

Influence of Propensity to Risk in the Entrepreneurial Intention of Engineering Students

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Abstract—Among the factors that prevent a student from having an entrepreneurial intention is the capacity and competencies that he or she can develop throughout his or her life. Therefore, universities can be seen as a solution to this constraint, through the quality programs that they can offer, which increase their skills related to entrepreneurial intention. Against this background, in this paper the level of risk tolerance in undergraduate engineering students by age or semester is examined, which may show that individuals accept greater risks. We propose an exploratory study and transversal and field design, where a questionnaire is self-administered to 365 university students active in engineering programs, which allows analyzing the determinants of this propensity by selecting the company α , which is an option with lower risk and moderate return on capital, and the company β with higher risk and return on capital than α . The results show that there is no evidence that the propensity to risk is related to any age class and semester level.

Index Terms—Entrepreneurship intention, university education, risk tolerance.

I. INTRODUCTION

Innovation capacity through the creation of new businesses and new business areas are seen as key to achieving the economic objectives of the company, the region and the nation, [1]. Often, in the different studies of entrepreneurship, the applicability of the models is highlighted and implications of them in research, education, public policy and business planning are presented [2].

A limiting factor for the economic development potential that entrepreneurship has is the availability of competent people to manage projects and become entrepreneurs. Universities can answer to this need by increasing motivation and competence of their graduates, forming people with a key role in the innovative and entrepreneurial activity [1].

In recent decades, the resulted system from the dynamic relationships between the areas of knowledge of academia, industry and government, has been formed as a result of a transition process of knowledge production, because universities have increasingly been taking an active role in economic and social development. It has been described as the model of "Triple Helix", which emphasizes the continuous

transformations and non-synchronized activities that cover the three groups of actors, and a greater role for universities, [2]-[4] Since the approach to the application of science is a key feature, with an opening to the production of knowledge through transdisciplinarity and collaboration with various stakeholders actively involved in research, [5], [6].

Currently, no one can deny that innovation is a key feature of an economy that aims to establish itself in the long time. The role of universities goes from being a mere agent that provides human capital with a certain level of training and generating new knowledge through research, to be an active subject of the mechanism, contributing to the development of its activity in the territory where is located, [7], [8].

A limiting factor for the economic development potential that entrepreneurship has is the availability of competent people to manage projects and become entrepreneurs. Universities can answer to this need by increasing motivation and competence of their graduates, forming people with a key role in the innovative and entrepreneurial activity, [9], [10].

It is then at this point becomes important when one of the questions that had the most relevance for researchers of entrepreneurship education in recent decades: Is it possible to educate people to become entrepreneurs? [9], [11].

Numerous individual reports on successful programs of educational institutions, often measured by the number of operating companies, have resulted in a significant increase in expectations. Quality education enables people to have many opportunities to expand their skills, acquire cultural heritage of their society and develop the necessary skills to perform well in their social context [12], [13]. According to these article, found that students who graduate with a major stimulus to entrepreneurship, are more likely to start new businesses and entrepreneurial intentions are stronger than other graduates [14] In this sense, without the freedom to challenge the existing, there are not entrepreneurs, not only in sciences, but also in culture and art fields and especially in business community. For this, education for entrepreneurship should provide students with the concepts and skills needed to recognize opportunities that others have wasted. We also provide these individuals the courage, intuition and knowledge to act where others have hesitated [12]

Entrepreneurship programs can significantly change the entrepreneurship intentions of the participants [14]. So enterprise education programs, in addition to direct effects on entrepreneurship, have the potential to repeat this type of process from the experiences of the participants and their influence on other entrepreneurs with whom they interact during his career, to start new businesses, new business areas in existing companies, by executing most competent business, or to help other entrepreneurs [9].

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The reasons why an entrepreneurial university should consider incorporating innovation and entrepreneurship training in their qualifications are: to sensitize and stimulate entrepreneurship from classrooms, encourage entrepreneurship and innovation culture and train future entrepreneurs in all fields [7]

The flow of candidates, or "innovative future persons", is a great potential and at the same time a responsibility of universities to address the need for a more entrepreneurial work force in general and highly qualified to compete in this area. The universities can meet the needs of innovative potential by increasing motivation and competence of their graduates to become key players in innovative and entrepreneurial activity [15].

Numerous individual reports on successful programs of educational institutions, often measured by the number of operating companies, have resulted in a significant increase in expectations. Quality education enables people to have many opportunities to expand their skills, acquire cultural heritage of their society and develop the necessary skills to perform well in their social context [16]. The objective of this article is to examine the level of risk tolerance of university engineering students from their age or semester.

II. RESEARCH METHODOLOGY

The research proposed in this paper is exploratory - descriptive from a quantitative methodological design using a self-administered questionnaire in order to be clear about different factors that influence the intention and entrepreneurial behaviour.

A study of exploratory type and transversal and field design is proposed. The methodological design is quantitative using a self-administered questionnaire as an instrument for collecting information, which allowed the collection of a sample of 356 university students active in engineering programs. Subsequently, a validation was performed against compliance with the quality criteria and 340 responses were used for the analysis.

The measurement was made with 5-level Likert scale questions, which assessed the level of agreement or disagreement with each questioning (Strongly agree, agree, neither agree or disagree, disagree, strongly disagree).

It was made a descriptive analysis with the contingency tables, so they offer a data distribution when taking into account the different levels, which each variable would have.

III. RESULTS

The propensity or tolerance to risk was measured by selection and the business creation of α company, which is an option with lower risk and with a moderate return of capital, and the β company with higher risk and return of capital than α . The aim was determine what individuals show a greater risk propensity, or in other words, accept greater risks. To analyse the determinants of that propensity, the age and semester influence were analysed. The results are presented below.

TABLE I: RISK PROPENSITY VS. AGE CLASS

Risk propensity	Age class			
	16-20	21-25	> 26	Total
α company	27,42%	29,52%	11,94%	68,87%
β company	12,58%	13,23%	5,32%	31,13%
Total	40,00%	42,74%	17,26%	100,00%

Table I shows that 68.87% of respondents have a moderate risk profile, 29.52% of them are between 21 and 25 years old, followed by 27.42% between 16 and 20 years old, and finally a 11.94% with 26 or more. Regarding to greater risk propensity, 13.23% are between 21 and 25 years old, 12.58% between 16 and 20 years old, and 5.32% are students with 26 and more years old.

According to the exposed above, there are no evidences that risk propensity is related to any age class. Precisely, to verify this information a chi-squared test was made using SPSS software with a significance level of $\alpha = 0.5$, and obtaining p-value of 0.990 with a re-counting 0 boxes less than 5. Since this value has a greater significance with ($p > \alpha$), it was concluded that they are not related.

Table II shows the results of risk propensity obtained according to the semester level. 69.23% of students have a lower risk propensity, 26.92% of them are in advanced semesters, 22.28% are in intermediate semesters and 20.03% are in initial semesters. The students who have chosen β company, those who have a higher risk propensity, 12.82% are in advanced semesters, 10.58% are in intermediated semesters and finalizing with a 7.37% that are in initial semesters.

TABLE II: RISK PROPENSITY VS. SEMESTER LEVEL

Risk propensity	Semester level			
	Initial	Interme diate	Advanced	Total
α company	20,03%	22,28%	26,92%	69,23%
β company	7,37%	10,58%	12,82%	30,77%
Total	27,40%	32,85%	39,74%	100,00%

Similar to the age analysis obtained, the risk propensity and the semester level have no relation, so a chi-square test was made and a p-value of 0.43 was obtained. In this way, the semester is not related to the risk propensity at all.

Reference [4] set out that the desire of taking risk came from the psychosocial enterprising profile. However, no variables included in this study measured this profile. In a research, it should be included the measurement and analysis to demonstrate the relation with the analyzed variables in this section.

Contingency Table for Training Level on Business Creation

The categorical variable training level was measured by how they consider the training level in the business creation issue, and the possible answers were: high, medium, low and invalid. The contingency analysis was made with the variables: semester and motivational situation for creating a business.

Table III shows the relation between the entrepreneurship training level and the semester level. The 19.84%, 13.17%, and 13.17% of surveyed students are, respectively, students in advanced, intermediate and initial semester level with a low entrepreneurship training level. That situation is similar with the consideration of a high entrepreneurship training level, with percentages of 2.06%, 2.22% y 1.75% for advanced, intermediate and initial level students, respectively.

TABLE II: ENTREPRENEURSHIP TRAINING LEVEL VS. SEMESTER LEVEL

Entrepreneurship training level	Semester level			
	Initial	Intermediate	Advanced	Total
High	1,75%	2,22%	2,06%	6,03%
Medium	10,16%	15,40%	14,76%	40,32%
Low	13,17%	13,17%	19,84%	46,19%
Invalid	2,38%	1,90%	3,17%	7,46%
Total	27,46%	32,70%	39,84%	100,00%

According to Jack & Anderson, higher education institutions where entrepreneurship is strengthened, it is supposed that advanced students have more training on entrepreneurship than initial students, Jack and Anderson (1999). However, in the case of advance students, most of them have a low training. So, as exposed above, it is observed the need of developing effective programs on entrepreneurship inside the analyzed institutions.

Contingency Tables for Looking for a Job after Graduation

Table IV shows the contingency table between looking for a job after being graduated and age level. The 23.25% of respondents are between 21 and 25 years old and won't look for a job when finishing their studies. However, there are no difference with the 19.59% of respondents who will look for a job when finishing their studies. The students who are between 16 and 20 years old show a 19.90% to not look for a job when there are graduated. Furthermore, persons with 26 years old or more of respondents have no expectations of looking for a job when finishing their studies.

TABLE IV: LOOKING FOR A JOB VS. AGE LEVEL

Looking for a job after being graduated	Age level			
	16-20	21-25	26 or more	Total
Yes	19,90%	19,59%	5,57%	45,06%
No	19,90%	23,25%	11,78%	54,94%
Total	39,81%	42,83%	17,36%	100,00%

According to Guzmán and Santos (2010), the desire of young people to look for a job when finish their studies is influenced by the perception that they have about the job market acceptance of their degrees, and the published statistics that are generated by different countries about unemployment.

Table V shows the contingency table between looking for a job and the risk propensity. From the people who won't look for a job after being graduated, 37.74% would create a α company, in other words, are little risky, while 17.04% would create a β company, so they take more risks.

The people who want to look for a job after being graduated, instead of beginning to be an entrepreneur, they are people who have fewer predispositions to taking risks, so it is expected that they would create a α Company, Guzmán and Santos (2010). The foregoing idea is supported with obtained results, because 31.37% who would look for a job chose the less risky option (α Company type), and only 13.85% chose the most risky option (β Company type).

TABLE V: LOOKING FOR A JOB VS. AGE LEVEL

Looking for a job after being graduated	Risk propensity		
	α company	β company	Total
Yes	31,37%	13,85%	45,06%
No	37,74%	17,04%	54,94%
Total	69,11%	30,89%	100,00%

IV. CONCLUSIONS

By means of the obtained results, it is evident that although a relationship between age and semester level factors is not shown, the percentage of students who chose the company α is approximately 70% in both cases, which shows that this percentage of students have not acquired skills to be able to assume greater risks, as opposed to approximately 30% that possibly they do. Therefore, it is important in future studies analyzing other types of variables that show how these skills have been acquired in the university.

When it was asked to students from different semesters about the intention to continue studying after completing an academic program, the results were not consistent with presented by [17], who explained that people in advanced semesters have greater clarity about the continuation of their education after being graduated; since the respondents, 62.81% of students of intermediate semesters (20.57% to 32.75%) responded that they wish to continue their education after being graduated, compared to 58.34% (23.26% to 39.87%) of students in advanced semesters.

Although there are many limiting factors within entrepreneurial intention such as the propensity to risk, reinforcing or creating educational programs within universities that bring entrepreneurial skills, it will make students understand the value of entrepreneurship as achieving different goals at the personal, business and national levels.

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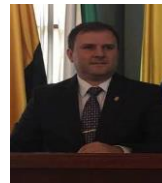
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