

*Research paper***Entrepreneurial potential among polytechnic higher education students***Submitted in August 19th**Accepted in October 30th**Evaluated by a double blind review system***ORLANDO LIMA RUA¹****Structured Abstract**

Purpose: The main goal of this article is to analyze the entrepreneurial potential of the Polytechnic higher education students.

Design/methodology/approach: For this purpose, we use a quantitative methodological approach, having applied a questionnaire to a sample of students enrolled in the entrepreneurship curricular unit of the School of Accounting and Administration (ISCAP) of the Polytechnic Institute of Porto (IPP).

Findings: Based on data collection from 227 undergraduate students in entrepreneurship from Portugal, the results allow us to conclude that personal desirability positively enhances the intention to start a business. On the other hand, perceived difficulties negatively enhance that intention.

Research limitations: As the main limitation of this study we highlight the fact that this is a unique case study can, in itself, constitute a limitation, advising on the future development of multiple case studies to consolidate the results obtained now.

Practical implications: This study provides guidance for managers and teachers of higher education polytechnic institutions when adopting policies that have implications on the consolidation of an organizational culture focused on entrepreneurship and which thus competently meets the demands of society's new paradigms. These implications will result in the implementation of an entrepreneurship curricular unit with programme, teaching methodologies and assessment, in order to train more skilled entrepreneurs.

Originality/value: The majority of studies concerning the entrepreneurial potential is basically targeted at universities (or university students). This study consists in analyzing entrepreneurial potential in higher education polytechnic students.

Keywords: Entrepreneurial potential, polytechnic students, business creation.

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1. Introduction

Entrepreneurship has assumed a leading role in society through its substantial contribution to the economic development of nations, noting a growing importance in the universe of higher education institutions. This is justified by the rising needs to accelerate economic growth through the generation of new ideas and the conversion of these into profitable companies (Duygu and Selcuk, 2009).

Sethi (2008) considers entrepreneurship to be the active process that propels the entrepreneur to only to create of enterprises and employment, thus organizing his/her business, but also fosters the increase of wealth as well as economic development.

Some authors argue that the previous understanding of the importance of the relation between ideas and action is critical to understand the entrepreneurial process (e.g. Bird, 1989; Krueger, 1993). Subsequent studies consolidate concepts such as potential and entrepreneurial intention in higher education students (e.g. Díaz Casero, Hernández and Raposo, 2007; Duygu and Sanda, 2009; Romaní, Didonet, Contuliano and Portillo, 2013).

Turker and Selcuk (2009) refer that the main reason for entrepreneurship is the ability to capture the attention of universities, as well as policy-makers. This is due to the growing needs of entrepreneurs to accelerate economic growth and development based on new ideas that will generate profitable companies. The first predictive factor of entrepreneurial intention is, thus, the education provided by the higher education institutions. Innovation appears linked to this phenomenon, requiring the participation and collaboration of the various players in the scientific and technological system (universities, and research centres, companies and public administration) (Garmendia and Castellanos, 2012).

Ali, Topping and Tariq (2011) support that the increasing relevance in the development of entrepreneurially oriented educational programs and start-up processes is due to the identification of the entrepreneurs' characteristics as well as the knowledge of the entrepreneurial profile of their potential.

Correia Santos, Caetano, Curral and Spagnoli (2010), when referring to the success of entrepreneurship programs, argue that the frameworks of each programme should encourage younger people (students and employees) to develop entrepreneurship and innovation, considering, however, that knowledge about the operationalization and measurement of the entrepreneurial potential is still scarce and not sufficiently systematized.

In this context, the effect that entrepreneurship education in higher education institutions has produced in entrepreneurs' business creation has been studied. Entrepreneurial education usually includes programmes, which promote entrepreneurship awareness for career purposes, promoting training skill for business creation and development (Vesper and McMullan, 1988; Vesper 1990; Bechard and Toulouse, 1998). Dohse and Walter (2010) report that active modes of educational programmes geared towards entrepreneurship practice (e.g. business plans, seminars, etc.) produce better results at the level of the stimulation of entrepreneurial intention than more reflective programmes (e.g. theory-based lectures), motivating and qualifying students for the creation of self-employment, confirming a change of paradigm, where the focus is now the concrete form and the programmes of courses.

According to Ali *et al.* (2011, p. 14) “*The entrepreneurial potential of the potential entrepreneurs can be enhanced through educational programmes*”. Parker and Van Praag (2006) concluded that the entrepreneurs’ performance is positively influenced by education, directly and/or indirectly, through entrepreneurial capacity factors such as personality traits, learning, experiences, social factors and culture. It should also be mentioned that the attitude of the potential entrepreneurs towards entrepreneurship is still influenced favorably by information technology development and education system (Dionco-Adetayo, 2006).

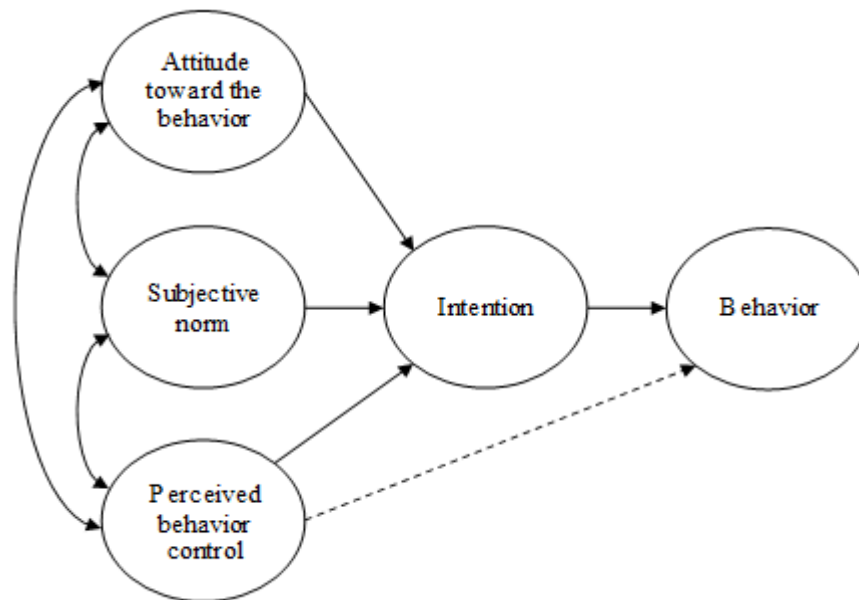
Thus, the main motivation of this study consists in analyzing business creation in higher education polytechnic students. This is based on entrepreneurial potential in order to assess the impact that this will have in terms of entrepreneurship’s education polytechnics.

2. Theoretical framework

2.1. Ajzen’s theory of planned behaviour (TPB)

Ajzen (1991) developed the TPB which claims that the consequence of a reasoned action results from previous studies performed (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980), as presented below in Figure 1. The fundamental thesis of this theory is based on the fact that the impact of behavioural attitudes and intended attitudes are strong behavioural predictors (Carsrud, Krueger, Brännback., Kickul and Elfving, 2007).

Figure 1. Theory of planned behaviour



Source: Ajzen (1991, p. 182).

The centrality of TPB resides in the individual intention to perform certain behaviour. In this context, such intention aggregates behavioural factors that influence such behaviour. The stronger the intention of achieving given behaviour, the greater the performance thereof. The focus is on the long term, rather than short-term, to the extent that this theory

is to predict and explain the behaviour of the individual at the intention of this act in a certain way, that may underlie the development of business and, consequently, the start of businesses and the creation of enterprises (Krueger and Carsrud, 1993).

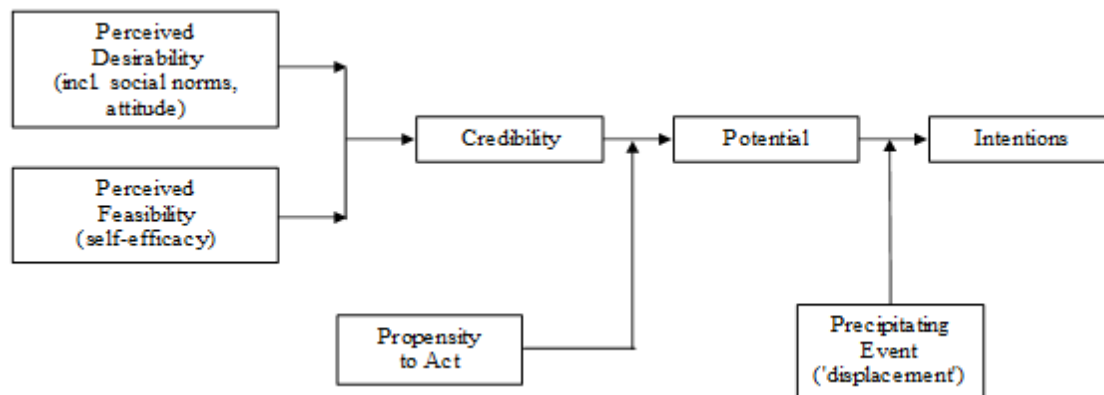
This theory contemplates three key attitudes leading to the prediction of intention: a) attitude through action, which subsumes perceptions of likely intrinsic and extrinsic personal outcomes; b) social norms, which subsumes the perceived extrapersonal influences on the decision maker; and c) perceived behaviour control (PBC), which subsumes personal perceptions of the behaviour's feasibility (Krueger and Brazeal, 1994). For Armitage and Conner (2001) the attitude, subjective norms and the PBC explain 40% of the variance in intent, and these and the PBC jointly account for 27% of the variance in behaviour. These results were subsequently reinforced by other studies (e.g. Krueger, Reilly and Carsrud, 2000; Courneya, Conner and Rhodes, 2006).

2.2. Krueger and Brazeal's Model of Entrepreneurial Potential

This model resulted from the combination of the Ajzen's (1987, 1991) TPB with the entrepreneurial event model (SEE) of Shapero (1982).

Shapero's model is characterized by intentions clearly applied to entrepreneurship, where the intentions to start a business have their origin from perceptions of desirability and feasibility, and from propensity to act upon opportunities that arise (Krueger, Reilly and Carsrud, 2000). In this model, the entrepreneurship event requires the potential to start a business (credibility and propensity to act) to exist prior to the displacement (along with the disposition to act after being displaced) (Krueger and Brazeal, 1994). Brännback, Krueger, Carsrud and Elfving (2007) consider that in Krueger and Brazeal's (1994) model, intentions toward pursuing an opportunity are best predicted by three critical perceptions: a) personally desirable; b) supported by social norms; and c) feasible (feasibility presumably impacted by perceived self-efficacy). Katz (1992) argues that the power for displacement leads to the change of behaviour, making decision-makers look for the best alternatives available. Thus, Díaz Casero *et al.* (2007) support that, before the precipitator element, business events will require the displacement of desire, of the perception of feasibility, and the propensity to act. Romaní *et al.* (2007) refer that this model points out that the beliefs and attitudes of potential entrepreneurs depend on their perceptions and suggest three critical constructs: perceived desirability, perceived feasibility, and the propensity to act (Figure 2).

Figure 2: Model of Entrepreneurial Potential (simplified)



Source: Kruger and Brazeal (1994, p. 95).

This model aims to improve the capacity of the previous model presented, because it considers two new explanatory variables, credibility and potential, and a new component, the propensity to act (Krueger and Brazeal, 1994). With these changes the authors expect to be able to identify the characteristics, beliefs and attitudes of potential entrepreneurs who see themselves as such, since the perceived desirability and perceived feasibility on their own do not explain entrepreneurial intention.

Perceived desirability

For Shapero (1982) perceived desirability consists in the personal attractiveness of starting a business, including both intrapersonal and extrapersonal impacts (Krueger, Reilly and Carsrud, 2000), reflecting the degree to which an individual considers attractive to create a business. Krueger and Brazeal (1994) consider that this construct comprises the two components of Ajzen's TPB: a) attitude toward the act; and b) social norms, considering that they are intercorrelated. Krueger *et al.* (2000) support that the attitude is the result of a set of beliefs and expectations resulting from the behaviour of the individual, which, according to previous studies carried out, will have an impact at the level of entrepreneurial intention with regards to personal wealth, stress, autonomy, and community benefits (Shapero, 1982).

The perception of the individual about what he/she considers as desirable and that relates to interests and intrinsic motivations influences his/her attitude, highlighting the fact that the individual is still influenced by incentives and disincentives (Romaní *et al.*, 2013).

Regards social norms, these include not only the family's expectations towards the individual becoming an entrepreneur, or exercising another profession, but also the very motivation that is inculcated, and extensible expectations to others (friends, teachers, etc.) (Krueger *et al.*, 2000). These norms cannot therefore dissociate themselves from social skills, i.e. the ability of the individual has to interact effectively with others (Baron, 2000). Ajzen (1987) considers that social norms are less predictive for intentions relating to subjects with a highly locus of control.

Social norms are thus related to individual perception with regard to the intention to create a business, playing a key role for students of higher education institutions that can start

their business through the creation of companies. Turker and Selcuk (2009) report that these institutions can be assumed as prevalent in the encouragement of young people to the choice of an entrepreneurial career. This will contribute to the construction of the designated entrepreneurial motivation, one of the most important predictors of the new venture's success (Baum, Locke and Smith, 2001). In this context, we must also know how, or rather, what resources (tangible and/or intangible) that higher education institutions may provide to students to support and stimulate them to fulfil their intentions of creating business enterprises.

This study pretends to test the following hypothesis:

H1. Personal desirability positively enhances the intention to start a business.

H2. The desirability for support from the polytechnic positively enhances the intention to start a business.

H3. The students' perception of their school positively enhances their intentions to start a business.

Perceived feasibility (perceived self-efficacy)

Krueger *et al.* (2000) defined perceived feasibility as the degree to which one feels personally capable of starting a business. For Krueger and Brazeal (1994) this construct is related to the concept of perceived self-efficacy, corresponding to a person's ability to execute some target behaviour. For these authors, to promote self-efficacy is more than teaching competencies. People must fully internalize those competencies through perceived mastery, considering that psychological and emotional support will enhance it. Díaz Casero *et al.* (2007) report that perceived self-efficacy is related to high-risk behaviours and uncertainty, as well as with the flexibility to face adversity.

Whenever a particular individual presents a significant business potential, it is enough that there is a substantial change in their situation. It is not necessarily required that he/she has the intent to actually fulfil it, but rather to precipitate the intentions or behaviour, in this case, to create a business (Krueger and Brazeal, 1994).

Romaní *et al.* (2013) refer that perceived feasibility and perceived self-efficacy correspond to the ability of each individual to implement a particular desired behaviour, while it is necessary for such perceived obstacles not to compromise the intention to create companies.

Thus, the objective is to test the following hypothesis:

H4. The perceived difficulties negatively enhance the intention to start a business.

H5. The proximity with entrepreneurs positively enhances the students' intention to start a business.

Propensity to act

Krueger and Brazeal (1994), based on prior research, consider that is possible to train individuals to enhance a greater autonomy, by teaching self-management, coping skills with adversity, and visibly reward initiative taking.

Shapero (1982) considered propensity to act as the personal disposition to act on one's decisions, thus reflecting volitional of intentions (Krueger *et al.*, 2000). We intend to accomplish something, but if we do not have an effective propensity to act we will never achieve anything. In this case, if we want to start a business or to create a company, if we are not sufficiently persistent and emulate behaviours that do lead to that creation, adversity and obstacles inherent in this process will vanquish us. It is also important to highlight the importance of self-efficacy as something associated with opportunity recognition and risk-taking (Krueger and Dickson, 1994). We need to link and leverage these two aspects.

During this act, it is normal to expect fear to arise, it is therefore important to emphasize resilience, i.e., the capability to react and recover when facing unexpected and unfavourable results in situations of risk and uncertainty, as one of the psychological skills of the individual (e.g. Marvel and Lumpkin, 2007; Barbosa, Gerhardt and Kickul, 2007), and consequently as a restraint to the propensity to act. Lüthje and Franke (2003) have proposed a model, which incorporated both personality traits and contextual factors, revealing that the impact of attitude towards self-employment might be linked to two personality traits (risk-taking propensity and internal locus of control) and two contextual factors (perceived barriers and perceived support).

Thus, the following hypothesis:

H6. A fearful attitude toward risk negatively enhances the intention to start a business.

3. Research methodology

3.1. Sample and data

The sample comprised 227 undergraduate students (45.3% female, 54.7% male), which are mostly between 20 and 35 years (64.3%), who attended the course of Entrepreneurship in the third year of the Degree in Accounting and Administration of the School of Accounting and Administration (ISCAP) of the Polytechnic of Porto (Portugal).

The results based on the sample have a confidence level of 95% and an estimated error mean of 5%. The response rate of the sample was 62%.

The constructs, dimensions, sub-dimensions and variables considered for analysis can be seen in the following table.

Table 1: Measurement scales used in the questionnaire

Construct	Dimensions	Sub-dimensions	Variables	References
Perceived Desirability	Attitude	Personal Desires	• High income • Escape unemployment • Flexible work schedule • Power • Be your own boss • Carry out own ideas	Krueger and Brazeal (1994), Krueger et al. (2000), Romani et al. (2013).
		Desired support from the Polytechnic	• Training • Course on business plans • Contacts with companies • Initial financial push • Polytechnic support office • Incubator	Krueger and Brazeal (1994), Krueger et al. (2000), Romani et al. (2013).
	Social Norms	Perception of the Polytechnic	• Curriculum • Business plan competition • Activities for the creation of enterprises	Krueger and Brazeal (1994), Krueger et al. (2000), Romani et al. (2013).
Perceived Feasibility	Perceived difficulties		• Lack of an appropriate partner • Lack of initiative • Lack of courage • Lack of contacts with customers • Lack of own capital • Lack of external capital • Lack of knowledge • High financial risk • Reduced earnings • Support from family and/or friends • Macroeconomic environment • Fear of failure • Costly regulations at the beginning	Krueger and Brazeal (1994), Krueger et al. (2000), Romani et al. (2013).
	Attitude toward risk		• Fear of risk	Krueger and Brazeal (1994), Krueger et al. (2000), Romani et al. (2013).
	Close entrepreneur		• Close person is an entrepreneur	Krueger and Brazeal (1994), Krueger et al. (2000), Romani et al. (2013).

Data collection started on 15th January of 2013 and ended on the 20th February of 2013, and data analysis was conducted using SPSS statistical software (version 19).

3.2. Measures

The instrument used was the questionnaire, in the sense that any variable was not manipulated and all data related were collected at the same time (Bryman and Cramer, 2005). It was constructed with the use of a four-point Likert scale ranging from “insignificant” to “very important” for the *personal desires* and the *desirability for support from the Polytechnic*, from “very bad” to “very good” for the *perception of the polytechnic*, from “strongly disagree” to “strongly agree” for the *perceived difficulties*, from “very fearful” to “not fearful at all” for the *attitude toward risk*, and to *close person is an entrepreneur* we use a dichotomous scale (yes/no), in order to better objectify the results obtained.

The reliability of the data collection instrument was estimated by cronbach’s alpha. On the other hand, to evaluate the effect of each variable in each construct, dimension, and sub-dimension we created a mean variable for each, based on the answers to each of the variables. After, to assess the relevance and real contribution of each variable in the construct (evaluated by the mean) we used Spearman's correlation coefficient to calculate the rank, the direction of association (positive and negative) and to determine significance.

3.3. Results of analyses

To evaluate the reliability of the sample we estimate the overall stability and consistency through internal Cronbach’s alpha (α). For the present study we used the scale proposed by Pestana and Gageiro (2010). The result of 0.749 obtained for all the variables of the questionnaire is considered good, confirming the internal consistency of the sample. We also tested for internal consistency for the set of variables that make up each of the construct studied, in order to assess the reliability thereof. We found that perceived desirability, and perceived feasibility also presented good consistency values: 0.720, and 0.703 respectively.

We observed the correlations between overall entrepreneurial potential, students’ characteristics and gender that lead to the business creation. For this we used the Spearman correlation coefficient, measuring the intensity according to Bryman and Cramer (2005).

H1. Personal desirability positively enhances the intention to start a business.

Table 2 that the mean of personal desires (PD) appears positively and moderately related to *High income* ($r=0.592$, $p<0.01$), *Flexible work schedule* ($r=0.605$, $p<0.01$), *Power* ($r=0.656$, $p<0.01$), *Be your own boss* ($r=0.641$, $p<0.01$), and *Carry out own ideas* ($r=0.514$, $p<0.01$), as expected. Regarding *Escape unemployment* ($r=0.321$, $p<0.01$), this unexpectedly appears positively and lowly related with the *personal desirability*.

Table 2: Correlations of Personal Desirability (PD)

		PD_mean	PD_1	PD_2	PD_3	PD_4	PD_5	PD_6
PD_mean	Correlation Coefficient Sig. (2-tailed) N	1,000 . 220						
PD_1	Correlation Coefficient Sig. (2-tailed) N	0,592** 0,000 220	1,000 . 226					
PD_2	Correlation Coefficient Sig. (2-tailed) N	0,321** 0,000 220	0,095 0,156 225	1,000 . 226				
PD_3	Correlation Coefficient Sig. (2-tailed) N	0,605** 0,000 220	0,305** ,000 226	,158* ,017 1226	1,000 . 227			
PD_4	Correlation Coefficient Sig. (2-tailed) N	,656** ,000 220	,316** ,000 225	,031 ,644 225	,308** ,000 226	1,000 . 226		
PD_5	Correlation Coefficient Sig. (2-tailed) N	,641** ,000 220	,264** ,000 222	-,137* ,041 221	,214** ,001 222	,318** ,000 221	1,000 . 222	
PD_6	Correlation Coefficient Sig. (2-tailed) N	,514** ,000 220	,197** ,003 225	-,140* ,035 225	,143* ,032 226	,230** ,000 225	,442** ,000 222	1,000 . 226

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

We found that 83% of the analysed correlations are positive and moderate. The value of p obtained from 0.001 is below the chosen significance level (0.05) and, as such, we reject H_0 in favour of H_1 and we conclude that the personal desirability positively enhances the intention to start a business.

H2. The desirability for support from the polytechnic positively enhances the intention to start a business.

The mean of the desirability for support from the polytechnic (DSP) appears positively and moderately related to *Training* ($r=0.531$, $p<0.01$), *Course on business plans* ($r=0.657$, $p<0.01$), *Contacts with companies* ($r=0.605$, $p<0.01$), *Initial financial push* ($r=0.638$, $p<0.01$), *Polytechnic support office* ($r=0.718$, $p<0.01$), and *Incubator* ($r=0.682$, $p<0.01$), as expected (Table 3).

Table 3: Correlations of Desirability for Support from the Polytechnic (DSP)

		DSP_mean	DSP_1	DSP_2	DSP_3	DSP_4	DSP_5	DSP_6
DSP_mean	Correlation Coefficient	1,000						
	Sig. (2-tailed)	.						
	N	203						
DSP_1	Correlation Coefficient	,531**	1,000					
	Sig. (2-tailed)	,000	.					
	N	203	227					
DSP_2	Correlation Coefficient	,657**	,379**	1,000				
	Sig. (2-tailed)	,000	,000	.				
	N	203	227	227				
DSP_3	Correlation Coefficient	,605**	,234**	,434**	1,000			
	Sig. (2-tailed)	,000	,000	,000	.			
	N	203	227	227	227			
DSP_4	Correlation Coefficient	,638**	,175**	,257**	,301**	1,000		
	Sig. (2-tailed)	,000	,008	,000	,000	.		
	N	203	227	227	227	227		
DSP_5	Correlation Coefficient	,718**	,216**	,304**	,261**	,415**	1,000	
	Sig. (2-tailed)	,000	,001	,000	,000	,000	.	
	N	203	227	227	227	227	227	
DSP_6	Correlation Coefficient	,682**	,194**	,303**	,346**	,301**	,475**	1,000
	Sig. (2-tailed)	,000	,006	,000	,000	,000	,000	.
	N	203	203	203	203	203	203	203

**. Correlation is significant at the 0.01 level (2-tailed).

All analysed relationships are positive and moderate, where the p value (0,001) obtained is lower than the significance level chosen (0.05) and, as such, we reject H_0 in favour of H_2 and concluded that the desirability for support from the polytechnic positively enhances the intention to start a business.

H3. The students' perception of their school positively enhances their intentions to start a business.

Table 4 shows that the mean regarding the students' perception of their school (PP) appears positively and highly related to *Curriculum* ($r=0.755$, $p<0.01$), *Business plan competition* ($r=0.780$, $p<0.01$), and *Activities for the creation of enterprises* ($r=0.866$, $p<0.01$), as expected.

Table 4: Correlations of Polytechnic' Perception (PP)

		PP_mean	PP_1	PP_2	PP_3
PP_mean	Correlation Coefficient	1,000			
	Sig. (2-tailed)	.			
	N	222			
PP_1	Correlation Coefficient	,755**	1,000		
	Sig. (2-tailed)	,000	.		
	N	222	226		
PP_2	Correlation Coefficient	,780**	,628**	1,000	
	Sig. (2-tailed)	,000	,000	.	
	N	222	224	224	
PP_3	Correlation Coefficient	,866**	,462**	,550**	1,000
	Sig. (2-tailed)	,000	,000	,000	.
	N	222	223	222	223

**. Correlation is significant at the 0.01 level (2-tailed).

Similarly, all analysed relationships are positive and moderate. The value of p obtained from 0.001 is below the chosen significance level (0.01). As such we reject H_0 in favour of H_3 and concluded that the students' perception of their school positively enhances their intentions to start a business.

H4. The perceived difficulties negatively enhance the intention to start a business.

The mean of the perceived difficulties (PDIF) appear to be positively and moderately related to *Lack of initiative* ($r=0.624$, $p<0.01$), *Lack of courage* ($r=0.684$, $p<0.01$), *Lack of contacts with customers* ($r=0.545$, $p<0.01$), *Lack of own capital* ($r=0.548$, $p<0.01$), *Lack of external capital* ($r=0.556$, $p<0.01$), *Lack of knowledge* ($r=0.604$, $p<0.01$), *High financial risk* ($r=0.599$, $p<0.01$), and *Fear of failure* ($r=0.542$, $p<0.01$), as expected. *Lack of an appropriate partner* ($r=0.497$, $p<0.01$), *Costly regulations at the beginning* ($r=0.426$, $p<0.05$), *Reduced earnings* ($r=0.380$, $p<0.01$), *Support from family and/or friends* ($r=0.395$, $p<0.01$), and *Macroeconomic environment* ($r=0.391$, $p<0.01$) unexpectedly appear to be positively and lowly related with the perceived difficulties (Table 5).

Table 5: Correlations of Perceived Difficulties

		PDIF_mean	PDIF_1	PDIF_2	PDIF_3	PDIF_4	PDIF_5	PDIF_6	PDIF_7	PDIF_8	PDIF_9	PDIF_10	PDIF_11	PDIF_12	PDIF_13
PDIF_mean	Correlation Coefficient Sig. (2-tailed) N	1,000 . 210													
PDIF_1	Correlation Coefficient Sig. (2-tailed) N	,497** ,000 210	1,000 . 225												
PDIF_2	Correlation Coefficient Sig. (2-tailed) N	,624** ,000 210	,414** ,000 224	1,000 . 226											
PDIF_3	Correlation Coefficient Sig. (2-tailed) N	,684** ,000 210	,372** ,000 225	,606** ,000 226	1,000 . 227										
PDIF_4	Correlation Coefficient Sig. (2-tailed) N	,545** ,000 210	,412** ,000 223	,325** ,000 224	,328** ,000 225	1,000 . 225									
PDIF_5	Correlation Coefficient Sig. (2-tailed) N	,548** ,000 210	,310** ,000 223	,282** ,000 224	,327** ,000 225	,494** ,000 224	1,000 . 225								
PDIF_6	Correlation Coefficient Sig. (2-tailed) N	,556** ,000 210	,334** ,000 222	,265** ,000 223	,260** ,000 224	,442** ,000 223	,727** ,000 224	1,000 . 224							
PDIF_7	Correlation Coefficient Sig. (2-tailed) N	,604** ,000 210	,247** ,000 222	,532** ,000 223	,444** ,000 224	,355** ,000 223	,160* ,017 223	,160* ,017 222	1,000 . 224						
PDIF_8	Correlation Coefficient Sig. (2-tailed) N	,599** ,000 210	,227** ,001 223	,155* ,020 224	,302** ,000 225	,275** ,000 224	,395** ,000 224	,409** ,000 223	,284** ,000 224	1,000 . 225					
PDIF_9	Correlation Coefficient Sig. (2-tailed) N	,380** ,000 210	-,012 ,857 218	,212** ,002 219	,137* ,042 220	,080 ,241 219	,067 ,322 219	,145* ,032 218	,387** ,000 219	,188** ,005 220	1,000 . 220				
PDIF_10	Correlation Coefficient Sig. (2-tailed) N	,395** ,000 210	,123 ,066 222	,146* ,030 223	,171* ,011 224	,130 ,053 223	-,007 ,913 223	-,033 ,626 222	,215** ,001 223	,119 ,076 224	,099 ,143 219	1,000 . 224			
PDIF_11	Correlation Coefficient Sig. (2-tailed) N	,391** ,000 210	,189** ,005 222	,102 ,127 223	,209** ,002 224	,181** ,007 223	,270** ,000 223	,287** ,000 222	,013 ,844 222	,397** ,000 223	,079 ,244 218	,092 ,172 222	1,000 . 224		
PDIF_12	Correlation Coefficient Sig. (2-tailed) N	,542** ,000 210	,166* ,013 224	,302** ,000 225	,335** ,000 226	,167* ,012 225	,129 ,054 225	,100 ,135 224	,239** ,000 224	,249** ,000 225	,212** ,002 220	,259** ,000 224	,176** ,008 224	1,000 . 226	
PDIF_13	Correlation Coefficient Sig. (2-tailed) N	,426** ,000 210	,069 ,303 223	,060 ,371 224	,126 ,059 225	,131 ,050 224	,275** ,000 224	,262** ,000 223	,039 ,562 223	,333** ,000 224	,178** ,008 223	,118 ,080 223	,302** ,000 224	,332** ,000 225	1,000 . 225

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

We found that 62% of the analysed correlations are positive and moderate, where the value of p (0.001) is lower than the 0.05 significance level chosen and, as such, we reject H_0 in favour of H_4 and concluded that the perceived difficulties negatively enhance the intention to start a business.

H5. A fearful attitude toward risk negatively enhances the intention to start a business.

As expected, the mean related to the attitude toward risk is positively and very strongly related to the attitude toward risk ($r=1.000$, $p<0.01$). The value of p obtained from 0.001 is below the chosen significance level (0.01) and, as such, we reject H_0 in favour of H_5 and concluded that the fearful attitude toward risk negatively enhances the intention to start a business.

H6. The proximity with entrepreneurs positively enhances the students' intention to start a business.

The mean of the proximity with entrepreneurs appears positively and very strongly related to the proximity with entrepreneurs ($r=1.000$, $p<0.01$), as expected, in that the value of p obtained (0.001) is below the 0.01 significance level chosen: As such, we reject H_0 in favour of H_6 and concluded that the proximity with entrepreneurs positively enhances the students' intention to start a business.

4. Discussion and conclusions

Several authors have been poring over the study of the entrepreneurial potential of higher education institutions' students, deriving mainly from the works of Ajzen (1991) and Krueger and Brazeal (1994). This study sought to go further and examine not only the potential entrepreneur dimensions proposed by these and other authors, but also consider the characteristics and gender of the students of the Portuguese public higher polytechnic education institutions.

We find that the personal desirability positively enhances the intention to start a business, as students look to obtain power, as well as the possibility of being their own bosses, of having a flexible work schedule, of achieving higher incomes, and carrying out their own ideas. These findings suggest the need to build and develop an environment, which encourages student initiative, independence and autonomy and which will encourage the creation of business. In order to do so, the commitment of higher education polytechnic institutions' top managers is essential.

This may have policy implications, especially for those providing assistance to entrepreneurs, future entrepreneurial activities organized by government agencies and higher education institutions should take this into consideration (Ismail *et al.*, 2009).

Students especially appreciate the polytechnic support office, the possibility to use incubator, having an initial financial push, attending a course on business plans, having the possibility to solicit contacts with companies, and the possibility of training, which confirms that the desirability for support from the polytechnic positively enhances the intention to start a business. Regarding the students' perception of their school, we've confirmed positive and high relations between the activities for the creation of enterprises, business plan competition, and the course's programmes.

With regard to the perceived difficulties that negatively enhance the intention to start a business, we highlight, in this domain, the lack of courage, initiative, knowledge, external capital, own capital, contacts with customers, high financial risk, and the fear of failure. In this situation, it is recommended that higher education institutions have a more proactive role providing administrative support, creating incubation centres and special funds to

partially finance star-up business, improving and reorienting their study programs towards entrepreneurship, and serving as a facilitator for the creation of business thus opening new horizons for entrepreneurs (Turker and Selcuk, 2009; Keat, Selvarajah and Meyer, 2011; Romaní *et al.*, 2013). This can reinforce the intentions to create a business, and it can also be seen as an opportunity not only for entrepreneurs, but also for higher education institutions.

Wang and Wong (2004) refer that it is expected that the students' attitude facilitates and encourages the inclination to create businesses in the future, while the proximity with entrepreneurs is also decisive. This positively enhances the students' intention to start a business, whereas the fearful attitude toward risk negatively enhances that same intention.

We can point out some limitations to the present study, which should serve as basis for future research themes. The fact that this is a unique case study can, in itself, constitute a limitation, advising on the future development of multiple case studies to consolidate the results obtained now.

Furthermore, we suggest a comparative study between Polytechnic and University institutions in order to ascertain which educational subsystem best works the entrepreneurial potential of its students. We also recommend the analysis of students from different areas of knowledge and not specifically from the business sciences. Finally, we think it's very important to carry out comparative studies among students who had the curricular unit Entrepreneurship with those who never had contact with this reality.

5. Theoretical and practical implications

This study makes a contribution to the literature by examining the contributions for business creation based on entrepreneurial potential in higher education polytechnic students. To our knowledge, these relations have not been previously empirically investigated in a holistic form in Portugal, even though there have been studies concerning the relationship between the referred constructs.

Our findings provide guidance for managers and teachers of higher education polytechnic institutions to adapt entrepreneurship' curricular unit program, teaching methodologies and assessment to students' needs for business creation, this will allow for the training and qualifications of entrepreneurs that are better able to respond to emerging social challenges. Additionally, it will contribute to the training of a more entrepreneurial society and less social asymmetries.

References

Ali, A., Topping K. J. and Tariq, R. H. (2011). "Entrepreneurial Attitudes among Potential Entrepreneurs". *Pak. J. Commer. Soc. Sci.*, Vol 5 No 1, 12-46.

Ajzen, I. (1987). "Attitudes, traits, and actions: Dispositional prediction of behaviour in social psychology", In L. Berkowitz (Ed.). *Advances in experimental social psychology* Vol. 20, 1-63 Academic Press, New York.

Ajzen, I. (1991). "Theory of planned behaviour". *Organizational Behavior and Human Decision Processes*, Vol. 50, 179–211.

Ajzen, I. and Fishbein, M. (1980). *Understanding attitudes & predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

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

Barbosa, S. D., Gerhardt, M. W. and Kickul, J. R. (2007). "The Role of Cognitive Style and Risk Preference on Entrepreneurial Self-Efficacy and Entrepreneurial Intentions". *Journal of Leadership e Organizational Studies*, Vol. 13 No 4, 86–104.

Baron, R. A. (2000), "Psychological perspectives on entrepreneurship: cognitive and social factors in entrepreneurs' success". *Current Directions in Psychological Science*. Vol. 9 No 1, 15-18.

Baum, J. R., Locke, E. A. and Smith, K. G. (2001). "A Multidimensional Model of Venture Growth", *Academy of Management Journal*. Vol. 44 No 2, 292-303.

Bird, B. (1989). *Entrepreneurial behaviour*, Glenview, IL: Scott Foresman & Company.

Bechard, J. P. and Toulouse, J. M. (1998). "Validation of a didactic model for the analysis of training objectives in entrepreneurship". *Journal of Business Venturing*, Vol. 13 No 4, 317-332.

Brännback, M., Krueger, N., Carsrud, A. and Elfving, J. (2007). "'Trying' to be an entrepreneur? A 'goal-specific' challenge to the intentions model". *Paper presented at the Babson Collegiate Entrepreneurship Research Conference*, June, Madrid.

Bryman, A. and Cramer, D (2005). *Quantitative Data Analysis with SPSS 12 and 13: A Guide for Social Scientists*. London: Routledge.

Carsrud, A., Krueger, N., Brännback, M., Kickul, J. and Elfving, J. (2007). "The Family Business Pipeline: Where Norms and Modeling Make a Difference", *Paper presented at Academy of Management Conference*, 2007.

Correia Santos, S., Caetano, A., Curral, L. and Spagnoli, P. (2010). "How to assess the entrepreneurial potential?" *International Council for Small Business 2010: Entrepreneurship: Bridging Global Boundaries*, Cincinnati, Ohio.

Courneya, K. S., Conner, M. and Rhodes, R. E. (2006). "Effects of different measurement scales on the variability and predictive validity of the 'two-component' model of the theory of planned behaviour in the exercise domain". *Psychology & Health*, Vol. 21 No 5, 557-570.

Díaz, J. C., Hernández, R. and Barata, M. L. (2007). “Estudiantes universitarios y creación de empresas. Un análisis comparativo entre España y Portugal”. *Conocimiento, Innovación y Emprendedores: Camino al Futuro*, pp. 1338–1355.

Dionco-Adetayo, E. A. (2006). “Factors influencing attitude of youth towards entrepreneurship”. *International Journal of Adolescence and Youth*, Vol. 13 No 1-2, 12-145.

Dohse, D. and Walter, S. G. (2010). “The Role of Entrepreneurship Education and Regional Context in Forming Entrepreneurial Intentions”. Document de treball de l’IEB 2010/18, Institut D’Economia de Barcelona.

Duygu, T. and Selcuk, S. (2009). “Which factors affect entrepreneurial intention of universities students?”. *Journal of European Industrial Training*, Vol. 33 No 2, 142-159.

Garmendia, J. R. and Castellanos, A. M. (2012). “Tipología de las spin-offs en un context universitario: una propuesta de clasificación”. *Cuadernos de Gestión*, Vol. 12 No 1, 39-57.

Fishbein, M. and Ajzen I. (1975). *Belief, attitude, intention & behaviour: An introduction to theory & research*. MA: Addison-Wesley: Reading.

Ismail, M., Khalid, S. A., Othman, M., Jusoff, H. K., Rahman, N. A., Kassim, K. M. and Zain, R. S. (2009). “Entrepreneurial Intention among Malaysian Undergraduates”. *International Journal of Business and Management*, Vol. 4 No 10, 54-60.

Luthje, C. and Franke, N. (2003). “The making of an entrepreneur: testing a model of entrepreneurial intention among engineering students at MIT”. *R&D Management*, Vol. 33 No 2, 135-147.

Katz, J. (1992). “A Psychological Cognitive Model of Employment Status Choice”. *Entrepreneurship Theory and Practice*, Fall, pp. 29-37.

Krueger, N. (1993). “The impact of prior entrepreneurial exposure on perceptions of new venture feasibility & desirability”. *Entrepreneurship Theory & Practice*, Vol. 18 No 1, 521-530.

Krueger, N. and Carsrud, A. (1993). “Entrepreneurial intentions: Applying the theory of planned behaviour”. *Entrepreneurship and Regional Development*, Vol. 5, 315–330.

Krueger, N. and Brazeal, D. (1994). “Entrepreneurial Potential and Potential Entrepreneurs”. *Entrepreneurship: Theory and Practice*, Vol. 18 No 3, 91-104.

Krueger, N. and Dickson, P. (1994). “How believing in ourselves increases risk taking: Self-efficacy and perceptions of opportunity and threat”. *Decision Sciences*, Vol. 25, 385–400.

Krueger, N., Reilly, M. and Carsrud, A. (2000). “Competing models of entrepreneurial intentions”. *Journal of Business Venturing*, Vol. 15 No 5/6, 411-532.

Marvel, M. R. and Lumpkin, G. T. (2007). “Entrepreneurs Human Capital and its Effects on Innovation Radicalness”. *Entrepreneurship: Theory and Practice*, Vol. 31 No 6, 807-828.

Parker, S. C. and Van Praag, C. M. (2006). “Schooling, capital constraints and entrepreneurial performance: The endogenous triangle”. *Journal of Business and Economics Statistics*, Vol 24 No 4, pp. 416-431.

Pestana, M. H. and Gageiro, J. N. (2010). *Análise de dados para ciências sociais: a complementaridade do SPSS*, 5a ed., Edições Sílabo, Lisboa.

Romaní, G., Didonet, S., Contuliano, S.-H. and Portilla, R. (2013). “Propensity of University Students in the Region of Antofagasta, Chile to Create Enterprise”. *Journal of Education for Business*, Vol. 88 N.o 5, pp. 253-264.

Scherer, R., Adams, J., Carley, S. and Wiebe, F. (1989). “Role model performance effects on development of entrepreneurial career preference”. *Entrepreneurship Theory & Practice*, Vol. 13, 53–81.

Scherer, R., Brodzinsky, J. and Wiebe, F. (1991). “Examining the Relationship between Personality and Entrepreneurial Career Preference”. *Entrepreneurship and Regional Development*, Vol. 2, 95-206.

Sethi, J. (2008). “Entrepreneur and Entrepreneurship (lecture materials - lesson-1)”, *Course in Entrepreneurship and Small Business Management*, University of Delhi, B.A. Programme.

Shapero, A. (1982). “Social dimensions of entrepreneurship”, In C. Kent, D. Sexton, and K. Vesper (eds.), *The encyclopedia of entrepreneurship*, pp. 72-90. Englewood Cliffs, NY: Prentice Hall.

Turker, D. and Selcuk, S. S. (2009). “Which factors affect entrepreneurial intention of university students?”. *Journal of European Industrial Training*, Vol. 33 No 2, 142-159.

Vesper, K. H. (1990). *New Venture Strategies*. Englewood Cliffs, NY: Prentice-Hall.

Vesper, K. H. and McMullan, W. E. (1988). “Entrepreneurship: Today courses, tomorrow degrees?”. *Entrepreneurship Theory & Practice*, Vol. 13 No 1, 7-13.

Wang, C. K., & Wong, P. K. (2004). “Entrepreneurial interest of university students in Singapore”. *Technovation*, Vol. 24 No 2, 163-72.