



# Development and Cross-Cultural Application of a Specific Instrument to Measure Entrepreneurial Intentions

Francisco Liñán  
Yi-Wen Chen

**This article uses Ajzen's theory of planned behavior to build an entrepreneurial intention questionnaire (EIQ) and analyzes its psychometric properties. The entrepreneurial intention model is then tested on a 519-individual sample from two rather diverse countries: Spain and Taiwan. EIQ and structural equation techniques have been used to try to overcome previous research limitations. The role of culture in explaining motivational perceptions has been specifically considered. Results indicate EIQ properties are satisfactory and strong support for the model is found. Relevant insights are derived about how cultural values modify the way individuals in each society perceive entrepreneurship.**

## Introduction

There is a growing body of literature arguing that intentions play a very relevant role in the decision to start a new firm. The importance of cognitive variables in understanding this personal decision has been highlighted by Baron (2004) and Shaver and Scott (1991), among other researchers. In their view, this cognitive focus provides additional insights into the complex process of entrepreneurship. "Given the impressive success of a cognitive approach in other fields (e.g., psychology, education), there are grounds for predicting that it may also yield positive results when applied to the field of entrepreneurship" (Baron, p. 237).

This study follows the cognitive approach through the application of an entrepreneurial intention model. A number of works have been published lately about this issue. However, a lot of research is still needed to better comprehend what the factors affecting entrepreneurial perceptions are. In particular, our knowledge is specially limited in two specific areas. First, cross-cultural studies are needed for the effect

---

Please send correspondence to: Francisco Liñán, tel.: +34.954554487; e-mail: flinan@us.es, and to Yi-Wen Chen at g1359508@nccu.edu.tw.

of different cultures and values on the entrepreneurial intention to be better understood. Nevertheless, for different research to be comparable, measurement instruments have to be standardized. Therefore, there is also a need to develop more adequate reliable and valid instruments to analyze entrepreneurial perceptions and intentions.

The main purpose of this article is clearly in line with these needs. The present study is divided into two parts. First, the construction and psychometric properties of a newly developed instrument—the entrepreneurial intention questionnaire (EIQ)—will be described. Reliability and validity analyses will be performed to assess the adequacy of this instrument. Second, the applicability of the entrepreneurial intention model to different cultural settings will also be tested.

Empirical analyses of entrepreneurial intentions are increasingly common (Autio, Keeley, Klofsten, Parker, & Hay, 2001; Chen, Greene, & Crick, 1998; Erikson, 1999; Fayolle, Gailly, & Lassas-Clerc, 2006; Kickul & Zaper, 2000; Kolvereid, 1996b; Kolvereid & Isaksen, 2006; Krueger, 1993; Krueger & Brazeal, 1994; Krueger, Reilly, & Carsrud, 2000; Lee & Wong, 2004; Peterman & Kennedy, 2003; Reitan, 1998; Tkachev & Kolvereid, 1999; Veciana, Aponte, & Urbano, 2005; Zhao, Hills, & Siebert, 2005). Most of them have developed their own *ad hoc* research instruments (Chandler & Lyon, 2001). Comparisons between these works become quite problematic since differences among construct measures are sometimes substantial. Therefore, this article undertakes the task of building a measure that may be statistically robust and theoretically sound.

This instrument will then be used on samples from two quite different countries (Spain and Taiwan). Data thus obtained will be used to test the entrepreneurial intention model using structural equation techniques, following Ajzen's (1991) formulation of the theory of planned behavior (TPB). This implies the existence of structural relationships. In the past, most research on entrepreneurial intentions has used linear regression models (Chandler & Lyon, 2001) despite the risk of biased results.

Regarding the pattern of relationships in the model, one important concern is the traditionally weak role of subjective norm (SN) in the TPB. In the area of entrepreneurship, however, this alleged weakness is not so clear. Nevertheless, some studies have simply omitted SN (Peterman & Kennedy, 2003; Veciana et al., 2005), while others found it to be nonsignificant (Autio et al., 2001; Krueger et al., 2000). The existence of interactions and indirect effects of SN on intention could be explaining these results. Thus, in this article, structural equations are used so that a clearer understanding of those effects may be gained.

This study will hopefully shed some light on a number of issues. It will serve as a confirmation of the applicability of this cognitive model to the entrepreneurial decision. In this case, our sample comes from two countries with very different cultural and social structures. Thus, the robustness of this model in different settings will be tested. It will also contribute to clarifying the specific pattern of relationships among the intention antecedents. In addition, some of the effects of culture over entrepreneurial intentions will be tested. Finally, relevant implications for educators and policy makers could be derived.

In this sense, these two countries are clearly different in history and culture. Nonetheless, they are both sizeable economies, whether we consider their population (42.7 million in Spain and 22.7 in Taiwan, according to IMF data for 2004 [IMF, 2008]) or total GDP (U.S. \$1,045.7 and U.S. \$331.1 billion, respectively). They are both considered high-income countries (U.S. \$24,493 and U.S. \$14,594 per capita). In addition, according to the GEM report (Reynolds, Bygrave, Autio, & Hay, 2002), similar levels of

entrepreneurial activity<sup>1</sup> are found in both of them (around 4.6%). These data suggest Spain and Taiwan, despite their large differences, are not completely dissimilar, which would render the comparison more fruitful.

The organization of the article is as follows. The second section reviews previous contributions and presents the theoretical entrepreneurial intention model adopted, together with the hypotheses to be tested. The third section describes how the questionnaire was developed and its psychometric properties. The fourth section presents the results for the cross-country study using a structural equations model. Finally, a discussion is included in the fifth section. The article ends with a brief conclusion.

## **Theory and Hypotheses**

The decision to become an entrepreneur may be plausibly considered as voluntary and conscious (Krueger et al., 2000). Therefore, it seems reasonable to analyze how that decision is made. Entrepreneurship may be viewed as a process that occurs over time (Gartner, Shaver, Gatewood, & Katz, 1994; Kyrö & Carrier, 2005). In this sense, entrepreneurial intentions would be the first step in the evolving and—sometimes—long process of venture creation (Lee & Wong, 2004). The intention to start up, then, would be a necessary precursor to performing entrepreneurial behaviors (Fayolle et al., 2006; Kolvereid, 1996b). Intention is considered the single best predictor of behavior (Ajzen, 1991, 2001; Fishbein & Ajzen, 1975).

In turn, the intention of carrying out entrepreneurial behaviors may be affected by several factors, such as needs, values, wants, habits, and beliefs (Bird, 1988; Lee & Wong, 2004). In particular, the cognitive variables influencing intention are called motivational “antecedents” by Ajzen (1991). More favorable antecedents would increase the start-up intention (Liñán, 2004). Obviously, situational factors also influence entrepreneurial intentions (Ajzen, 1987; Boyd & Vozikis, 1994; Tubbs & Ekeberg, 1991). These external factors influence one’s attitudes toward entrepreneurship (Krueger, 1993). Variables such as time constraints, task difficulty, and the influence of other people through social pressure could be examples of these situational factors (Lee & Wong).

Results have supported the applicability of the TPB to entrepreneurship, despite some conflicts between the various studies. A good part of these differences may have been due to measurement issues (Chandler & Lyon, 2001). In fact, measuring cognitive variables implies considerable difficulty (Baron, 1998). Thus, empirical tests have differed widely. Krueger et al. (2000) used single-item variables to measure each construct. Kolvereid (1996b) used a belief-based measure of attitudes. More recently, Kolvereid and Isaksen (2006) have used an aggregate measure for attitudes, but a single-item one for intention. Similarly, some of these studies used an unconditional measure of intention (Autio et al., 2001; Kickul & Zaper, 2000; Kolvereid & Isaksen; Krueger et al.; Zhao et al., 2005), while others forced participants to state their preferences and estimated likelihoods of pursuing a self-employment career “as opposed to organizational employment” (Erikson, 1999; Fayolle et al., 2006; Kolvereid). Therefore, there is work to be done to produce a standard measurement instrument for entrepreneurial intention and its antecedents. In this sense, this article develops an EIQ, based on an integration of psychology and

---

1. Data from the Global Entrepreneurship Monitor. In 2002, the term “Total Entrepreneurial Activity” was used, which corresponds to “Early-Stage Entrepreneurial Activity” at present. That is, nascent entrepreneurs and owners of young businesses (up to 42 months of existence).

entrepreneurship literature, as well as previous empirical research in this field. The EIQ tries to overcome the main shortcomings of previous research instruments.

According to the TPB, entrepreneurial intention indicates the effort that the person will make to carry out that entrepreneurial behavior. And so, it captures the three motivational factors, or antecedents, influencing behavior (Ajzen, 1991; Liñán, 2004):

- *Attitude toward start-up (personal attitude, PA)* refers to the degree to which the individual holds a positive or negative personal valuation about being an entrepreneur (Ajzen, 2001; Autio et al., 2001; Kolvereid, 1996b). It includes not only affective (I like it, it is attractive), but also evaluative considerations (it has advantages).

- *Subjective norm (SN)* measures the perceived social pressure to carry out—or not to carry out—entrepreneurial behaviors. In particular, it would refer to the perception that “reference people” would approve of the decision to become an entrepreneur, or not (Ajzen, 2001).

- *Perceived behavioral control (PBC)* is defined as the perception of the ease or difficulty of becoming an entrepreneur. It is, therefore, a concept quite similar to *self-efficacy (SE)* (Bandura, 1997), and to perceived feasibility (Shapero & Sokol, 1982). All three concepts refer to the sense of capacity regarding the fulfillment of firm-creation behaviors. Nevertheless, recent work has emphasized the difference between PBC and SE (Ajzen, 2002). PBC would include not only the feeling of being able, but also the perception about controllability of the behavior.

The relative contributions of these three motivational factors to explaining entrepreneurial intention are not established beforehand. The specific configuration of relationships between those constructs would have to be empirically determined for each specific behavior (Ajzen, 1991, 2002).

In the specific area of entrepreneurship research, only 7 out of the 16 studies previously reported included SNs in the analysis. However, two of them did not perform any regression analysis. Of the remaining five studies, three found SN to significantly explain EI (Kolvereid, 1996b; Kolvereid & Isaksen, 2006; Tkachev & Kolvereid, 1999), whereas the other two found SN to be nonsignificant (Autio et al., 2001; Krueger et al., 2000). Therefore, although there is support for the idea that a direct SN–EI relationship might be established, some controversy remains. In this sense, the possibility of indirect effects of SN on EI should be investigated further.

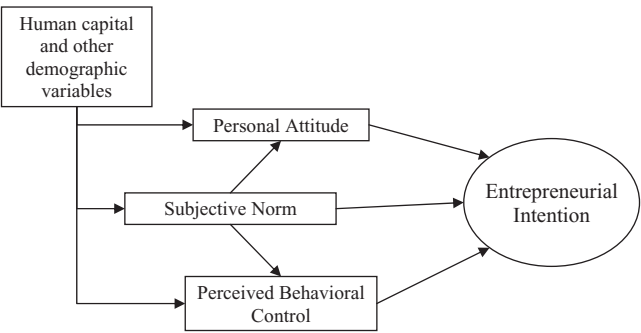
In this sense, there may be reasons to consider that SN has an effect on both PA and PBC. From a social-capital point of view, a number of authors argue that values transmitted by “reference people” would cause more favorable perceptions regarding PA and PBC (Cooper, 1993; Matthews & Moser, 1995; Scherer, Brodzinsky, & Wiebe, 1991). Liñán and Santos (2007) describe SN as a specific form of social capital and suggest a causation effect over the other two intention antecedents. Figure 1 reflects this idea.

On the other hand, as mentioned previously, human capital and other demographic factors have an influence on intentions (Boyd & Vozikis, 1994; Lee & Wong, 2004; Tubbs & Ekeberg, 1991). In particular, a greater knowledge of different entrepreneurial aspects will surely contribute to more realistic perceptions about entrepreneurial activity (Ajzen, 2002), thus indirectly influencing intentions.

The relevance of experience and education has been widely highlighted, especially for the increased knowledge it provides (Cooper, 1985, 1993). In general, greater knowledge will also directly provide a greater awareness about the existence of that professional career option (Liñán, 2004), as may be inferred by the importance attached to the existence of role models (Carrier, 2005; Matthews & Moser, 1995; Rondstadt, 1990). This latter element would have an influence on PBC and possibly on PA and SN as well

Figure 1

Entrepreneurial Intention Model



(Scherer et al., 1991). Therefore, it might be expected that the different circumstances modifying the level of entrepreneurial knowledge would have distinct and significant effects on the motivational intention antecedents.

Figure 1, therefore, summarizes the model we will be using as a starting point for our analysis. Apart from the explicit inclusion of demographic and human capital variables, Figure 1 is equivalent to the TPB described by Ajzen (1991), and used by Autio et al. (2001), Erikson (1999), Fayolle et al. (2006), Kolvereid (1996b), Kolvereid and Isaksen (2006), Krueger et al. (2000), Reitan (1998), and Veciana et al. (2005), among others. One particularity, however, is that we have specifically hypothesized what the pattern of relationships among the motivational antecedents of intention is. SN is assumed to influence both PA and PBC.

Cultural Considerations

The application of this model to different cultures has been scarce. Autio et al. (2001) is one of the few examples. Culture has been defined as the underlying system of values peculiar to a specific group or society (Mueller & Thomas, 2001). Thus, culture motivates individuals in a society to engage in behaviors that may not be evident in other societies. A number of authors (Busenitz, Gómez, & Spencer, 2000; George & Zahra, 2002; Mueller, Thomas, & Jaeger, 2002) see culture as a moderator between economic and institutional conditions, on one side, and entrepreneurship, on the other.

Most research about the influence of culture on entrepreneurship has followed Hofstede’s (1980) cultural dimensions (Hayton, George, & Zahra, 2002; Mcgrath & MacMillan, 1992; Mitchell, Smith, Seawright, & Morse, 2000; Mueller & Thomas, 2001; Mueller et al., 2002; Shane, Kolvereid, & Westhead, 1991). However, Hofstede et al. (2004) consider two alternative forms in which this influence may be exercised. A positive aggregate effect would take place when culture shapes economic and social institutions, making them more favorable toward entrepreneurial activity. Thus, “integrated” individuals may find it easier to become entrepreneurs. Where culture is relatively unfavorable toward entrepreneurship, “dissatisfied” individuals would seek personal realization through self-employment.

Mcgrath, MacMillan, and Scheinberg (1992) argue that entrepreneurs would tend to exhibit certain levels of those dimensions: high power-distance (PDI+), low uncertainty-

avoidance (UAV-), high individualism (IND+), and high masculinity (MAS+). In particular, they consider PDI+ as a personal characteristic of entrepreneurs “regardless of whether the culture is high or low on power-distance” (Mcgrath et al., p. 119). Busenitz and Lau (1996) transfer these assumptions to the national level, suggesting that cultures high on those values would favor the entrepreneurial activity of its members. Mueller et al. (2002) share this view, except for the PDI index. They argue that low power distance (PDI-) cultures would favor entrepreneurship.

This view is called by Hofstede et al. (2004) the “aggregate psychological traits” perspective and would favor start-up of “integrated” individuals. However, they argue that “dissatisfied” individuals would tend to become self-employed when the national culture is relatively unfavorable to entrepreneurship. Thus, opposite relationships might be established (PDI+, UAV+, IND-, and MAS- national cultural dimensions would be associated with higher self-employment levels).

As Hayton et al. (2002) and Busenitz et al. (2000) point out, cultural dimensions would moderate the relationship between economic situation and entrepreneurial activity. Thus, the relative presence of integrated and dissatisfied entrepreneurs in any given culture may change substantially depending on its economic situation. In this sense, support found by Hofstede et al. (2004) for the “dissatisfaction” theory might partly be due to their measure of entrepreneurship. They used self-employment as the dependent variable, which is quite different from entrepreneurial activity (Uhlener & Thurik, 2007). It would include new and established business owners, but it would not yet include nascent and intentional entrepreneurs. It might be expected that new start-up attempts would correspond more closely to “integrated” entrepreneurial efforts, while “dissatisfied” business owners would remain self-employed for a long period (Uhlener & Thurik).

Thus, a culture unfavorable to entrepreneurship might lead to a higher proportion of self-employed individuals and, therefore, to smaller average firm size. However, this would be compatible with lower entrepreneurial activity (start-ups attempted). On the other hand, it may be argued that a supportive culture would lead to higher entrepreneurial intentions among the population and, therefore, more new ventures being attempted.

Values shared within a culture, according to the TPB approach, would affect the motivational intention antecedents. In this sense, a supportive culture would help in the legitimization of entrepreneurship (Etzioni, 1987). As SN reflects the perceived social pressure to start a firm, the influence of cultural values might be stronger on this motivational antecedent (Ajzen, 2001; Begley & Tan, 2001; Kristiansen & Indarti, 2004) argue that SN tends to play a stronger role in explaining intention in collectivist cultures, and weaker in individualistic societies.

In this study, two quite different countries are considered. Nevertheless, Hofstede’s cultural dimensions are relatively similar in both of them. Thus, power-distance (57 for Spain and 58 for Taiwan) and masculinity (42 and 45, respectively) scores are broadly equivalent (Hofstede, 2003). However, Spain scores substantially higher in individualism (51 vs. 17 for Taiwan), which would imply a culture more supportive of entrepreneurship. On the other hand, Spain also scores higher on uncertainty avoidance (86 vs. 69). It could be considered that in this dimension, Spanish culture is relatively more opposed to entrepreneurship.

The economic situation has been positive in both countries since the mid-1990s (2002 being the only exception). Economic growth has tended to be somewhat higher in Taiwan, whereas unemployment level has been lower. Spain’s unemployment, although still higher, has been decreasing substantially since the mid-1990s. Therefore, the influence of the economic situation might be considered as neutral for the purposes of this study.

No specific research comparing the effects of cultural differences on entrepreneurial intentions for these two countries has been found. However, Mcgrath, MacMillan, Yang, and Tsai (1992) compared cultural values of entrepreneurs from Taiwan and the United States (and also China). Uslay, Teach, and Schwartz (2002)—although not using Hofstede’s dimensions—compared entrepreneurial attitudes of Spanish and U.S. MBA students (and also Turkish).

Based on this literature, some tentative predictions may be formulated. First, Taiwan is much less individualistic than Spain, being among the more collectivistic countries in the world, and this seems to be an enduring characteristic (Mcgrath et al., 1992). Thus, one should expect that SN would exert a much higher effect over PA, PBC, and EI than in Spain (Begley & Tan, 2001).

Second, Uslay et al. (2002) found that Spanish students agreed significantly more than their U.S. counterparts with the statement “entrepreneurship offers job satisfaction.” On the other hand, Taiwanese entrepreneurs disagree significantly more with the statement “starting a company adds to the excitement of your life.” This would be indicating that “salient beliefs” conforming the motivational intention antecedents are different in each culture (Ajzen, 1991; Kolvereid, 1996a). In this sense, entrepreneurial intention could be more closely linked to PA among Spanish respondents, whereas in Taiwan PBC would be a relatively stronger influence.

Regarding the effect of higher uncertainty avoidance in Spain, entrepreneurship would be considered a more uncertain career option and, therefore, socially discouraged (Busenitz & Lau, 1996; Mueller et al., 2002). The effect over motivational antecedents, however, is far from clear. High UAV would lead people to feel “threatened by uncertain or unknown situations” (Hofstede, 1991, p. 113). Thus, they might feel less able to start a firm, even if they had all the technical and practical knowledge. In this sense, the effect of PBC over EI would be lower.

## Hypotheses

The hypotheses to be tested are summarized in Table 1. As may be seen, hypotheses 1 to 3 correspond to the traditional intention model used elsewhere. Hypotheses 4 and 5 would explain the internal configuration of antecedents. To test these two hypotheses, structural equation systems are required.

Table 1

## Hypotheses

| No. | Description  |                       |
|-----|--|-----------------------|
| 1   | Personal attitude positively influences entrepreneurial intention  | PA → EI               |
| 2   | Perceived behavioral control positively influences entrepreneurial intention   | PBC → EI              |
| 3   | Subjective norm positively influences entrepreneurial intention  | SN → EI               |
| 4   | Subjective norm positively influences personal attitude  | SN → PA               |
| 5   | Subjective norm positively influences perceived behavioral control   | SN → PBC              |
| 6   | Subjective norm exerts a stronger effect on PA and PBC in the less individualistic country (Taiwan)                              | Tw → SN+              |
| 7   | The relative effect of PA and PBC on EI differs by country<br>(PA effect on EI stronger in Spain, PBC effect stronger in Taiwan) | Sp → PA+<br>Tw → PBC+ |

Finally, two hypotheses relating to culture have also been derived. The higher collectivist character (IND–) of Taiwan suggests that SN would exert a stronger effect over the other motivational antecedents and also over EI (hypothesis 6). On the other hand, specific salient beliefs associated with entrepreneurship would be different in Spain and Taiwan. Similarly, higher UAV in Spain might downplay the role of PBC in the formation of entrepreneurial intentions. These two still tentative arguments, taken together, lead us to formulate hypothesis 7.

## **Instrument Development and Psychometric Properties**

In this article, the entrepreneurial intention model is considered as essentially adequate to analyze the intention of becoming an entrepreneur. Therefore, an instrument to measure intentions and the other variables in the model was needed. The EIQ was developed for that purpose. It is based on the existing theoretical and empirical literature about the application of the TPB to entrepreneurship. Thus, it has been carefully cross-checked with those instruments used by other researchers, such as Autio et al. (2001), Chen et al. (1998), Kickul and Zaper (2000), Kolvereid (1996b), Kolvereid and Isaksen (2006), Krueger et al. (2000), and Veciana et al. (2005). Throughout the whole construction process, Ajzen's (1991, 2001, 2002) work has been carefully revised to solve any discrepancy that might have arisen between the different instruments. The EIQ is available from the authors upon request. Items used to capture the central elements of the entrepreneurial intention model are included in the Appendix.

The EIQ has been divided into 10 sections. Sections 3 to 6 correspond with the elements in the entrepreneurial intention model (see Figure 1). Within them, all constructs are Likert-type scales. In this sense, Nunnally (1978) suggests that multi-item scales are more reliable than single-item ones.

The first (education and experience), second (entrepreneurial knowledge), and ninth (personal data) sections require human capital and demographic information that should not affect intention directly, but could be very useful in identifying their effect on PA, SN, and PBC.

Finally, we also asked students to voluntarily provide contact data so that they may be studied again later. This follow-up will hopefully allow for future analysis of the intention–behavior relationship. In this sense, a section centered on entrepreneurial objectives has also been included. Its purpose is to analyze students' concept of "success" and the importance they attach to business development and growth. Entrepreneurial quality has been defined as the behaviors performed to develop the firm and make it dynamic (Guzman & Santos, 2001; Santos & Liñán, 2007).

## **Measures**

Entrepreneurial intention has been measured through a Likert-type scale with five items. These are general sentences indicating different aspects of intention. A similar system has already been used by Chen et al. (1998) and Zhao et al. (2005). However, Armitage and Conner (2001) identified three distinct kinds of intention measures: desire ("I want to . . ."), self-prediction ("How likely it is . . .") and behavioral intention ("I intend to . . ."). This latter type seems to provide slightly better results in the prediction of behavior (Armitage & Conner, 2001, p. 483). In this sense, Chen et al. use a mix of self-prediction and pure-intention items, whereas Zhao et al. use "interest" measures

("How interested are you in...?"). In our opinion, the similarity between interest and intention may not be so clear. For this reason we have chosen a pure-intention measure.

PA has also been measured through an aggregate attitude scale. This is an important difference compared to other studies, such as those of Kolvereid (1996b) and Fayolle et al. (2006), where a belief-based measure of PA was used. However, Ajzen (1991, 2001) states that beliefs are the antecedents of attitudes and suggests using an aggregate measure for attitudes (beliefs would explain attitude, while attitude would explain intention). In this sense, Krueger et al. (2000) use such a design, with beliefs explaining an aggregate measure of attitude, while this latter variable was used to explain intention. Similarly, in Kolvereid and Isaksen's (2006) study, both kinds of measures were included together in a linear regression with entrepreneurial intention as the dependent variable. Aggregate attitude was a significant regressor, while beliefs were not. Correlations between the aggregate and belief-based measures are sometimes disappointing (Ajzen, 1991, p. 192). For this reason, we have chosen an aggregate measure of PA in the EIQ.

PA toward entrepreneurship has sometimes been measured unconditionally (Krueger et al., 2000), while in some other instances it has been considered as opposed to salaried work (Kolvereid, 1996b). This opposition is far from clear. It has been argued that "this dichotomization is clearly a simplification. [...] It is not clear how to categorize people who combine working for an employer and running their own business. There is evidence to suggest that a large proportion of new business founders start their business as a part-time operation while they continue to work for their employer (Carter, Gartner, & Reynolds, 1996; Delmar & Davidsson, 2000)" (Kolvereid & Isaksen, 2006, p. 870).

In this sense, we have included an additional question in the EIQ to test the extent to which these two concepts may be considered as truly opposed. Thus, following Autio et al. (2001), respondents were asked to rate their preference toward both options as different items. Analyzing the correlation between the answers to these two items could serve to check the validity of this assumption.

SN, according to Ajzen (1991), should be approached through an aggregate measure of the kind "what do reference people think?" In practice, however, some researchers simply omit this element from the model (Chen et al., 1998; Krueger, 1993). On the other hand, others have posited answers to this question with their respective "motives to comply" (Kolvereid, 1996b; Kolvereid & Isaksen, 2006; Tkachev & Kolvereid, 1999). Nevertheless, Armitage and Conner (2001, p. 485) found that, in general, the "subjective norm  $\times$  motives to comply" measure tends to show weaker predictive power toward intention than the "multiple-item subjective norm" measure. This alleged weakness may not be so clear in the specific area of entrepreneurship research. Nonetheless, we have used one simpler scale in the validation process, including three groups of "reference people: family, friends and colleagues." In this manner, we also contribute to keep the EIQ as parsimonious as possible.

In previous research, PBC has been measured through specific self-efficacies (Chen et al., 1998; Zhao et al., 2005). More general measures of SE and perceived controllability of behavior have also been used. In particular, Kolvereid (1996b) used a general 6-item scale with good results, whereas Kolvereid and Isaksen (2006) used an 18-item scale that was then grouped into four specific self-efficacies through factor analysis. This latter study showed no significant correlation between PBC and intention. In Ajzen's (1991) opinion, control beliefs would be the antecedents of an aggregate measure of PBC. Thus, specific efficacies and control beliefs could be understood as being the antecedent of general PBC. In this sense, as aggregate measures have been used for PA and SN, we chose to keep this scheme for PBC as well.

Therefore, respondents were asked to rate their level of agreement with several general statements about the feeling of capacity regarding firm creation. In a recent work, Ajzen (2002) considers that PBC is a concept somewhat wider than SE. It would also include a measure of controllability (the extent to which successfully performing the behavior is up to the person). Nevertheless, Kolvereid and Isaksen (2006) used a pure “self-efficacy” scale because Armitage and Conner (2001) concluded that SE is more clearly defined and more strongly correlated with intention and behavior. The EIQ includes a 6-item scale; five of these items measure general SE, whereas one is a controllability statement (15c, see Appendix).

## Psychometric Properties

To analyze the psychometric properties of the EIQ, a sample of last-year university students was used. Samples of students are very common in the entrepreneurship literature (Autio et al., 2001; Fayolle et al., 2006; Kolvereid, 1996b; Krueger et al., 2000; Tkachev & Kolvereid, 1999; Veciana et al., 2005). In addition, recent research has found that university graduates between 25 and 34 years of age show the highest propensity toward starting up a firm (Reynolds et al., 2002). Last-year students would be, therefore, very close to entering this segment of the population.

Questionnaires were administered in class, with prior permission from the lecturer. Students were briefed on the purpose of the study by a member of the research team, and then asked to voluntarily fill in the EIQ. Questionnaires were in principle anonymous, but contact data were asked for if they freely wanted to participate in the project follow-up. Fieldwork was carried out in October and November 2004 at University of Seville (Spain).

A total of 323 questionnaires were thus collected. Thirteen of them were removed due to a high level of missing data, or to respondents being visiting students from abroad. For the remaining 310, missing data were always less than 2% of responses and were thus retained. Business students were 66.7% of the sample (the rest being students of economics). Of the sample, 53.5% were female, and the average age was 23.8 years. These figures roughly correspond to the general characteristics of students in these degrees. Thus, it may be considered a representative sample.

Chandler and Lyon (2001, p. 103) consider reliability (“consistency and stability of a score from a measurement scale”) and validity (“evidence that the measurement is actually measuring the intended construct”) as the essential psychometrics to be reported.

The first step was using Cronbach’s alpha to test reliability of the proposed scales. The usual threshold level is .7 for newly developed measures (Nunnally, 1978). In this case, the values range from .773 to .943 (see last row in Table 2). Thus, the theoretically developed scales may be considered as reliable.

The second step was validity analysis. Chandler and Lyon (2001) establish several possible validation procedures. Structural and content validities have been carefully considered when developing the instrument. All items are carefully matched to the theoretical construction of the model. Much care has been taken to ensure that items are both relevant and representative of the construct being measured (Messick, 1988). Substantive validity, on the other hand, refers to the convergent and discriminant characteristics of the construct.

Convergent validity is usually assessed using factor analysis (Klein, Astrachan, & Smyrnios, 2005; Kreiser, Marino, & Weaver, 2002; Moriano, Palací, & Morales, 2006). In our sample, the Kaiser–Meyer–Olkin test for sample adequacy was notably high (.912) and Bartlett’s sphericity test highly significant ( $p < .001$ ). Both statistics suggest that data

Table 2

### Rotated Factor Matrix and Reliability Indicators

|                     | Factor |      |      |       |
|---------------------|--------|------|------|-------|
|                     | EI     | PBC  | SN   | PA    |
| 11a personal att.   |        |      |      | -.639 |
| 11b personal att.   |        |      |      | -.640 |
| 11c personal att.   |        |      |      | -.762 |
| 11d personal att.   |        |      |      | -.756 |
| 11e personal att.   |        |      |      | -.608 |
| 13a subj. norm      |        |      | .480 |       |
| 13b subj. norm      |        |      | .997 |       |
| 13c subj. norm      |        |      | .760 |       |
| 15a p. beh. control |        | .652 |      |       |
| 15b p. beh. control |        | .731 |      |       |
| 15c p. beh. control |        | .824 |      |       |
| 15d p. beh. control |        | .714 |      |       |
| 15e p. beh. control |        | .773 |      |       |
| 15f p. beh. control |        | .648 |      |       |
| 18a entrep. intent. | .654   |      |      |       |
| 18b entrep. intent. | .839   |      |      |       |
| 18c entrep. intent. | .865   |      |      |       |
| 18d entrep. intent. | .914   |      |      |       |
| 18e entrep. intent. | .782   |      |      |       |
| 18f entrep. intent. | .856   |      |      |       |
| Cronbach's $\alpha$ | .943   | .885 | .773 | .897  |

*Note:* Extraction method: principal axis factorization. Rotation method: Oblimin Normalization with Kaiser. Rotation converged after six iterations. Loadings below .40 not shown.

are suitable for factor analysis. A Kolmogorov–Smirnov test was performed to check for normality in the items' distribution. Since normality was not supported, the extraction method selected was principal axis factorization. Three factors with eigenvalues greater than 1 emerged, whereas the fourth eigenvalue was .998. Therefore, the scree plot was considered, which suggested a 4-factor solution. Cumulative variance explained by the extraction was 72.2%. Table 2 presents the rotated factor matrix. As may be observed, all items loaded on the expected factor only.

Discriminant validity may be assessed looking at correlations. Items should correlate more strongly with their own construct than with any other, indicating that they are perceived by respondents as belonging to their theoretical construct (Messick, 1988). In this sense, in Table 3, the average item-construct correlation has been computed for each construct. As may be observed, correlations of each item to other constructs are always below the average correlation with their own construct.

Obviously, these psychometric properties should be tested again on different samples. Nevertheless, initial results suggest the EIQ might fulfill reliability and validity requirements. Therefore, we will use it in the second part of our study.

Table 3

## Item-Construct Correlations

|                     | EI    | PBC   | SN    | PA    |
|---------------------|-------|-------|-------|-------|
| 11a personal att.   | .461  | .344  | .242  |       |
| 11b personal att.   | .700  | .298  | .318  |       |
| 11c personal att.   | .700  | .306  | .326  | .834  |
| 11d personal att.   | .609  | .317  | .363  |       |
| 11e personal att.   | .719  | .325  | .285  |       |
| 13a subj. norm      | .214  | .238  |       | .318  |
| 13b subj. norm      | .119  | .208  | .766  | .270  |
| 13c subj. norm      | .117  | .152  |       | .240  |
| 15a p. beh. control | .315  |       | .126  | .343  |
| 15b p. beh. control | .450  |       | .233  | .447  |
| 15c p. beh. control | .375  | .793  | .306  | .347  |
| 15d p. beh. control | .192  |       | .165  | .161  |
| 15e p. beh. control | .340  |       | .164  | .270  |
| 15f p. beh. control | .459  |       | .296  | .317  |
| 18a entrep. intent. |       | .278  | .138  | .620  |
| 18b entrep. intent. |       | .308  | .201  | .718  |
| 18c entrep. intent. | .880  | .383  | .247  | .701  |
| 18d entrep. intent. |       | .426  | .152  | .662  |
| 18e entrep. intent. |       | .469  | .199  | .656  |
| 18f entrep. intent. |       | .393  | .138  | .639  |
| EI                  | 1.000 | .428  | .198  | .765  |
| PBC                 | .428  | 1.000 | .261  | .370  |
| SN                  | .198  | .261  | 1.000 | .353  |
| PA                  | .765  | .370  | .353  | 1.000 |

## Cross-Cultural Empirical Analysis

The EIQ developed in the previous section will now be used in this second part of the study. The cross-cultural applicability of the entrepreneurial intention model and the specific role of cultural values will be analyzed. An enlarged Spanish sample was used together with a Taiwanese one.

## Sample Characteristics

For the Spanish sample, another two universities were included (Pablo Olavide and Jaen universities), to be added to the 310 original usable questionnaires from Seville. Data collection procedure was similar. In this manner, we collected another 77 questionnaires (November 2004). All of them had less than 2% of missing data, and no foreigners or visiting students filled them in, so they were all usable. Separate analyses were performed on the initial sample and the new one. In this latter sample, there were more women (64.9%) and all respondents were business students (economics is not on offer at these two universities).

Finally, of the 387 total respondents, 71.9% of them are business students, the rest being essentially students of economics (26.8%). Of the respondents, 55.8% are female, while the average age is 23.6 years.

The Taiwanese sample was obtained from the eighth edition of the Technology Innovation Competition (February 2006). This is the largest business plan competition in

Table 4

Sample Characteristics

|                     | Spain |        |       | Taiwan |        |       | Total |        |       |
|---------------------|-------|--------|-------|--------|--------|-------|-------|--------|-------|
|                     | N     | Mean   | SD    | N      | Mean   | SD    | N     | Mean   | SD    |
| Age                 | 386   | 23.632 | 3.104 | 125    | 23.088 | 2.978 | 511   | 23.499 | 3.080 |
| Gender*             | 387   | .442   | .497  | 125    | .584   | .495  | 512   | .477   | .500  |
| Degree studied      | 385   |        |       | 126    |        |       | 511   |        |       |
| Business            |       | 71.9%  |       |        | 60.3%  |       |       | 69.1%  |       |
| Economics           |       | 26.8%  |       |        | —      |       |       | 20.2%  |       |
| Engineering         |       | —      |       |        | 24.6%  |       |       | 6.1%   |       |
| Other               |       | 1.3%   |       |        | 15.1%  |       |       | 4.7%   |       |
| Work experience     | 387   | .434   | .496  | 132    | .364   | .483  | 519   | .416   | .493  |
| Self-empl. exper.** | 387   | .023   | .151  | 129    | .085   | .280  | 516   | .039   | .193  |
| Know entrepreneur*  | 387   | .863   | .344  | 131    | .481   | .502  | 518   | .766   | .424  |

\* Country difference is significant ( $p < .01$ ), \*\* Significant at the 99.9% level ( $p < .001$ ).

Taiwan for university students. One of the steps consists of a 3-day winter camp. It was during this stage that the fieldwork was carried out. Each competing team was made up of four to seven members. Two of them were randomly selected from each competing team and asked to complete the survey. Questionnaires were administered to 180 participants, 132 valid questionnaires being collected (73.9%). Average age was 23.1 years and 42.1% of respondents were female. Again, business is the most common degree (60.6%), followed by engineering (24.4%), the rest being mostly health and life sciences.

Regarding EIQ translation, the instrument was originally and simultaneously developed in Spanish and English. Three researchers (one Spanish and two native English) made independent bidirectional translations. Any concern or discrepancy was jointly solved. A Chinese version was used in Taiwan, based on the English version and translated by one of the authors. Three graduate students then checked the translation independently. A joint session served to solve discrepancies. Finally, the EIQ was completed by a different student, who found no problems in understanding and answering the questions.

Some differences do arise between both samples, as might be expected (see Table 4). In the first place, the Spanish sample includes significantly more women. Similarly, knowing an entrepreneur is more common in Spain (86.3% compared to 48.1% of the Taiwanese sample). On the other hand, even though the proportion of respondents having work experience is broadly similar (43.4% to 36.4%), Taiwanese students have much higher self-employment experience. These differences might have relevant effects on the variables in the entrepreneurial intention model. For this reason, we will include these demographics as control variables in the statistical analysis.

Structural Analysis

The entrepreneurial intention model to be tested has been presented in Figure 1. Structural equation modeling was used to test its empirical validity (Gefen, Straub, &

Boudreau, 2000). However, as a first step, reliability and validity analyses were performed for each subsample. Thus, Cronbach’s alphas ranged from .776 to .953. Factor analysis resulted in four factors being extracted (all of them with eigenvalues greater than 1), fully corresponding to theoretical expectations.

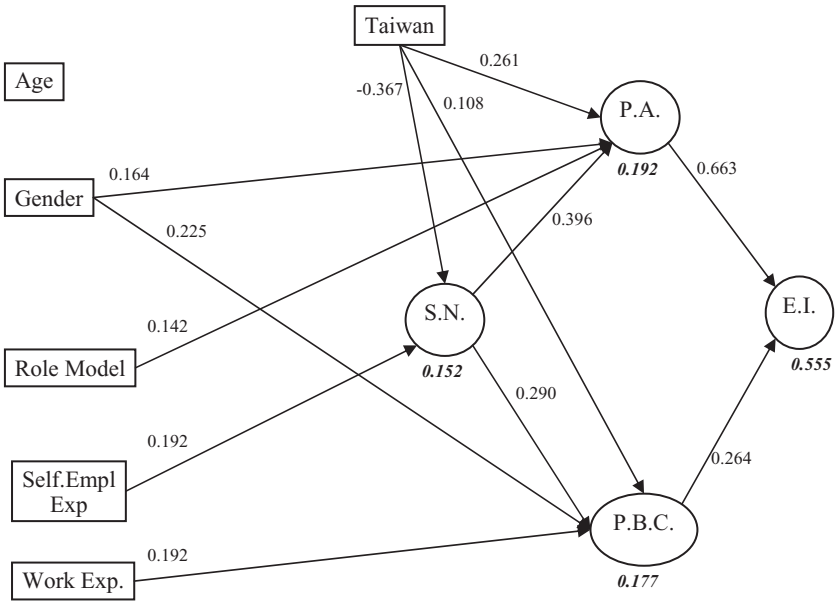
According to the theory, external variables will exert their direct influence only on the intention antecedents. For this reason, control variables are included as explaining PA, SN, and PBC. Age is measured in years. The other four demographic variables are dichotomic 0/1. The value 1 means male (in the “Gender” variable), knows personally an entrepreneur (in “Role Model”), has self-employment experience (in “SelfEmpl Exper”), and has labor experience (in “Work Exper”). The value 0 means the opposite. Therefore, positive relationships are expected for these demographics with the intention antecedents, as possessing these characteristics would be associated with more favorable perceptions.

The statistical analysis has been carried out using PLSGraph v.3.00 (Chin & Frye, 2003). The initial model to be tested was presented in Figure 1. Apart from human capital and demographic variables, a country dummy has also been included (labeled Taiwan) to account for possible cultural country differences. In this case, a direct influence of this dummy on intention was initially drawn to reflect the possibility of the way intentions are formed differing in each culture.

After running the statistical software on these data, a number of nonsignificant path coefficients were found. A recursive method has been used to eliminate the path with the lowest *t*-statistic at each iteration, until all coefficients were significant at least at the 95% level ( $p < .05$ ). Figure 2 presents the results for the combined sample. As may be observed, the core entrepreneurial intention model is generally supported by this analysis,

Figure 2

### Results for the Combined Sample



Note: Only significant path coefficients included. Numbers below the constructs indicate variance explained.

with the only exception of the subjective norm–intention relationship. Therefore, hypotheses 1 and 2 are confirmed, whereas hypothesis 3 is not. The relative strength of this motivational factor has already been identified as a pending issue in intention models.

It has been argued earlier that the main influence of SN would be exerted through its effects on PA and PBC. Hypotheses 4 and 5 were intended to test this possibility. They have been fully supported since both paths are significant.

Demographic and human capital variables have relatively few significant effects on the antecedents of entrepreneurial intention and, in general, they are small in magnitude. The signs of coefficients, however, are as expected. Only the effect of gender (being male) on PBC is considerably large (.225).

This model explains 55.5% of the variance in entrepreneurial intention based on PA and PBC. This result is highly satisfactory since most previous research using linear models typically explain less than 40%. Besides, the model also serves to explain nearly 20% of the variance in PA and PBC, thanks to the important contribution of SN.

These results also indicate that significant cultural differences between these two samples probably exist since the country-dummy coefficients are significant. Nevertheless, no significant direct effect on EI was found from this variable. This would mean that, starting from perceptions, intentions are formed the same way in the European country and the Asian country studied, pointing to the universal applicability of the planned behavior approach in entrepreneurship.

However, there are significant differences with respect to levels of those antecedents: PA, SN, and PBC. Taiwanese respondents tend to perceive much lower support in their closer environment (−.367) than Spanish do. In contrast, they state a higher PA (.261) and, to a lesser extent, PBC (.108). Nonetheless, testing cultural hypotheses (6 and 7) requires performing separate analyses of each national subsample.

Figure 3 presents comparative results for each subsample. Paths that are significant in both cases are drawn as a full line. Both path coefficients are included (Spain/Taiwan). Paths that are significant in one subsample only (Spain in all instances) are drawn as a dashed line. Hypotheses 1, 2, 4, and 5 fully hold for each subsample, adding robustness to our results. Meanwhile, hypothesis 3 is rejected in both cases, as it was in the combined sample. Similarly, variance explained by the model is even higher than it was for the combined sample (over 57.8%).

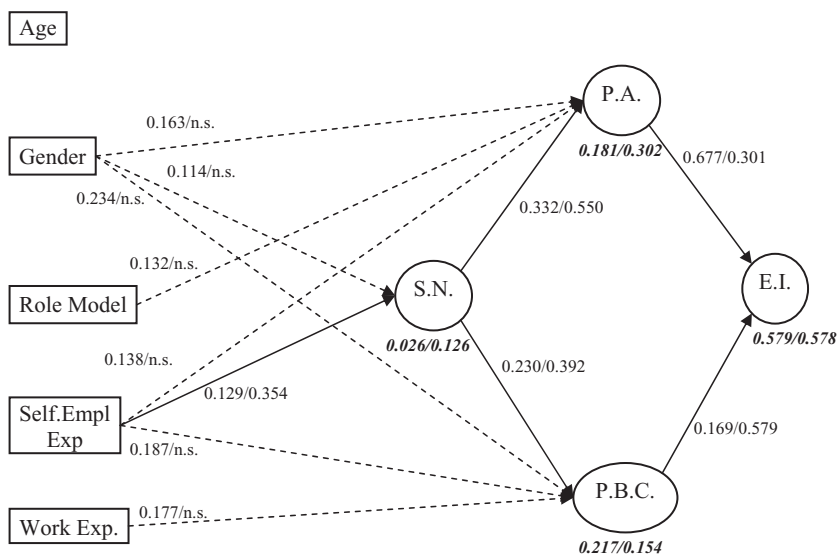
Regarding possible cultural specificities, some notable differences are found between the path coefficients. SN exerts a stronger influence over both PA and PBC in Taiwan. This result would support hypothesis 6. This stronger effect cannot be confirmed for the SN–EI relationship since this latter path is not significant.

Hypothesis 7 stated that the relative influence of PA and PBC on EI would be different depending on the country. In the Spanish subsample, PA exerts the stronger effect (.677 vs. .169 for PBC). In Taiwan, PBC is the strongest predictor of EI (.579 vs. .301 for PA). Therefore, hypothesis 7 would be supported.

The number of human capital and demographic variables significantly influencing motivational factors is notably different. In Taiwan, there is only one of them, linking self-employment experience to SN. Smaller sample size probably accounts for this lower presence of significant variables. The SelfEmpl.Exp–SN relationship holds for both subsamples. This would indicate that, regardless of culture, having been an entrepreneur before significantly improves perceived approval by “reference people.” On the other hand, age is not significant in either sample. This would be probably explained by the short age span considered. A new study of the general population may be needed to more accurately assess the role of age.

Figure 3

Compared Results for Each Subsample



Note: Spain/Taiwan. n.s. = nonsignificant in the Taiwanese subsample. Numbers below the constructs indicate variance explained.

Discussion

The first part of this study describes the construction and validation of an EIQ. All items in the questionnaire are based on the theory and have taken previous empirical literature as a reference. In this sense, a decision was made to use aggregate measures for the three motivational antecedents (PA, SN, and PBC). This decision may not be too problematic with regard to PA and PBC. However, with respect to SN, it has been relatively frequent in the past to moderate direct responses about reference people’s approval with their relative “motives to comply.” The decision was taken to keep the EIQ as parsimonious as possible. Nevertheless, it may be argued that part of the results (in particular, rejection of hypothesis 3) may be a consequence of this specific design of the SN measure.

Previous research using a “subjective norm” × “motives to comply” measure has found a significant relationship with EI (Kolvereid, 1996b; Kolvereid & Isaksen, 2006; Tkachev & Kolvereid, 1999). On the other hand, the simpler “subjective norm” measure has most often been nonsignificant (Autio et al., 2001; Krueger et al., 2000). A specific comparison of these two alternative measures using structural equations would probably be appropriate to help clarify their relative properties. Then, a modification of this measure in the EIQ may be needed.

Another characteristic of the EIQ is its consideration of entrepreneurship as not opposed to employee. To test this hypothesis, we used Spearman correlation coefficients (since the Kolmogorov–Smirnov test suggested distributions were not normal). Two items similar to those used by Autio et al. (2001) were checked. Correlation between “attraction toward salaried work” and “attraction toward entrepreneurship” takes a significant value

of  $-.307$  ( $p < .001$ ). Although it is negative, its magnitude is relatively small, suggesting that respondents do not see them as exact opposites. The value for the Spanish sample is slightly larger  $-.362$  and equally significant ( $p < .001$ ), but it is much lower ( $-.129$ ) and nonsignificant for the Taiwanese sample. Therefore, although Spaniards still see them partially as alternative options, it seems that in Taiwan this is not the case at all. Future research should be developed to confirm that these two career options are not perceived as completely opposed. In this case, there would be a strong case for using unconditional measures of both PA and entrepreneurial intention in future research, in line with recent reasoning by Kolvereid and Isaksen (2006).

The validation procedure has yielded satisfactory results. Scales are reliable and valid when tested on the initial Spanish sample. In addition, the enlarged sample for Spain, and that of Taiwan also offered satisfactory psychometric properties (although not reported in detail due to reasons of space). In this sense, we are confident that the EIQ may be an adequate instrument to analyze entrepreneurial intentions. The follow-up study will try to verify the intention–behavior link.

Based on the findings presented in this article, strong support for the entrepreneurial intention model could be claimed. The applicability of the TPB to entrepreneurship had received wide empirical support in the past, although not without some exceptions (Kolvereid & Isaksen, 2006). The originality of this article resides in testing it on a two-country sample, considering the role of culture, with a newly developed instrument, and specifying the structural relations between the intention antecedents.

General results are satisfactory since most hypotheses have been confirmed and the explained variance is notably high. In particular, four of the five original core-model relationships were significant. SN would exert its influence on both PA and PBC (which in turn explain intention), but not directly on intention. Demographic or human capital variables, on the other hand, exert their effect on those antecedents. The existence of direct relationships between external variables and entrepreneurial intention was tested, with none resulting significant.

Results suggest that the traditional specification of the entrepreneurial intention model—based on linear regressions—may not be completely adequate. It would seem that perceived SN does not play a direct role in determining entrepreneurial intention. Its effect would rather be indirect. This holds for both the Spanish and Taiwanese samples. It may be argued that social pressures modify PA and PBC levels. When individuals feel that “reference people” would approve of their decision to become entrepreneurs, they would be more attracted toward that option and feel more able to perform it satisfactorily. Nevertheless, other researchers have found a direct and significant relationship between SN and entrepreneurial intention. However, their analyses were based on linear regression models and not on structural equations such as ours.

It is important to note that the same hypotheses (1, 2, 4, and 5) are confirmed for the combined sample and for each of the national subsamples. This holds despite national differences between both countries and even some differences in sample characteristics. Therefore, the robustness of the model seems to be confirmed.

For the combined sample, a country dummy was included to explain the three motivational antecedents and entrepreneurial intention itself. This latter relationship was not significant, whereas the effect on the three antecedents was. This, in our opinion, reinforces the cross-cultural applicability of the entrepreneurial intention model, since intention is explained by its motivational factors regardless of the country. This would mean that the effect of demographics on perceptions differs for each country, depending possibly on cultural and social differences. On the other hand, the formation of intention from its antecedents is essentially similar in both samples. Thus, internal cognitive

mechanisms would be the same for all people. That is, the “lenses” through which each of us “see” reality may differ in a cultural or social manner, but our way of “elaborating” on what we have “seen” would be similar.

In this case, Taiwanese respondents have more favorable perceptions about their PA and PBC toward firm creation than Spaniards do. Cultural disparities may be responsible for this difference, as stated in hypotheses 6 and 7. However, it may also be the case that sample characteristics account for part of this difference since the Taiwanese sample is made up of participants in a business plan competition. On the other hand, Taiwanese respondents have much lower levels of perceived SN. This is more difficult to explain by sample characteristics. Instead, it could be more logically attributed to cultural factors.

The role of culture in explaining entrepreneurial intentions is probably very relevant. Cultural values would exert their influence on the three motivational antecedents and on their relative strength in explaining intention. In our study, two additional hypotheses (6 and 7) were included to test the influence of culture. Hypothesis 6 is relatively straightforward since the literature recognizes that individuals in collectivistic cultures tend to be more influenced by others’ opinions (Ajzen, 2001; Begley & Tan, 2001; McGrath et al., 1992).

Hypothesis 7 is more exploratory in nature. It derives from two parallel arguments. First, salient beliefs seem to be different between both countries. In Spain, entrepreneurship would be more closely associated with enjoyment and satisfaction (Usley et al., 2002). Therefore, it is reasonable to assume that PA would be a stronger predictor of entrepreneurial intention than in Taiwan. On the other hand, uncertainty avoidance is higher in Spain, so respondents here would feel less capable of coping with the uncertainty of start-up even if they have the necessary skills. Thus, PBC would be a weaker predictor of entrepreneurial intention than in Taiwan.

Given the complexity of culture and the exploratory character of hypothesis 7, our results should be taken with caution until further research confirms them, or alternative hypotheses are formulated and tested. In particular, since sample characteristics are not identical, this difference may explain part of the variation in PA–EI and PBC–EI relationships. Nevertheless, this is one of the first attempts to explain the specific role of certain cultural dimensions in entrepreneurial cognitions. Therefore, we call for new research that may confirm or refute our results.

## Limitations and Implications

Results from this study have to be taken with caution, as some limitations regarding the instrument or the sample may be present. In the first place, as previously mentioned, the SN measure may be problematic. Other researchers argue that a “SN” × “motives to comply” measure would be more adequate. If this is true, hypotheses 3, 4, 5, and 6 might be affected. A new analysis using structural equation systems with alternative measures of SN may be needed to confirm our results.

On the other hand, the fact that the items making up each scale were listed adjacent and always positive may have had an influence on respondents (acquiescence bias). This study should be replicated with a modified questionnaire to check the results. Nevertheless, this problem may artificially increase reliability and validity measures, but would not *per se* improve results of the structural model (sign, magnitude, and significance of the path coefficients).

A sample made up of university students is very common in entrepreneurial intention research. It offers the advantage of similar age and qualifications, making it more homogeneous. However, in multinational studies, it is very difficult to obtain fully comparable samples. In our case, the Taiwanese students were participating in a business plan

competition, while the Spanish were not. It may be possible that this circumstance has conditioned their answers and, thus, the results. Nevertheless, we ran the analysis only for business students in both countries to make them the most similar possible. Factor analysis results were broadly equivalent and the same happened with the structural analysis.

Implications of our results may be derived in at least two areas. First, regarding entrepreneurship education, more attention should be paid to the effect of different content on cognitions (Kuratko, 2005). Business plan elaboration is the basic instrument provided by the great majority of courses and programs (Honig, 2004). However, some recent studies indicate that a course consisting only of the production of a business plan may have a negative effect on PA (Carrier, 2005). Therefore, the case for a wider entrepreneurship education program would be strengthened. Content specifically designed to increase PA and SN should be included. In particular, this latter element appears to play a very relevant role. However, we still know very little about ways of improving perceived SN. This is an obvious path for future research.

Second, implications for public decision makers could also be derived. If future research confirms that SN is a previous element helping to determine PA and PBC, there is a strong case for the promotion of an entrepreneurially friendly culture in each society. The better entrepreneurship is valued as a career option, the higher the probabilities that people would perceive favorable SN in their closer environment. This effect would be stronger in more collectivistic cultures since the influence of SN over PA and PBC would be higher there. Every opportunity should be taken to recognize the role of entrepreneurs in the economy. Legal reforms that facilitate firm creation—for instance—would be important not only as such, but because they transmit the message that becoming an entrepreneur is a positively valued option.

## Conclusions

The present article has addressed some still unsolved issues regarding entrepreneurial intention. In the first place, it has tried to test the applicability of the entrepreneurial intention model in two different cultural environments: Spain and Taiwan. Second, it has used a newly developed instrument (EIQ) to measure the relevant cognitive constructs. Third, it has considered the particular role of perceived SN through a specific structural pattern of relationships between the elements of the model. Finally, it has included specific hypotheses to test the role of cultural dimensions in entrepreneurial cognitions. Reliability and validity measures suggest the EIQ may be generally adequate, although there still may be room for improvement of the research instrument.

Results have supported most of our hypotheses. It seems that the model holds for different countries. Cultural and social particularities would be reflected by the effect of external variables on the antecedents of intention (SN, PA, and PBC) and also by the relative strength of links between these cognitive constructs. In particular, the individualism–collectivism dimension seems to explain the relative importance of SN in the model. Similarly, beliefs associated with entrepreneurship in each culture seem to vary, resulting in the relative strength of each motivational factor being different (especially, PA and PBC).

In particular, our results seem to confirm that the cognitive process from perceptions to intention is essentially similar in different cultures. At most, the relative importance of each antecedent in the configuration of intention may differ, but intentions would always be formed based on the three motivational antecedents. National particularities manifest themselves in the way people apprehend reality and transform it into perceptions toward

entrepreneurship. Similarly, SN would be the first step in the mental process, acting as a first filter to external stimuli and thus influencing perceptions of PA and PBC.

Future research should be developed to confirm our findings. In particular, this study should be replicated with a wider sample from different countries. Additionally, more than 80% of participants in this study provided contact data. It is thus our purpose to follow up these students to test the intention–behavior relationship.

Appendix

Measures of Core Entrepreneurial Intention Model Elements

Personal Attitude

11. Indicate your level of agreement with the following sentences from 1 (total disagreement) to 7 (total agreement).

|  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 11.a- Being an entrepreneur implies more advantages than disadvantages to me | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11.b- A career as entrepreneur is attractive for me                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11.c- If I had the opportunity and resources, I'd like to start a firm       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11.d- Being an entrepreneur would entail great satisfactions for me          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11.e- Among various options, I would rather be an entrepreneur               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Subjective Norm

13. If you decided to create a firm, would people in your close environment approve of that decision? Indicate from 1 (total disapproval) to 7 (total approval).

|                         | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 13.a- Your close family | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13.b- Your friends      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13.c- Your colleagues   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Perceived Behavioral Control

15. To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).

|   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 15.a- To start a firm and keep it working would be easy for me                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15.b- I am prepared to start a viable firm                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15.c- I can control the creation process of a new firm                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15.d- I know the necessary practical details to start a firm                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15.e- I know how to develop an entrepreneurial project                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15.f- If I tried to start a firm, I would have a high probability of succeeding | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Entrepreneurial Intention

18. Indicate your level of agreement with the following statements from 1 (total disagreement) to 7 (total agreement)

|   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 18.a- I am ready to do anything to be an entrepreneur       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18.b- My professional goal is to become an entrepreneur     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18.c- I will make every effort to start and run my own firm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18.d- I am determined to create a firm in the future        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18.e- I have very seriously thought of starting a firm      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18.f- I have the firm intention to start a firm some day    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

REFERENCES

Ajzen, I. (1987). Attitudes, traits, and actions—Dispositional prediction of behavior in personality and social-psychology. *Advances in Experimental Social Psychology*, 20, 1–63.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*, 52, 27–58.

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, 32(4), 665–683.

Armitage, C.J. & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*, 40, 471–499.

Autio, E., Keeley, R.H., Klofsten, M., Parker, G.G.C., & Hay, M. (2001). Entrepreneurial intent among students in Scandinavia and in the USA. *Enterprise and Innovation Management Studies*, 2(2), 145–160.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Baron, R.A. (1998). Cognitive mechanisms in entrepreneurship: Why and when entrepreneurs think differently than other people. *Journal of Business Venturing*, 13(4), 275–294.

Baron, R.A. (2004). The cognitive perspective: A valuable tool for answering entrepreneurship’s basic “why” questions. *Journal of Business Venturing*, 19(2), 221–239.

Begley, T.M. & Tan, W.L. (2001). The socio-cultural environment for entrepreneurship: A comparison between East-Asia and Anglo-Saxon countries. *Journal of International Business Studies*, 32(3), 537–553.

Bird, B. (1988). Implementing entrepreneurial ideas: The case for intention. *Academy of Management Review*, 13, 442–453.

Boyd, N.G. & Vozikis, G.S. (1994). The influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice*, 18, 63–77.

Busenitz, L.W., Gómez, C., & Spencer, J.W. (2000). Country institutional profiles: Unlocking entrepreneurial phenomena. *Academy of Management Journal*, 43(5), 994–1003.

Busenitz, L.W. & Lau, C.M. (1996). A cross-cultural cognitive model of new venture creation. *Entrepreneurship Theory and Practice*, 20(4), 25–39.

- Carrier, C. (2005). Pedagogical challenges in entrepreneurship education. In P. Kyrö & C. Carrier (Eds.), *The dynamics of learning entrepreneurship in a cross-cultural university context* (pp. 136–158). Hämeenlinna: University of Tampere.
- Carter, N.M., Gartner, W.B., & Reynolds, P.D. (1996). Exploring start-up event sequences. *Journal of Business Venturing*, 11(3), 151–166.
- Chandler, G.N. & Lyon, D.W. (2001). Issues of research design and construct measurement in entrepreneurship research: The past decade. *Entrepreneurship Theory and Practice*, 25(4), 101–113.
- Chen, C.C., Greene, P.G., & Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *Journal of Business Venturing*, 13(4), 295–316.
- Chin, W.W. & Frye, T. (2003). *PLS-graph, version 3.00 build 1126*. Houston, TX: University of Houston.
- Cooper, A.C. (1985). The role of incubator organizations in the founding of growth-oriented firms. *Journal of Business Venturing*, 1(1), 75–86.
- Cooper, A.C. (1993). Challenges in predicting new firm performance. *Journal of Business Venturing*, 8(3), 241–253.
- Delmar, F. & Davidsson, P. (2000). Where do they come from? Prevalence and characteristics of nascent entrepreneurs. *Entrepreneurship and Regional Development*, 12(1), 1–23.
- Erikson, T. (1999). A study of entrepreneurial career choices among MBAs—The extended Bird model. *Journal of Enterprising Culture*, 7(1), 1–17.
- Etzioni, A. (1987). Entrepreneurship, adaptation and legitimation: A macro-behavioral perspective. *Journal of Economic Behavior & Organization*, 8, 175–189.
- Fayolle, A., Gailly, B., & Lassas-Clerc, N. (2006). Assessing the impact of entrepreneurship education programmes: A new methodology. *Journal of European Industrial Training*, 30(9), 701–720.
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. New York: Addison-Wesley.
- Gartner, W.B., Shaver, K.G., Gatewood, E.J., & Katz, J. (1994). Finding the entrepreneur in entrepreneurship. *Entrepreneurship Theory and Practice*, 18(3), 5–10.
- Gefen, D., Straub, D.W., & Boudreau, M.C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Society*, 4(7), 1–77.
- George, G. & Zahra, S.A. (2002). Culture and its consequence for entrepreneurship. *Entrepreneurship Theory and Practice*, 26(4), 5–7.
- Guzman, J. & Santos, F.J. (2001). The booster function and the entrepreneurial quality: An application to the province of Seville. *Entrepreneurship and Regional Development*, 13(3), 211–228.
- Hayton, J.C., George, G., & Zahra, S.A. (2002). National culture and entrepreneurship: A review of behavioral research. *Entrepreneurship Theory and Practice*, 26(4), 33–52.
- Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: Sage Publications.
- Hofstede, G. (1991). *Cultures and organizations: Software of the mind*. London: McGraw-Hill.
- Hofstede, G. (2003). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Newbury Park, CA: Sage Publications.

- Hofstede, G., Noorderhaven, N., Thurik, A.R., Uhlaner, L.M., Wennekers, A.R.M., & Wildeman, R.E. (2004). Culture's role in entrepreneurship: Self-employment out of dissatisfaction. In T.E. Brown & J.M. Ulijn (Eds.), *Innovation, entrepreneurship and culture* (pp. 162–203). Cheltenham: Edward Elgar.
- Honig, B. (2004). Entrepreneurship education: Toward a model of contingency-based business planning. *Academy of Management Learning and Education*, 3(3), 258–273.
- IMF (2008). *World Economic Outlook Database*. Washington, DC: International Monetary Fund. <http://www.imf.org/external/pubs/ft/weo/2008/02/weodata/index.aspx>. Last accessed: March 17th, 2009.
- Kickul, J. & Zaper, J.A. (2000). Untying the knot: Do personal and organizational determinants influence entrepreneurial intentions? *Journal of Small Business and Entrepreneurship*, 15(3), 57–77.
- Klein, S.B., Astrachan, J.H., & Smyrnios, K.X. (2005). The F-PEC scale of family influence: Construction, validation, and further implication for theory. *Entrepreneurship Theory and Practice*, 29(3), 321–339.
- Kolvereid, L. (1996a). Organizational employment versus self-employment: Reasons for career intentions. *Entrepreneurship Theory and Practice*, 20(3), 23–31.
- Kolvereid, L. (1996b). Prediction of employment status choice intentions. *Entrepreneurship Theory and Practice*, 21(1), 47–57.
- Kolvereid, L. & Isaksen, E. (2006). New business start-up and subsequent entry into self-employment. *Journal of Business Venturing*, 21(6), 866–885.
- Kreiser, P.M., Marino, L.D., & Weaver, K.M. (2002). Assessing the psychometric properties of the entrepreneurial orientation scale: A multi-country analysis. *Entrepreneurship Theory and Practice*, 26(4), 71–94.
- Kristiansen, S. & Indarti, N. (2004). Entrepreneurial intention among Indonesian and Norwegian students. *Journal of Enterprising Culture*, 12(1), 55–78.
- Krueger, N.F. (1993). The impact of prior entrepreneurial exposure on perceptions of new venture feasibility and desirability. *Entrepreneurship Theory and Practice*, 18(1), 5–21.
- Krueger, N.F. & Brazeal, D.V. (1994). Entrepreneurial potential and potential entrepreneurs. *Entrepreneurship Theory and Practice*, 19(3), 91–104.
- Krueger, N.F., Reilly, M.D., & Carsrud, A.L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing*, 15(5–6), 411–432.
- Kuratko, D.F. (2005). The emergence of entrepreneurship education: Development, trends, and challenges. *Entrepreneurship Theory and Practice*, 29(5), 577–597.
- Kyrö, P. & Carrier, C. (2005). Entrepreneurial learning in universities: Bridges across borders. In P. Kyrö & C. Carrier (Eds.), *The dynamics of learning entrepreneurship in a cross-cultural university context* (pp. 14–43). Hämeenlinna: University of Tampere.
- Lee, S.H. & Wong, P.K. (2004). An exploratory study of technopreneurial intentions: A career anchor perspective. *Journal of Business Venturing*, 19(1), 7–28.
- Liñán, F. (2004). Intention-based models of entrepreneurship education. *Piccola Impresa/Small Business*, 2004(3), 11–35.
- Liñán, F. & Santos, F.J. (2007). Does social capital affect entrepreneurial intentions? *International Advances in Economic Research*, 13(4), 443–453.
- Matthews, C.H. & Moser, S.B. (1995). Family background and gender: Implications for interest in small firm ownership. *Entrepreneurship and Regional Development*, 7(4), 365–377.

- Mcgrath, R.G. & MacMillan, I.C. (1992). More like each other than anyone else—A cross-cultural-study of entrepreneurial perceptions. *Journal of Business Venturing*, 7(5), 419–429.
- Mcgrath, R.G., MacMillan, I.C., & Scheinberg, S. (1992). Elitists, risk-takers, and rugged individualists—An exploratory analysis of cultural-differences between entrepreneurs and non-entrepreneurs. *Journal of Business Venturing*, 7(2), 115–135.
- Mcgrath, R.G., MacMillan, I.C., Yang, E.A., & Tsai, W. (1992). Does culture endure, or is it malleable—Issues for entrepreneurial economic-development. *Journal of Business Venturing*, 7(6), 441–458.
- Messick, S. (1988). Validity. In R.L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 13–103). New York: American Council on Education/Orix Press.
- Mitchell, R.K., Smith, B., Seawright, K.W., & Morse, E.A. (2000). Cross cultural cognition and venture creation decision. *Academy of Management Review*, 43(5), 974–993.
- Moriano, J.A., Palací, F.J., & Morales, J.F. (2006). Adaptation and validation of the entrepreneurial self-efficacy scale in Spain. *Revista de Psicología Social*, 21(1), 51–64.
- Mueller, S.L. & Thomas, A.S. (2001). Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness. *Journal of Business Venturing*, 16(1), 51–75.
- Mueller, S.L., Thomas, A.S., & Jaeger, A.M. (2002). National entrepreneurial potential: The role of culture, economic development and political history. In M.A. Hitt & J.L.C. Cheng (Eds.), *Managing transnational firms: Resources, market entry and strategic alliances* (Vol. 14, pp. 221–257). Amsterdam: JAI Press.
- Nunnally, J.C. (1978). *Psychometric theory*. New York: McGraw-Hill.
- Peterman, N.E. & Kennedy, J. (2003). Enterprise education: Influencing students' perceptions of entrepreneurship. *Entrepreneurship Theory and Practice*, 28(2), 129–144.
- Reitan, B. (1998). *Perspectives on new venture creation. The stimulation of entrepreneurial potential and new venture attempts among young people*. Unpublished Doctoral Dissertation, The Norwegian University of Science and Technology, Department of Social Sciences and Technology Management, Trondheim, Norway.
- Reynolds, P.D., Bygrave, W., Autio, E., & Hay, M. (2002). *Global entrepreneurship monitor. 2002 summary report*. Kansas City: Ewin Marion Kauffman Foundation.
- Rondstadt, R. (1990). The educated entrepreneur: A new era of entrepreneurial education is beginning. In C.A. Kent (Ed.), *Entrepreneurship education: Current developments, future directions* (pp. 69–88). Westport, CT: Quorum Books.
- Santos, F.J. & Liñán, F. (2007). Measuring entrepreneurial quality in southern Europe. *International Entrepreneurship and Management Journal*, 3(1), 87–107.
- Scherer, R.F., Brodzinsky, J.D., & Wiebe, F.A. (1991). Examining the relationship between personality and entrepreneurial career preference. *Entrepreneurship and Regional Development*, 3, 195–206.
- Shane, S., Kolvereid, L., & Westhead, P. (1991). An exploratory examination of the reasons leading to new firm formation across country and gender. *Journal of Business Venturing*, 6(6), 431–446.
- Shapero, A. & Sokol, L. (1982). Social dimensions of entrepreneurship. In C.A. Kent, D.L. Sexton, & K.H. Vesper (Eds.), *Encyclopedia of entrepreneurship* (pp. 72–90). Englewood Cliffs, NJ: Prentice Hall.
- Shaver, K.G. & Scott, L.R. (1991). Person, process, choice: The psychology of new venture creation. *Entrepreneurship Theory and Practice*, 16(2), 23–45.
- Tkachev, A. & Kolvereid, L. (1999). Self-employment intentions among Russian students. *Entrepreneurship and Regional Development*, 11(3), 269–280.

- Tubbs, M.E. & Ekeberg, S.E. (1991). The role of intentions in work motivation: Implications for goal-setting theory and research. *Academy of Management Review*, 16(1), 180–199.
- Uhlaner, L. & Thurik, A.R. (2007). Postmaterialism influencing total entrepreneurial activity across nations. *Journal of Evolutionary Economics*, 17(2), 161–185.
- Uslay, C., Teach, R.D., & Schwartz, R.G. (2002). Promoting entrepreneurship for economic development: A cross-cultural analysis of attitudinal differences about entrepreneurship. *Journal of Research in Marketing and Entrepreneurship*, 4(2), 101–118.
- Veciana, J.M., Aponte, M., & Urbano, D. (2005). University students' attitudes towards entrepreneurship: A two countries comparison. *International Entrepreneurship and Management Journal*, 1(2), 165–182.
- Zhao, H., Hills, G.E., & Siebert, S.E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Journal of Applied Psychology*, 90(6), 1265–1272.
- 

Francisco Liñán is Associate Professor at Department Economía Aplicada I, University of Seville.

Yi-Wen Chen is a PhD Candidate at Graduate Institute of Technology & Innovation Management, National Chengchi University.

A previous version of this article was presented as a seminar at the European Doctoral Programme in Entrepreneurship and Small Business Management, Universitat Autònoma de Barcelona. We are most grateful to Dr. David Urbano for his invitation to present the seminar, and also to the Department of Management, which published that previous version in its Working-Paper Series: <http://www.recercat.net/bitstream/2072/2213/1/UABDT06-7.pdf>.

We also wish to thank the editor for her support and guidance throughout the review process, and two anonymous reviewers for their insightful comments and suggestions.