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The influence of perceptions on potential entrepreneurs

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Abstract Much research has tried to explain why some people, but not others, choose to become entrepreneurs. The cognitive approach provides a useful insight to explore the entrepreneur-related phenomena through perceptions and intentions. Cross-national studies of this kind are rare, since large international surveys are needed. In this sense, the GEM-project questionnaire includes some questions about entrepreneurial perceptions of the adult population. Thus, the main objective of this paper is building a theoretical framework of entrepreneurial perceptions and testing their influence on entrepreneurial intentions with GEM data. This may allow overcoming some of the weaknesses of previous studies in entrepreneurial intentions. Three kinds of perceptions are identified: individual perceptions, perceptions about entrepreneurial opportunities, and socio-cultural perceptions. Their effect on intentions is tested along with some control variables. Results confirm that these perceptions are relevant variables in explaining the entrepreneurial intention of individuals across nations. At the same time, results from this paper would contribute to the opening up of a new line of analysis using GEM-project data: the conception stage of the new venture process; that is, the study of potential entrepreneurs.

Keywords Entrepreneurship · Cognitive models · Perceptions · Entrepreneurial intention · Logit regression

Introduction

In general, social researchers agree that entrepreneurship is very important to promote the development process (Hébert and Link 1989; Audretsch and Thurik 2000; Arenius and Minniti 2005; Wennekers et al. 2005; Acs and Szerb 2007). In fact, the objectives of the different approaches to entrepreneurship can be summarized in the desire to look for an

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explanation of why, how, when or where entrepreneurs discover and exploit opportunities which promote the development process (Shane and Venkataraman 2000).

From a multidisciplinary focus, the cognitive approach is acquiring a great relevance nowadays to explain entrepreneurship not only at the individual level (Krueger et al. 2000), but also at the aggregate level (Arenius and Minniti 2005). Both potential and existing entrepreneurs capture the influence of the external environment through their motivations and perceptions, generating attitudes and intentions which, in turn, determine behaviors. Nevertheless, the current emphasis on entrepreneurial cognition has evolved throughout the development of the entrepreneurship research domain.

This paper, within this cognitive perspective, tries to contribute to the understanding of one of the key aspects of the discovery-exploitation process. Specifically, its main objective is to analyze the role of different perceptions in the formation of intentions towards start-up (Krueger 2000). Perceptions are a cognitive construct. They are mental representations of the external environment around individuals, captured through their senses and elaborated in their minds. These representations may differ between individuals because of the presence of different cognitive biases. That is to say, the tendency to make errors in judgment when facing complex problems with incomplete information (Baron 1998; Busenitz and Barney 1997). Entrepreneurs, because of their work in conditions characterized by high uncertainty and time pressure, have a high susceptibility to several cognitive biases. These affect their level of perceptions. In this sense, compared to other people, they can perceive lower risk levels or higher confidence in their own capacities to start a business.

Until now, the cognitive entrepreneurship literature has studied the influence exerted by some perceptions on the intentions to start-up. This has restricted the analysis to an individual level and using small samples, generally made up of students attending MBA programs (Krueger 1993; Krueger et al. 2000; Kolvereid 1996). Cross-national studies of this kind are rare, since large international surveys are needed. In this sense, the Global Entrepreneurship Monitor research project (www.gemconsortium.org) annually collects data on the entrepreneurial activity in 43 countries around the world (Bosma et al. 2008). This survey is very relevant not only for our understanding of the entrepreneurial process, but also for the more general understanding of the economic development process.

GEM questionnaires include some cognitive items that may allow analyzing entrepreneurial intentions at an aggregate level (Reynolds et al. 2005). Therefore, GEM data has the advantage of helping to overcome some of the above-mentioned limitations, since it is based on a large international survey of the general adult population. Specifically, for this paper perceptions have been divided into three groups: individual perceptions (role model, self-efficacy and risk aversion), perceptions on economic opportunities and, finally, socio-cultural perceptions (perceptions about the social legitimation of entrepreneurship). Although some studies do exist analyzing cognitive processes with data from the GEM project (Arenius and Minniti 2005; Koellinger et al. 2007), they have concentrated on explaining nascent entrepreneurship and young entrepreneurs. In this respect, the present study is probably the first one to use these data to explain the entrepreneurial intention of the general adult population. This is, in our opinion, the greatest contribution that may be expected from this paper.

In the following conceptual section, three basic theoretical propositions are derived. The methodology section describes the data set ("2004 APS Data—Individual Level [all respondents, all countries]", downloaded from the consortium web page), and the variables used in the analysis. This data set includes a total of 145,189 observations. However, after a depuration process to eliminate all observations with missing data in any of the selected variables and all individuals involved at any stage of entrepreneurial activity (nascent and established entrepreneurs), the final usable sample included 33,731 observations from 13 different countries. Given the dichotomic nature of most variables, logistic regression has been deemed as the most suitable statistical technique. Results are presented in section four. The paper ends with a discussion and conclusion.

Conceptual framework

The relevance of cognitive processes in shaping the individual's entrepreneurial decisions and actions has been stressed elsewhere (Baron 2004; Krueger 2000; Shaver and Scott 1991; Mitchell et al. 2002a). In this sense, this paper studies, at an aggregate level, the role of perceptions as one of the most important cognitive factors in the intention to start a business. In this second section, the literature related to the importance of entrepreneurial cognition is reviewed. Then, derived from this literature, the role of three distinct kinds of perceptions is considered: individual, socio-cultural and economic perceptions.

The entrepreneurial cognition approach

The focus of entrepreneurship research which emerged from the interaction of socio-psychology and organizational management started paying attention to the most important characteristics which could differentiate entrepreneurs from non-entrepreneurs (Gartner 1989). The most important personality traits found by this literature were achievement motivation, need of independence, internal locus of control and moderate risk-taking propensity (McClelland 1961; Collins and Moore 1964; Brockhaus 1980; Jennings and Zeithaml 1983; Borland 1975). Some scholars even proposed a dark side of entrepreneurs, emphasizing their need for control, dissatisfaction, distrustful behavior or scapegoat feelings (Kets de Vries 1985).

This trait approach was complemented by the analysis of the influence of some demographic variables on the start-up rate. Among these variables, the following may be highlighted: age, gender, religion, ethnic group, education, socioeconomic status or professional experience (Cooper and Dunkelberg 1987; Dahlqvist et al. 2000; Cooper et al. 1994; Reynolds et al. 1994; Storey 1994; Wagener et al. 2010). A positive aspect of these approaches is that they have allowed the identification of some significant relationships between demographic and personality traits with some entrepreneurial behaviors, such as innovation. These findings undoubtedly helped, during the 1990s, the implementation of some policies designed by governments to promote small businesses and entrepreneurship (Santos 2004). Nevertheless, from a theoretical point of view, these approaches were criticized both for their methodological and conceptual problems and for their weak explanatory capacity (Gartner 1989; Robinson et al. 1991; Krueger et al. 2000).

One important cause of the weak explanatory capacity attributed to the trait and demographic approaches is that they did not consider behavior as a consequence of person-situation interactions, in contrast to the wide acceptance of this view in cognitive psychology since the 1960s (Shaver and Scott 1991). Fortunately, research has notably evolved and this cognitive approach has gained much relevance in the attempts to explain entrepreneurship nowadays (Krueger and Carsrud 1993; Guzman and Santos 2001; Mitchell et al. 2004; Baron 2004; Mitchell et al. 2002a).

The cognitive approach emphasizes the fact that everything we say or do as human beings is influenced by mental processes, such as motivation, perceptions or attitudes (Krueger 2003). Through these processes, people acquire information, store it, transform it and use it to accomplish different tasks, such as making decisions or solving problems. According to Mitchell et al. (2002a), *"entrepreneurial cognitions are the knowledge structures that people use to make assessment, judgement or decisions involving opportunity evaluation, venture creation and growth"*.

Studies which first developed the cognitive approach to entrepreneurship were those focused on motivation (McClelland 1961; Collins and Moore 1964). Motivation is the set of reasons that determines individuals to engage in a particular behavior, for instance, the start-up (Shane et al. 2003). However, related to motivation studies and the intention to start-up, the social learning theory (Bandura 1977, 1982) is probably the cognitive approach which has awakened the highest interest among entrepreneurship scholars. According to this, behavior is the consequence of environmental stimuli, feed-back processes and observational learning. Following this line of research, Ajzen built his theory of planned behavior (TPB) stating that intentions capture the motivational factors which influence behavior. Thus, they become measures of the effort the individual plans to exert in order to perform the behavior (Ajzen 1991). The influence of Bandura's and Ajzen's works has been very important in entrepreneurial cognition research because they define some important individual perceptions, such as, for instance, self-efficacy. These perceptions have been useful to entrepreneurship scholars in explaining why entrepreneurs start a business, (Krueger 2003; Shapero and Sokol 1982; Krueger 1993; Kolvereid 1996; Liñán and Chen 2009).

More recently, the entrepreneurial cognition approach has been paying attention to the analysis of cognitive biases and heuristics (Busenitz and Lau 1996; Simon et al. 2000; Keh et al. 2002; De Carolis and Saparito 2006; Baron 1998; Koellinger et al. 2007; Schade and Koellinger 2007). Cognitive biases represent a person's tendency to make errors in judgment based on cognitive factors, such as perceptions and motivations. Heuristics are efficient rules coded by evolutionary or learned processes. These rules help explain why and how people, such as existing entrepreneurs or potential entrepreneurs, make decisions, come to judgments or solve problems when facing complex matters with incomplete information. Therefore, biases and heuristics are very important in the decision-making process. For instance, in order to successfully start a new business when an opportunity is discovered, it is not possible to wait for all the necessary information to be available because then, probably, the opportunity will be gone (Busenitz and Barney 1997).

To sum up, perceptions are the central cognitive element of analysis in both entrepreneurial cognitive approaches. Specifically, perceptions are representations of the external environment around individuals captured through our senses and consciousness

(Krueger 2003). They represent a subjective interpretation of reality, and therefore do not necessarily reflect objective circumstances (Arenius and Minniti 2005). For the purposes of this study, it may be useful to differentiate three different categories of perceptions that may be affecting the individual's entrepreneurial intention.

Individual perceptions affecting entrepreneurial intentions

Bandura's (1977) work has emphasized the relevance of two important perceptions in social learning: role model perception and self-efficacy. These have consistently been introduced into entrepreneurial cognitive research (Krueger et al. 2000; Kolvereid 1996; Liñán and Chen 2009). Firstly, *role model theory* explains the process of learning by copying the action of other persons through observing them doing it. This theory has been applied to entrepreneurship research to explain why individuals whose parents are entrepreneurs become entrepreneurs (Arenius and Minniti 2005). According to Scherer et al. (1991), this happens when individuals perceive their parents as effective entrepreneurs. In this sense, role modeling is different to imitation because observational learning and perceptions change the behavior of individuals through a cognitive process of four stages: attention, retention, reproduction and, finally, motivation (Bandura 1977).

On the other hand, the concept of *self-efficacy* is the belief in one's own capabilities to perform an action and to attain different outcomes (Bandura 1982). Thus, individuals considering themselves as capable of successfully performing as entrepreneurs will have a greater probability of becoming entrepreneurs or, at least, of exhibiting entrepreneurial intentions (Krueger and Carsrud 1993). This concept is different to the internal locus of control which means that people believe the outcomes of their actions as depending on their own effort (Borland 1975; Ajzen 2002). Although there is a correlation between these two concepts, it is possible to have an internal locus of control but low self-efficacy (Robinson et al. 1991).

Related to the concept of self-efficacy, entrepreneurship research developed some entrepreneurial intention models. The most important early contribution to this approach is the 'entrepreneurial event' theory (Shapero and Sokol 1982). According to this, individuals decide to create a firm when the entrepreneurial activity is perceived to be more desirable and more feasible than other alternatives. Perceived feasibility refers to the perception of the ability to perform the entrepreneurial behavior or, in other words, self-efficacy.

Similarly, Krueger and Carsrud (1993) apply the theory of planned behavior (TPB) developed by Ajzen (1991) to explain entrepreneurial potential. According to them, the intention to set up a new firm is influenced by three perceptions: personal attraction to entrepreneurial activity, perceived subjective norms (perception that people in their closer environment would approve of the firm-creation decision) and again perceived behavioral control or self-efficacy (Krueger et al. 2000).

Finally, entrepreneurial cognition research has focused on *risk perceptions* as an important factor influencing the start-up process (Simon et al. 2000). A high risk perception is expected to be a negative influence on entrepreneurial intention. Risk perception may be considered as a consequence of fear of failure (Arenius and Minniti 2005), that is to say, fear of the uncertainty about the economic or even social and psychological rewards inherent to the venture creation process.

Risk propensity of entrepreneurs was first studied during the 1970s as a factor which could differentiate entrepreneurs from non-entrepreneurs. These researchers expected entrepreneurs to exhibit a higher willingness to take risky actions compared to others. However, results have shown that risk propensity was very similar between entrepreneurs and non-entrepreneurs (Brockhaus 1980). It may be argued that this "traits perspective" failed to explain the role of risk in entrepreneurship because it did not consider the cognitive process. The cognitive approach has shown that risk plays an important role in, for instance, entrepreneurial intentions (Shane et al. 2003). Objectively, situations faced by entrepreneurs are more risky than situations faced by managers. However, the former perceived less risk than the latter because of cognitive biases, such as, for instance, overconfidence (Simon et al. 2000). For this reason, potential entrepreneurs are expected to perceive lower risks and show lower fear of failure and, therefore, their intentions of becoming entrepreneurs would be higher.

Summarizing, the following proposition is established:

Proposition 1 Individual perceptions (knowing a role model, having high self-efficacy and low risk perception) will exert a positive effect on entrepreneurial intentions.

Perceptions of economic (or entrepreneurial) opportunities

Besides these individual perceptions, it is important to consider others related to the individual's environment which can also be influencing entrepreneurial intentions. In this sense, the effect of perceptions on economic opportunities could be highlighted.

As is well known, economic conditions are related to the start-up rate. The literature suggests that a high level of economic development (high national income per inhabitant, a well-educated population, a high life expectancy) and a positive economic cycle (low interest rates, budget surplus, low inflation, low unemployment rate, high economic growth) exert a positive influence on the creation of new firms (Thurik et al. 2002). Nevertheless, the GEM data has found that less developed countries, usually characterized by negative economic conditions, have recorded higher new-venture rates than most developed countries. An explanation of this behavior is that the degree of economic welfare provided by a good economic situation determines the existence of job alternatives for people (Wennekers et al. 2005). In fact, only when unemployment became an important problem during the seventies and eighties, did the start-up rate grow more intensively in developed countries, although not at the same level as in less developed countries (Carlsson 1996).

Besides, one important qualitative difference between businesses started in highly-developed and less-developed countries is that most people are motivated by economic opportunities in the former and most people are motivated by economic necessity in the latter (Bosma et al. 2008). Then, the question is: Why do some people and not others discover these economic opportunities? A plausible explanation is that the discovery of opportunities is not a mechanical process (Baumol 1993). The specific characteristics of markets, such as their size or composition, and the availability of financing and different kinds of capital (physical,

technological, human or social) can increase economic opportunities since they increase potential profits (Romero-Martínez et al. 2010; Smallbone et al. 2010; Mas-Verdu et al. 2010). This, in turn, would raise the amount of people engaged in the start-up process (Wilken 1979; Casson 1982). However, even in this case, it is necessary for individuals to perceive these economic opportunities as feasible and desirable (Krueger 2000). Therefore, again the cognitive process makes some individuals more sensitive than others to the different economic opportunities provided by the market and the available resources (Shane and Venkataraman 2000; Ardichvili et al. 2003).

In this sense, the general evolution of economic or entrepreneurial opportunities available to people will have a macroeconomic effect on the aggregate level of entrepreneurial intentions and on the overall start-up rate (Thurik et al. 2002). But, at the individual level, individuals will show entrepreneurial intentions and exhibit start-up behaviors depending on their cognitive processes and their perceptions of the existence of economic opportunities, independently of the realism of these perceptions (Arenius and Minniti 2005).

An important question is whether the perception of entrepreneurial opportunities is an antecedent of other perceptions, such as self-efficacy or risk perception, or not. In this sense, according to Krueger (2003), the perception of entrepreneurial opportunities could act as a precipitating factor because it reinforces other individual perceptions in the formation of intentions.

Therefore, these arguments lead to the following proposition:

Proposition 2 A positive perception about the existence of entrepreneurial opportunities will exert a positive influence on entrepreneurial intentions.

Socio-cultural perceptions

Finally, the entrepreneurship literature has also studied the influence of cultural and sociological aspects on opportunity recognition and entrepreneurial intention through cognitive mechanisms. Culture is made up of ideas, values and norms common to a group of people. In fact, Inglehart (1997) defines culture as the set of basic common values which contributes to shaping people's behavior in a society. According to Hofstede and Hofstede (2005), the notion of culture also includes patterns of thinking, feeling and acting, which are learned and shared by people living within the same social environment. They call these patterns of behavior "software of the mind" and, thus, define culture as the collective programing of the mind which distinguishes the members of a group of people from others.

According to the literature, culture may influence entrepreneurship both through social legitimation and through promoting certain positive attitudes related to firm creation in individuals (Wilken 1979; Etzioni 1987; Davidsson 1995; Liñán and Santos 2007). As Hofstede (1980) pointed out, culture shapes people's cognitive schemes, programing behavioral patterns which are consistent with the cultural context. Moreover, these cognitive schemes derived from culture can help entrepreneurs in several aspects (Busenitz and Lau 1996): reducing the uncertainty of making a decision, identifying cause/effect relationships to advance the

development of ideas and opportunities; facilitating forecasts and predictions about outcomes; and, what is most important in this study, increasing the start-up intention.

From an empirical point of view, studies about the cultural influence on entrepreneurial behaviors (Mcgrath et al. 1992; Mueller and Thomas 2001; Wennekers et al. 2005) have most often used Hofstede' s (1980) four dimensions of national culture: masculinity (MAS), power-distance (PDI), individualism (IND) and uncertainty avoidance (UAV). In general, as McGrath et al. (1992) argue, entrepreneurs tend to exhibit high masculinity (MAS+), high power distance (PDI+), high individualism (IND+) and low uncertainty avoidance (UAV-) across cultures. Other scholars, however, such as Mueller & Thomas (2001), have found that low power distance (PDI-) would favor entrepreneurship.

Mitchell et al. (2000), based on a combination of expert information processing, entrepreneurship and social cognition literatures, analyzed the role of cultural cognitions in venture creation. Differences across countries were detected in the level and nature of ability and willingness cognitions. In subsequent studies (Mitchell et al. 2002a, b), entrepreneurial cognitions across cultures were found to be broadly similar, but with significant differences depending on the national culture. Therefore, it may be argued that a more positive perceived social valuation of entrepreneurship will lead to an increased entrepreneurial intention of respondents (Liñán et al. 2011).

Therefore, this leads to the following proposition:

Proposition 3 A positive perception about the entrepreneurial cultural values, such as perceived social legitimation, will exert a positive influence on the entrepreneurial intention.

Methodology

As was pointed out in the introduction section, the empirical analysis will be developed using the GEM database. Our greatest interest in this paper is focused on the analysis of entrepreneurial intentions in all the countries which participate in the GEM research project. The three theoretical propositions will be tested with four regressions. Each group of dependent variables will be introduced in a subsequent logit model. The first one includes only demographic and socio-economic characteristics as independent variables. Model 2 includes individual perceptions. Model 3 adds perceptions on entrepreneurial opportunities and model 4 also includes socio-cultural perceptions

Sample and variables

The sample used for the analysis has been obtained from the Global Entrepreneurship Monitor database. Specifically, the "2004 APS Data—Individual Level (all respondents, all countries)" was downloaded from the consortium web page.[1] This data set includes a total of 145,189 observations. A depuration process was carried out to eliminate all observations with missing data in any of the selected variables. Additionally, since our target population is the potential entrepreneur, all individuals involved in any stage of entrepreneurial activity (nascent and established entrepreneurs) were excluded. The

[1] http://www.gemconsortium.org/about.aspx?page=gem_datasets

final usable sample included 33,731 observations from thirteen countries. The sample size varied from 46 individuals in Croatia to 17,730 in Sweden.

The empirical study tries to identify significant variables that help to estimate the likelihood of an individual intention to start a business within 3 years. That is to say, potential entrepreneurs (Krueger and Brazeal 1994). The specific variables used to measure concepts developed in the theory section are the following:

1. Entrepreneurial intention (dependent variable): respondents were ask whether they intend to start a business within 3 years (0 = No, 1 = Yes).

2. Individual perceptions:

    a. Role Model: respondents were asked whether they personally knew someone who had started a business in the 2 years preceding the survey (0 = No, 1 = Yes).
    b. Self-efficacy: respondents answered if they believed they had the required skills and knowledge to start a business (0 = No, 1 = Yes).
    c. Risk perception: whether fear of failure would prevent them from setting up a business or not (0 = No, 1 = Yes).

3. Perceptions on economic (entrepreneurial) opportunities: respondents stated if they thought there would be good opportunities to start a firm in the area where they live in the 6 months following the survey (0 = No, 1 = Yes).

4. Socio cultural perceptions:

    a. Desirable career choice: respondents' perception that in their country, most people consider starting a new business a desirable career choice (0 = No, 1 = Yes).
    b. Status and respect: agreement with the statement that in their country, those successful at starting a new business have a high level of status and respect (0 = No, 1 = Yes).
    c. Public media: agreement with the statement that in their country, they will often see stories in the public media about successful new businesses (0 = No, 1 = Yes).

5. Control variables: standard demographic and economic variables.

    a. Age: exact age at time of interview, the respondents were asked to provide their year of birth (numerical variable)
    b. Gender: (0 = Female, 1 = Male).
    c. Education level: respondents were asked to provide the highest degree they had gained. The GEM coordination unit harmonizes responses across all countries into a five-category variable (0 = No education, 1 = Some secondary education, 2 = Secondary degree, 3 = Post-secondary education, 4 = Graduate degree). However, since none of the respondents in our selected sample chose the first option, the reference category for the logistic regression will be "some secondary education".

d. Income level: respondents were asked to provide information about their household income. Responses are harmonized across all countries into 3 categories based on the income distribution of the country of origin (0 = lower, 1 = middle, 2 = upper income group).
e. Work status: respondents were asked to provide their occupational status (0 = Full or part time work, 1 = Not working, 2 = Retired or student).

Proposed regression model

The logit regression model estimates the probability of an individual belonging to a certain group (dependent = 1), or not (dependent = 0). It also identifies the most important variables explaining the differences between both groups. Additionally, logit models do not make assumptions about the statistical distribution of the variables (Greene 2002). In this empirical study, therefore, the use of a logit model would be fully justified on three grounds:

- The dependent variable is dichotomous.
- The great majority of independent variables are also dichotomous or categorical.
- It allows analyzing the effect of a certain level of the independent variables on the probability of the studied event being present (in this case, being a potential entrepreneur).

The goodness-of-fit of the models is assessed by the Omnibus test for model coefficients, the Hosmer-Lemeshow test, the rate of correct classification and the pseudo-R^2. The significance of individual independent variables was tested using the Wald statistics. A collinearity analysis was also performed to avoid biased estimations of the coefficients. The Variance Inflation Factor (VIF) and Condition indexes were used for this purpose.

Results

In the theory section, three propositions have been derived regarding the influence of perceptual variables in the entrepreneurial intention of the adult population. They will be tested by introducing each group of variables into a subsequent logit model. The multicollinearity test was satisfactory, since the highest VIF was 1.2, and the highest Condition Index was 15.4, well below the 20.0 threshold suggested by Belsley et al. (1980). Four logistic regressions have been performed, as shown in Table 1. The first one includes only demographic and socio-economic characteristics as independent variables. Model 2 includes individual perceptions. Model 3 adds perceptions on entrepreneurial opportunities, whereas model 4 includes socio-cultural perceptions.

Global results are relatively satisfactory, as may be seen in Table 2. The Omnibus test is always significant ($p<0.05$), denoting acceptance of the hypothesis that β coefficients are different from zero. Nevertheless, the variables considered here only explain a limited fraction of the variance in entrepreneurial intentions (pseudo R-

squared statistics). Additional variables are probably needed to complement those included in models 1 to 4. In this sense, the Hosmer-Lemeshow test confirms this idea (Table 2).

Model 1 is the basic model including only variables related to socio-demographic characteristics (Table 1). As may be seen, gender, education, income, age and work status significantly contribute to explaining the entrepreneurial intention of respondents, with the expected signs. A linear effect for age has been assumed (despite Levesque and Minniti 2006).[2] Regarding gender, males are 1.846 times more likely than females to declare a positive intention (odds ratio). Similarly, a higher education level is associated with higher intentions, with odds-ratios ranging from 1.746 to 2.369. The effect of income is reversed because lower levels of income are associated with positive entrepreneurial intentions. For the work status, individuals of the category "students/retired" and "not working" are shown to be more likely to be potential entrepreneurs.

Model 2 tries to verify Proposition 1. The three individual perceptions considered have significant coefficients with the expected signs. In particular, the effects of knowing a role model or having self-efficacy are the strongest of all variables included (odds-ratios are 1.991 and 3.854, respectively). On the other hand, perceiving a higher risk of failure contributes to decreasing entrepreneurial intentions. The contribution of socio-demographic characteristics remains essentially the same with respect to both the sign and level of coefficients, and also to significance levels. Thus, once the effect of these perceptions has been considered, better-off people exhibit a lower intention to become entrepreneurs.

Model 3 includes an additional variable measuring the individuals' perceptions of the existence of entrepreneurial opportunities to start a firm in their area of residence. Proposition 2 is satisfactorily confirmed, since this variable has a significant and positive β coefficient, with a relatively high odds-ratio. Besides, the signs, level and significance of all the other variables are similar to those in model 2.

To test Proposition 3, socio-cultural perceptions have been included in model 4. The three cultural perceptions considered have significant coefficients with the expected signs. These results support Proposition 3. Nevertheless, the odds-ratios for these variables are relatively low. For instance, the odds-ratios for perceiving the society's respect of entrepreneurs and becoming an entrepreneur to be a desirable career choice are respectively 1.093 and 1.159. The strongest influence is exerted by "Public Media", with the highest odds ratio among these socio-cultural perceptions (1.516).

Discussion and conclusions

As was pointed out in the introduction to this paper, the cognitive approach to entrepreneurship is very important nowadays not only at the individual level but also

[2] In this sense, Age Squared was initially included in the analysis, following the reasoning by Levesque and Minniti (2006). Results for the four regression models were in accordance with the theory (positive and significant coefficient for Age, negative significant coefficient for Age Squared). However, multicollinearity between both variables was present. Therefore, since the purpose of this study is not the analysis of the role of Age, and the values and significance levels of all other coefficients and odds-ratios were similar to those in Table 1, it was decided to include Age only as a control variable.

Table 1 Logistic regressions on entrepreneurial intention

	Model 1		Model 2		Model 3		Model 4	
	B	Exp (B)	B	Exp (B)	B	Exp (B)	B	Exp (B)
Socioeconomic variables								
Gender(1)	0.613***	1.846	0.347***	1.415	0.323***	1.382	0.326***	1.386
Age	−0.038**	0.962	−0.040***	0.960	−0.040***	0.960	−0.040***	0.961
Work	**		***		***		***	
Work(1)	0.127**	1.136	0.290***	1.336	0.290***	1.336	0.281***	1.325
Work(2)	0.139*	1.149	0.427***	1.533	0.442***	1.556	0.433***	1.541
Education	***		***		***		***	
Education(1)	0.557***	1.746	0.420***	1.523	0.411***	1.508	0.428***	1.534
Education(2)	0.734***	2.083	0.554***	1.741	0.548***	1.730	0.575***	1.777
Education(3)	0.862***	2.369	0.644***	1.905	0.616***	1.852	0.647***	1.910
Income	***		***		***		***	
Income(1)	−0.258***	0.772	−0.337***	0.713	−0.333***	0.716	−0.330***	0.718
Income(2)	−0.297***	0.743	−0.492***	0.611	−0.512***	0.599	−0.507***	0.602
Individual perceptions								
Role_model(1)			0.689***	1.991	0.644***	1.904	0.625***	1.869
Risk_aversion(1)			−0.314***	0.730	−0.284***	0.752	−0.293***	0.746
Self_efficacy(1)			1.349***	3.854	1.301***	3.673	1.287***	3.623
Economic perceptions								
Entre_opportunities (1)					0.527***	1.694	0.474***	1.606
Cultural perceptions								
Good_career(1)							0.148***	1.159
Respect(1)							0.088***	1.093
Public_media(1)							0.416***	1.516
Constant	−0.998***	0.368	−1.710***	0.180	−1.919***	0.146	−2.287***	0.101

*** significant at $p<0.001$; ** significant at $p<0.01$; * significant at $p<0.05$

Table 2 Goodness-of-fit statistics

	Model 1	Model 2	Model 3	Model 4
Omnibus test (significance level)	0.000	0.000	0.000	0.000
Cox & Snell pseudo R-squared	0.058	0.116	0.122	0.127
Nagelkerke pseudo R-squared	0.107	0.214	0.225	0.234
Hosmer-Lemeshow test (Signif. lev.)	0.000	0.000	0.000	0.000
Percentage correct	86.7	86.7	86.7	86.7

at the aggregate level. At present, two different main approaches may be identified in cognitive entrepreneurship research. On the one hand, one focus is centered on analyzing entrepreneurial intentions and some perceptions related to them. On the other hand, a second focus centers on the analysis of cognitive biases related to entrepreneurial perceptions and intentions. Of course, entrepreneurship perceptions are central elements of analysis in both approaches. Specifically, a first important contribution of this paper has been providing a classification of different perceptions related to entrepreneurial intentions. According to the literature, three groups of entrepreneurial perceptions have been found: individual perceptions, perceptions of economic opportunities and, finally, socio-cultural perceptions.

The influence of these different perceptions on entrepreneurial intentions has usually been empirically tested on small samples of university students. Results have been very promising but it was necessary to carry out additional analyses at the aggregate level on samples from the general population (Arenius and Minniti 2005). In particular, the GEM project provides a good opportunity to perform this kind of analysis since it collects data on different aspects of the firm-creation process from several countries around the world. In this sense, the empirical objective of this paper has been testing the theoretical classification developed on a multinational sample from the GEM database.

The first important finding of the empirical analysis is that the three kinds of perceptions proposed have a significant influence on intentions in this GEM global sample. They significantly increase the global explanatory capacity of the model. Of course, there must be other important factors affecting entrepreneurial intentions which have not been considered in this analysis. For instance, the case of founding teams (Wu et al. 2009), or leadership issues (Amagoh 2009), might be mentioned. But the increase in probability (odds-ratio) is generally high and significant for these variables, indicating that perceptions do matter in entrepreneurial intentions.

As expected, according to the literature our first group of perceptions, individual perceptions (especially, self-efficacy and role model) are the most important antecedents of entrepreneurial intention (Krueger et al. 2000). They significantly improve the results of model 1 (which used only demographic variables and can thus be labeled as a trait-approach model). These individual perceptions act together to shape intentions. Specifically, role model perception is a way of reinforcing self-efficacy because people who personally know an entrepreneur can feel they are more able to become entrepreneurs (Scherer et al. 1991). Another way to increase self-confidence in one's own capabilities is, of course, receiving education, both the general formal education and/or a specific education (entrepreneurship education).

Regarding perceptions on economic opportunities, this influence is not as high as expected. Our interpretation is that the literature may be emphasizing the role of opportunities without taking into account the important differentiation between developed and underdeveloped countries, and also between expansion and recession in the economic cycle. It may be the case that precisely the people with high intentions perceive the recognition of opportunities as the normal situation. It is possible too that the presence of cognitive biases is exerting an influence on perceptions about economic opportunities (Keh et al. 2002). As a consequence, therefore, people with entrepreneurial intention may be less worried about opportunities.

Results regarding socio-cultural perceptions in the GEM global sample are also significant, but their influence on intentions is the weakest. Thus, although the person's intention level is affected by both perceiving a high respect for entrepreneurs in the society and considering entrepreneurship to be a desirable career choice, the effect is quite weak. Nevertheless, the perception that successful new businesses are frequently featured in the public media contributes to increasing the entrepreneurial intention of respondents more clearly. Again the existence of cognitive biases or a positive environment to create firms in developed countries may make individuals take socio-cultural support for granted, thus diminishing its effect on intentions (Busenitz and Lau 1996). As Davidsson (1995) argues for the case of Swedish regions, the relatively small differences in cultural values among the respondents' countries would make these variables non-significant.

Of course, this study has a number of limitations. Some of them are related to the characteristics of the GEM database. First, the number of items related to entrepreneurial intentions and entrepreneurial perceptions is small in this database. Secondly, the kind of items included in the questionnaire prevent the use of more accurate statistical techniques, such as structural equations models that may show the different relationships between perceptions and intentions. In this sense, the fact that variance explained by the different models is low should be due to the relevant theoretical variables being omitted. An obvious example is the case of desirability (Shapero and Sokol 1982) or personal attitude towards start-up (Ajzen 1991). We fully believe the GEM data provides a very relevant starting point for the analysis of these cognitive aspects of the firm-creation process. Nevertheless, if a more detailed analysis of the potential entrepreneur is to be carried out, the GEM questionnaire needs to include some additional items and other modifications. What is more, with that aggregated information, the relationship between intentions and actions (that is to say, between entrepreneurial potential and entrepreneurial activity) could be studied in greater depth.

Finally, this study is probably the first one to use cross-national general-population data from the GEM survey to explain entrepreneurial intentions. In this sense, results have been highly satisfactory since they have supported a priori expectations. Nevertheless, more research is called for to confirm or reject these results. In particular, more fine-grained hypotheses should be tested with different samples to advance knowledge in this respect.

As future extensions of this study, the comparison of different regions or sets of countries (developed vs. developing, for instance) is an obvious avenue for research which we intend to pursue. Similarly, our purpose is to replicate this study with more recent GEM data at the national and/or subnational levels. Additionally, the inclusion of other variables may allow a more detailed assessment of the relative probabilities to state entrepreneurial intentions for several specific groups of respondents, such as women (Pardo-del-Val 2010), intrapreneurship (Alpkan et al. 2010; Arendt and Brettel 2010) or franchise businesses (Lindblom and Tikkanen 2010; Gámez-González et al. 2010). In particular, this analysis may be applied to assess high-tech (Lin et al. 2010) and innovation-driven start-ups (Sundbo 2009; Zhang and Duan 2010; Baregheh et al. 2009; Huang et al. 2010; Abreu et al. 2010; Meliá et al. 2010; Rubalcaba et al. 2010; Toivonen and Tuominen 2009). On the other hand, a new questionnaire may be developed and tested to allow overcoming some of the limitations of the one used here.

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