lusardi, 2015; Wieland *et al.*, 2019).

Recent studies have recognized the need for financial education and literacy among business owners, entrepreneurs and society in general (Binks *et al.*, 2006; Hussain *et al.*, 2008; Njoroge, 2013; Wise, 2013; Fatoki, 2014; Li and Qian, 2019). However, the relationship between financial skills and entrepreneurship and the gender gap has been very largely under-investigated (Fauzi *et al.*, 2020; Oggero *et al.*, 2020; Ughetto *et al.*, 2020). A lack of financial literacy in nascent entrepreneurs can undermine the outcome and chances of success of their new venture. Given that women entrepreneurs find it more difficult to access financial resources to initiate their business activity (Orhan and Scott, 2001; Muravyev *et al.*, 2009; Hakim *et al.*, 2018; Basiglio *et al.*, 2019), this financial discrimination compels female entrepreneurs to fund their nascent business activity with their own personal savings (Marlow and Patton, 2005). The availability of financial skills and external support illustrates the association between entrepreneurship, gender and disadvantage. Accordingly, businesses owned by women are smaller and less prone to need or to seek external capital (Orser *et al.*, 2006). As Sullivan and Meek (2012) suggest, women entrepreneurs will probably rely less on financial measures of performance compared to men.

Women entrepreneurs tend to reveal a greater lack of confidence in relation to financial management (Gneezy *et al.*, 2009; Amatucci and Crawley, 2011), and financial literacy training improves their economic performance (Brixiova *et al.*, 2020). Indeed, women graduates are more likely to be self-employed if they have a balanced set of skills combined with a perceptible level of entrepreneurial self-efficacy (Tegtmeier and Kurczewska, 2016). Indeed, competency portfolios matter, particularly for female entrepreneurs (Camuffo *et al.*, 2012; Ughetto *et al.*, 2020). Hence, motivated by the need to fill the gap between cognitive skills and venture intentions, the following hypotheses are proposed:

- H1. Entrepreneurial intention is positively affected by cognitive skills.
- H1a. Entrepreneurial intention is favoured by numerical ability.
- H1b. Entrepreneurial intention is encouraged by financial literacy.

Behavioural traits. While cognitive skills are important in starting and running a business, the behavioural aspects of an individual should not be underestimated. There is broad consensus among researchers on the importance of entrepreneurial self-efficacy as a personal trait that appears to be a particularly important antecedent to new venture intentions (Boyd and Vozikis, 1994; Arenius and Minniti, 2005; Zhao *et al.*, 2005; Barbosa *et al.*, 2007; Hockerts, 2017). As stated in Zhao *et al.* (2005), entrepreneurial self-efficacy reveals entrepreneurs' perceptions of their own capacity to adequately respond to specific entrepreneurial challenges, particularly in uncertain environments (Engel *et al.*, 2014; Brändle *et al.*, 2018).

Some studies (Kjeldsen and Nielsen, 2000; Wilson *et al.*, 2007; Brighetti and Lucarelli, 2013) observed significant gender effects in entrepreneurial self-efficacy, risk aversion, personal traits, background and career intentions. These personal elements linked to women's experience, abilities and personality characteristics were shown to determine their lesser entrepreneurial intention compared to men. Kuratko and Hodgetts (1992) in particular state that a lack of experience and management skills prior to starting a business is a major challenge facing women when they engage in business creation. Recent literature shows that women's entrepreneurial profiles are defined by perceptions and stereotypes more than by differences in abilities or skills. Hence, behavioural differences in gender specific perceptions, confidence and preferences could explain the distinct inclination of women towards entrepreneurship (Koellinger *et al.*, 2013; Viveiros de Castro Krakauer *et al.*, 2018). Women's lesser confidence in their own skills and perceived capabilities and sense of poor external support, affecting their entrepreneurial self-efficacy, may therefore restrict the rate of women entrepreneurs (Noguera *et al.*, 2013; Dawson and Henley, 2015; Mishra, 2015).

Although various empirical studies have confirmed that entrepreneurs are risk-takers, there is no consensus in the literature about the extent of risk-taking in an entrepreneurship process. Indeed, a number of studies have shown that entrepreneurs are moderate risk-takers, taking calculated risks to avoid uncertain situations (Koh, 1996; Mueller and Thomas, 2001). While most studies find women to be more risk-averse than men, some studies report distinct findings (Byrnes *et al.*, 1999). Since there is no clear conclusion about whether men have a higher tolerance of risk than women, we cannot confirm that risk tolerance explains why women are less likely to engage in entrepreneurship. The following hypotheses are therefore proposed:

H2. Entrepreneurship is influenced by behavioural traits.

H2a. Entrepreneurial intention is positively driven by entrepreneurial self-efficacy.

H2b. Entrepreneurial intention is influenced by risk tolerance.

Both potential and existing entrepreneurs are influenced by the external environment through their motivations and perceptions, generating attitudes and intentions which, in turn, determine behaviours (Liñán, Santos and Fernández, 2011). In particular, perceptions are representations of the external environment surrounding the individual, captured by the senses and consciousness (Krueger, 2003). These perceptions exert an important effect on entrepreneurial intention.

Socially conditioned perceptions also influence entrepreneurial behaviour, providing an inferior outcome even when individual factors are similar among genders (Mueller and Dato-On, 2008; Bernardino *et al.*, 2018). Business evolution is affected because entrepreneurial motivation is important, not only for business creation, but also for company performance (Levie and Autio, 2013). Women often experience greater constraints on their economic actions relative to men that limit their capacity to take advantages of business opportunities (Kantor, 2001; Mayoux, 2001). Female-led ventures are less likely than male-led ventures to obtain venture capital (Guzman and Kacperczyk, 2019). We therefore propose the following hypotheses:

H3. Contextual factors positively affect entrepreneurial intention.

H3a. The perception of external support positively influences entrepreneurship.

H3b. Entrepreneurial intention is affected by social image.

Motivations define different profiles of potential female entrepreneurs

In the past, a number of studies have examined the motivations and challenges of women entrepreneurs. Different empirical studies identify self-identity, independence, greater wealth (Dann and Bennett, 2005; Walker and Webster, 2006), personal fulfilment and desire for flexibility over their professional and personal lives (see e.g. Mattis, 2004; McGowan *et al.*, 2015) as women's main entrepreneurial motivations.

Cultural values may shape the societal gender rules and stereotypes that define occupations considered appropriate for women (Heilman and Chen, 2003; Shinnar *et al.*, 2012), propensity for venture creation and typology of venture. Previous research suggests that women start businesses for somewhat different reasons than their male counterparts. Urbano *et al.* (2014) points out that women are less inclined to achieve economic benefits than to pursue social value. They are more likely to be involved in social than business entrepreneurship (Estrin *et al.*, 2013; Solesvik *et al.*, 2019). Family needs and the flexibility to live a more balanced life are revealed as significant drivers of female entrepreneurial motivation (Konrad and Langton, 1991; Morris *et al.*, 2006; Bosma *et al.*, 2011; McGowan *et al.*, 2012; Jayawarna *et al.*, 2013), and female entrepreneurs usually attach more importance to community impact (Buttner, 2001; Bernardino *et al.*, 2018).

Since women's entrepreneurship is extremely varied and rich in nuances (Cardella *et al.*, 2020), when women decide to launch their own business venture, their decision does not usually originate from a single motivating factor; rather, it is usually influenced by a combination of different factors. Therefore, the following hypotheses are proposed:

H4. Different motivations give rise to several kinds of female entrepreneurs.

H4a. Advanced financial skills favour the pursuit of achievement and discovery of market opportunities.

H4b. Social entrepreneurship is not related to complex cognitive skills.

H4c. Overconfidence transforms economic necessity into entrepreneurial intention.

Data and methods

Research goals and sample description

Despite the arguments described in the previous section, the role of financial literacy in entrepreneurial intention among women undergraduates has scarcely been addressed in academic research. The aim of this study is to contribute to closing this gap, exploring the effect of cognitive skills, personality traits, contextual factors and motivations. In order to collect the necessary information to construct our data set, we created a structured questionnaire consisting of 47 items designed to identify the entrepreneurial intentions of the women respondents.

This survey instrument was administered to women involved in learning processes at the Universitat Oberta de Catalunya (UOC), a Spanish university with a full online learning model. Data were collected through a self-administered online survey sent to all students and full-time professors at the end of 2018. We obtained 205 valid responses, which implies a sampling error of 6.18% (for $p = q = 0.5$, and $\alpha = 0.05$).

To prevent self-selection and non-response biases, reminder messages were sent to members of the less represented groups and an ex-post analysis was implemented to validate

the representativeness of the sample, according to age distribution and current professional status. The correlation of age distribution between the sample and the population is very high (0.916), whereas the participation of women with a job in the sample (83.4%) is similar to the university (80.4%), providing an acceptable sampling design.

Table 1 summarizes the main characteristics of the sample. Students represented almost 90% of the sample, most of whom were employed; the average age was 35; and half of the survey respondents revealed entrepreneurial intentions.

Empirical methodology and variable definition

Our research aimed to identify the determining factors which promoted new venture intentions among our sample of female students and academics. To model the probability and measure the influence and impact of personal attributes and contextual factors on nascent entrepreneurial activity, we performed a logistic regression analysis.

The original sample of active potential entrepreneurs was identified through the data collection process. The dependent variable in the model was *Entrepreneurial intention*, obtained from a combination of responses to the question of whether the participants were intending to start a new venture or had already engaged in activities to help start the business. In particular, respondents were asked about their venture intentions with a question that reads: Do you intend to take steps to start a business soon? This binary variable is equal to one for those who answered planning to do so in the near future or are currently involved in setting up a new business; and it is equal to zero for those who do not intend to create a business. Thus, nascent women entrepreneurs involved in an ongoing but not yet operational start-up were included.

The data on the explanatory variables in the model were also collected from the answers to the questionnaire. In line with previous studies, we focused on the influence of cognitive skills, personal traits and contextual factors, complementing these by testing the contribution of cognitive skills such as numerical ability and financial literacy on new venture intention.

Attribute	Women	Percentage
<i>Number of valid answers</i>	205	
18–24 years old	31	15.1
25–34 years old	71	34.6
35–44 years old	57	27.8
45–54 years old	40	19.5
Over 54 years old	6	3.0
Student	183	89.3
Faculty	22	10.7
Secondary school	39	19.0
Vocational	62	30.2
Undergraduate	70	34.1
Postgraduate	23	11.2
Doctorate (PhD)	11	5.4
Employed	149	72.7
Business owner	5	2.4
Self-employed	17	8.3
Unemployed seeking work	23	11.2
Unemployed not seeking work	8	3.9
Retired	1	0.5
Unable to work	2	1.0
Entrepreneurial intention	103	50.2

Table 1.
Sample distribution

Cognitive skills were evaluated by measuring the survey respondents' basic financial skills and numerical ability.

Financial literacy. The survey contained two sets of questions aimed at assessing financial literacy. The first set measured basic financial literacy, essentially, the ability to perform simple financial calculations. The second group of questions evaluated advanced financial literacy and, in particular, familiarity with financial products and concepts, aiming to measure a higher level of financial knowledge related to investment and portfolio choices. Most of the questions had previously been used in other studies such as the English Longitudinal Study of Ageing (Banks and Oldfield, 2007; Steptoe et al., 2013), the US Health and Retirement Survey (HRS) and the Rand American Life Panel (Lusardi and Mitchell, 2007).

Responses to questions related to financial literacy and numerical ability are reported in Table 2. We differentiated between basic financial skills and more advanced skills. With respect to the three basic literacy questions in the questionnaire, the average number of questions answered correctly was 1.2. Thus, while many of the respondents displayed knowledge of a few financial concepts, basic financial literacy was uncommon. The variable *Basic_Financ_Skills* was created as the sum of the correct responses. Accordingly, the value of the variable received a rank of 0–3.

The survey contained a further module of two advanced questions. The results showed that only a small proportion of respondents, 10%, were able to answer all the advanced financial literacy questions correctly. The percentage of incorrect answers was noteworthy, therefore. Almost half the survey respondents were unable to provide a correct answer to a single question. These findings confirmed low levels of financial literacy and are very similar to those of previous studies. As the number of related questions in the survey was two, the value of the variable *Adv_Financ_Skills* received a rank of 0–2.

Numerical ability. Considering that an entrepreneur must regularly deal with complex decisions, cognitive numerical ability is a feature that should not be neglected when studying entrepreneurial features. To measure this skill, we followed the cognitive reflection test (CRT) introduced by Frederick (2005), whereby respondents answer three questions involving numerical calculations, and the number of questions answered correctly is a straightforward measure of numerical ability. Accordingly, the value of the variable *Numerical_ability* received a rank of 0–3.

The average number of correct responses was 0.6. Two out of five respondents were unable to answer a single question correctly, revealing a low level of numerical ability.

Distribution of valid answers*				
	None	1	2	3
Basic financial literacy	26.3%	37.6%	28.3%	7.8%
Advanced financial literacy	48.3%	41.5%	10.2%	
Numerical ability	60.5%	20.0%	17.6%	2.0%

Note(s): *: Weighted number of correct answers for the basic financial literacy measure (three questions), the advanced financial literacy measure (two questions) and the numerical ability measure (three questions)

Table 2. Financial literacy and numerical ability

The behavioural traits and personality differences among the individuals in the sample were measured using two variables: entrepreneurial self-efficacy (ESE) and self-assessment of risk tolerance.

Entrepreneurial self-efficacy (ESE). The critical role of ESE in the entrepreneurship process has been widely recognized in the existing literature. As for the majority of previous ESE measure scales, we constructed a variable following [Mcgee et al. \(2009\)](#). The items measured individuals' perceived capabilities in different entrepreneurial tasks or at different stages of the entrepreneurial process, such as searching, planning, marshalling and implementing.

The searching stage covers the development of a unique idea, detection of an opportunity or viability screening. The planning stage entails measuring the ability of developing activities to convert an idea into a realistic business plan for the new venture. The questions on marshalling evaluate the skills needed to assemble resources in order to bring the business into existence. Finally, the implementing phase reflects management competencies and abilities to solve problems quickly and efficiently, launch the new business venture and ensure that the firm survives and prospers.

According to [Mcgee et al. \(2009\)](#), the implementation stage is divided into two discrete factors, representing people-management skills and financial-management skills. However, unlike other studies, we did not include questions regarding financial capability in the implementing dimension because financial skills were measured using specific variables in the model.

The different dimensions of the ESE variable were constructed from 15 items, employing a factor analysis with varimax rotation and the Kaiser normalization method. [Table 3](#) shows the results of the principal components analysis. The four different tasks were detected and the items loaded on the different factors explained 70.65% of the variance. All these factor loadings of independent variables were bigger than 0.5, and the Kaiser-Meyer-Olkin (KMO) value (0.88) revealed that the variables were appropriate for the usage of a factor analysis. Since Barlett's test of sphericity was also highly significant, we confirmed that the variables were suitable for factor analysis. Our data also confirmed the reliability of the scale, as Cronbach's alpha values (0.91) were acceptable.

Risk tolerance. We also included a personal attribute, such as risk self-assessment or personal risk attitude, in the model. One of the most widely used assessment instruments in the risk-tolerance literature is the self-assessment single-question measure, based on a question that reads: *On a scale from 1 to 5, where 1 means "very low risk tolerance" and 5 means "very high risk tolerance", how would you assess your overall tolerance for risk?*

Regarding risk self-assessment, [Table 4](#) shows that most respondents reported themselves as having between moderate and high-risk tolerance. From these answers, we created the dummy variable *Risk_Tolerance*, which takes a value of 1 when survey respondents consider they have a low or very low tolerance of risk (16.6% of the sample).

Finally, contextual factors were also considered in this study as drivers of entrepreneurial motivation. In cultures in which social relationships are important, both formal and informal institutions play a positive role in motivating and facilitating entrepreneurial intentions. Perception of social support is an important antecedent of entrepreneurial intentions ([Ajzen, 2002](#); [Hockerts, 2017](#)). A positive and motivating social environment could have a greater effect on women in particular, as women tend to be less likely to start a business ([Bosma et al., 2011](#)).

The contribution of the university, by providing external support and an environment favourable to the promotion of entrepreneurship, was tested using the variable *External_Support*, which takes a value of 1 when individuals recognize the positive influence of university services on their decision-making (48.3% of the sample). This variable may also provide information on the impact on entrepreneurial intention of subjective norms,

Factors and variables	Factor loading			
	Searching	Planning	Marshalling	Implementing
<i>Searching—(How much confidence do you have in your ability to . . . ?)</i>				
Brainstorm a new idea for a product or service	0.862			
Identify the need for a new product or service	0.858			
Design a product or service that will satisfy customer needs and wants	0.772			
<i>Planning—(How much confidence do you have in your ability to . . . ?)</i>				
Determine a competitive price for a new product or service		0.837		
Estimate the amount of start-up funds and working capital necessary to start your business		0.781		
Estimate customer demand for a new product or service		0.766		
<i>Marshalling—(How much confidence do you have in your ability to . . . ?)</i>				
Network, i.e., make contact with and exchange information with others			0.827	
Get others to identify with and believe in your vision and plans for a new business			0.730	
Clearly and concisely explain verbally/in writing your business idea in everyday terms			0.559	
<i>Implementing people—(How much confidence do you have in your ability to . . . ?)</i>				
Supervise employees				0.797
Recruit and hire employees				0.781
Inspire, encourage and motivate your employees				0.775
Train employees				0.727
Delegate tasks and responsibilities to employees in your business				0.698
Deal effectively with day-to-day problems and crises				0.660
Eigenvalue	6.988	2.033	1.291	1.083
% Variance	43.114	12.704	8.069	6.767
Note(s): Extraction method: principal component analysis Rotation method: varimax with Kaiser normalization				
KMO and Bartlett's test				
Kaiser-Meyer-Olkin measure of sampling adequacy				0.878
Bartlett's test of sphericity	1895.702			2548.098
	120			105
	0.000			0.000
Reliability statistics				
Cronbach's alpha*	Cronbach's alpha based on standardized items			No. of items
0.910	0.911			16
Note(s): *Cronbach's alpha does not improve if any of the items is deleted				

Table 3. Entrepreneurial self-efficacy

defined as perceived social pressure to engage in specific behaviours, may regulate the actions of entrepreneurs (Forster and Grichnik, 2013).

Social influences may also determine intentions or behaviours, given that individuals usually seek the approval of those in their closest circle regarding starting a business

(Liñán and Chen, 2009; Ruttman, 2012; Schlaegel and Koenig, 2014). This influence is reinforced by entrepreneurs' positive self-assessment of the social image of entrepreneurs in society. Entrepreneurship may be associated with higher levels of social recognition, stimulating a more favourable institutional environment (Dileo and García Pereiro, 2019).

This perception is revealed through the following self-assessment single-question measure: *On a scale from 1 to 5, where 1 means totally disagree and 5 means totally agree, do you consider that becoming an entrepreneur is a good career choice?* (Select your answer from a 5-point scale, where 1 means "totally disagree" and 5 means "totally agree". The dummy variable *Social_Status* takes a value of 1 when women in the sample answer that entrepreneurship is a good professional option for them. Most of survey respondents perceive entrepreneurship as an attractive career opportunity (Table 5).

Table 4.
Risk tolerance

	Answers (%)
Very low tolerance	3.4
Low tolerance	13.2
Moderate tolerance	34.1
High tolerance	42.4
Very high tolerance	6.8

Table 5.
Social status of
entrepreneurs

	Answers (%)
Totally disagree	2.4
Disagree	11.7
Indifferent	14.1
Agree	52.7
Totally agree	19.0

Results and discussion

Next, we proceeded to check the research hypotheses (summarized in Table 6).

Prior to regression analysis, the discriminant validity of all the explanatory variables was positively tested. We analysed the correlations between the independent variables and found that none of the 95% confidence intervals of the correlations contained values close to either 1 or -1. As expected, we only detected moderate correlations for the different dimensions of ESE. Consequently, no paired factors were perfectly correlated, and the discriminant validity of the measurement model was also satisfied (see Table 7).

The different logistic models show the probability of entrepreneurial intention, expressed as a dependent binary variable, as the consequence of different combinations of independent variables. The influence of each cognitive skill and behavioural trait, as predictors of the launching of a new venture, is shown in Table 8. These logistics models reveal that some skills and attributes exert a positive effect.

In particular, model 1 confirms that ESE determined new venture intention in our sample, as stated in H2a. Individuals with high levels of confidence in their skills and competencies to start a business are more likely to manifest a positive attitude towards entrepreneurship (Barba-Sánchez and Atienza-Sahuquillo, 2011).

H1 – Entrepreneurial intention is positively affected by cognitive skills
H1a – Entrepreneurial intention is favoured by numerical ability
H1b – Entrepreneurial intention is encouraged by financial literacy
H2 – Entrepreneurship is influenced by behavioural traits
H2a – Entrepreneurial intention is positively driven by entrepreneurial self-efficacy
H2b – Entrepreneurial intention is influenced by risk tolerance
H3 – Contextual factors positively affect entrepreneurial intention
H3a – The perception of external support positively influences entrepreneurship
H3b – Entrepreneurial intention is affected by social image
H4 – Different motivations give rise to several kinds of female entrepreneurs
H4a – Advanced financial skills favour the pursuit of achievement and discovery of market opportunities
H4b – Social entrepreneurship is not related to complex cognitive skills
H4c – Overconfidence transforms economic necessity into entrepreneurial intention

Table 6.
Research hypotheses

However, the splitting of ESE into the four main dimensions of the entrepreneurial process, as suggested by (Stevenson *et al.*, 1999), reveals that not all these dimensions exert the same influence on the decision to start a new business. Our study focused on entrepreneurial intention and the possibility of this intention resulting in an entrepreneurial activity, and therefore only on the dimensions of searching and marshalling, as the women participants had yet to develop a business plan or launch a new company. Accordingly, we only used the items related to the tasks of searching and marshalling in our analysis of entrepreneurial intention.

Entrepreneurs tend to have a higher tolerance of risk than non-entrepreneurs. In fact, a personality trait often cited as characteristic of entrepreneurs is their propensity to take risks. Greater confidence in their ability to perform new venture activities may lead entrepreneurs to perceive lower levels of risk or have a greater propensity to take risks (Stewart and Roth, 2001). They may be more inclined to take decisions in uncertain situations to perceive situations as less risky compared to others and to exploit as well as recognize opportunities that arise (Rauch and Frese, 2007). In fact, successful entrepreneurs enjoy discovering opportunities and taking risks, according to their different profiles (Barba-Sánchez and Atienza-Sahuquillo, 2011).

The insertion of risk tolerance significantly improves the predictive power of the model, since women with a higher degree of risk aversion are less inclined to start a new business. Hypothesis H3a was confirmed. The negative contribution of risk aversion (1.525 points) exceeds the positive effect of self-efficacy, emphasizing the critical influence of risk-propensity for women to launch an entrepreneurial career.

Table 8 also shows the favourable influence of financial literacy and other calculation skills in fostering entrepreneurial intentions (Model 2). As stated in Suparno and Saptono (2018), financial literacy increases awareness of business opportunities. ESE, particularly when combined with cognition processes such as financial knowledge and calculation, is revealed as extremely significant for new venture intentions. These cognitive and personal dimensions explain 28% of entrepreneurial intention in our sample. Consequently, hypotheses H1a and H1b were also corroborated. In our sample of women, entrepreneurial intention is positively affected by cognitive skills. Financial literacy reinforces the stimulus of self-efficacy and risk tolerance for the propensity to venture creation.

The influence of contextual factors is also verified (Model 3). Support systems from individuals' surroundings and personal networks can play a positive role because entrepreneurs do not innovate in isolation (Ruttmann, 2012). As knowledge creation relies on the ability to combine and exchange diverse kinds of information, networked relationships can improve the set of skills needed to launch a new venture. This relational capital can also

Table 7.
Correlations between
explanatory variables

	ESE_ Searching	ESE_ Planning	ESE_ Marshalling	ESE_ Implement	Numerical_Ability	Basic_Fin_Skills	External_Support	Social_Status	Risk_Self-Assessment
ESE_ Searching	1	0.008	0.495**	-0.033	-0.033	0.095**	0.190	0.176	-0.150**
ESE_ Planning	0.008	1	0.479**	0.106	-0.005	0.116**	0.267	0.271	-0.154**
ESE_ Marshalling	0.495**	0.479**	1	0.479**	0.004*	0.187	0.276**	0.203**	-0.181
ESE_ Implement	-0.033	0.106	0.479**	1	0.077	0.122**	0.191	0.050	-0.204**
Numerical_Ability	-0.033	-0.005	0.004*	0.077	1	0.166	-0.086	0.082	-0.074
Basic_Fin_Skills	0.095**	0.116**	0.187**	0.122	0.166	1	-0.015	-0.022	-0.014**
External_Support	0.190**	0.267**	0.276**	0.191**	-0.086**	-0.015**	1	0.260**	-0.195**
Social_Status	0.176**	0.271**	0.203**	0.050*	0.082**	-0.022**	0.260*	1	-0.302**
Risk_Self-Assessment	-0.150*	-0.154*	-0.181**	-0.204*	-0.074*	-0.014**	-0.195*	-0.302*	1

Note(s): **Significant at 0.01 level (bilateral)
*Significant at 0.05 level (bilateral)

Variables	β	Sig	Exp (β)
<i>Model 1</i>			
Intercept	0.202	0.222	1.223
ESE_Searching	0.573	0.001	1.774
ESE_Marshalling	0.509	0.002	1.664
ESE_Planning	0.151	0.336	1.249
ESE_Implement	0.126	0.450	1.135
Risk_Self_Assessment	-1.525	0.003	0.218
Hosmer and Lemeshow test	4.629 (Chi ²)	0.796 (Sig)	
R ² Nagelkerke	0.237		
% correctly predicted cases			
Intention	76.7		
No intention	56.9		
Total	66.8		
<i>Model 2</i>			
Intercept	-0.432	0.125	0.649
ESE_Searching	0.587	0.002	1.799
ESE_Marshalling	0.522	0.002	1.685
Risk_Self_Assessment	-1.694	0.001	0.184
Numerical_Ability	0.380	0.053	1.463
Basic_Fin_Skills	0.361	0.045	1.435
Hosmer and Lemeshow test	7.942 (Chi ²)	0.439 (Sig)	
R ² Nagelkerke	0.278		
% correctly predicted cases			
Intention	79.6		
No intention	67.6		
Total	73.7		
<i>Model 3</i>			
Intercept	-2.186	0.000	0.112
ESE_Searching	0.565	0.005	1.760
ESE_Marshalling	0.415	0.021	1.514
Numerical_Ability	0.400	0.058	1.492
Basic_Fin_Skills	0.443	0.022	1.558
External_Support	0.948	0.006	2.579
Social_Status	1.457	0.001	4.293
Risk_Self_Assessment	-1.096	0.046	0.334
Hosmer and Lemeshow test	3.290 (Chi ²)	0.915 (Sig)	
R ² Nagelkerke	0.396		
% correctly predicted cases			
Intention	78.6		
No intention	72.5		
Total	75.6		

Table 8. Influence of behavioural traits (Model 1), cognitive skills (Model 2) and contextual factors (Model 3)

enhance the illusion of control and shape the cognitive characteristics of potential entrepreneurs. According to these results, if a university provides adequate knowledge and inspiration for entrepreneurship, the chances of young women choosing an entrepreneurial career may increase, confirming the key role of education in the development of entrepreneurial intention (Turker and Selcuk, 2009).

In addition, the perception of social and family support can influence entrepreneurial intentions (Johansen, 2013), particularly when women come up against unfavourable gendered preferences on the part of potential investors (Guzman and Kacperczyk, 2019).

Our research provides empirical evidence of the way in which perceived external support and favourable assessment on the social status of entrepreneurs clearly improves the

probability of entrepreneurial intention (hypotheses H3a and H3b). The contribution of both variables is highly significant (coefficients of 0.95 and 1.45, respectively) and the model explains almost 40% of entrepreneurial intention. Women who perceive a positive assessment from their social circle to becoming self-employed will be motivated to meet these positive expectations. Hence, the academic environment is positively affecting attitudes and exerting social pressure on students to engage in entrepreneurial behaviours. This favourable influence has a greater impact on venture intention when women benefit from financial and numerical skills.

In short, entrepreneurial intention is explained as a combination of specific cognitive skills, surrounding influences and behavioural traits (Lüthje and Franke, 2004; Segal *et al.*, 2005; Gelard and Saleh, 2010). However, personal motivations also play a key role, since the intention to launch a new venture is driven by necessity as well as the desirability of becoming an entrepreneur.

As different motivations may also lead to different entrepreneurial intentions (Solesvik, 2013), an exploratory factor analysis of the overall sample, based on a principal component analysis with varimax rotation, was undertaken to identify how advanced financial skills, combined with personal attributes and an entrepreneurial background, interact with different motivations for becoming an entrepreneur.

The variable *Adv_Fin_Skills* refers to the level of advanced financial skills and is derived from the questions previously analysed in Table 2. Although a significant share of the individuals in our sample (48.3%) did not have this specific knowledge, self-confidence may counterbalance the influence of cognitive skills. As our sample was mostly composed of university students, these young potential entrepreneurs were likely to have less experience and lower levels of both business insight and cognitive skills. On the other hand, young people in general tend to have greater self-confidence, which may positively affect their entrepreneurial intentions.

We tested whether financial literacy overconfidence influences entrepreneurship, since entrepreneurs may tend to overestimate their own abilities to compensate for their dislike of market uncertainty and risk (Salamouris, 2013). We created the variable *Overconfidence* to test this effect. The variable was calculated from the difference between the evaluation of financial knowledge, obtained from our respondents' answers to the five financial literacy questions and their self-assessment of their financial knowledge, obtained from their answers to the following question: *On a scale from 1 to 5, where 1 means "very low" and 5 means "very high", how would you assess your overall financial knowledge? (S. your answer on a 5-point scale, where 1 means "very low" and 5 means "very high")*.

Table 9 describes the frequency of this variable, obtained from the difference between actual knowledge and perception, with values from +3 to -3. The dummy *Overconfidence* takes a value of 1 when this difference is negative, showing the respondents' overconfidence in their own financial skills (13.2% of the sample).

In addition to financial literacy and trust, the factor analysis also tested the influence of previous experience and role models, using other dichotomous variables. The variable *Past_Exp* takes a value of 1 when respondents state they have experience in new venture creation (affirmative answer to the question, *"This is not my first venture"*), which was the case for 5.9% of the surveyed women. Close contact with other entrepreneurs was also considered in the analysis. Several authors (Liao and Welsch, 2003; Altinay and Altinay, 2006; Pruett *et al.*, 2009) suggest that the proximity of an entrepreneurial family member raises entrepreneurial intentions because such individuals may serve as role models. Consequently, the variable *Role_Model* takes a value of 1 when survey respondents give an affirmative answer to the question, *"I have regular contact with entrepreneurs, such as my parents or other family members"* (76.1% of the sample).

Since the motivations underlying entrepreneurship are complex, the different typologies of entrepreneurial motivations were analysed beyond the traditional opportunity-necessity differentiation (Stoner and Fry, 1982). Our perspective was multidimensional, evaluating entrepreneurship motivations according to responses to the following question: *If you are actively engaged in starting or running a new business, what was the main motivation for your decision? Dissatisfaction with current occupation; Taking advantage of market opportunities to achieve a higher income and greater wealth; The lack of alternative job options; The desire for autonomy and independence; or Making a difference in the world and improving society* (see Table 10).

From our respondents' answers to this question, we included two dummy variables in the factor analysis to consider the motivations given for starting a new venture. The variable *Mot_Improv* identifies the pursuit of achievement and autonomy as the main drivers of entrepreneurial intention, taking a value of 1 when survey respondents indicate one of the following two reasons for becoming an entrepreneur: "Taking advantage of market opportunities to achieve a higher income and greater wealth" or "Desire for autonomy and independence". Social entrepreneurship, aimed at improving society, is also emerging as a new and non-economic driver of new venture intentions (Spear, 2006). The variable *Mot_Soc* identifies social motivations, taking a value of 1 when individuals indicate the following reason for becoming an entrepreneur: "Making a difference in the world and improving society". Although the quantity of women involved in social entrepreneurship is very low, we employ this variable in the cluster analysis due to the distinctive attributes of these entrepreneurs. Previous findings reveal that social gains are the primary motivators for these entrepreneurs (Carsrud and Brännback, 2011) and personality traits could explain some of the behavioural differences in the social entrepreneurship field (Rauch and Frese, 2007).

This analysis was performed for the 103 women, 96 of whom were students intending to start a new venture in the near future. Table 11 displays the results of the factor analysis with varimax rotation. Only the commonalities between independent variables and factors greater than 0.4 are displayed in the table. We obtained three factors with eigenvalues greater than 1. These three factors, extracted through principal components analysis, explain 63.9% of the total variance.

Value	Answers (%)
-3	0.5
-2	1.5
-1	11.2
0	35.6
+1	38.0
+2	11.2
+3	2.0

Table 9.
Overconfidence in financial skills

Dissatisfaction with current occupation	3.9%
Taking advantage of market opportunities to achieve a higher income and greater wealth	13.2%
Lack of alternative job options	5.4%
Desire for autonomy and independence	37.1%
Making a difference in the world and improving society	5.9%

Table 10.
Motivations for becoming an entrepreneur*

Note(s): *: 34.5% of survey respondents did not answer the question

Table 11.
Matrix of rotated
components*

	Factor loadings		
	1	2	3
Mot_Improv	-0.637		0.400
Mot_Social	0.827		
Past_Experience	0.598		
Role_Model		0.776	
Overconfidence		0.677	
Adv_Fin_Literacy			0.945
Eigenvalues	1.618	1.172	1.045
% Variance explained	26.961	19.528	17.416

Note(s): *Values below 0.4 are omitted

On the basis of these factor scores, we were able to describe the three different factors. The first factor was highly saturated with social entrepreneurship motivations, though there was a small amount of interest in taking advantage of market opportunities. The variable *Past Experience* also appears with a high positive loading, indicating that previous knowledge about the entrepreneurship process provides the expertise to promote new social welfare venture intention. Accordingly, we denoted this factor as *Social Entrepreneurship*.

The second factor includes two variables related to contextual factors and personal characteristics of individuals. Close contact with entrepreneurs encourages students to have confidence in their own skills and competences and drives entrepreneurial intention. Consequently, we named this factor *Overconfidence*.

The third and final factor involves the highest values for the advanced financial literacy variable. The improvement and achievement motivations also reflect a significant loading for this factor. Both variables reflect the weight of financial skills in the ability to detect market and professional career opportunities. Hence, we called this factor *Search for Improvement*.

To establish a typology of women entrepreneurs in terms of their motives for starting a business, we performed a K-means cluster analysis, using the motivational and personal items identified in the factor analysis combined with information about each respondent's level of education (undergraduate, vocational or technical education, or graduate), business studies (if any), age (in a five-year scale from 16 to over 60) and professional status (low income, medium income or unemployed). Results should be taken carefully due to the limited size of the sample.

The best solution, in which clusters are maximally different from one another but contain elements with minimal differences, is provided by four different clusters. The interpretation of each group reflects the values adopted for each factor and variable, according to the centroids of the different clusters. Table 12 provides information about the characteristics of each cluster, confirming that different motivations give rise to several kinds of entrepreneurs. Differences between the groups were computed using an analysis of variance (ANOVA) analysis. The mean values of all variables were statistically different among clusters, except in the case of the unemployed respondents.

The combination of these elements may provide different patterns of entrepreneurial behaviour. Motivations, skills, expertise, self-evaluation and contextual factors interact, shaping the identity and attitudes of individuals and finally becoming drivers for entrepreneurial intentions (Fauchart and Gruber, 2011). Thus, cluster 1 contains 31 entrepreneurs characterized by the search for improvement. These women were motivated to make the most of a business opportunity or by the need for professional autonomy and personal achievement. The older respondents were found in this group, most of whom had

	1	2	3*	4	ANOVA (sig.)
Social_Entrepremen	-0.12161	-0.31701	3.36148	-0.19135	0.000
Overconfidence	0.00956	0.78796	-0.23386	-0.62589	0.000
Search_Improv	0.73397	-0.21699	0.08240	-0.46493	0.000
Undergraduate	0.29	0.07	0.50	0.31	0.038
Voluntary Education	0.10	0.70	0.17	0.22	0.000
Graduate	0.52	0.20	0.33	0.44	0.067
Low_Salary	0.35	0.80	0.50	0.47	0.004
Intermediate_Salary	0.55	0.13	0.17	0.06	0.000
Business_Education	0.32	0.70	0.17	0.06	0.001
Unemployed	0.00	0.03	0.00	0.11	0.169
Age	3.74	2.27	2.67	1.81	0.000
Number of women entrepreneurs	31	30	6	36	

Note(s): *Cluster 3 is not included in the analysis due to the low number of observations

Table 12.
Cluster analysis results

graduated and were currently placed in well-paid jobs. New venture intentions respond to a desire for self-realization. Entrepreneurial alertness is the ability to detect opportunities that have been overlooked by others (Kirzner, 1997). This opportunity identification process relies mainly on individual cognition (Mitchell *et al.*, 2002).

In particular, financial literacy differences determine entrepreneurial ability and alertness, encouraging entrepreneurs to recognize and value opportunities (Venkataraman, 1997; Shane and Venkataraman, 2000). The advanced financial skills of these entrepreneurs favour the search for achievement and detection of market opportunities, confirming our hypothesis H4a.

As logistic regression has made clear that new venture intentions among students with inferior skills and poor ESE are manifestly lower, entrepreneurship in these cases would be closely related to economic necessity and a vulnerable labour situation. For these individuals, overconfidence and support from social circles and institutions may become a critical factor in improving their perception of their ability to become self-employed.

In effect, cluster 2 included 30 women attracted to entrepreneurship as a result of economic necessity and personal growth. A high confidence in their own skills, based on technical and business education, combined with close contact with other entrepreneurs, encourages young women employed in low-paid jobs to take risks in pursuit of professional autonomy and higher incomes. In the absence of advanced financial skills, overconfidence has the capacity to transform economy necessity into entrepreneurial intention.

Perceived behavioural control reveals the confidence of these individuals in their capabilities and their ability to control new venture outcomes, even when their endowment of advanced financial skills is limited. This perceived behavioural control improves when the individual has a role model in their closest environment. Consequently, hypothesis H4c is corroborated.

Hypothesis H4b refers to social entrepreneurship and the desire to contribute to community welfare (Carsrud and Brännback, 2011). Although the results seem to confirm that social entrepreneurship may not necessarily be related to complex cognitive skills, the reduced number of observations is an overwhelming obstacle to corroborate the hypothesis. Cluster 3 does not allow to draw a conclusion.

Cluster 4 is the largest, consisting of 36 entrepreneurs. In our sample of female students, new venture intention was significantly driven by poor labour conditions for the younger women. Although most of the entrepreneurs in the sample had yet to graduate, they were motivated by lack of employment opportunities, difficulty in finding an interesting occupation or to escape from a low-paid job. The pursuit of financial autonomy or economic security describes this cluster.

Conclusions

The purpose of the present paper is to explore the motivations and determinants of potential female entrepreneurs in a sample of university students. Our findings confirm that financial and numerical skills could be an extremely significant instrument in promoting a more entrepreneurial culture in society. The introduction of certain financial content into the education system by governments and policymakers could therefore produce remarkable results.

Entrepreneurial intention is explained as a combination of specific cognitive skills, personal traits and surrounding influences. Our findings show that basic financial skills and numerical ability are extremely significant for new venture intentions when these are combined with ESE. Relational capital and positive social influences also contribute to mitigating the effects of risk aversion, one of the main barriers for potential female entrepreneurs.

Motivations have a crucial impact on the launching of new ventures, since while intention may stem from desire for greater autonomy or social improvements, it may also arise out of economic necessity. The existence of different typologies of potential entrepreneurs has been detected. This study provides evidence that the endowment of advanced financial skills increases awareness of business opportunities for women seeking a higher income or greater autonomy.

This research highlights the importance of education policies reinforcing the development of financial and numerical skills to promote entrepreneurial intentions among women, but the benefits of training in the ability to make appropriate financial decisions transcends the launching of new ventures. Financial literacy is knowledge and understanding that enable sound financial decision-making and effective management of personal finances in periods of uncertainty and challenges, such as the current pandemic environment. New evidence reveals that the coronavirus disease 2019 (COVID-19) pandemic has financially impacted women more so than men (Alon *et al.*, 2019; Madgavkar *et al.*, 2020; Yakoboski *et al.*, 2020), calling for action to policymakers and education community to develop training programmes and other interventions that result in positive financial outcomes for women and society as a whole.

A number of limitations should be mentioned. As our study is focused on a sample of university students and professors, the level of education, expectations and motivations are probably over the average. These characteristics have also to be considered to interpret and extrapolate the findings. In addition, as previously mentioned, the small size of the sample may influence the results. Consequently, and given that the study has analysed entrepreneurial intentions in only one specific online university, further research will be needed before these conclusions may be inferred to other settings and circumstances. Comparison with a similar sample of potential male entrepreneurs may also be necessary to deduce the influence of gender.

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Corresponding author

Josep Lladós-Masllorens can be contacted at: jlladosm@uoc.edu

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