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## RESUMO/ABSTRACT

### Prediction of Entrepreneurship: An Ordered Regression Approach

Entrepreneurship is a popular research topic over the last several decades. Various authors study the characteristics that best define future entrepreneur profiles. In this paper, we apply a framework to screen school populations in the Azores Islands, Portugal, for prospects of entrepreneurship and to study the profiles of those who show noticeably entrepreneurial orientations. The contribution of the paper consists of applying ordered regression to explain the entrepreneurial prospects of students in high school.

**JEL classification:** M13

**Key words:** Entrepreneurship; Entrepreneurial Prospects; Personality Traits; Ordered Regression

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# **PREDICTION OF ENTREPRENEURSHIP: AN ORDERED REGRESSION**

## **APPROACH**

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## Abstract

Entrepreneurship is a popular research topic over the last several decades. Various authors study the characteristics that best define future entrepreneur profiles. In this paper, we apply a framework to screen school populations in the Azores Islands, Portugal, for prospects of entrepreneurship and to study the profiles of those who show noticeably entrepreneurial orientations. The contribution of the paper consists of applying ordered regression to explain the entrepreneurial prospects of students in high school.

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## **1 Introduction**

The primary objective of this research is to analyze the prospects for entrepreneurship among high school students in the Azores Islands, based on factors such as entrepreneurial orientation and willingness to work. If educational systems are to be used as an instrument for the promotion of entrepreneurship, a student's last years in school are decisive for the construction of his/her aspirations and objectives for the future (Frank, et Al., 2005).

Etzkowitz (2000) argues that entrepreneurial positioning should be confirmed mainly by universities. Thus, universities should facilitate entrepreneurship, not only by producing entrepreneurs, but also by transferring technologies to the market, managing the efficacy of its basic systems in the most efficient way: research, education and development of new technologies.

On the other hand, Gasse (1985) recommends that entrepreneurial potential first be identified and evaluated in high school, during an individual's development phase, wherein the possibility of a future career as an independent worker remains an option. During the last years in elementary and high school, there is growing attention in the literature relative to the development of entrepreneurship (Donckels, 1991).

Accordingly, the object of this study resonates with the opinion of Kourilsky and Walstad (2000), who infer that young people should be prepared as soon as possible for the new realities they are expected to face this century.

The prospect of entrepreneurship, as an object of study, includes analysis of a combination of characteristics, including: interest in entrepreneurship (e.g., interest in activities related to business, such as reading business periodicals); entrepreneurial abilities (e.g., characteristics related to the work of an entrepreneur, as in the capacity to

debate) and entrepreneurial personality (e.g., leadership abilities). The combination of these traits can be defined as entrepreneurial orientation.

The propensity of an individual to make an effort, or the capacity to work, is another variable that often foretells an individual's entrepreneurial potential. Schmitt-Rodermund and Vondracek (2002) conclude that adolescents with an elevated level of business orientation and who at the same time expect to work hard toward the achievement of an objective, have greater prospects of becoming an entrepreneur in the future.

Psychological attributes are considered the most reliable traits to predict whether or not an individual will pursue an entrepreneurial career (Stewart et al., 1999). There is some empirical evidence based on a questionnaire related to the characteristics of personality, as carried out by King (1985), which outlines particular differences between entrepreneurs and employees. Further, several psychologists admit that personal attributes do not change over time, which is why his/her particular characteristics may foretell his/her future business success (Muller, 1999).

From the several personality guidelines associated with entrepreneurs, motivation to reach one's goals is firmly established as an important entrepreneurial characteristic. This orientation expresses one's motivation and his/her ability as a potential business founder to search for more efficient solutions than those presently available within his/her economic environment (McClelland, 1961; Begley and Boyd, 1987; and Lumkin and Dess, 1996).

Most entrepreneurial individuals attribute the responsibility for what happens to them to themselves or to external factors; they are individuals with a *locus* of internal control who believe they are capable of molding their futures by their own actions. Rotter (1966) and Furnham (1986) assert that individuals with such an internal control *locus*

have better chances of succeeding as entrepreneurs than those with external control *loci*. Gasse (1985) confirms these findings, indicating that entrepreneurs typically have stronger internal control *loci* than the remaining population in general.

Lower risk aversion is another success indicator for entrepreneurial activities (McClelland, 1966). Such risk lovers are likely to invest resources in projects where the consequences of failure may be elevated (Miller and Friesen, 1978).

Another personality characteristic that plays a fundamental role in entrepreneurship and is studied in this paper is the self-efficacy trait of Begley and Boyd (1987), as well as four of the so-called "big-five" personality traits (neuroticism, the fifth personality trait, is not used because it does not fit with the objective, in agreement with Schmitt-Rodermund and Vondracek (2002)). These traits include: conscientiousness, openness to new experiences, extroversion and agreeableness (Costa and McCrae, 1985). Similarly, Kourilsky (1980) and Robinson et al. (1991) highlight innovation and creativity as important variables that define the entrepreneurial profile.

Scott and Twomey (1988) find a series of factors, such as parental influence and professional experience, to be explanatory variables for one's career aspirations. Family examples are largely influential and young people who start their own businesses likely come from families where their parents are also entrepreneurs (Cromie, Callaghan and Jansen, 1992; Blackburn and Curran, 1993).

If the adolescent's social environment is favorable to entrepreneurship and he/she has previous positive experiences in an "adventurous" business, then it is probable that he/she will later become an entrepreneur (Henderson and Robertson, 2000).

However, the positive and direct relationship that exists between an entrepreneur in the family and the future prospects of entrepreneurship are not observed in all of studies carried out on the subject. For example, Schmitt-Rodermund and Vondracek (2002)

introduce predisposition as a variable in their work. Predisposition is a predominant factor involved in the influence that one's family has or does not have in an adolescent's career choice. The authors conclude that belonging to an entrepreneurial family may lead to short levels of entrepreneurial orientation for the group of adolescents with a lower predisposition to working hard. Likely, the authors observe, these individuals' parents work hard to achieve business success and it becomes clear to these adolescent that being an entrepreneur requires a lot of effort and investment, something he/she is not willing to do.

The remainder of this paper is organized as follows. In Section 2, we present the methodology and hypotheses used to evaluate entrepreneurial orientation and provide guidelines for the personality traits of potential entrepreneurs. In Section 3, we provide corresponding empirical results and parallel entrepreneurship rationale. In Section 4, we offer concluding remarks.

## **2 Methodology**

In the present work, we seek to test whether entrepreneurship prospects are related to the following personality traits: learning strategies for business success, leading one's own business, participating in sales negotiations, receiving training in leadership, administration and management, leading a group, supervising the work of others, dealing with senior executives, targeting groups with a specific purpose, collaborating in a political campaign, working as a business consultant and studying business and management.

For this purpose, we collect data using questionnaires presented to students in their 12th year of schooling in the Azores Islands (Portugal). Although some authors base their research on students with various levels of education, particularly Schmitt-Rodermund and Vondracek (2002), who apply a questionnaire to pupils in the 10th year, we opt to

conduct the present study with students who are in their 12th year of study because they are in their final years of high school and we expect the vast majority to have already developed plans for the future. Also, their personalities are well defined at this age, which is a key factor for the validity of the results. Accordingly, we distribute 1,827 questionnaires to high school in the Azores Islands, from which 906 questionnaires are returned, resulting in a response rate of 49.59%. Some previous results, obtained from the same research study, can be found in Silva et al. (2010).

### **3 Empirical Results**

The primary objective of this research is to analyze the prospects of entrepreneurship for students in the Azores Islands, based on factors such as entrepreneurial orientation and willingness to work.

Data are categorized into three levels of entrepreneurial prospects, as shown in Table 1. The dependent variable is assumed an ordinal variable, so its analysis and explanation should be based in an ordered regression. The ordered probit model is indicated by Zavoina and McElvey (1975) to understand the behavior of the ordinal dependent variables. This model appears appropriate for studying the prospects of entrepreneurship (dependent variable ordinal), explaining the elements through entrepreneurial orientation and willingness to work. These explanatory variables can be further subdivided into other factors as well.

The entrepreneurial orientation variable is measured using the following factors: entrepreneurial skills, interest in entrepreneurship and entrepreneurial behavior.

The results of linear regression with ordered dependent variable can be seen in Table 2. For entrepreneurial skills, we can conclude that the items: "learn strategies for business

success," "lead your own business" and "contribute to a political campaign," are significant and offer a positive contribution to entrepreneurial attributes.

The items: "participating in sales negotiations" and "leading groups with a specific purpose," are also significant and contribute negatively to the establishment of entrepreneurial nature.

With regard to interest in entrepreneurship, only the items: "learn strategies for business success" and "leading your own business" are significant and result in a positive contribution to the prediction of entrepreneurial prospects.

With respect to entrepreneurial behavior, only the items "I am good at debates" and "I like to compete with others" are significant and contribute positively to entrepreneurial prospects.

Willingness to work is calculated using the following factors: curiosity about new topics; willingness to attend additional courses; and workload support. Results of the linear regression with ordered dependent variables can be found in Table 2. Of the items mentioned above, only the disciplines "entrepreneurship" and "computer science" are proven significant. Further, attending to "entrepreneurship" increases entrepreneurial prospects while attending to "computer science" decreases entrepreneurial prospects.

All other items are not related to the prospects for entrepreneurship (the ordered dependent variable.)

#### **4 Conclusions**

There are two important conclusions to be drawn from this work. First, in contrast to what is expected, one's willingness to work hard does not forecast prospects for entrepreneurship. However, it is also true that one's entrepreneurial orientation only explains, in part, his/her prospects for entrepreneurship.

Second, we present a set of characteristics that, when observed in terms of individual personality, are associated with a high entrepreneurial orientation. Careful selection of participants in programs that promote entrepreneurship on the basis of such traits can increase the efficacy of such programs. Young students with personality traits associated with entrepreneurial prospects and adequate entrepreneurial orientation meet the necessary conditions to be independent workers.

This work leaves some ideas open for future research. There remain questions of whether the sciences relate to psychology. There is need to identify the correct variables that capture entrepreneurial behavior; as well as whether personality traits associated with the prospects of entrepreneurship are indeed stable over time; if support measures (e.g., incubators) can create an impact on the personality traits of an individual; or whether only the methods used to attract potential entrepreneurs require improvement.

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**Table 1.** Categories of entrepreneurial prospectives.

<b>Value</b>	<b>Entrepreneurial prospective</b>
0	None
1	Some
2	Many

**Table 2 : Ordered regression:**

<b>Coefficient</b>	<b>Standard Error</b>	<b>Significance</b>	<b>Description</b>
<b><u>1. ENTREPRENEURIAL ORIENTATION</u></b>			
<b><u>1.1 Entrepreneurial skills</u></b>			
0,1535	0,0597	0,0102	Learn strategies for business success
0,4267	0,0646	0,0000	Leading your own business
-0,1740	0,0642	0,0067	Participate in sales negotiations
-0,0046	0,0602	0,9391	Receive training in leadership, administration and management
0,0454	0,0696	0,5144	Being the head of a group
-0,0445	0,0670	0,5071	Supervise the work of others
-0,0304	0,0649	0,6393	Dealing with senior executives
-0,1484	0,0654	0,0234	Targeting a group with a specific purpose
0,1048	0,0485	0,0309	Collaborate in a political campaign
0,0328	0,0661	0,6197	Working as a business consultant
-0,0460	0,0588	0,4337	Study on Business and Management
<b><u>1.2 Interest in entrepreneurship</u></b>			
0,1023	0,0515	0,0471	Learn strategies for business success
0,4099	0,0555	0,0000	Leading your own business
-0,0572	0,0546	0,2945	Participate in sales negotiations
-0,0244	0,0524	0,6423	Receive training in leadership, administration and management
0,0695	0,0593	0,2412	Being the head of a group
-0,0479	0,0558	0,3905	Supervise the work of other
0,0520	0,0579	0,3692	Dealing with senior executives
-0,1048	0,0555	0,0592	Targeting a group with a specific purpose
0,0379	0,0485	0,4340	Collaborate in a political campaign
-0,0374	0,0636	0,5565	Working as a business consultant
-0,0951	0,0574	0,0978	Study on Business and Management
<b><u>1.3 Entrepreneurial behaviour</u></b>			
0,0410	0,0724	0,5713	I am an effective leader
-0,0733	0,0608	0,2281	I am a good communicator with a large audience
0,1292	0,0668	0,0531	I can manage a sales campaign
0,0030	0,0679	0,9653	I can organize the tasks for a working group
0,0695	0,0697	0,3186	I can convince other people to do what I wont them to do
0,0206	0,0594	0,7284	I am a good salesman
0,1442	0,0582	0,0133	I am good at debates

Coefficient	Standard Error	Significance	Description
-0,0827	0,0723	0,2528	I can have much influence on other people
-0,0058	0,0703	0,9338	I have good planning capabilities
0,0861	0,0662	0,1930	I will be a good entrepreneur
-0,0732	0,0719	0,3088	I am a good leader
0,1093	0,0477	0,0219	I like to compete with others
-0,0807	0,0782	0,3024	I have good leadership qualities
			<b><u>2. WILLINGNESS TO WORK</u></b>
			<b><u>2.1 Curiosity about new topics</u></b>
-0,0114	0,0682	0,8673	When a, I accept new task because I can always learn something
0,0385	0,0599	0,5205	I get enthusiasm with things very fast, even when I don't know them
0,0796	0,0578	0,1685	I take every opportunity to increase my knowledge, even when they are not
0,0511	0,0538	0,3423	Whenever I get the chance, I peek over the shoulder of others to learn something
0,0882	0,0662	0,1826	Even if it doesn't bring me any immediate benefit I do the task if it broadens my skills
			<b><u>2.2 Willingness to attend additional courses</u></b>
-0,0077	0,0669	0,9078	Technical English
-0,1160	0,0767	0,1304	Photo
0,0896	0,0816	0,2723	Literature Club
0,3813	0,0782	0,0000	Entrepreneurship
0,0452	0,0699	0,5180	Theatre group
-0,1706	0,0761	0,0249	Computers
0,0121	0,0641	0,8503	Sports
			<b><u>2.3 Workload support</u></b>
0,0036	0,0034	0,2839	Working hours