



Article

Never Too Late to Learn: How Education Helps Female Entrepreneurs at Overcoming Barriers in the Digital Economy

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Abstract: The study of Entrepreneurship Framework Conditions (EFC) has found that training and education have, among other things, a positive effect on overcoming barriers when starting your own firm. Our research can be placed in this line, but with an added specificity, since it is focused firstly on women and secondly on the digital economy. Thus, we have studied the situation of women entrepreneurs in the digital economy in Spain, asking them about their personal traits, the characteristics of their ventures and the barriers they encountered. We have studied the effect of EFCs on overcoming barriers to entrepreneurship, with a special focus on training and entrepreneurship education. In addition, the effect of self-efficacy perception (the conviction of having the necessary skills to start a business) on overcoming barriers to entrepreneurship has been factored in. After the implementation of a Structural Equation Model (SEM), we show that training helps female entrepreneurs in the digital economy to overcome barriers to entrepreneurship, especially after the mediation of their self-efficacy perception, which is increased by specific entrepreneurial training. We can conclude that policy recommendations to counteract the gender gap in entrepreneurship with specific training should be promoted, specifically in such a strategic sector as the digital economy.

Keywords: female entrepreneurship; digital entrepreneurship; education; training; overcoming barriers; Structural Equation Model (SEM)



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1. Introduction

Despite a narrowing divide between men and women in entrepreneurship, there is a persistent lower participation of women as entrepreneurs. According to the Global Entrepreneurship Monitor-GEM World Report 2019, for every 10 male entrepreneurs in Spain, there are 9 female entrepreneurs, and the ratio in the total of the European Union is 6 women for every 10 men [1]. This difference becomes more acute in traditionally male-dominated sectors, such as IT and associated digital activities. However, as developed economies become increasingly digital, this gender gap takes on a much broader dimension. Only 39% of startups in Spain have at least one female entrepreneur on their team, compared to an average of 36% in Europe and 50% in Latin American Countries [2].

This is bad news because the digital economy is the future and contributes greatly to economic development as it has been seen during the COVID-19 crisis, in which an imposed behavioral change and lock-downs around the world has led to dramatic transformations in the economy and social interactions in most countries. Not only is the digital economy expected to be the primary driving force for economic growth in the near future, but it also has shown to give birth to the most disruptive enterprises. Taking into consideration these characteristics of digital enterprises, together with the comparatively low participation of women as entrepreneurs in the digital economy, it becomes clear how leaving great parts of the population behind would deny them important opportunities for growth and

increase general gender discrimination. Therefore, the impact of reducing the gender gap would have a great effect on social equality and, furthermore, on the economy at large [3]. Additionally, in global economic terms, it would mean a poor use of the human resources and creative potential available in our society. As we will see, there has been a lot of work on this topic, but it still deserves further research, specifically focused on these high growth opportunity ventures. A better understanding of the specific barriers female entrepreneurs encounter and how they have managed to overcome them would allow us to give useful policy recommendations to counter this situation.

In order to do so, we have studied the situation of female entrepreneurs in the digital economy in Spain, asking them about their personal traits, the characteristics of their ventures and the barriers they encountered. These enterprises are included in the so-called “technology-based companies” or new technology-based companies (NTBCs) because they base their activity on technology. Technology-based companies are, according to Storey and Teher [4], those of small size and independent ownership that operate in sectors related to new technologies. More precisely, the digital entrepreneurship concept can be associated with new internet-based products and services [5]. These services run only in the cloud, using big data or artificial intelligence. In this type of companies, technology is an entry factor, high growth is pursued and to quickly stand out from competitors is key—a set of specific needs different from non-technology-based firms [6]. All the entrepreneurs included in our sample could be categorized under this type of entrepreneurship.

The research was designed based on a thorough review of the extant literature on the topic, which led us to believe in the importance of the Entrepreneurship Framework Conditions (EFC), as coined by the Global Entrepreneurship Monitor (GEM) [7]. However, we have taken these conditions not only to examine levels of new business creation, as is done in the GEM, but to study how they help at overcoming barriers. More specifically, as prior studies have done, we focused on examining education and self-efficacy, whilst describing the existing EFCs. These measures are also included in the tool employed by the GEM, the National Experts Survey (NES), which includes indicators relating to Entrepreneurship Education [8]. In line with this benchmark survey, the questionnaire used in this study included indicators relating to entrepreneurship education at post-secondary level, commercial and legal infrastructure, entry regulations, government entrepreneurship programs and entrepreneurial finance. Whilst being similar in their approach, there are two important differences between the NES and our questionnaire. Firstly, GEM directs the NES to experts, while ours gathered data from entrepreneurs. Secondly, the NES is conducted by doing personal interviews, whilst our questionnaire was answered online.

The link between general education and entrepreneurship has been studied by several authors, and there is consensus on its positive effect on entrepreneurship [9,10]. Furthermore, a number of studies on specific entrepreneurship training exist and examine the relationship between levels of entrepreneurship training and new venture creation [11], also highlighting the importance of specific training in the field of entrepreneurship. Our research can be placed in this line of research, but with an added specificity, since it is focused, firstly on women and, secondly on the digital economy. The digital economy is of growing importance in Spain, where it already is responsible for 9% of GDP (2019) directly and 18.7%, if we consider indirect effects. This places the Spanish economy above the world average of 16% (2017) and relatively close to the 22% (2017) registered in the USA [12].

We will study the effect of EFCs on overcoming barriers to entrepreneurship, with a special focus on general and entrepreneurship education. In addition, we will take into consideration the effect of self-efficacy perception—the conviction of having the necessary skills to start a business—related to education. Prior research points towards this relationship between general education level and specific training and self-efficacy perception of the entrepreneur [13].

Our premise will be that female entrepreneurs in the digital economy may overcome a set of barriers for establishing their own firm with a set of specific entrepreneurial education

and training, such as coaching and mentoring. We will also consider that this relationship could be mediated through the increase in the entrepreneur's self-efficacy perception. This empirical study has been conducted at the beginning of the year 2020 in Spain.

We will conclude our work by stating policy recommendations to counteract the gender gap in entrepreneurship, specifically in such a strategic sector as the digital economy.

2. Theoretical Framework

The present study can be placed in the field of Entrepreneurship Self-Efficacy (ESE) research, which has shown to be of growing interest in regard to finding the origin of greater entrepreneurial activity. Studying the question of what influences individuals to start their own business has taken different perspectives, from the individual or micro level to the environmental factors or macro level. Our paper may be located at the intersection of both these approaches, since it tries to clarify how entrepreneurs' intimate motivations are influenced by external factors. More specifically, what role education and training plays, not only in the decision of engaging in entrepreneurial activity, but also in succeeding at it.

As Newman et al. [14] have presented very clearly in their comprehensive review of the studies on the topic of ESE, there are a number of antecedents of self-efficacy, which then lead to a perceived desirability of engaging in entrepreneurship and, in turn, affect venture creation, entrepreneurial behavior and success. Whilst most research concentrated on the effect of ESE on startup creation, our intention is to examine its role in overcoming barriers to entrepreneurship. This perspective is a contribution in that direction, which extends the perspective of the intention to launch a new venture. Furthermore, we have selected specific training and education, even if other variables were also introduced as control variables, which were previously found to be relevant for self-efficacy and entrepreneurial motivations.

Furthermore, on average, women are less represented in the digital compared to the whole of Spain (42.7% vs. 46.3%) [15]. It has become an important issue, taking into account that only 24 out of every 1000 female graduates decide to study an ICT-related subject, of which only six go on to work in the digital sector [14]. Gender stereotypes are preventing women to choose careers with a high level of mathematical content, as well as to seek jobs in higher paid digital sectors [15–17]. So, in the case of female entrepreneurs in the digital economy, they need to face not only the gender burdens related to entrepreneurship but also to overcome the stereotypes associated with women working in an ICT field.

It is our goal to contribute with significant policy recommendations. As previous studies have highlighted, ESE can be promoted by external factors [18] and we therefore intend to identify those factors in order to recommend their use in aiding female entrepreneurs in the digital economy and closing the gender gap. In the following section, we will review the perspectives taken on ESE by previous studies and derive our hypotheses from them.

2.1. Self-Efficacy Perception and Its Impact on Overcoming Entrepreneurial Barriers among Female Entrepreneurs

Bandura [19,20] has conceptualized self-efficacy as the expectations one has about one's abilities to complete a task related to a specific goal. Women's higher self-imposed standards, associated with their decisions of whether to apply for top managerial positions or establishing their own firm, can come from the fact that women generally judge themselves as being less suitable than men for many non-traditional occupations [21–23].

Leadership positions are often believed to require agentic qualities (i.e., speaking assertively, competing for attention, influencing others) that are traditionally more associated with men. By contrast, communal qualities (i.e., accepting others' direction, supporting and soothing others, contributing to the solution of relational and interpersonal problems)—which are not usually considered important for leadership success—are, traditionally, associated more with women. It has been argued that, since agentic qualities are the typical qualities needed to succeed as a leader, the mismatch between the traditional female gender role and the leadership role could raise internal barriers that would prevent more women from considering themselves to be ready for management positions [24]. Women

could decide not to apply for a job or against creating their own company if they believed they lack the listed qualifications, while their male counterparts could go forward if they possessed even a few of the skills that match the listed requirements [25].

Such insight into self-efficacy is especially relevant to an understanding of female behavior, as it relates to the decision to apply for a leadership position or establish their own firm, given the role and gender [26] stereotypes women face, and which can threaten their levels of perceived efficacy. This lower self-efficacy perception, in relation to success in traditionally male tasks (s.a. running one's own firm successfully), means that not only must women contend with the negative view that others hold of their competence in traditional male domains, but they also have to contend with their own negative self-views [27]. This does not mean, however, that the relative absence of women entrepreneurs is at the fault of women, but rather a consequence of women who are actually internalizing the prominent values relating to gender and management (i.e., the 'think manager-think male' phenomenon). Indeed, Schein [28] examined this phenomenon in the international arena, finding it is a pervasive phenomenon that exists among men and women.

In this regard, Koellinger, Minniti and Schade [29] show that the lack of confidence among women in their own entrepreneurial skills is a major reason for the gender gap in start-ups. After analyzing 30 OECD countries, the authors conclude that only 33% of men say that fear of failure would prevent them from starting a business, compared to 40% of women. Furthermore, Coleman and Kariv [30] point out, after analyzing 1214 firms, that female entrepreneurs need higher levels of self-efficacy perception in order to overcome their perceptions of institutional barriers for securing financial capital and growing their firms.

Lastly, Dempsey and Jannings [31] claim that this lower entrepreneurial self-efficacy of women is attributable to their lower prior entrepreneurial experience and their higher likelihood of receiving failure feedback. According to the authors, the four major factors known to contribute to self-efficacy in general are enactive mastery, vicarious experience, physiological arousal and verbal persuasion, helping in equal measures, men and women, at overcoming their entrepreneurial self-efficacy perception. Thus, it could be expected that women with higher self-efficacy perception (i.e., the ones who tend to believe in their own capabilities as entrepreneurs more) are more likely to overcome the barriers required for establishing their own firm as represented in Figure 1 by the positive sign. In this study we will analyze whether women with higher self-efficacy perception will overcome the different difficulties they may face when establishing their own firm in the digital economy.

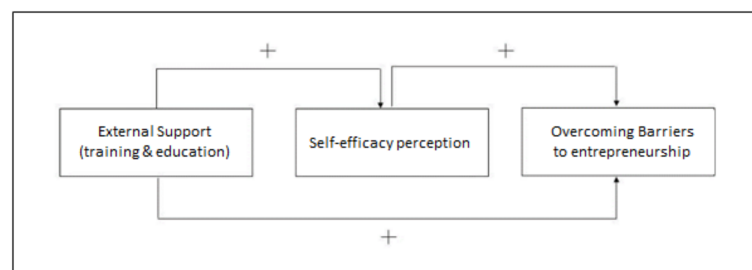


Figure 1. Theoretical Model of the effect of internal support at overcoming barriers to entrepreneurship. Women with higher self-efficacy perception are more likely to overcome the barriers required for establishing their own firm, represented by the “+” sign. Source: Own elaboration.

In summary, for a better understanding of how external support helps female entrepreneurs to overcome barriers to entrepreneurship, we propose the following hypothesis:

Hypothesis 1 (H1). *Self-efficacy perception has a positive effect on overcoming barriers to entrepreneurship for female digital entrepreneurship.*

2.2. Entrepreneurship Education and Training and Its Impact on Overcoming Entrepreneurial Barriers among Female Entrepreneurs

One obvious external support factor for entrepreneurship is education. The accepted rationale is, based on the psychological entrepreneurship model, that the better a person's education is, the more skills this person will have to build his or her own enterprise. In addition, a broader set of general skills will allow the individual to spot opportunities faster and hence lead them with more likelihood to become an entrepreneur. Lastly, great emphasis has been put on the importance of specific training on entrepreneurship and business administration, arguing that the more someone knows about the topic, the more likely he or she will be to see entrepreneurship as an attractive career option, versus a company job. In addition, these skills will increase the likelihood of success. With regards to the broader social context, entrepreneurship training also positively impacts the image of the entrepreneur in society, promoting a culture of entrepreneurship. This in turn would reward the choice of starting one's own firm instead of regarding it as a poor alternative to paid work in an organization.

The impact of education on entrepreneurship is regularly measured and published in the Global Entrepreneurship Monitor and has been examined in detail by one of the report's original authors [9]. In their study, the authors found that indeed, in developed countries, higher levels of post-secondary entrepreneurship education had a positive effect on new business activity, including high-growth expectation ventures (such as the ones examined in our case). Furthermore, Levie and Autio [10] were able to determine that the studied consequence of education had its effect more through enhanced opportunity perception and less so through its perceived start-up skills.

Specific entrepreneurship education has also been proven to be a key element for increasing entrepreneurial intention. Farashah [32] stated that Entrepreneurship Education and Training (EET), such as awareness programs like career options and sources of funding, informal inspirational programs like interviews with entrepreneurs and field trips, active experimentation like consulting with entrepreneurs and computer simulation, and skill building courses and theoretical courses offered formally by universities, are key factors that contribute to this initiative [33].

Lastly, according to Heinonen and Poikkijoki [34] EET contributes to entrepreneurial intention by pursuing three objectives: learning to understand entrepreneurship, to act in an entrepreneurial way and to become an entrepreneur. It is not only about boosting the entrepreneurial intention but making the entrepreneur more successful in the new activity. In this regard, Jimenez et al. [13] conclude that the effect of this specific education on formal entrepreneurship is a consequence of higher self-efficacy perception, lower perceived risk and enhanced human capital.

Based on the above rationale, to evaluate the effectiveness of external support, such as specific training and entrepreneurial education, on overcoming the barriers, we formulate the following hypothesis:

Hypothesis 2 (H2). *Entrepreneurship training has a positive effect on female digital entrepreneurship at overcoming barriers to entrepreneurship.*

With regards to self-efficacy's role in overcoming barriers to entrepreneurship, we can see that it is an important variable for predicting future performance. In this sense, Wilson et al. [35] stated that when individuals undergo an entrepreneurship training, their more favorable perception of entrepreneurship can be attributed, at least partially, to the belief in their own abilities to perform entrepreneurial tasks and roles.

As one would generally expect, education is fundamental when raising and strengthening an individual's self-efficacy, which in turn is of critical importance in the pursuit of personal growth and development [36,37]. In this sense, Moen and Allgood [37] study the impact of a one-year executive coaching experiment in a Fortune 500 Company. This intervention increased the coachee's self-efficacy, boosting their leadership role.

According to Bergman et al. [38], entrepreneurial self-efficacy and entrepreneurial education seem to have a reciprocal relationship. As stated by the authors, the former influences individuals' tendencies to become entrepreneurs and to enroll in an entrepreneurial education program; reciprocally an entrepreneurial education may enhance entrepreneurial self-efficacy because of the acquired skills and experiences. Thus, coaching and mentorship programs may increase self-efficacy perception via social persuasion, imaginal experiences and physical and emotional states [37].

Furthermore, training and vicarious experience are intimately related, and it has been found that the latter is boosted by the connection with startup incubators and entrepreneurs' networks [39] and through the exposition to role models [40]. A role model is a reference whose behavior, example or success may inspire other individuals to make decisions and achieve goals [41]. According to social learning theory [18], role models could empower individuals, fostering self-efficacy perception through the observation of others with whom the individuals could identify themselves, making them believe that they too possess capabilities to achieve comparable goals. In fact, when asked why they started their own business. Entrepreneurs often answer that 'others' significantly influenced their decision, amongst which other entrepreneurs, family members or informal mentors are found. Therefore, previous exposure to successful role models plays a crucial role in the development of entrepreneurial intentions [42]. The intervention of role models in the early stages of the individuals' careers, for example in the university, could make the difference and increase students' intention to start their own business [43–45].

Consequently, role models' interventions could foster entrepreneurial intentions, which is even more important in the case of women as they have fewer entrepreneurial role models and less social support, as stereotypes still push women away from entrepreneurship [46]. Considering that gender stereotypes appear in adolescence, around the age of 12 according to Sainz, Pálmen, and García-Cuesta [47], it becomes crucial to provide young women with early-age entrepreneurship education and opportunities to engage with female role models [48]. This is especially relevant in the Systems, Telecommunications, Engineering and Mathematics (STEM) fields, since there is a wider gender gap than elsewhere [49]. The role of the entrepreneurship educators in promoting the development of students' entrepreneurial competences and intentions becomes a crucial element [50,51].

In this regard, Chowdhury and Endres [52] found that entrepreneurial education played a more significant role for women than for men when measuring entrepreneurial self-efficacy. The authors measured this entrepreneurial education by comparing graduate and undergraduate students that took part in a business simulation. Further, Wilson et al. [35], also measured it through the concentration of certain subjects in a sample of MBA students. Both studies strongly support the importance of well-designed entrepreneurial education for improving entrepreneurial self-efficacy among women.

We can conclude that entrepreneurship training and education, in its different forms, ranging from formal university undergraduate and postgraduate training to vocational initiatives has a positive effect on ESE [14]. In addition, students' perceptions of different support mechanisms from the entrepreneurial ecosystem, such as educational support or institutional support, all correlate positively with ESE [53].

Lastly, the effect of ESE as a moderator has been studied by Gielnik et al. [18], who found that ESE sustains the positive influence of entrepreneurship training on entrepreneurial passion, leading to higher rates of business creation. Concludingly, we would therefore expect to find a similar pattern for the case of women entrepreneurs in the digital economy, even if this particular case needs to be validated. This leads us to our H3 hypothesis, which we formulate as follows:

Hypothesis 3 (H3). *Entrepreneurship training has a positive effect on self-efficacy perception for female digital entrepreneurs.*

3. Methodology

3.1. Sample Selection

This study focuses on female digital entrepreneurship in Spain, which accounts for only 14% of total digital entrepreneurship. The aim of this study is to analyze the barriers women have when founding their own firms, examining the role that a set of specific environmental framework conditions (EFCs), such as entrepreneurial education and training or coaching and mentoring.

Thus, we conducted a questionnaire, seeking to contrast the barriers commonly cited in the literature for female entrepreneurship. The questionnaire was sent to female entrepreneurs in the digital economy that were part of WStartup Community, a Spanish Association whose main purpose is to connect women who start up in the STEM field. The questionnaire was received by 326 and answered by 161 female digital entrepreneurs, which gives us a response rate of 49.4%.

3.2. Study Design and Procedure

Our method selection is in line with the most commonly applied tools for ESE measurement, developed by Chen et al. [54], in which factor analysis was applied in order to group together a 22-item multidimensional measure. However, we decided to adapt the indicators to the specific sector this study focused on, namely the digital economy, and the particular focus on training and education. Nonetheless, we also found that many variables are common to all areas of entrepreneurship.

The questionnaire consisted of 45 questions grouped into four blocks: profile of digital companies founded by women, main sociodemographic characteristics, motivations for entrepreneurship and main barriers, challenges and needs. This questionnaire was tested and revised before its publication and the data were subsequently processed using IBM SPSS Statistics 24 and Smart PLS.

For the analysis model, we used a Structural Equation Model (SEM) which enabled us to estimate the chains of causal relations defined between the latent variables that are not observable using statistical methods [55]. The latent variables are reflected by the manifest variables or measurable variables from which the information is taken, so that they can be estimated. SEM provides a better understanding of the complex human and behavioral issues, that cannot be easily explained by single relations [56].

The empirical strategy was as follows. First, the relationship between self-efficacy perception and overcoming barriers to entrepreneurship for female digital entrepreneurs was tested (H1) by using structural equation modelling. Next, the relationship between training and support among female entrepreneurs and overcoming barriers was examined (H2). Finally, we tested if entrepreneurship training and support had a positive effect at overcoming barriers based on self-efficacy perception (H3).

3.3. Measures

The present study uses reflective variables (see Table 1) since these meet the aims of the research [57]. Indicators and observable variables are a reflection or expression of the constructs, that were not observed directly but were linked to the selected indicators [58].

Table 1. Description of the variables, indicators and authors.

Variable	Indicator	Definition	Literature
External support	External_support_1	Public initiative to foster entrepreneurship	[59–66]
	External_support_2	Access to training on business creation	
	External_support_3	Support for bureaucratic and legal procedures	
	External_support_4	Support for the search for financing in times of COVID (*)	
	External_support_5	Access to additional training resources for start-ups	
	External_support_6	Support received from Business Angel (*)	
	External_support_7	Getting entrepreneurship training	
	External_support_8	Seeking support for entrepreneurship (incubators, accelerators, entrepreneurship centres) (*)	
	External_support_9	Access to financing for the growth of my business	
	External_support_10	Getting support from associations (*)	
Self-efficacy perception	Self_efficacy_1	Ability to carry out administrative procedures	[67–69]
	Self_efficacy_2	Lack of knowledge in business creation was not a barrier for me	
	Self_efficacy_3	Perception of having enough capacities to undertake	
Overcoming_barriers	Barrier_1	Legal procedures	[70–72]
	Barrier_2	More demanding because of being a woman (*)	
	Barrier_3	Legal framework that fosters business' creation	
	Barrier_4	Access to social networks in the sector	
	Barrier_5	Access to sources of early financing	

Note: (*) Indicators not significant in the empirical model. Source: own elaboration.

In SEM's deductive procedure, the researcher proposes a priori the indicators that will form each construct, before subsequently ruling out those which fail to meet certain internal consistency criteria: reliability, convergent validity, and discriminant validity. This type of statistical technique has been used in multiple studies that try to explain the reasons to start a new business [73,74]. In our model, we propose the following three latent variables:

- I. External_support: exogenous latent variable indicating how female entrepreneurs receive direct or indirect support from a third party, which is measured using six indicators.
- II. Self-efficacy Perception: endogenous latent variable, which is measured through three indicators and reflects the self-esteem and confidence of female entrepreneurs, which is measured using three indicators.
- III. Overcoming_Barriers: considered as an endogenous latent variable, reflecting the external and internal barriers that women need to overcome when they want to start up. In order to measure it, we use four indicators.

4. Results

4.1. Measurement Model Evaluation

Reliability aims to test the absence of error in the model, and specifically to determine how accurate the measuring instrument is, so that if the instrument is reliable, the value of the various measures repeated on the same object will be the same. Reliability is taken into account at the indicator level and at the construct level.

The individual reliability of each indicator or manifest variable is tested by examining the weights obtained by PLS (λ) or simple correlations of the manifest variables with their specific construct. An initial iteration was carried out of the algorithm using SmartPLS. Indicators with standardised weights below 0.4 (Churchill, cited in [75]) were removed, and the model was reformulated. Other indicators, with loadings of 0.40–0.70 were also

considered for removal from the scale, but only if doing so increases the composite reliability above the suggested threshold value [76]. In the present study, all the items have loadings above or near the cut-off value of 0.7. Only one item has a lower value (i.e., Barrier_4 at 0.465), but deleting it does not increase the composite reliability of the construct Overcoming_Barriers (0.699) and was therefore kept in the model [76].

The Cronbach Alphas obtained in the present research were also considered satisfactory because the values were over 0.70 [56], which confirms the constructs' high reliability, except for overcoming barriers and self-efficacy perception. For Fornell and Larcker [77], Composite Reliability (CR) is a more recommendable criterion and would reach an appropriate value. In this case, all the indicators are over 0.6, which following Henseler et al. [78] indicates sufficient reliability in confirmatory factor analysis.

Convergent validity in the measurement model tests the capacity of the latent variable to explain its indicators. It was evaluated using the Average Variance Extracted (AVE), and considered adequate if $AVE \geq 0.50$ [77]. The discriminant validity was determined when the AVE of each construct was greater than the squared correlations (R2) between the constructs [77]. We measure it through the average variance extracted (AVE). The criterion establishes AVE values were considered of at least 0.5 for values of the latent variables, which represents the construct's capacity to explain, on average, over half of the variance of its indicators [77]. In the present research, all the variables are near to this value. Details of our construct validity testing are provided in Table 2 below.

Table 2. Discriminant and convergent validity of constructs.

Indicator	Loadings (λ)	CA	CR	AVE
External support		0.767	0.833	0.459
External_support_1	0.670			
External_support_2	0.670			
External_support_3	0.838			
External_support_4	0.703			
External_support_5	0.550			
External_support_6	0.595			
Self-efficacy perception		0.445	0.712	0.456
Self_efficacy_1	0.751			
Self_efficacy_2	0.694			
Self_efficacy_3	0.566			
Overcoming barriers		0.434	0.699	0.372
Barrier_1	0.635			
Barrier_2	0.642			
Barrier_3	0.465			
Barrier_4	0.675			

CA = Cronbach's Alpha; CR = Composite Reliability. AVE = Average Variance Extracted. Source: own based on SmartPLS.

Discriminant Validity

The factor loading matrix and the cross-loadings show that the loading of an indicator in its corresponding latent variable is greater than its loadings crossed with the rest of the latent variables. The results obtained when testing the discriminant validity of the constructs applying the Fornell–Larcker criterion [77] are shown in Table 3. The discriminant validity implies that each construct must be significantly different from the rest of the constructs with which it is not related.

Table 3. Fornell-Larcker Criterion.

	External_Support	Self-Efficacy Perception	Overcoming_Barriers
External_Support	0.677		
Self-Efficacy Perception	0.248	0.675	
Overcoming_Barriers	0.612	0.379	0.610

Source: own elaboration based on SmartPLS.

Moreover, in the cross-loading matrix we observe the loadings between the indicators of all the latent variables and see how an indicator's loading in its associated construct is much greater than its loading in the other constructs (see Table 4 below).

Table 4. Cross-Loading Matrix.

	External_Support	Self-Efficacy Perception	Overcoming_Barriers
External_Support_1	0.670	0.067	0.378
External_Support_2	0.670	0.189	0.281
External_Support_3	0.838	0.300	0.552
External_Support_5	0.703	0.219	0.390
External_Support_7	0.550	0.015	0.221
External_Support_9	0.595	0.104	0.508
Self-Efficacy_1	0.191	0.751	0.344
Self-Efficacy_2	0.209	0.694	0.208
Self-Efficacy_3	0.076	0.566	0.176
Barrier_1	0.283	0.497	0.635
Barrier_3	0.351	0.169	0.642
Barrier_4	0.282	0.188	0.465
Barrier_5	0.538	0.080	0.675

Source: own based on SmartPLS.

Henseler et al. [75] showed that lack of validity is best detected through the heterotrait–monotrait ratio indicator. We found that the heterotrait–monotrait ratio is below one, which is in line with the established criteria. The proposed constructs are fully compliant with this, as can be seen in Table 5 below.

Table 5. Heterotrait–Monotrait Ratio.

	External_Support	Self-Efficacy Perception	Overcoming_Barriers
External_Support			
Self-Efficacy Perception	0.394		
Overcoming_Barriers	0.972	0.818	

Source: own elaboration based on SmartPLS.

We examined the residual matrix of correlations and found that there were no significant residual values that would indicate a substantial prediction error for the indicators or manifest variables that make up each of the constructs in the model.

Ultimately, we were able to conclude the validity and reliability of our construct.

4.2. Moderators and Control Variables

The following control variables were introduced in the model: children (having children vs. not having children) and marital status (married vs. single). As the control variables are categorical, we have conducted a multigroup analysis to assess possible differences. This approach shows a complete vision of the influence that the moderating variable has on the results, examining its impact on all the relationships of the model [76]. According to the Partial Least Squares Multi-Group Analysis (PLS-MGA) approach [78] in the indicated cases, the differences are not significant for these digital entrepreneurs, being consistent with previous research [14,79].

4.3. Structural Model Evaluation

Variance Inflation Factor

The assessment of the structural model comprises several evaluations [78,80]. We studied multicollinearity in the structural model through tolerance evaluation, below 0.20, and the variance inflation factor, with values below 5.

The following table shows the results obtained, where we see that they are all below 3. As a result, the model constructs are valid (see Table 6).

Table 6. Variance inflation factor.

	External_Support	Self-Efficacy_Perception	Overcoming_Barriers
External Support		1.000	1.066
Self-Efficacy_Perception			1.066
Overcoming_Barrier			

Source: own elaboration based on SmartPLS.

4.4. Predictive Relevance of the Model

The proposed model's capacity to explain the dependent variables it is composed of is shown through the coefficient of determination, R^2 , [81–83]. According to the R^2 results obtained, the predictive power of Overcoming-barriers is moderate. Specifically, for Overcoming-barriers, 43% of the variability is explained by the latent variables External Support and Self-Efficacy Perception (Table 7).

Table 7. Construct Cross-validated Redundancy.

	R-Square	Q ²
Self-Efficacy Perception	0.062	0.018
Overcoming Barriers	0.430	0.136

Source: own based on SmartPLS.

As a complement to consider predictive relevance, the Q^2 criterion of Stone [84] and Geisser [85] is used. There is predictive relevance in the dependent construct considered, when Q^2 is positive, and the higher its value, the greater the relevance [78,86]. In accordance with the results obtained, the predictive relevance of the model is ensured in this research, given that a positive value is reached for each endogenous variable.

Having ensured the partial scalar invariance and the consistency of the constructs, path models were used to test the theoretical model. The model includes all of the paths and covariances and the predictive relations between external support, self-efficacy perception and overcoming barriers to undertake in Figure 2.

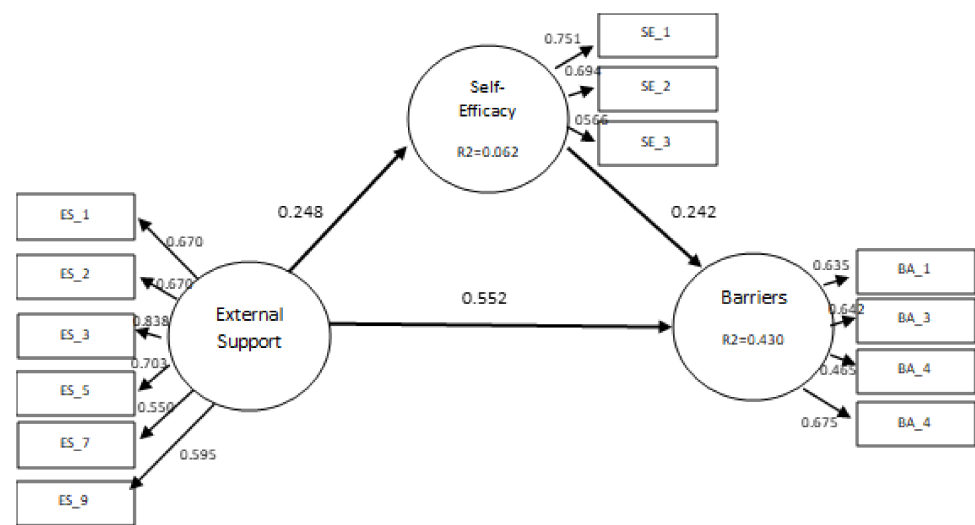


Figure 2. Empirical findings. Source: own elaboration based on SmartPLS.

Table 8 shows the results for the beta (β) coefficient, degree of significance, and importance of the value distribution using Student's t-test. To test the hypotheses, a bootstrapping procedure with 5000 subsamples was used, as recommended by Chin [87].

Table 8. Hypothesis testing.

	Hypothesis	β Coefficients	t-Values	Supported
H1	Self-efficacy_perception > overcoming_barriers	0.242 *	2351	Yes
H2	External_support > overcoming_barriers	0.552 ***	6265	Yes
H3	External_support > self-efficacy_perception	0.248 **	3029	Yes

* $p < 0.1$ ** $p < 0.01$ *** $p < 0.001$. Source: own elaboration based on SmartPLS.

Overall, the findings confirm, the hypothesized relationships for the proposed model for overcoming barriers to entrepreneurship. The results confirm that there is a positive and significant effect between the external support that women receive and the overcoming of the barriers or difficulties in digital entrepreneurship (H2), as well as its influence on their self-efficacy perception (H3). Self-efficacy perception also helps to overcome the barriers women find when starting their own firm. In addition, we have detected that self-efficacy perception plays a mediating role between the external support and the overcoming of barriers (0.060), achieving a total effect of 0.612.

5. Conclusions, Implications, Limitations and Future Research

5.1. Conclusions

The objective of this research was to explore the influence of external support, such as training and entrepreneurial education in female digital start-ups. Based on our data, we can conclude that self-efficacy perception has a significant and positive effect on women's entrepreneurial success. This means that every improvement in entrepreneurial self-efficacy perception will have a positive effect on improving women's entrepreneurship outcomes. Therefore, we can conclude that, female digital entrepreneurs have a high self-efficiency, which means that they believe they have the ability to become an entrepreneur. As a result, the belief in self-efficacy increases the perception of feasibility in the women and, finally, influences the entrepreneurial intention and outcome.

These results show that entrepreneurial education and training stimulate women's self-confidence and encourages them to take up entrepreneurship as a career option, over-

coming the barriers that they find in their path. In order to increase the number of female entrepreneurs, giving them external support becomes a key factor, as it doesn't only improve their self-efficacy perception, but also provides them the tools to overcoming the barriers by themselves. Women in the digital economy that receive training and external support feel more capable of undertaking complex and unfamiliar tasks. Getting appropriate education helps them find sources of innovative ideas and transforming these ideas into enterprises. Even more, the self-confidence that female entrepreneurs get when they receive training helps them overcome the existing barriers that they find when they want to start their own business. Therefore, there is a double way by which entrepreneurship education improves the entrepreneurial vocation of women and its outcomes.

5.2. Implications

The digital economy, which has shown to give birth to the most disruptive enterprises, is expected to be the primary driving force for economic growth in the near future globally. Thus, it becomes clear how leaving great parts of the population behind would deny them great opportunities for growth, increase general gender discrimination and affect the economy at large [3]. Therefore, different measures could be promoted in order to increase the odds of increasing the number of females deciding to undertake in the digital economy.

As it has been shown, lack of self-confidence is one of the keys that lead women not to engage in entrepreneurship. This perception arises in the early stages of girls' development; therefore, it becomes essential to invest in entrepreneurship education programs from the earliest educational stages. Girls believe in themselves just as much as boys do until the age of 12, but after reaching that age, however, a confidence gap starts to emerge, due to a girl's self-confidence plunge [47]. In order to increase the number of female entrepreneurs, girls should leave their secondary schooling with experiences of real digital entrepreneurship and having met female entrepreneur role models, with whom they can identify themselves. It could boost their self-confidence and leadership capacity which will be important in overcoming barriers to entrepreneurship. Another thing to consider is that it is key to build strong self-efficacy perception, but this does not mean that girls could not fail. In fact, the educational experiences that girls should receive, and in which they should participate, must prepare them as much for failure as it does for success.

Additionally, specific leadership programs at later stages, such as university, would encourage women to take on leading roles and improve their self-confidence. The skills acquired in these courses and the role it places their participants in, would empower women for their future ventures.

In order to help current entrepreneurs, those that are willing, programs that help female entrepreneurs in the digital economy, sharing their experiences as well as exchanging advice, should be promoted by public administrations. These types of programs, or associations, could also contact experts and academics in the field, giving specific education and training in the field. By doing this, women participating in entrepreneurship training programs could experience a short-term boost in passion through entrepreneurial self-efficacy [18]. As mentioned by Orbia et al. [88], promoting specific education and training could also lead to business sustainability, which would also result in an improvement of the way of doing business, enabling businesses to get a competitive edge.

Ultimately, we would recommend investing in targeted entrepreneurship training in the fields related to the digital economy at all levels of education, taking into consideration not only the technical skills for creating your own firm but also the promotion of empowering experiences for women.

5.3. Limitations and Future Research

The survey may suffer from cognitive biases of the respondents, because many questions ask for the subjective assessment of the respondent. The survey was conducted online in the first semester of 2020. It should be mentioned that this was a special time period, as it coincided with the onset of the COVID-19 health crisis. By exposing the extraordinary

situation of the COVID-19 pandemic, an attempt was made to warn about the possible influence of such a serious event on the responses. Even so, it is considered that this difficulty is assumed by many studies that follow the same technique, such as the Global Entrepreneurship Monitor.

Also, the study lacks a sample of digital companies created by men, which would have allowed us to compare the difficulties of women with those of men. Future studies could replicate this study with a sample of male digital entrepreneurs to see the impact of entrepreneurial training a self-efficacy when undertaking in the digital field. Similar studies could be also extrapolated to other traditional sectors for seeing potential differences with the digital economy. Especially, when comparing with other sectors, future studies could be controlled by the funding difficulties, analyzing these more closely to understand whether they are due to the technology used, characteristics of the entrepreneurial project (markedly social orientation) or weaknesses of the entrepreneurial ecosystem. It would also be interesting to know which parts of the legal framework make it more difficult to create digital companies founded by women in order to offer recommendations to alleviate them.

Furthermore, another limitation of the study is that we have used some indicators that don't fit well in the Spanish entrepreneurship environment. Specifically, external support provided by business angels is something common in the US, but not yet in Spain. Therefore, it would be an interesting future research line to adapt this questionnaire to the peculiarities of the Spanish entrepreneurship landscape, taking into account, for example, other types of financing.

Finally, the present study suffers from the limitation of survivor bias, since only active founded digital companies were surveyed and not those that did not manage to survive. Getting access to a sample that includes the later would enrich the analyses of future studies.

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