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Tracking student entrepreneurial potential: personal attributes and the propensity for business start-ups after graduation in a Portuguese university

Abstract

The aim of this article is twofold: (a) to evaluate the extent to which undergraduate students at UTAD, a Portuguese university in the less-developed interior of the country, might wish to create their own companies on graduation; and (b) to analyze the personal attributes and competencies that may influence such intentions. The statistical procedures adopted in the processing of the data collected from a sample of 640 UTAD undergraduates were the following: (1) an exploratory study of the general characteristics of university students and their attitudes regarding their future employment preferences; and (2) the use of multivariate statistical techniques in order to better understand students' attitudes regarding their paths from university education into the labor market – with particular regard to the possibility of their establishing their own enterprise. Gender, risk, factors related to profession/employment choice and academic training were found to significantly affect students' interest in and motivation for starting their own business.

Keywords: entrepreneurship, entrepreneurial potential, business start-ups, university students.

JEL Classification: L26, J24, M13, I21.

Introduction

Entrepreneurship, particularly in relation to small and micro-enterprises, is frequently seen as a key vehicle for employment creation (Folster, 2000), an essential means of enhancing the innovation dynamic in the local, regional and national economies (Robbins et al., 2000). In this way, entrepreneurial initiatives contribute to the process of adaptive remodelling and restructuring of the contemporary business world, providing a constant stream of learning experiences and consequently underpinning development of a more sustainable type (Videira, 2001, quotes in Franco, 2007).

While at a macro-level entrepreneurship is seen as being responsible for job-creation, innovation and the creation of wealth, at a more individual level, the development of enterprising behavior has been characterized as one of the primary stimuli to the widening of career options, particularly among first-time labor market entrants (Reynolds et al., 1994).

In recent years, the rapid changes unleashed by a new phase of globalization, combined with a deteriorating economic conjuncture – both in Portugal in particular as well as in the international economy in general, has shrunk recruitment and/or significantly altered employment conditions in many of the traditional types of employment that, in the past, absorbed most university students. Today, graduating students are more likely than before to see the possibility of establishing their own enterprises as a positive rather than residual career option (Kolvereid and Moen, 1997). However, both the extent of the propensity for students to do so and the opportunities for them to accumulate the necessary attributes and competencies would appear to be

highly variable between countries and regions, as well as between courses of study.

Various studies, both in the USA (e.g., Kourilsky and Walstad, 1998; Lüthje and Franke, 2003; Van Auken et al., 2006) and in Europe (e.g., Kolvereid and Moen, 1997; Gürul and Atson, 2006) have provided clear evidence of a general growth in people's propensity to create their own enterprises. Though there appears to be widespread agreement concerning the main factors at work when employed professionals opt to establish their own firms, it would be unwise and inappropriate to uncritically assume that these factors play exactly the same role when the research focuses on recently-graduated university students. A number of recent studies (e.g., Lena and Wong, 2003; Franke and Luthje, 2004; Teixeira, 2007; Rodrigues et al., 2008) have attempted to gain a better understanding of precisely which variables may contribute most significantly to graduate business start-ups. The research on which this paper reports was undertaken with a view to contributing to our understanding of the determinants of students propensity to start their own businesses on graduation by focusing in particular on the analysis of those personal attributes and competencies that exert greatest influence on such intentions – without, of course, denying the importance of contextual/environmental factors in moulding perceptions and consequent decisions¹.

¹ Generally, those who never been in full time employment will have insufficient experience of the 'external environment', and rather imperfect knowledge of the current conditions in the labor market. Furthermore, they will understandably be poorly informed regarding the pros and cons of self-employment, either because their (self-)interest has not yet been stimulated, and/or due to poor dissemination (by government and by universities) of the business start-up support programs available.

1. Student entrepreneurship potential: a brief review of the literature

Writers such as Cunningham and Lischeron (1991) have suggested the existence of a number of schools of thought regarding the explanation of the entrepreneurial function and/or entrepreneurial behavior.

Table 1. The nature of the entrepreneur: main schools of thought

School of thought	Characterization of the entrepreneur
'Great People'	'Innate capacity': the entrepreneur born with the potential to act intuitively, energetically, with confidence and determination.
Classical	'Entrepreneurial function': the entrepreneur is anyone showing evidence of functioning in an inventive, innovative and creative way.
Psychological/behavioral characteristics	'Psychological profile': the entrepreneur has values and behavioral patterns that set him/her apart from the rest of society.
Management schools	'The organizer': the entrepreneur is able to identify opportunities, assess risks, plan the process, and manage the resources necessary for its successful conclusion.
	'The leader': the entrepreneur directs and motivates a team established to achieve specific aims.
	'The intrapreneur': the motivations and mind-set of managers working in complex organizations allows them to act in an enterprising manner

Source: Adapted from Cunningham and Lischeron (1991).

The same authors (Cunningham and Lischeron, 1991) further argue that the definition of the entrepreneur to be adopted will depend on the type of data to which the researcher gives the greatest emphasis, and on the particular aspect of entrepreneurship the study seeks to elucidate. More frequently than not, researchers deploy a combination of behavioralist, classical and managerialist assumptions regarding entrepreneurship, focusing both on key individual psychological characteristics (such as creativity, imagination, ambition and determination), and more technical organizational competences such as decision-making ability and resource-coordination capacity (Henderson and Robertson, 1999).

Adapting the definition of an entrepreneur proposed by Carland et al. (1984) we define 'potential entrepreneur' in this paper as "an individual [student] who [accepts the possibility that he/she might] establish and manage a business for the principal purposes of profit and growth" (p. 358).

In much of the literature on entrepreneurial activities, there has been consistent interest in identifying the factors that lead an individual to become an entrepreneur (Kourilsky, 1980; Koh, 1996; Martínez et al., 2007). According to several authors (e.g., Car-

land et al., 1984; Hatten and Ruhland, 1995), the behavioral characteristics most commonly found in entrepreneurs include their propensity for innovation and their use of strategic management practices in their entrepreneurial initiatives. Additionally, the belief that entrepreneurs have distinctive psychological characteristics has a long tradition in entrepreneurship research (Gartner, 1988). Numerous studies have focused on personality traits that may be in some way connected to entrepreneurial behavior through their influence on either the constitution of future entrepreneurial intentions and/or the reinforcement of established ones (Kennedy et al., 2003; Brice, 2004; Liñán-Alcalde and Rodríguez-Cohard, 2004; Barahona and Escudero, 2005; Asián, 2005; Li, 2006). The types of factors most frequently associated with entrepreneurial behavior and, for this reason, analyzed in many studies, include age, gender, professional background, work experience, and broad-based aspects of the potential entrepreneur's educational and psychological profile (Delmar and Davidsson, 2000). Three factors in particular have been frequently used to measure entrepreneurial tendencies: personal characteristics, personality traits (e.g., Robinson, 1987), and contextual factors (e.g., Naffziger et al., 1994).

Individual personal/demographic characteristics such as those relating to gender, age, educational status and regional origin, can be used to describe existing or potential entrepreneurs (as opposed to purely psychological traits): however, most of these variables appear to have little or no influence on a person's predisposition for entrepreneurship, nor can they be used as predictors of such a career or lifestyle choice (Robinson et al., 1991; Hatten and Ruhland, 1995).

The second method of assessing entrepreneurial tendencies is to examine *personality traits* such as achievement motivation, risk assumption/aversion, and attitudes regarding control and delegation. Several psychological characteristics have been suggested as being good predictors of entrepreneurial behavior: (i) the need for self-achievement (e.g., McClelland, 1961); (ii) creativity and initiative (e.g., Hull et al., 1980); (iii) the propensity for risk-taking (e.g., Hirsrich and Peters, 1995); (iv) self-confidence and the "locus of control" (e.g., Brockhaus, 1987); (v) desire for independence and autonomy (e.g., Collins and Moore, 1964; Hornaday and Aboud, 1971); (vi) motivation, energy and commitment; and (vii) persistence. To these attributes Gorman (1997) adds a variety of values and attitudes, as well as personal objectives. Robinson et al. (1991) stress self-esteem and innovation behavior as being more relevant than the need for McClelland's classic self-achievement. Davidsson (1989) produced some evidence of a relationship between the need for

achievement and individual entrepreneurial behavior. In several studies, high self-confidence has been identified as a typical trait of entrepreneurs.

Finally, several authors (e.g., Naffziger et al., 1994), have stressed the importance of *contextual factors*, arguing that the decision to adopt an entrepreneurial lifestyle is based on something more than merely personal characteristics and psychological traits. From this perspective, analysts need to gain a better understanding of the interaction between a potential entrepreneur's social background and his/her subjective perceptions of the *contextual factors* in which the decision to become an entrepreneur is taken, and in which patterns of entrepreneurial behavior are concretely developed and put into practice.

Thus the theory that entrepreneurial behavior is the result of inherited competencies or that entrepreneurship is an innate characteristic of a minority of individuals no longer seems to have many followers (Rodrigues et al., 2008). Some researchers have come to support the idea that psychological attributes conducive to entrepreneurial behavior can be culturally acquired (Vesper, 1990) and/or culturally moderated (Stephan et al., 2003). However, Li (2006) argues that the theory of *planned* behavior provides a sound theoretical framework for understanding the origins of entrepreneurial intentions, emphasizing that it is possible for people to *learn* to be entrepreneurs, mainly through the use of targeted educational approaches. From this perspective, it seems pertinent to analyze the contribution of education to the development of entrepreneurship.

In principle, few would disagree that it would benefit *all* students if, before completing their education, they were exposed to well-designed entrepreneurship-related inputs that stimulated independent, creative and critical thinking. Hatten and Ruhland (1995) and Teixeira (2007) argue that if students with entrepreneurial potential were identified earlier and nurtured throughout their educational experience, the result both for the individuals concerned and for society would be more – and more successful – entrepreneurs. Thus it makes sense to investigate the extent to which entrepreneurial propensity and intentions may be the result of factors that can be significantly altered through education, as Kolvereid and Moen (1997) have suggested.

More concretely, the idea of becoming an entrepreneur may become more and more attractive to students because it is seen as a valuable way of being employed without losing one's independence (Martínez et al., 2007). While there has been a large number of studies of entrepreneurial propensity (e.g., Naffziger et al., 1994; Brandstätter, 1997), only a limited number of studies have focused on students' entrepreneurial intent (e.g., Scott and

Twomey, 1988; Oakey et al., 2002; Klapper and Léger-Jarniou, 2006). In general, the results of such studies indicate that males with a strong need for achievement, with evidence of creativity and leadership capacity, with a propensity for risk taking, and whose parents are or have been self-employed, are those that possess the key factors favoring the decision to become an entrepreneur (e.g., Lena and Wong, 2003; Franke and Luthje, 2004; Teixeira, 2007; Rodrigues et al., 2008).

In Section 3, we assess which of the three groups of determinants of entrepreneurial intention – demographic, psychological, and contextual – are the most relevant among the university students selected for study. Before embarking on this analysis, the next section details and describes the methodology adopted and the type of data gathered.

2. Methodology and related descriptive statistics

A questionnaire was designed, pre-tested and applied during the academic year 2006-2007. A sample was obtained from a population of students who at the time were attending a first degree (undergraduate) course at the University of Trás-os-Montes e Alto Douro (UTAD), located in the interior north-east of Portugal. They were directly approached by the interviewers, who visited classrooms throughout the main and satellite university campuses. The sample covered a total of 640 students, distributed over 14 courses. The sample constituted 9.5% of the total student population. The survey was conducted using a self-administered questionnaire.

The questionnaire contained 18 questions, which included specific demographic descriptors (such as gender, age, student status, and region of origin), as well as data on previous professional experience, academic performance, and the individual's social context. Students were presented with statements designed to measure the extent of their fears with regard to the possible creation of a business venture, provide an assessment of the key difficulties and obstacles they expected to encounter, and to identify factors associated with success in such an initiative. Respondents' attitudes were evaluated using a 5-point Likert scale. Entrepreneurial potential was directly assessed by asking students to indicate the intensity of their current *general* interest in creating their own business on graduation, and the extent to which they had taken steps to concretize the intention to establish their own firm.

After the data had been collected, they were analyzed and interpreted using the statistical software package SPSS[®]. Table 2 summarizes the main methodological characteristics of the study.

Table 2. Synthesis of methodological aspects

Time basis	Cross-section
Sampling unit	Undergraduate students
Population	6047 individuals
Sample	640 individuals
Response rate	9,5%
Sample error	4,22%
Research method	Self-administered questionnaire
Time period	June 2006 – May 2007
Statistical analysis	Bivariate, multivariate – logistic regression

The sample consisted of 640 individuals who at that time were attending any of the courses provided by the University of Trás-os-Montes e Alto Douro. The demographic and geographic characteristics are shown in Table 3.

Table 3. Characterization of the sample

Sex	%
Female	68,6
Male	31,4
Age	
Under 21	37,8
21-24	48,1
25-29	10,3
30-39	2,8
Above 40	0,5
No answer	0,5
Student status	
Students	92,7
Worker-students	6,6
No answer	0,8
Type of course	%
Economics & business	30,4
Other social & human sciences	26,1
Engineering	19,4
Health sciences	15,3
Arts	8,8
Region of origin	
Trás-os-Montes e Alto Douro	8,0
Rest of Northern region	79,5
Rest of the country	11,9
No answer	0,6

From the results of the questionnaire survey it was possible to conclude that the majority of students were female (68.6%), that a large majority of students interviewed (85.9%) were aged between 17 and 24 years of age and that the average age was 23 – a predictable outcome, given the typical age of initiating studies (18) and the average duration of their courses at the time (5 years, pre-Bologna). Almost all of those surveyed (95%) had always wanted to undertake university studies; almost the same proportion (94%) felt that a university education was a determinant factor in finding future employment in a profession that was to their liking, and a substantial number (84%) were registered for their

first choice courses. Two thirds (67%) claimed that their university corresponded in general terms to their expectations.

Nine out of ten (90%) saw their future life as consisting of the independent exercise of decision-making responsibilities in their chosen profession. Two thirds thought it likely that they would end up in salaried employment, i.e. working for some one else; put another way, only a third could conceive of a future in self-employment at the time of the survey. Just over half (56%) indicated a preference for employment in the private sector, while the remaining 44% preferred to see their future as being in the public sector. Respondents were evenly divided over the extent to which university education provided students with an adequate preparation for becoming self-employed – 49% felt that it did, and 51% that it did not. Notwithstanding this result, almost two thirds (64%) of the students surveyed expressed a predisposition to establish their own enterprises. Of the 24% who indicated that they were *seriously* considering this possibility, a little over a quarter (28%) already had a clear idea of the type of business they would like to launch. The majority (60%) of those expressing the concrete desire to start their own business were female; in terms of their areas of study, 28% were students of economics and management, 26% from other social sciences and humanities, 22% from various engineering courses, 14% from arts courses and 10% were studying health sciences. These results are similar to those arrived at in studies of other universities in other regions of Portugal¹ (Rodrigues et al., 2008, Teixeira, 2007), as Table 4 illustrates.

Table 4. Intention to establish own enterprise on graduation

Do you intend to establish your own firm on graduation?	Beira Interior University (UBI)	University of Trás-os-Montes & Alto Douro (UTAD)	Porto University (UP)
Yes	63.8%	23.8%	26.5%
No	35.9%	40.2%	73.6%
No response	0.4%	36.0%	–

Comparing these three regions of Portugal, we find that it is in Beira Interior University (UBI) that the largest proportion of respondents (63.8%) indicated a desire to establish their own firms on graduation. Both UTAD's and UP's students demonstrated a much lower willingness to establish their own businesses, the former having the lowest proportion of students with entrepreneurial plans (23.6%). Part of this discrepancy may be due to differences in the composition of the sample: for example, at UBI the

¹ The studies were undertaken in the University of Beira Interior (in the inland areas of the Central region of Portugal), and at the University of Porto (Portugal's second city, situated on coast of the Northern Region).

questionnaire targeted only final and penultimate year students, while at UTAD students from all years of study were surveyed.

Most studies focusing on student entrepreneurial propensities and intentions provide only a snapshot, whereas what is really required is a moving picture, i.e. the results that only a longitudinal study can provide. In this sense, the differences noted above may disguise the fact that, on the one hand, even though first year students may show some general interest in establishing their own firms on graduation, many may not have had sufficient time to develop any really specific and concrete plans in this regard. On the other hand, those evincing little or no interest in their first year or two of study may radically alter their views and intentions, as a result of their overall educational experience, and/or due to some specific input into their undergraduate studies, and/or because of a shift in the conjuncture in which such intentions might or might not come to be realized.

Furthermore, the similarity of results for metropolitan Porto and peripheral Vila Real may be due to the influence of quite different factors. For example, all other factors being equal, do students in universities in metropolitan areas typically have lower propensities and intentions to create their own employment because, in such environments, competition is more intense, business initiatives are riskier, and market niches scarcer? In contrast, many students at universities in relatively peripheral territories with a much less dense and dynamic business community may reject the idea of creating their own employment because they recognize the limitations on local self-employment such localities. And of course, the reasons may be rather different if we compare the propensities and intentions of students from less entrepreneurially-developed regions studying in a metropolitan area, compared to those from large cities studying in more rural environments. Then why are the results from UBI more impressive? Notwithstanding the difficulties that the city of Covilhã and its surrounding areas had to overcome in the latter part of the 20th century – a massive decline in traditional industry and the consequent restructuring of

investment and employment – it now benefits from improved road connections not only with businesses on the Portuguese coast, but also with Spain’s Extremadura region, with which it is generating significant business and institutional synergies. This – and the coastal origin of many of its students – may go some way to explaining the marked predisposition for entrepreneurship among its students.

3. Estimation model and results of the study

The major aim of this study was to assess what are the main determinants of student’s entrepreneurial propensity. The nature of the data collected with regard to the dependent variable [Do you intend to create your own business? (1) Yes; (0) No] dictated the choice of the estimation model. Conventional estimation techniques (e.g., multiple regression analysis), in the context of a discrete dependent variable, are not a valid option. First of all, the assumptions needed for hypothesis testing in conventional regression analysis are necessarily violated – it is unreasonable to assume, for instance, that the distribution of errors is normal. Secondly, in multiple regression analysis, predicted values cannot be interpreted as probabilities – they are not constrained to fall in the interval between 0 and 1 (Hosmer and Lemeshow, 2000).

According to the literature (see Section 1), there exists a set of factors, such as student’s demographic descriptors (gender, age, student status), psychological traits (creativity, leadership, risk and capacity of self-assessment), and contextual factors (such as the type of profession/employment desired, extent of entrepreneurship training, extent of information on entrepreneurship support, academic training) that influence entrepreneurial propensity. The empirical assessment of student’s entrepreneurial propensity is based on the estimation of the following general logistic regression:

$$P(\text{entrepreneur}) = \frac{1}{1 + e^{-z}}$$

Writing the logistic model in terms of the odds, we obtain the *logit* model:

$$\log\left(\frac{\text{Pr ob}(\text{entrepreneur})}{\text{Pr ob}(\text{Non - entrepreneur})}\right) = \beta_0 + \underbrace{\beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Status}}_{\text{Student's demographic descriptors}} + \underbrace{\beta_4 \text{Creativity} + \beta_5 \text{Leadership} + \beta_6 \text{Risk} + \beta_7 \text{capacity of self - assessment}}_{\text{Student's psychological traits}} + \underbrace{\beta_8 \text{profession/employment desired} + \beta_9 \text{Extent of entrepreneurship training / information} + \beta_{10} \text{Academic training}}_{\text{Context factors}} + \varepsilon_{ii}$$

The logistic coefficient can be interpreted as the change in the log odds associated with a one-unit change in the independent variable. Thus, e raised to the power β_i is the factor by which the odds change when the i^{th} independent variable increases by one unit. If β_i is positive, this factor will be greater than

1, which means that the odds are increased; if β_i is negative, the factor will be less than one, which means that the odds are decreased. When β_i is 0, the factor equals 1, which leaves the odds unchanged. In the case of gender, for example, where the estimate of β_i emerges as positive and significant for the

conventional levels of statistical significance (that is, 1%, 5% or 10%), this means that, on average, all other factors being held constant, female students would have a higher (log) odds of entrepreneurial potential. The estimates of the β_s are given in Table 5 below.

Table 5. Determinants of students' entrepreneurial propensity

	Estimates (β_s)
<i>Individual characteristics</i>	
(1) Gender (Fem = 1)	-0,539**
(2) Age	0,060
(3) Student status (Normal = 1)	0,513
<i>Psychological characteristics</i>	
(4) Creativity	0,089
(5) Leadership	-0,137
(6) Risk acceptance/aversion	0,303**
(7) Capacity for self-assessment	-0,017
<i>Contextual factors</i>	
(8) Factors related to profession/employment of choice	-0,862*
(9) Extent of entrepreneurship training/information	0,437*
(10) Academic training (in general)	1,544
Constant	
<i>N</i>	343
<i>Entrepreneurs</i>	119
<i>Other</i>	224
<i>Goodness of fit statistics (correct %)</i>	74,6
Hosmer and Lameshow test (p-value)	4,142 (0,720)

Notes: * significant at 1%; ** significant at 5%. Method: Forward Stepwise (Likelihood Ratio).

In this model females demonstrate a much lower propensity for entrepreneurship. This ties in with other studies (e.g., Martínez et al., 2007), that have indicated that entrepreneurship behavior is found more commonly in males. Nevertheless, it contrasts, to a certain extent, with the study of African American students conducted by Ede et al. (1998), who found no difference between males and females in their attitudes toward entrepreneurship.

Psychologically related factors, namely risk propensity, leadership behavior, creativity focus and capacity for self-assessment, emerge as critical for explaining students' entrepreneurial intent in the factorial analysis. The main differences between potential entrepreneurs and other students are observed in risk bearing. In this competence the scores of potential entrepreneurs are much higher than those of the remaining students. Surprisingly, two of the contextual factors turn out to be relevant: desired future profession/employment and academic training, these tie with the study of Martínez et al. (2007).

Conclusion

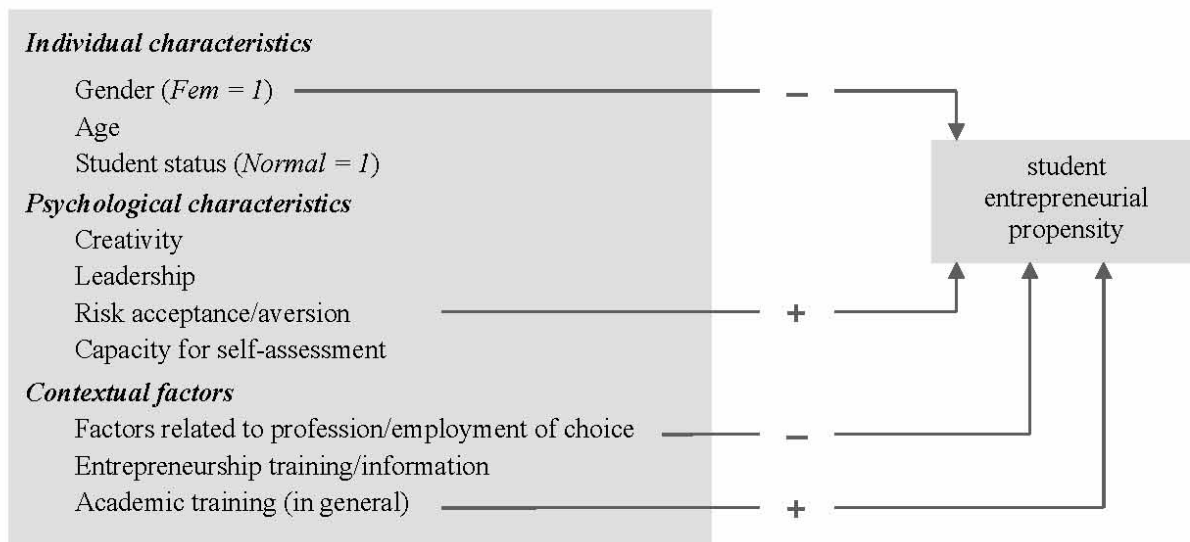
In this paper, the entrepreneurial intentions of undergraduates in UTAD are examined along with their related factors. First, the entrepreneurial propensity of undergraduates attending universities located in the Portuguese Interior is reasonably high (around 24%) and compares favorably with the find-

ings of studies in other European countries (e.g., Germany, Austria).

More specifically, although a reasonable amount of students in Portugal would like to run their own businesses, their intentions are hindered by inadequate preparation, i.e. they recognize that both their practical business knowledge and entrepreneurial preparation are insufficient. Furthermore, one demographic factor (gender), one psychological trait (risk) and two contextual factors (students' declared profession of choice, and academic training) were found to significantly affect students' interest in and motivation for starting their own business.

Notwithstanding the predominance of female students in the sample, it is males that manifest greater propensity to establish their own businesses; this confirms the findings of many earlier studies, but does not allow us to assess the subjective and objective elements that may constitute the "glass ceiling" faced by potential women entrepreneurs. It is no surprise that attitudes towards risk-taking constitute the most significant psychological factor, a result that again mirrors the findings of many previous studies. The pronounced negative influence of students' chosen professions may well be predominantly a question of context and culture: many students arrive at university with clearly established (though not necessarily realistic) ambitions with regard to the profession they wish to follow. For example, despite the contraction in public sector employment opportunities in recent years, this type of employment continues to be a popular and highly-favored career choice; this suggests that slowly-changing cultural attitudes, as well as slowly-emerging improvements in the relevance of university training, still influence student decisions regarding self-employment and entrepreneurship. Finally, the acquisition of specifically *entrepreneurship*-related training and associated information appears to have no significant bearing on student entrepreneurial propensity: this result is probably due to the fact that entrepreneurship modules have only recently been established both in Portuguese universities in general, and more specifically in the case of UTAD.

Notwithstanding the details of the above results, we agree with the conclusions of Hatten and Ruhland (1995) and Teixeira (2007) that more young people could become successful entrepreneurs if more potential entrepreneurs were identified and cultivated throughout their entire educational process. Though only a half of the sample of UTAD students felt that the university was equipping them well for possible future self-employment, the results summarized above demonstrate that university training in general is a factor that significantly influences student propensity to seriously contemplate establishing their own enterprises, and take concrete steps to turn their intentions into realities.



The findings provide insights with practical implications for researchers, university educators and administrators, as well as government policy makers. Future studies need to be longitudinal, and need to focus on the *specific* effects of entrepreneurship training, rather than university education in general. On the question of policy, while the government (in general) and the Ministries most directly associated with education and training (in particular) clearly have a role to play in stimulating entrepreneurship – above all through higher education – it may well be that the *internal* policies and priorities of higher education institutions deserve a closer and more critical examination. Some institutions have adopted very specific measures with regard to entrepreneurship training, restricting it to

students taking courses in economics and management. Others have adopted a cross-cutting approach, introducing entrepreneurship modules in a wide range of undergraduate and postgraduate schemes of study. Recent research (Gerry and Abreu, 2007), suggests that, in UTAD at least, entrepreneurial propensity is far from being limited to economics and management graduates, and therefore a more broad-based strategy of entrepreneurship training would be the appropriate response. Clearly more research is required, however, if we are to assess the influence of specific educational inputs both on students' decisions to establish their own enterprises on graduation, and on the subsequent success and sustainability of such entrepreneurial initiatives.

References

1. Asián, R. (2005). Measuring the Entrepreneurial Capacity of Business Men from Coria del Rio: Perceived Self-efficacy [in Spanish: Medición de la Capacidad Emprendedora de los Empresarios de Coria del Rio: La Autoficacia Percibida]. Selected papers from the XV Spanish-Portuguese Meeting of Scientific Management, *Cities in Competition*, Seville.
2. Barahona, J. and Escudero, A. (2005). Is the Entrepreneur Born or Made? An analysis of Entrepreneurial Spirit Determinants [in Spanish: El Emprendedor Nace o se Hace? Un Análisis de los Determinantes del Espíritu Emprendedor]. Selected papers from the XV Spanish-Portuguese Meeting of Scientific Management, *Cities in Competition*, Seville.
3. Brandstätter, H. (1997). Becoming an entrepreneur – a question of personality structure? *Journal of Economic Psychology*, 18: 157-177.
4. Brice, J. (2004). The Role of Personality Dimensions on the Formation of Entrepreneurial Intentions. *USASBE Small Business Advancent National Center*, University of Central Arkansas, USA.
5. Brockhaus, R.H. (1987). Entrepreneurial folklore. *Journal of Small Business Management*, 25(3): 1-6.
6. Carland, J.W.; Hoy, F.; Boulton, W.R. and Carland, J. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review*, 9: 354-359.
7. Collins, O.F. and Moore, D.G. (1964). *The Entreprising Man*. East Lansang, Michigan: Michigan State University Press.
8. Cunningham, J.B. and Lischeron, J. (1991). Defining entrepreneurship. *Journal of Small Business Management*, 29: 45-61.
9. Davidsson, P. (1989). *Continued Entrepreneurship and Small Firm Growth*. Stockholm School of Economics, Stockholm, Sweden.
10. Delmar, F. and Davidsson, P. (2000). Where do they come from? Prevalence and characteristics of nascent entrepreneurs. *Entrepreneurship & Regional Development*, 12: 1-23.
11. Ede, Fred O., Panigrahi, Bhagaban, and Calcich, Stephen E., (1998). African American students' attitudes toward entrepreneurship. *Journal of Education for Business*, May/Jun98, 73 (5).
12. Folster, S., (2000). Do entrepreneurs Create Jobs? *Small Business Economics*, 14: 137-148.

13. Franco, M.J.B. (2007). Estudo do empreendedorismo ao nível de aprendizagem individual: o papel do empreendedor. Ayola, J.C.C and Grupo de Investigación FEDRA (eds.). *Conocimiento, Innovación y Emprendedoris. Camino al Futuro*. Logroño: Universidad de La Rioja, 1307-1323.
14. Franke, N. and Lüthje, C. (2004). Entrepreneurial Intentions of Business Students: A Benchmarking Study. *International Journal of Innovation and Technology Management*, 1 (3): 269-288.
15. Gerry, C. and Abreu, S. (2007). IncUTAD: incubadora de inovação, networking e competitividade. Narrativa da prática. Report submitted to the EU Equal Programme as part of the GLOCAL project, UTAD, Vila Real, 32-36.
16. Gorman G. (1997). Some Research Perspectives on Entrepreneurship Education, Enterprise Education and Education for Small Business Management: A Ten-Year Literature Review. *International Small Business Journal*, 15 (3): 56-79.
17. Gürol, Y. and Atsan, N. (2006). Entrepreneurial characteristics amongst university students: some insights for enterprise education and training in Turkey. *Education and Training*, 48 (1): 25-39.
18. Hatten, T.S. and Ruhland, S.K. (1995). Student attitude toward entrepreneurship as affected by participation in an SBI program. *Journal of Education for Business*, 70 (4): 224-227.
19. Henderson, R. and Robertson, M. (1999). Who wants to be an entrepreneur? Young adult attitudes to entrepreneurship as a career. *Education and Training*, 41 (4/5): 236-246.
20. Hisrich, R.D. and Peters, M.P. (1995). *Entrepreneurship: Starting, developing and managing a new enterprise*. 3rd Edition, Chicago et al., Irwin.
21. Hornaday, J.A and Aboud, J. (1971). Characteristics of Successful Entrepreneurs. *Personal Psychology*, Summer: 141-153.
22. Hornaday, J.A. and About, J. (1971). Characteristics of Successful Entrepreneurs. *Personnel Psychology*. 24 (2): 141-153.
23. Hosmer, D. and Lemeshow, S. (1989). *Applied Logistic Regression*. New York: John Wiley & Sons.
24. Hull, D.L.; Bosley, J.J. and Udell, G.G. (1980). Renewing the Hunt for the Heffalump: Identifying Potencial Entrepreneurs by Personality Characteristics. *Journal of Small Business*. 18 (1): 1-18.
25. Kennedy, J.; Drennan, J.; Renfrow, P. and Watson, B. (2003). Situational Factors and Entrepreneurial Intentions. An paper for the *Small Enterprise Association of Australia and New Zealand, 16th Annual Conference*, Ballarat, 28 Setember – 1 October.
26. Klapper, R. and Léger-Jarniou, C. (2006). Entrepreneurial intension among French Grande École and university students: an application of Shapiro's model. *Industry & Higher Education*, April: 97-110.
27. Koh, H.C. (1996). Testing hypotheses of entrepreneurial characteristics: A study of Hong Kong MBA student. *Journal of Managerial Psychology*, 11 (3): 12-26.
28. Kolvereid, L. and Moen, Ø. (1997). Entrepreneurship among business graduates: does a major in entrepreneurship make a difference? *Journal of European Industrial Training*, 21 (4): 154.
29. Kourilsky, M.L. and Walstad, W.B. (1998). Entrepreneurship and female youth: Knowledge, attitudes, gender differences and educational practices. *Journal of Business Venturing*, 13: 77-88.
30. Kourilsky, M.L. (1980). Predictors of Entrepreneurship in a Simulated Economy. *Journal of Creative Behavior*, 14 (3): 175-199.
31. Lena, L. and Wong, P.K. (2003). Attitude towards entrepreneurship education and new venture creation. *Journal of Enterprising Culture*, 11 (4): 339-357.
32. Li, W (2006). Entrepreneurial Intention among International Students: Testing a Model of Entrepreneurial Intention. *USASBE Small Business Advancent National Center*, University of Central Arkansas.
33. Liñán-Alcalde, F. and Rodríguez-Cohard, J. (2004). Entrepreneurial Attitudes of Andalusian University Studentes. in <http://ideas.repec.org/p/wiw/wiwsa/ersa04p161.html>, accessed in 20-01-07.
34. Lüthje, C. and Franke, N. (2003). The 'Making' of an Entrepreneur: Testing a Model of Entrepreneurial Intent among Engineering Students at MIT. *R&D Management*, 33: 2.
35. Martínez, D.; Mora, J-G and Vila, L. (2007). Entrepreneurs, the Self-employed and Employees amongst Young European Higher Education Graduates. *European Journal of Education*, 42 (1).
36. McClelland, D.C. (1961). *The Achieving Society*. Van Nostrand, Princeton, NJ.
37. Naffziger, D.W.; Hornsby, J.S. and Kurtako, D.F. (1994). A proposed research model of entrepreneurial motivation. *Entrepreneurship Theory and Practice*, 18 (3): 29-42.
38. Oakey, R.; Mukhtar, S-M and Kipling, M. (2002). Student perspectives on entrepreneurship: observations on their propensity for entrepreneurial behaviour. 2 (4/5), 308-322.
39. Reynolds, P., Storey, D.J. and Westhead, P. (1994). Cross-national comparisons of the variation in new firm formation rates. *Regional Studies*, 28: 443-456.
40. Robbins, D.K.; L.J. Pantuosco, D.F.; Parker and B.K. Fuller (2000). An Empirical Assessment of the Contribution of Small Business Employment to U.S. State Economic Performance. *Small Business Economics*, 15: 293-302.
41. Robinson, P.B. (1987). Prediction of entrepreneurship based on attitude consistency model. Unpublished doctoral dissertation, Brigham Young University. Dissertation Abstracts International, 48, 2807B.
42. Robinson, P.B.; Stimpson, D.V.; Huefner, J.C. and Hunt, H.K. (1991). An Attitude Approach to the Prediction of Entrepreneurship. *Entrepreneurship Theory and Practice*, 15 (4): 13-31.
43. Rodrigues, R.G.; Raposo, M.; Ferreira, J. and Paço, A. (2008). Entrepreneurship Education and Business Creation Propensity: Testing a structural model. *Int. J. Entrepreneurship and Small Business*, 9(1): xx-xx (forthcoming paper).

44. Scott, M.G., and Twomey, D.F. (1988). The long-term supply of entrepreneurs: students' career aspirations in relation to entrepreneurship. *Journal of Small Business Management*: 5-13.
45. Stephan, U., Lukes, M., Pawlowska A. and Richter, P.G. (2003). Conditions for entrepreneurship in Germany, Czech Republic and Poland: is culture the crux? Paper presented at the *XI European Congress on Work & Organizational Psychology*, May 14-17, Lisbon.
46. Teixeira, A.A.C. (2007). Beyond economics and engineering: the hidden entrepreneurial potential. Mimeo, Faculdade de Economia, Universidade do Porto.
47. Van Auken, H.; Stephens, P.; Fry F. and Silva J. (2006). Role model influences on entrepreneurial intentions: A comparison between USA and Mexico. *Entrepreneurship Management*, 2: 325-336.
48. Vesper, K.H. (1990). *New Ventures Strategies*. Prentice-Hall, Englewood Cliffs, New Jersey, 1990.