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Entrepreneurial intention and Personality Traits: an exploratory study

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Entrepreneurial intention and Personality Traits: an exploratory study

Abstract:

In this paper we investigate how individual characteristics and personality traits affect the entrepreneurial intentions among graduate students of science and technology. We conduct our exercise using individual data provided by the survey with 336 second year master students at a portuguese-speaking University, Universidade Nova de Lisboa, in 2019. A broad range of personality scales were categorized in a set of constructs using the Five Factor model of personality dimensions which were combined with student´s individual characteristics. The results show that extraversion (ρ=0,199), consciousness (ρ=0,151) and openness to experience (ρ=0,114) are positively correlated with entrepreneurial intent and significant. As expected, emotional stability and agreeableness have positive and negative correlations with entrepreneurial intent respectively but are not statistically significant. In terms of individual characteristics, gender is negatively correlated with entrepreneurial intent (ρ= - 0,121) and significant which means that women have lower entrepreneurial intent than men. Income is positively correlated with entrepreneurial intent (ρ=0,143), and also significant. These results suggest that personality traits play a role in entrepreneurial intentions and facilitating access to specific business skills is the most powerful instruments to increase entrepreneurial intent.

Keywords: entrepreneurial intention, personality traits, graduate students

1. Introduction

Entrepreneurship is not a function or an outcome of simple efforts. It requires a regular and permanent attitude as part of an entrepreneur´s personality. A growing literature has shown the interest of studying the role of personality traits and entrepreneurship[1].

Brockhaus & Horwitz (1986) and Gartner (1988) have concluded that there was no relationship between personality traits and entrepreneurship. However, more recently, some authors have concluded the opposite (Ahmed et al. 2010; Stewart and Roth, 2001 and 2004; Rauch and Frese, 2007a and 2007b; Collins, Hanges, and Locke 2004; and Stewart and Roth 2007). Several recent meta-analyses have shown that entrepreneurs do differ from other groups (e.g., managers) in terms of a broad range of personality. For example, Stewart and Roth (2001, 2004) found entrepreneurs to be significantly higher in risk propensity than managers, and Collins, Hanges, and Locke (2004) and Stewart and Roth (2007) found entrepreneurs to be significantly higher on achievement motivation. Zhao et al. (2005) and Zhao and Seibert (2006) used a Five Factor model (FFM) of personality to categorize differences in the range of scale and using meta-analysis showed that entrepreneurs are higher on conscientiousness, emotional stability, and openness to experience and are lower on agreeableness than non-entrepreneurs managers. Although these meta-analytic studies provide evidence that entrepreneurs differ from managers in terms of personality, there is still limited theoretical understanding of the processes through which these group differences in personality emerge (Rauch & Frese, 2007a 2007b).

There is a growing concern about fostering entrepreneurial skills among students in Portugal as entrepreneurship by opportunity due to innovations promotes country growth and development. Thus, the aim of this research is to deepen our understanding of how personality traits and individual characteristics influence entrepreneurial intent, which is the beginning of the entrepreneurial process, for science and technology graduate students The intention to become an

[1] There is no agreed to definition of entrepreneur. See Branco et al. (2008).

entrepreneur is widely seen as the first critical step in the process of becoming an entrepreneur.

The current research makes three important contributions to the literature and moreover, it can give some lights on how to foster entrepreneurial intent. First, this study deepen our theoretical understanding of the processes that personality differences and demographic individual characteristics may help distinguish the ones that want to be entrepreneurs from the ones that do not have entrepreneurial intent. Consistent with recent models of entrepreneurship (e.g., Zhao et. al 2010; Baron, 2007; Venkataraman, 1997), our analyses promise to provide a better and more specific comprehensive assessment of the effects of personality on entrepreneurial intentions controlling for differences in education. Second, it will be possible to see if graduate students in engineering and science who are future inventors of new technologies have different entrepreneurial intentions among them and, according to the relation with certain personality traits, it can give some clues on how to foster entrepreneurial intent in an academic environment. And third, it also analysis if gender matters in entrepreneurial intent.

This study may help promote entrepreneurship in an efficient way without wasting efforts and financial resources.

2. Literature Review

Individual entrepreneurial intent is a key variable in research on new business formation. However, neither a consistent definition nor a reliable way to measure entrepreneurial intent is found in the literature.

Thompson (2009) distinguishes individual entrepreneurial intent from desire to be self-employed, considering that entrepreneurial intent is a self-acknowledged conviction by a person that they will set up a new business venture and consciously plan to do so in the future but this measure of entrepreneurial intent may be affected by perceptions of contextual variables as barriers to be an entrepreneur.

In this paper we measure entrepreneurship intentions as if they respond yes or no to whether or not they have ever thought of starting a business (as in Raijman 2001, Lee and Wong, 2004 and Lee et al. 2004). Krueger et al. (2000) consider the probability that you'll start your own business in the next 5 years as a measure of entrepreneurship intentions. The key point is to determine at what stage does someone with entrepreneurial intent become a nascent entrepreneur. The individual entrepreneurial intent lies on a continuum from who merely have entrepreneurial dispositions at one end and those who are taking concrete actions to possibly set up a new firm, with these latter being called nascent entrepreneurs in datasets like PSED and GEM.

Entrepreneurship Intent and Personality Traits

The Big Five personality traits model or grouping of personality traits was developed from the 1980s onward in psychological trait theory and identified five factors labels typically referred as extraversion (outgoing/energetic vs. solitary/reserved), agreeableness (friendly/compassionate vs. critical/rational), conscientiousness (efficient/organized vs. extravagant/careless), emotional stability (sensitive/nervous vs. resilient/confident) and openness to experience (inventive/curious vs. consistent/cautious) as in Matthews et al (2003). When applied to a survey, it reveals some associations as for example someone described as conscientious is more likely to be described as "always prepared" rather than "messy".

Personality traits may influence entrepreneurship intent either directly as well as through gender characteristics. Kerr et al. (2017) in their review of the literature of personality traits like the Big-5 model shows common results and many points of disagreement, reflective of the heterogeneous nature of entrepreneurship.

Luthje and Franke (2003) discusses the causes of entrepreneurial intent among engineering students. The survey of 512 students at the MIT School of Engineering confirms that personality traits which were basically risk-taking propensity and internal locus of control (conscientiousness), have a strong impact on the attitude towards self-employment. Also, the entrepreneurial intent is directly affected by the entrepreneurship-related context: if the student

perceives serious barriers for starting a company, the weaker are their individual´s intention to become self-employed. On the other hand, the more favorable a student perceives the supporting context to start up a new business the stronger is the individual entrepreneurship intent.

Ahmed et al. (2010) studies the impact of personality traits towards innovation, demographic characteristics and entrepreneurship education on entrepreneurial intentions of 276 business graduate students from five major universities in Pakistan. Out of the respondents 195 (66%) were male students and 81 (34%) female students with an average age of 22 years. Results show that demographical characteristics such as gender and age were insignificant related with the intentions to become entrepreneurs, but prior experience, family exposure to business and personality traits towards innovation is positively related toward the intent of students to become entrepreneur.

Extraversion

Extraversion is marked by pronounced engagement with the external world. A high score means a person that enjoys interacting with people and are often perceived as full of energy. They tend to be enthusiastic, optimistic, action oriented individuals. They possess high group visibility, like to talk, and are friendly. Extroverted people may appear more dominant in social settings, as opposed to introverted people. Low scores in extraversion mean people that have lower social engagement and energy levels. They tend to seem quiet, low-key, deliberate, and less involved in the social world. Introverts need less stimulation, and more time alone than extraverts. This does not mean that they are unfriendly or antisocial; rather, they are reserved in social situations. Engagement with external world, assertiveness, high activity level, optimism are traits that have been associated with entrepreneurs (Zhao et al., 2010; Baron, 1999; Locke, 2000). Zhao et. al considered the extraversion personality dimension as associated with a leadership role as its components such as assertiveness, sociability and energy is related to people´s perception of leaders. Entrepreneurs need to have a leadership role in their new venture and so a first hypothesis can be formulated as:

Hypothesis 1: Extraversion is positively related to entrepreneurship intent.

Agreeableness

Agreeableness refers to a person who is altruistic, has a general concern for social harmony, individuals that value getting along with others. A high score means a person who is kind, generous, trustworthy, helpful, and willing to compromise their interests with others. A low score means a stubborn person who find difficult to forgive mistakes, self-centered and with less compassion for others. Singh and DeNoble (2003) argue that entrepreneurs that are profit oriented also have their business to fulfill their needs and interests fighting for their business in detriment of the well-being of their employees. Thus, the agreeableness personality dimension and attributes related to altruistic behavior are probably not present in entrepreneurs. A second hypothesis can be formulated as:

Hypothesis 2: Agreeableness is negatively related to entrepreneurship intent.

Conscientiousness

Conscientiousness is a personality dimension that describes a person´s self-discipline, organization, work motivation, individual´s level of achievement, virtue and responsibility towards others (Costa and McCrae, 1992; Roberts et al., 2005: Zhao et al., 2010). A high score on conscientiousness means a preference for higher levels of achievement and individuals who prefer planned rather than spontaneous work situations. According to McClelland´s (1961) high achievement motivation means individuals that are attracted to work situations in which they have personal control over the results and are moderate risk averse. A low score means individuals that are less organized, complete tasks in a less structured way and are impulsive. McClleland assumed that a preference for higher levels of achievement is positively related to entrepreneurship as entrepreneurs have more often this personality trait. Zhao et al. (2010) surmised that other traits related to consciousness such as motivation, work goal orientation, hard work and perseverance are also associated with entrepreneurial

work. Based on the observation that individuals tend to prefer roles that match their personality a third hypothesis was formulated:

Hypothesis 3: Conscientiousness is positively related to entrepreneurship intent

Emotional Stability

Emotional stability means a confident person. A high score means more resilience, a person that find it easy to keep calm under stress, that is more optimistic, worry less and has a more stable mood. They tend to me less risk averse. A low score describes a tendency to have unsettling thoughts and feelings, a person who get easily stressed, is more vulnerable and insecure and have mood swings. According to Baron (1999), Locke (2000) and Zhao (2010) entrepreneurs are perceived as confident, capable of facing pressure, stress and uncertainty. Entrepreneurs need to deal with uncertainty having to face the risk of failure of the new venture. Pressures in terms of workload, responsibility, decision making with sometimes limited information which may have economic consequences for the new venture requires emotional stability. Thus, a fourth hypothesis is formulated:

Hypothesis 4: Emotional Stability is positively related to entrepreneurship intent.

Openness to Experience

Openness to experience or intellect refers to a person who appreciates emotion, adventure, unusual ideas (innovation), imagination, curiosity, and variety of experience. They tend to be more creative and hold unconventional beliefs. A high score means more creative people that hold unconventional beliefs, who enjoys trying new things, have a good imagination and is willing to consider new ideas, new methods for solving things. Being open to new ideas help to adjust easily to changes. A low score in openness means a person who prefers to do things in a familiar way, avoid change, are more traditional in the way they think. Entrepreneurs need to be creative and innovative, they tend to think in an unconventional way as in Locke (2000). Thus, a fourth

hypothesis can be tested considering that entrepreneurs are open to new experiences:

Hypothesis 5: Openness to Experience is positively related to entrepreneurship intent.

Entrepreneurship Intent and Individual Characteristics

Gender

The literature on entrepreneurship has uncovered differences in the rate of entrepreneurship between men and women, with women generally displaying lower entrepreneurial activity than men (Ardagna and Lusardi (2008) ; Djankov et al. (2006)). There is a vast literature that discusses the difficulties women face in starting a business compared to their male counter parts. Particularly, they have more difficulties in financing their venture (Fay & Williams, 1993, Becker-Blease & Sohl, 2007), have lower skills as education and work experience (Boden & Nucci, 2000) and also network. Cromie (1987) finds that both genders do have a variety of reasons for founding a business, primarily autonomy, achievement, a desire for job satisfaction and other non-economic rewards. The desire to make money, also present, is less important for women, who often choose entrepreneurship as a result of career dissatisfaction and as a means of meeting simultaneously their own career needs and the needs of their children.

As a result, women entrepreneurs are less in number and also face slower rate of growth, low profits, and low sales (Brush et al.2006; Welter et al.2006).

The research also supports the generally held perception that to be an entrepreneur is a purely masculine characteristic of the members of society (Ahl, 2006; Lewis, 2006).

Perception and expectations – such as the degree of self-confidence and the fear of failure are pointed as the reason for gender differences in business creation between males and females. Along this line, entrepreneurs are fundamentally seen as individuals who are more likely than others to be alert to the existence of and keen to take advantage of profit opportunities, as

espoused in Venkataraman (1997). The attitude toward entrepreneurship reflects subjective perceptions rather than the objective context such as individual differences in socio-economic conditions, work status, and educational level. For instance, Minniti and Nardone (2007) use bootstrap methods and data from Global Entrepreneurship Monitor (GEM) for 2002 to conclude that self-confidence, fear of failure and expectations of new of business opportunities are the main factors explaining gender differences in entrepreneurial activity. Nierdele (2008) reinforces this argument showing that for a given ability women and men seem to react differently when given a choice to enter demanding tasks. Women would tend to avoid challenges relative to their male counterparts, which may be due to self-confidence or different attitudes toward risk.

Other authors explains gender differences in entrepreneurship rates due to differences in social, economic, cultural and contextual differences including differences in human and social capital – as in Greene (2000) -, differences in socio economic conditions – Lefkowitz (1994) -, the fact that women are more likely than men to shoulder family-related obligations, especially child rearing – Boden & Nucci (2000). Other authors suggest that both individual characteristics and personal perceptions and expectations matter to explain differences in entrepreneurship rate across gender. For instance, Djankov et al. (2005) run over 2,000 interviews in Russia and find evidence that perceptions of the local institutional environment, social network effects, and individual characteristics as gender are all important determinants of entrepreneurial behavior.

Based on those arguments we propose to a second hypothesis:

Hypothesis 6. *Gender differences may influence entrepreneurial intent*

Income

A vast literature studies the impact of wealth and the probability of starting a business (Evans and Jovanovic (1989), Evans and Leighton, (1989), Blanchflower and Oswald, (1998)).

In this paper we will not be able to access the impact of age, education, skills and institutions on entrepreneurship intent due to the sample homogeneity we are working with (second year science and technology master students studying at same university in Portugal). However, we are able to test an eight hypothesis:

Hipothesis 7. *Income may influence entrepreneurial intents*

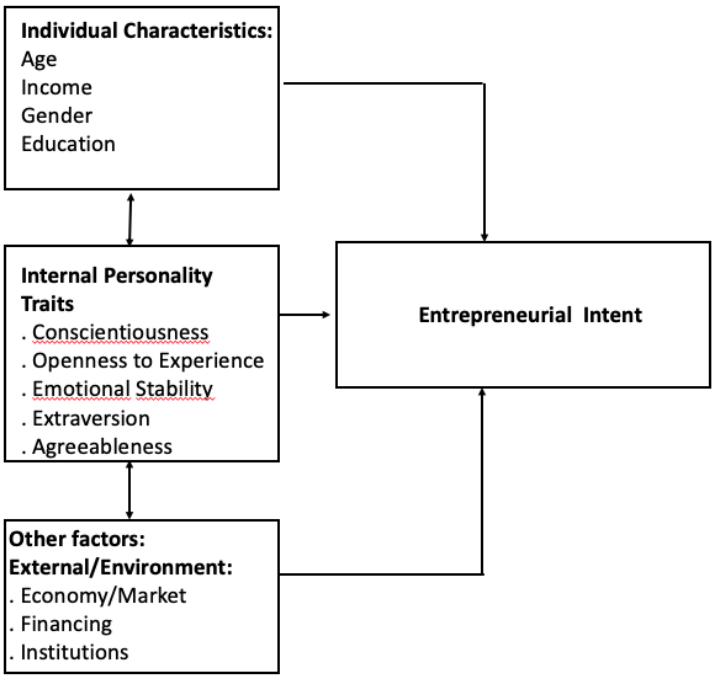
3. Factors which Impact Students' Entrepreneurial Intentions: A conceptual model

Based upon the existing literature, the model integrates individual characteristics and personality traits. Other environmental factors like country´s institutions (political stability, rule of law, among others), economic growth, employment opportunities and financing opportunities (venture capital and bank loans) are recognized in the theoretical model as having an impact on entrepreneurial intent[2]. Universities can also play a role by increasing motivation and competence of their graduates to become key persons in innovative and entrepreneurial activity as in Rasmussen and Sørheim (2006). Also, Aguinis et al. (2008) provide evidence in support of social power as a distinguishing individual characteristic of successful entrepreneurs which can be stimulated in universities and might influence entrepreneurial intent.

However, in this study it is not possible to address the impact of environmental factors as but the advantage of working with a cross-section of graduate students based on a single country is the homogeneity of the sample relatively to environmental factors. Environmental factors affect entrepreneurship rate (Ardagna and Lusardi, 2010). Country characteristics likely to be associated with country income and that have been exploited in the literature as determinants of the rates of business creation (Ardagna and Lusardi, 2010). Individual characteristics as age and education also have been

[2] In this paper the data used is a cross-section of graduate STEM students in a single university in Portugal. Thus it is not possible to study the impact of the environmental factors in entrepreneurial intentions.

reported in the literature as affecting entrepreneurship rates. Education may foster entrepreneurial intent. Autio et al. (1997) survey of technology students from four different countries shows that the university environment and the image of successful entrepreneurs influences entrepreneurial intent among university students. Franke, N. & Luthje, (2004) compare entrepreneurial intentions of business and economics students at two German-speaking universities (the Vienna University of Economics and Business Administration and the University of Munich) with the corresponding results for a leading institution in this field: Massachusetts Institute of Technology (MIT) and find that the lower level of entrepreneurship intentions among students in Munich and Vienna may be attributed to their less distinctive entrepreneurship education. Dyer (1994) and Krueger and Brazeal (1994) also has suggested that entrepreneurship education foster business creation. However, given the sample homogeneity in terms of education (second year graduate students) and age (from 20 to 22 years old) this research will not address the effect of these two variables on entrepreneurship intention.



4. Data

In this section we present the individual data we collected on entrepreneurial intentions and personality traits among 336 graduate students of science and technology at Nova School of Science and Technology, Universidade Nova de Lisboa, Portugal, in January and February 2019. There is a sample homogeneity in terms of context given that all of the students are Portuguese, a developed European country, and the data is a cross-section. In terms of age the range is from 20 to 22 years old, with an average age of education as all of the students are second year master students and the areas of science and technology.

Portugal is considered a moderate innovator compared to other EU countries (European Innovation Scoreboard, 2019) but it´s performance has increased since 2011 due to a favourable entrepreneurial ecosystem. Start-up creation has been responsible for about 20% of new jobs per year in Portugal and has been very effective in attracting foreign direct investment (Peixoto, 2017).
Thus, we have a single testing ground for the study of the influence of individual characteristics, personality traits and gender in entrepreneurial intentions among STEM students in a developed European country.

5. Results

A study interested in assessing how personality traits affect entrepreneurial intentions would like a data set that covers the widest number of graduate students that have the same age and education but differing in terms of gender, income and personality traits in a single country. The homogeneity in the sample in terms of certain attributes could play in favour of studying the effect of personality traits on entrepreneurial intent.
The results obtained are presented in tables 2 and 3 . In table 2 extraversion (R=0,199), consciousness (R=0,151) and openness to experience (R=0,114) are positively correlated with entrepreneurial intent and significant. As

expected, emotional stability and agreeableness have positive and negative correlations with entrepreneurial intent respectively but are not statistically significant. In terms of individual characteristics, gender is negatively correlated with entrepreneurial intent (R= - 0,121) and significant which means that women have lower entrepreneurial intent than men. Income is positively correlated with entrepreneurial intent (R=0,143), and also significant. In terms of the correlations and significance table 3 shows the same results. These results suggest that personality traits, as well as gender and income, play a role in entrepreneurial intentions. Regarding personality traits, entrepreneurship education as well as facilitating access to specific business skills are the most powerful instruments to increase entrepreneurial intent.

5. Conclusions

This paper examines the entrepreneurial intention of engineers (technology and science) graduate students and relates them to individual characteristics and personality traits. Extraversion, consciousness and openness to experience have a positive and significant impact on the likelihood of one wanting to become an entrepreneur. Women has lower entrepreneurial intent and income is positively associated with business creation intentions. This is consistent with previous literature results (Stewart and Roth, 2001; Collins et al., 2004; Zhao and Seibert, 2006 and Zhao et al. 2010). Personality traits as extraversion, consciousness and openness to experience being related to entrepreneurial intent can be developed and fostered by entrepreneurial education which might impact in having a rise in entrepreneurial skills and entrepreneurship by opportunity, which due to innovations promotes country growth and development. The differences in male and female entrepreneurial intentions also have policy implications: imparting the specific business skills associated with entrepreneurship may be the most potent levers to increase female and total entrepreneurship across countries. This is an exploratory survey with limitations. Further research is needed to narrow the list of items

through standard validity and reliability criterion as well as the survey should be done across other European countries and outside Europe.

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Appendix
VARIABLE DEFINITON

This dataset comes from a survey to ….. graduate students of technology at Faculdade de Ciências e Technologia, Universidade Nova de Lisboa done during January and February 2019.

EI = 1 if students have answered yes they would like to open a business when they finish their course. Source: survey to STEM students at Universidade Nova de Lisboa, Portugal, 2019.

The TEI rate is calculated dividing the number of students that have answered yes they would like to open a business when they finish their course to the total number of students in the sample.

LOW INCOME= 1 students who report that their family net income is below 20000 euros per year at the time of the survy. Source: survey to STEM students at Universidade Nova de Lisboa, Portugal, 2019.

MID INCOME =1 students who report that their family net income is between 20 000 and 40 000 euros per year at the time of the survey. Source: survey to STEM students at Universidade Nova de Lisboa, Portugal, 2019.

UP INCOME = 1 students who report that their family net income is above 40 000 euros per year at the time of the survey. Source: survey to STEM students at Universidade Nova de Lisboa, Portugal, 2019.

EXTRAVERSION, AGRREABLENESS, CONSCIENTIOUSNESS, EMOTIONAL STABILITY and INTELLECT IMAGINATION = variables constructed according to Five Factor model of personality dimensions.

Table 1: Summary Statistics

Course	N.obs	EI	Gender (FEM=1)	Age (MEAN)	Income (MEAN)	Extraversion (MEAN)	Agreeablness (MEAN)	Conscientiousness (MEAN)	Emotional Stability (MEAN)	Openness to Experience (MEAN)
Informatics Engineering	46	0,4	0,2	21,3	1,8	23,7	29,1	27,9	22,1	28,6
Food Tech. and Safety	12	0,2	0,6	21,7	1,4	26,0	28,9	28,4	21,8	28,5
Biotechnology	10	0,2	0,9	21,1	2,0	23,8	28,8	28,4	21,2	30,3
Molecular Gen. and Biomed.	14	0,2	0,7	21,1	1,6	25,2	30,4	29,9	21,8	30,6
Environmental Engineering	25	0,3	0,6	21,7	1,6	25,0	27,8	28,4	21,7	28,4
Mechanical Engineering	22	0,5	0,2	21,1	1,8	27,6	29,2	29,9	22,5	30,2
Physics Engineering	7	0,3	0,3	21,4	2,0	24,1	28,0	28,0	22,9	29,9
Chemical and Bioch.Engineering	23	0,3	0,7	21,3	1,8	24,3	30,0	29,6	22,1	29,9
Electrial and Computer Eng.	51	0,4	0,3	21,4	1,9	25,4	28,5	28,1	22,8	28,8
Micro and Nanotech. Eng.	22	0,1	0,4	21,5	1,5	26,5	30,0	29,0	21,7	30,0
Industrial Eng. and Managem.	18	0,3	0,6	21,4	1,8	26,6	30,3	29,6	22,8	30,1
Biomedical Eng.	24	0,1	0,6	21,4	1,7	26,4	29,4	27,9	21,5	30,4
Bioorganic Chemistry	8	0,1	0,5	21,1	2,0	23,3	29,1	28,4	21,6	28,5
Biochemistry	9	0,1	0,8	21,0	1,5	23,6	29,6	28,1	20,9	28,7
Civil Engineering	6	0,7	0,5	22,0	1,8	26,7	28,5	27,8	22,0	27,8
Agro-industrial production	5	0,6	0,6	21,5	1,2	25,4	28,6	31,0	21,2	31,0
Engineering of Big Data	5	0,4	0,2	22,0	1,3	28,0	29,0	28,8	23,8	27,0
Other	28	0,1	0,5	21,0	1,9	23,7	28,9	29,2	22,6	29,5
All Sample	336	0,29	0,44	21,34	1,74	25	29	29	22	29

Table 2: Entrepreneurial Intent (EI) Pearson Correlations

	EI (ρ)	Sig. (2-tailed)
Gender	-0,121*	0,027
Income	0,143*	0,016
Extraversion	0,199**	0,000
Agreeableness	-0,026	0,637
Consciousness	0,151**	0,005
Emotional Stability	0,037	0,496
Openess to Experience/Intellect	0,114*	0,036
N.obs.	336	336

** Correlation is significant at the 0,01 level (2-tailed)

* Correlation is significant at the 0,05 level (2-tailed)

Table 3: Entrepreneurial Intent (EI) Spearman´s rho Correlations

	EI (ρ)	Sig. (2-tailed)
Gender	-0,121*	0,027
Income	0,133*	0,026
Extraversion	0,176**	0,001
Agreeableness	-0,051	0,347
Consciousness	0,125*	0,022
Emotional Stability	0,040	0,466
Openess to Experience/Intellect	0,151**	0,006
N.obs.	336	336

** Correlation is significant at the 0,01 level (2-tailed)

* Correlation is significant at the 0,05 level (2-tailed)