

ENTREPRENEURSHIP PROMOTION IN HIGHER EDUCATION INSTITUTIONS

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Abstracts

The importance of entrepreneurship promotion has increased significantly in today's society, especially during periods of crises. This work is based on the responses obtained through a survey conducted on a sample of 305 undergraduates of the University of the Azores, enrolled in different science programs. The aim is to deepen the knowledge of the entrepreneurial propensity of higher education students in the Azores, and in that way the university can stimulate their interest in creating businesses. The main results obtained, using exploratory data analysis (from the univariate to the multivariate), are presented and discussed.

Research paper

Keywords: Entrepreneurship; Higher education institutions; Multiple correspondence analysis; Cluster analysis

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Introduction

Entrepreneurship plays a critical role in the development of the society, as this is the key contributor to innovativeness and product improvement in a competitive economy. It is one of the important ingredients for the creation of new employments, and in the building of communities by way of offering them jobs. That is why entrepreneurship has recently become a very important topic for different academic studies. This corroborates the growing importance of this phenomenon, which is assumed as a catalyst of economic and social development of many regions.

Some studies (Kalantaridis, 2004; Awang *et al.*, 2014; Salamzadeh *et al.*, 2014; Guerrero *et al.*, 2014; & Awang *et al.*, 2016), in the field of entrepreneurship introduced several perspectives on the concepts of entrepreneurship and entrepreneur, demonstrating different perspectives about factors that contribute to the evolvement of the entrepreneur, and that influence entrepreneurial activity, thus, verifying the existence of different explanatory currents of this phenomenon, namely: psychology, which explains the entrepreneurial propensity through the use of motivation and cognitive capacity of individuals; sociology and anthropology, which explain individuals' degree of entrepreneurship according to their surroundings, and economics that explains this reality as a result of existing economic activity.

The idea that an entrepreneur is merely the result of a hereditary factor, or that entrepreneurship is an innate characteristic of some individuals is now being disregarded by the academia, earning place the approach that states that one can learn to be an entrepreneur through the use of different policies learned in school (Rodrigues *et al.*, 2007). Thus, entrepreneurship can be seen as a continuous learning process (Teixeira, 2009).

In Portugal, we assist the growing concern of higher education institutions by implementing actions and programs to promote, among students, the entrepreneurial spirit and mechanisms to provide students with entrepreneurial skills. To assess the results of these initiatives and test their adequacy, some studies have been developed (e.g., Camilo, 2005; Rosário, 2007; Teixeira, 2009) in order to verify the level of entrepreneurial propensity among higher education students, at the national level.

Rosário (2007) in his study of entrepreneurial propensity of Portuguese students in higher education, found that the rate of propensity for entrepreneurship was 26.5%, presenting itself fairly high, compared to some international benchmarks such as Austria, Germany, Norway, and Turkey. According to the studies carried out by Teixeira (2009), Branco (2013) and Sousa *et al.* (2015a), less than 10% of higher education students in Portugal have created new companies, so-called effective entrepreneurship. Revealing also that the students in higher education are unaware of the entrepreneurial process, the obstacles that entrepreneurs may face when trying to bring the business idea to market, but do not have enough knowledge about the creation of firms, and business plans.

The main purpose of this paper is to deepen the knowledge on the entrepreneurial propensity of the higher education students in the Azores archipelago (Portugal), and assess how the University of the Azores can stimulate the interest of their students in creating their own business. It is intended to also list some of the main difficulties reported by students in starting a new business, according to the undergraduate programs' scientific areas. The main conclusions are obtained based on the analysis of data collected from a survey. From the articulation between the Multiple Corre-

spondence Analysis (MCA), and the *k*-means non-hierarchical method we obtained three profiles of students based on some relevant variables. Moreover, from hierarchical clustering methods we obtained a typology of variables linked to initiatives and activities that can be developed by the university.

The paper is organized as follows: the second section is related to entrepreneurship promotion. The third section is devoted to the methodology and the variables used in this study. We present, in the fourth section, the main results obtained with the application of some multivariate statistical methods (e.g., Multiple Correspondence Analysis (MCA), some algorithms of Ascendant Hierarchical Cluster Analysis (AHCA), and the *k*-means non-hierarchical method). Finally, the fifth section contains some concluding remarks about the developed work.

Entrepreneurship Promotion

The purpose of entrepreneurship promotion is to create conditions for small firms and individuals (self-employment) to start their start-up firms, and for social firms to develop their business. Unlike the entrepreneur, the intrapreneur acts within an existing organization (Maier and Zenovia, 2011). Public policy continues to be an important determinant of entrepreneurship development. However, there are other important factors in the context of entrepreneurship promotion, which will be referred to later in this section.

We can also find authors such as Evans and Leighton (1989), De Wit and Van Winden (1991), Van Praag (1996), and Verheul *et al.* (2001), who argue that variables such as personality features, educational level, financial assets, family background and professional experience of individuals, are

important to evaluate the propensity for entrepreneurship. According to Rees and Shah (1986), individuals with higher education tend to perform better, adding that they have more information on market opportunities, and are better prepared to implement them. Other studies also show that past experiences and working in small businesses help young people in the process of learning how to undertake new ventures (Henrique and Cunha, 2008).

The main factors that influence the propensity of students in higher education in Portugal, are mainly the socio-demographic variables (gender, age, country of origin, existence of family entrepreneurial background, parental occupation and family income level); contextual variables (incentives and existing infrastructures); the personality traits (ability to take risks, leadership, creativity, openness to experience and being innovative, practising sports, and being part of associations). Other important factors in this context are the knowledge and entrepreneurial experience, work experience, educational level, and the influence of family and friends (Camilo, 2005; Rosário, 2007; Teixeira, 2009).

Entrepreneurship programs include topics related to the creation and internationalization of companies and intrapreneurship, among others. One cannot just be educated on entrepreneurship, it is also essential to understand risk, uncertainty and autonomy. Mistake and failure should not be excessively penalized, and a learning culture should be stimulated. Entrepreneurship education, and education for risk are related, since an entrepreneur should have the capacity to make risky decisions (Sousa *et al.*, 2015a).

Several authors have emphasized the positive impact of entrepreneurship education on the success of the entrepreneurial intentions (Unger *et al.*, 2011; Zhang *et al.*, 2014; Hussain and Norashidah, 2015). Some empiri-

cal studies show that people who have training in this field can be more successful in identifying opportunities (DeTienne and Chandler, 2004), and more likely to start new businesses and have stronger entrepreneurial intentions, than other graduates (Kolvereid and Moen, 1997). Thus, higher education institutions play an important role, not only in terms of teaching, but also by conducting various activities and initiatives to promote entrepreneurship.

The impact of entrepreneurial education is affected by the type of education the individual is exposed to because it depends on the use of two approaches: a more practical or a more abstract, and theoretical (Cole and Ulrich, 1987). Whenever possible, the activities in class should stimulate creativity, innovation and teamwork in an environment of cooperation. As it is referred to in Sousa *et al.* (2015a), “these activities should enhance the development of soft essential skills to an entrepreneurial and labour market (e.g., autonomy, self-confidence, creativity and sense of responsibility, ability for critical analysis, reasoning, communication and social interaction, ability to identify needs, opportunities and resources, ability to work in a team, to negotiate and build consensus, ability to plan interventions taking into account risks and rewards, initiative, leadership and mobilization of teams, problem-solving ability)”.

In a competitive society, there is an increasing interest in entrepreneurship education recognized by politicians, higher education institutions, students (Küttim *et al.*, 2014), and citizens in general. Seikkula-Leino *et al.* (2010) highlight the role of the development of the teacher's learning, in the context of entrepreneurship education, in terms of reflection, which should be developed in their basic and in-service training. The authors also empha-

size the role of the implementation of changes in the educational context (e.g., curriculum reform), from the perspective of learning and reflection.

Higher education institutions can provide students with the opportunity for networking with entrepreneurs and intrapreneurs, encouraging students to ask them pertinent questions. The contact, sharing of ideas, and experiences in this context can strongly stimulate the capacity for reflection, and learning from mistakes and difficulties, resilience, and a greater awareness of the importance of social responsibility and business ethics (Sousa *et al.*, 2015a). It is also a key factor to encourage an entrepreneurial culture. In this context, some entrepreneurs use networks to get ideas and gather information to recognize entrepreneurial opportunities (Hoang and Antoncic, 2003).

Sample, Methodology and Study Variables

The survey was conducted on a sample of 305 students (36% male and 64% female) of the University of the Azores, enrolled in undergraduate programs in different science areas. Regarding the degree enrolled on by the surveyed students, 90.1% of are on undergraduate programs (UP), compared with 9.6% enrolled on master's programs (MP), and 0.3% on post-graduate studies (PS). The sample used in this study covers individuals from 18 years onward. The majority (70.1%) are aged between 18 and 24 years old, followed by 25 and 30 years old (11.3%). The most representative science areas in the collected sample are Economics and Management, “E-M”, (29.5%) and History and Social Sciences, “H-SS”, (19.9%), followed by Biology/Health Sciences, “B-HS”, (12.6%). The distribution of the respondents by years of attendance are as follows: 1st year (24.5%), 2nd year

(22.1%), 3rd year (52.7%), and 4th year (0.7%). A total of 23.9% of the inquiries are working students (WS), compared to 76.1% who are regular students (RS), as shown in Table 1.

Table 1. Sociodemographic characteristics of the sample

<i>Gender</i>		<i>Academic degree</i>			<i>Age group</i>			<i>Scientific area</i>			
<i>Male</i>	<i>Female</i>	<i>UP</i>	<i>MP</i>	<i>PS</i>	<i>18-24</i>	<i>25-30</i>	<i>>30</i>	<i>E-M</i>	<i>H-SS</i>	<i>B-HS</i>	<i>Other</i>
36.0	64.0	90.1	9.6	0.3	70.1	11.3	18.6	29.5	19.9	12.6	38.0

<i>Years of attendance</i>				<i>Status of the students</i>		<i>Professional experience</i>		
<i>1st</i>	<i>2nd</i>	<i>3rd</i>	<i>4th</i>	<i>WS</i>	<i>RS</i>	<i>No_PE</i>	<i>SPO_PE</i>	<i>Full_time_PE</i>
24.5	22.1	52.7	0.7	23.9	76.1	18.6	52.8	28.6

The questionnaire contains (among other variables) “Gender”, “Age group”, “Scientific area”, “Status of the students”, “Performance of activities in associations/organizations”, “existence of entrepreneurs in the family (“Family entrepreneurs”)", "The most recent professional experience", and “Own business/Entrepreneurial propensity”, and four groups of items (G1, G2, G3, and G4), whose associated statements are presented in Table 2.

Table 2. Statements associated with the items of G1, G2, G3, and G4, and percentage of students in a position of (total or partial) agreement with each statement.

Items of G1: Knowledge at the level of entrepreneurship	%
G1a- “I know the techniques to identify market needs”	17.7
G1b – “I understand the questions in the matter of business opening”	31.3
G1c – “I can create a business plan and a business concept”	27.3
G1d – “I know how to legally fund a new (concept of) business”	23.3
Items of G2: Difficulties involved in the initiation of business	
G2a-“Lack of financial support”	61.5
G2b-“Complexity of the administrative process”	55.0
G2c- “Little information of how to do it”	39.8
G2d- “Lack of skills in management”	35.3
G2e- “Lack of innovative ideas”	30.4
G2f- “Lack of institutional support”	37.8
G2g-“The great risk of failure”	52.8
G2h- “The economic climate unfavourable to the creation of own business”	64.2
Items of G3: Academic Activities / initiatives that the University can develop in order to promote the entrepreneurship	
G3a- “Promotion of the entrepreneurship as a career option”	54.8
G3b-“Disclosure of useful ideas to create own business”	56.5
G3c-“Assignment of degrees or master's degrees in entrepreneurship”	55.2
G3d-“Design of work projects in entrepreneurship”	63.2
G3e- “Organization of conferences / workshops on entrepreneurship”	67.2
G3f- “Creation and promotion of the access to networks of useful contacts to start new business”	79.9
G3g- “Use of the university facilities by the companies run by students”	57.2
G3h-“Allocation of funds in order to give the possibility of the students create a new business”	56.4
G3i- “Placing of entrepreneurial students in contact with each other”	70.5
Items of G4: Practical personal experiences associated to entre-	

preneurship	
G4a-“I regularly read books/articles related to entrepreneurship and innovation“	10.3
G4b-“I regularly participate in conferences on entrepreneurship and innovation“	7.6
G4c-“I worked on my own during adolescence“	14.9
G4d-“I worked or have worked as a freelancer or on my own“	5.6
G4e-“I accompanied the creation of own family business“	26.5
G4f-“I accompanied the creation of own business friends“	19.9
G4g-“ The business of which accompanied its establishment eventually failed“	9.6
G4h- “Do not should start a business when there is a risk of it failing“	24.9

The items included in G1 are intended to evaluate students' knowledge at the level of entrepreneurship. Group G2 contains items related to the difficulties involved in the initiation of business. Group G3 contains statements on the activities / initiatives that the University can develop to stimulate students' interest, in terms of own-business creation. Finally, the items of G4 are concerned with sources of familiarity of the students with practical personnel experiences associated with entrepreneurship. The respondents indicated their degree of agreement or disagreement with the statements concerning the items included in the four groups (G1 to G4), which are measured on a scale containing five ordered modalities (1-*Total disagreement*, 2 - *Disagreement*, 3 - *Neither Agreement nor Disagreement*, 4 - *Agreement*, 5 -*Total agreement*).

In order to evaluate the impact of the entrepreneurial knowledge acquired by students enrolled in Economics and Management, the variable "Scientific area" was re-coded into two categories ("Economics and Management" (E-M) and "other scientific areas" (Other)).

The aim of the MCA is to find association between the categories of three or more qualitative variables, and the reduction of the data dimensionality, locating each variable/data unit as a point in a low-dimensional space. The graphic representation of the discrimination measures allows the observation of the disposition of the multiple variables in the plans defined by the axes (dimensions), and the evaluation of the relevance of each variable for those dimensions. Moreover, the interpretation of the joint categories plot (perceptual map) shall take into account the contribution of each category to the dimensions, and the proximities and oppositions between the projections of the categories on the axes. Variables furthest from the graph origin and more related to a single dimension, point out the presence of different dimensions, which involve different traits of characterization. Variables near the origin correspond to variables that do not discriminate between the two dimensions considered in a plan. A variable may be relevant for more than one dimension (Benzécri, 1992; Greenacre and Hastie, 1987; Greenacre and Blasius, 2006). Different combinations of the characteristics in analysis (proximity of categories of different variables) induce the presence of individuals who tend to share the same characteristics (groups of individuals with different profiles). In the present work, the ACM was performed using the procedure Optimal Scaling of the SPSS (Statistical Package for Social Sciences) software. The object scores in the dimensions considered in the MCA were used as input variables of the Cluster Analysis, in order to make the articulation between the MCA and the Cluster Analysis. The goal of Cluster Analysis is to identify groups (clusters) of elements (units/objects or variables) to classify, homogeneous and, preferably, well separated, so that (based on a certain clustering criterion) the elements in a

cluster are more similar to each other than the elements in different clusters (Sousa et al., 2015b). The hierarchical methods return a nested sequence of partitions (hierarchical structure), and proceed successively by merging smaller clusters into larger ones (agglomerative methods), or by splitting larger clusters (divisive methods) (Halkidi et al., 2001). On the other hand, the non-hierarchical methods return a single partition into an appropriate number of clusters. In this category (non-hierarchical methods), the k -means algorithm (MacQueen, 1967) is the most popular. In this work, we applied hierarchic agglomerative methods (Ascendant Hierarchical Cluster Analysis - AHCA), and the k -means method. The k -means algorithm was used in order to perform the articulation between the MCA and the Cluster Analysis. Finally, the AHCA was based on the affinity coefficient (Bacelar-Nicolau, 1980, 1987, 1988; Bacelar-Nicolau et al., 2009), and on three probabilistic aggregation criteria (AVL , AVI , and AVB), included in a family of parametric methods in the context of the VL methodology (Nicolau, 1983; Bacelar-Nicolau, 1988; Nicolau and Bacelar-Nicolau, 1998; Lerman, 1972, 1981). The validation index named global statistics of levels, $STAT$, (Lerman, 1970, 1981; Bacelar-Nicolau, 1980, 1985) was used to select the best partitions from the dendrograms obtained.

Main Results and Discussion

As regards the question “Have you ever had your own business?” (Variable “Own business/Entrepreneurial propensity”), it was found that 17.9% of the respondents selected the response “I have not and I have no interest in having” (No_OB); 49.3% the response “No, but I can imagine creating my own company” (NoIC_OB); 19.9% the response “No, but I have an idea that

could work” (No_Idea); 8.3% the response “I am currently thinking about that possibility” (Thinking_OB); only 1% the response “I am a few steps from creating a business” (FS_OB), and only 3.6% the response “Yes, I created a company” (Yes_OB).

Table 2 contains the percentage of students in a position of (total or partial) agreement with the statements associated with the items of G1, G2, G3, and G4. Concerning knowledge at the level of entrepreneurship (items of G1), this table shows that only 17.7% of the respondents reported that they feel able to identify market needs, 31.3% understand the kind of questions related to business opening, 27.4% consider themselves able to create a business plan and a business concept, and 23.3% know how to legally fund a new (concept of) business. With regard to the difficulties involved in starting a business (items of G2 - see Table 2), majority of the students of our sample pointed to: the lack of financial support (61.6%), the complexity of the administrative process (55%), and the current economic climate unfavourable to the creation of an own business (64.2%). Also in this context, a large proportion of students reported: to have little information of how to do it (39.8%), lack of skills in management (35.3%), lack of innovative ideas (30.3%), lack of institutional support to do so (37.8%), and great risk of failure (52.8%).

As shown in Table 2, all academic initiatives/activities associated with the items of G3 in order to promote the entrepreneurship are important (percentages of students in a position of (total or partial) agreement with each of these initiatives/activities above 50%), but the favourites are clearly the access to networks of useful contacts for the creation of business (79.9%), and placement of the entrepreneurial students in contact with each

other (70.5%). In fact, an advantage of the networks for the entrepreneurial process is the access they provide to information and advice (Hoang and Antoncic, 2003).

According to the STAT index, the AHCA of the nine items of group G3 (Activities / initiatives that the University can develop in order to promote the entrepreneurship) has provided dendrograms, whose best cut-off level (level 3) corresponds to a partition into six clusters (STAT = 3.8203): C1:{G3a}; C2:{G3b}; C3:{G3c}; C4:{G3d, G3e, G3f, G3i}; and C5:{G3g}, C6:{G3h}. Cluster 4 includes the design of work projects in entrepreneurship, the organization of conferences / workshops on entrepreneurship, the promotion of the access to networks of useful contacts to start new business, and the placement of student entrepreneurs in contact with each other. The dendrograms given by the methods *AVI* and *AVB* show that the most dissimilar item from the others, keeping in mind the degree of (dis)agreement of the respondents, is the allocation of funds in order to solidify the possibility of the students to create a new business (G3h).

Concerning the items of G4 (sources of familiarity of the students with practical personal experiences associated with entrepreneurship) and considering the total respondents of our entire sample, we can see for instance that only 10.3% of the respondents agree (totally or partially) to regularly read books/articles related to entrepreneurship and innovation, and only 7.6% recognize that regularly participating in conferences on entrepreneurship and innovation.

The percentage of respondents who agree (totally or partially) with the statements associated with items G1a, G1b, G1c, G1d, G3e, G3G, G4a, and G4b is higher among students enrolled in Economics and Management,

as shown in Figure 1. As expected, the same is not verified in relation to item G2d. These empirical results reflect the impact of the entrepreneurship education in the development of students' entrepreneurial intentions, and they justify the growing interest in entrepreneurship education.

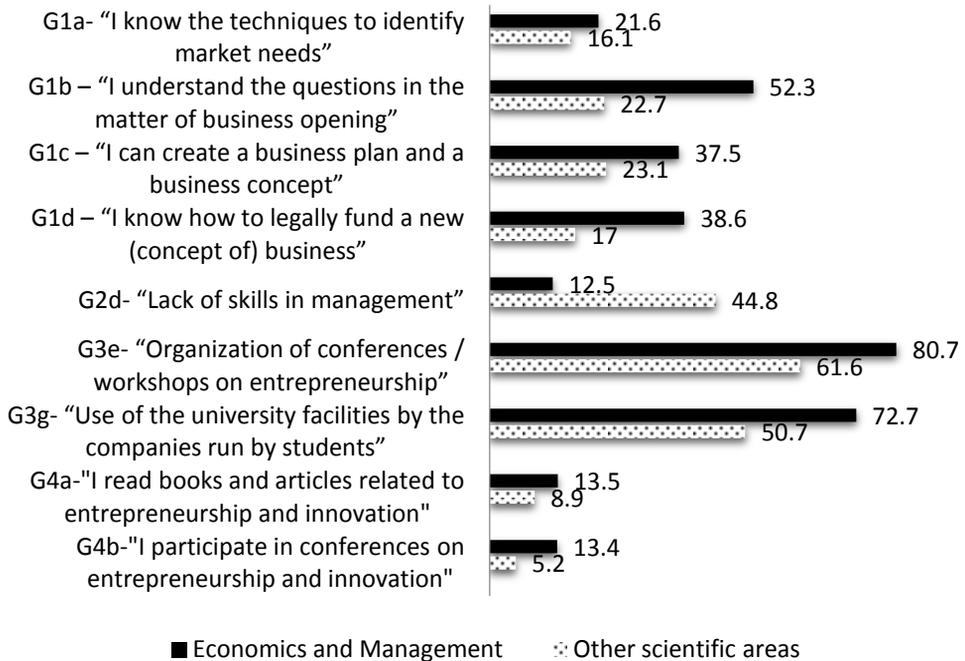


Figure 1. Percentage of students in a position of (total or partial) agreement with statements associated with some items according to the scientific area.

Before the application of the MCA, the age was re-coded into three age groups (18-24, 25-34, more than 35 years old (35+)), and the items G1a, G1b, G4a, and G4b were re-coded into three ordered modalities (1- *Disagreement* (D), 2-*Neither Disagreement nor Agreement* (NDNA), 3- *Agreement* (A)). The MCA was performed considering, as active variables, the "Scientific area", "Status of the students", "Age group", "The most re-

cent professional experience (PE)", G1a (briefly, "Identify market needs"), and G1b (abbreviated, "Questions in the matter of business opening", G4a (In a concise way, "Reading of books/articles on entrepreneurship") and G4b (abbreviated, "Participation in conferences on entrepreneurship"). In addition, five supplementary variables were used: "Gender", "Professional experience", "Performance of activities in associations/organizations (AAO)", "Own business/Entrepreneurial propensity", and "Family entrepreneurs (FE)".

The first three dimensions account for 83.1% (dimensions 1, 2, and 3 account for 37.6%, 24.8%, and 20.6%, respectively) of the data variation. Figure 2 shows the plan that crosses the first two dimensions. The variables G4a, G4b, G1b, G1a, and "Scientific area" are associated with the dimension 1. The first four items are also important for the definition of the third dimension. The "Age group" and "the Status of the students" are the most important variables for dimension 2. In the following interpretation of Figure 2, we will point out the most important variables and categories to the definition of the dimensions, based on the discrimination measures of the variables, and on the quantification of the categories.

Dimension 1 (37.6%) opposes (on the right side), in general, the students who attend courses in Economics and Management (E-M), who are, in general, able to identify market needs (A-G1a), who are familiar with the "questions in the matter of business opening" (A-G1b), who participate regularly (A-G4b) or sporadically (NDNA-G4b) in conferences on entrepreneurship and innovation, who are currently thinking about the possibility of creating their own business (Thinking_OB) or are a few steps from creating a business" (FS_OB); to the students (on the left side) of other scientific

areas (OSA), who have not mastered the techniques to identify market needs (D-G1a), who have not had training in the subject "questions in the matter of business opening," (D-G1b), who do not regularly read books/articles on entrepreneurship and innovation (D-G4a), who do not regularly participate in conferences on entrepreneurship and innovation (D-G4b), and who have not had and have no interest in having their own business (No_OB).

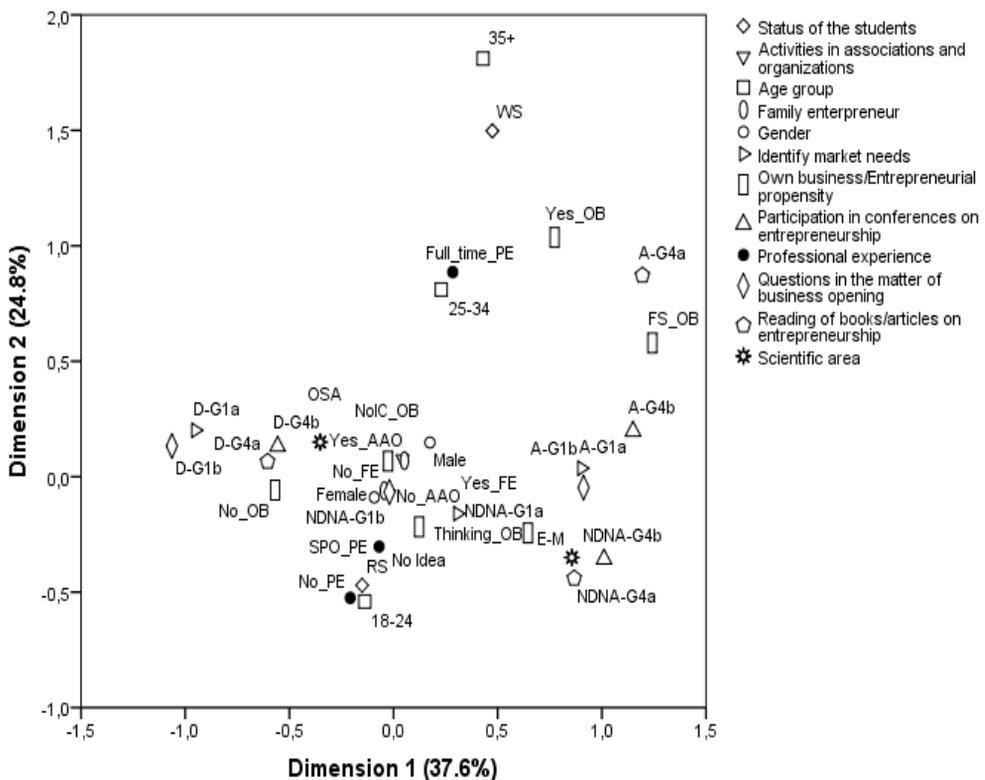


Figure 2. Map of correspondence of the categories from MCA for the dimensions 1 and 2 (Method of normalization: Variable Principal).

Dimension 2 opposes (up) the students aged 25 years or older, who are working students (WS), who regularly participate in conferences on en-

entrepreneurship and innovation (A-G4b), who work full-time (Full-time-PE), who have created a company (Yes_OB); to (down) the younger students (18-24 years old), who are regular students (RS), who do not have professional experience, or are in professional stage or part-time work (SPO_PE).

Dimension 3 opposes the students with a greater investment in the area of entrepreneurship, who are students that regularly read books/articles related to entrepreneurship and innovation (C-G4a), who regularly participate in conferences on entrepreneurship and innovation (C-G4B), who know the techniques to identify market needs (C-G1a), and who understand the questions in the matter of business opening (C-G1b); to the students who neither disagree nor agree with the statements associated with questions G1a, G1b, G4a, and G4b.

Cluster Analysis, considering the scores of the respondents in the three dimensions from the MCA and a partition into three clusters, provided three profiles of students sharing similar characteristics. Cluster 1 contains 170 (55.7%), cluster 2 contains 98 (32.1%), and cluster 3 contains only 37 (12.1%) of the students. Appendix contains the description of the individuals belonging to each cluster in the previous variables. In the remaining text, we will only refer to the main features of the clusters.

with the statement associated with item G1b. Approximately, a quarter (24.6%) of the individuals belonging to this cluster have not had and have no interest in having their own business (percentage higher than the corresponding ones to the other two clusters).

The majority (61.2%) of the respondents included in cluster 2 (potential entrepreneurs) are attending courses in Economics and Management (see Appendix). The majority of the respondents included in this cluster are between 18 years and 24 years (76.5%), have not participated in activities in associations/organizations (59.2%), and neither disagree nor agree with the statements associated with items G1a (72.2%), G1b (50.5%), G4a (76.5%), and G4b (67.3%). Approximately, 46.9% of the members of this cluster have not had their own business, but they can imagine creating their own company, and 13.3% are currently thinking about that possibility (higher percentage than those of the clusters 1 and 3). One half of the individuals of this cluster have family entrepreneurs (higher percentage compared to those related to the other two clusters). Thus, the students included in this cluster have a medium entrepreneurial propensity.

A significant number (43.2%) of the respondents included in cluster 3 (individuals with a high entrepreneurial propensity) are attending Economics and Management courses. The majority of respondents included in this cluster are 25 years or more (52.7%), have participated in activities in associations / organizations (64.9%), and are in a position of total agreement with the statements associated with the items G1a (52.8%), G1b (86.1%), G4a (67.6%), and G4b (51.4%). The proportion of working students (29.7%) in this cluster is greater, compared to the corresponding ones in clusters 1 (23.4%) and 2 (22.7%). It is important to emphasize that 10.8% of

individuals included in this cluster created a company (Yes_OB), compared to only 2.4% of the individuals of cluster 1 and 3.1% of the individuals of cluster 2. As shown in Appendix, the percentage of individuals in this cluster whose most recent professional experience is full time work (40.5%) is higher, compared with the corresponding ones in the case of the clusters 1 (29.5%) and 2 (22.4%). Hence, the students included in this cluster have a high entrepreneurial propensity. Note that the weight of this cluster in the overall sample is only 12.1%, so the development of academic initiatives is fundamental in order to promote the entrepreneurship and to increase the percentage of graduates with this profile.

The results of the present study are in accordance with the idea that the educational preparation for entrepreneurship contributes to the increase of entrepreneurs, by developing a positive perception of the need and feasibility of entrepreneurship, as argued by some authors (Rodrigues *et al.*, 2007; Fayolle and Klandt, 2006; Wang and Wong, 2004). In fact, many entrepreneurs recognize the need to receive training in areas such as general management, finance, strategy, marketing, leadership and communication (Cardoso *et al.*, 2015). However, personal interest in entrepreneurship cannot be imposed on individuals but it can be encouraged or discouraged.

Concluding Remarks

The multivariate data analysis methods have made it possible to obtain or confirm some relevant results about the position of the surveyed students of higher education in relation to the entrepreneurial propensity in the Azores and their ability to create their own business.

In particular, three dimensions resulted from the MCA, which explained about 83.1% of the data variation. These three dimensions highlighted three sets of well-defined students and allowed us to examine the relationship between the categories of some relevant variables. It is noteworthy that the first dimension opposes, in general, the students who attend Economics and Management courses, who are able to identify market needs, who are familiar with the questions in the matter of business opening, who participate regularly in conferences on entrepreneurship and innovation, who are currently thinking about the possibility of creating their own business or are a few steps from creating a business; to the students of other scientific areas, who have not mastered the techniques to identify market needs, who have not had training in the subject "questions in the matter of business opening", who do not regularly read books on entrepreneurship and innovation, who do not regularly participate in conferences on entrepreneurship and innovation, and who have not and have no interest in having their own business.

The application of the *k*-means clustering algorithm based on the scores of the individuals in the three dimensions resulting of the MCA (articulation between the MCA and the *k*-means method) confirmed the existence of three profiles of students with low, medium and high propensity entrepreneur. We also confirmed that some of the main difficulties reported by the students in starting a new business are related to their science areas. Thus, the higher education institutions must play an increasingly important role in entrepreneurship promotion and in the development of students' interest in becoming entrepreneurs, minimizing some of the main difficulties in starting a new business, including the ones related to their science areas. Among the academic initiatives and activities that can be dynamized, in this

context, preference of the respondents for the creation and promotion of the access to networks of useful contacts for the creation of business, by placing entrepreneurial students in contact with each other, and by the organization of seminars and conferences stands out. The organization of conferences / workshops on entrepreneurship by the University can be done (easily, and involving relatively small costs) taking advantage of the science potential of their human resources (university professors), with knowledge of entrepreneurship. Initiatives of this kind can be directed at the students from various science fields and even open to the general public, because entrepreneurship is considered to be learning for life.

More and more young people see no other alternative but to create their own company. Entrepreneurship is vital for enhancing employment opportunities. Thus, entrepreneurship promotion in higher education institutions contributes to an entrepreneurial culture, and can be a plus for all university students. In fact, the presence of a higher percentage of young people with an entrepreneurial profile could contribute to the regional economic development, either by creating companies or through intrapreneurship. This research provides guidelines for the implementation of some initiatives and activities in order to stimulate the entrepreneurial spirit among students. In this context, possible guidelines for future research include the study of the impact of some academic activities on regional economic development, and on employment generation in Azores or another region.

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APPENDIX

Description of the individuals belonging to each cluster (%)

	Gender		Age group			
	Male	Female	18-24	25-34	35+	
Cluster 1	32.5%	67.5%	71.3%	14.4%	14.4%	
Cluster 2	37.8%	62.2%	76.5%	12.2%	11.2%	
Cluster 3	48.6%	51.4%	47.2%	33.3%	19.4%	
	Own business					
	No_OB	NoIC_OB	No_Idea	Thinking_OB	FS_OB	Yes_OB
Cluster 1	24.6%	50.9%	17.4%	4.8%	0.0%	2.4%
Cluster 2	8.2%	46.9%	26.5%	13.3%	2.0%	3.1%
Cluster 3	13.5%	48.6%	13.5%	10.8%	2.7%	10.8%
	Activities in associations and organizations		Scientific area		Status of the students	
	Yes_AAO	No_AAO	E-M	OSA	WS	RS
Cluster 1	47.9%	52.1%	7.8%	92.2%	23.4%	76.6%
Cluster 2	40.8%	59.2%	61.2%	38.8%	22.7%	77.3%
Cluster 3	64.9%	35.1%	43.2%	56.8%	29.7%	70.3%
	Professional experience			G1a-Identify market needs		
	No_PE	SPO_PE	Full_time_PE	D-G1a	NDNA-G1a	A-G1a
Cluster 1	19.9%	50.6%	29.5%	54.8%	38.0%	7.2%
Cluster 2	20.4%	57.1%	22.4%	5.2%	72.2%	22.7%
Cluster 3	8.1%	51.4%	40.5%	8.3%	38.9%	52.8%
	G1b-Questions in the matter of business opening			G4a-Reading of books on entrepreneurship		
	D-G1b	NDNA-G1b	A-G1b	D-G4a	NDNA-G4a	A-G4a
Cluster 1	44.9%	44.3%	10.8%	92.2%	4.8%	3.0%
Cluster 2	3.1%	50.5%	46.4%	22.4%	76.5%	1.0%
Cluster 3	5.6%	8.3%	86.1%	21.6%	10.8%	67.6%
	G4b-Participation in conferences on entrepreneurship			Family entrepreneur		
	D-G4b	NDNA-G4b	A-G4b	Yes_FE	No_FE	
Cluster 1	96.4%	3.0%	0.6%	43.4%	56.6%	
Cluster 2	29.6%	67.3%	3.1%	50.0%	50.0%	
Cluster 3	16.2%	32.4%	51.4%	41.7%	58.3%	