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**ENTREPRENEURIAL INTENTION AMONG INFORMATION SYSTEMS
STUDENTS: INVESTIGATING THE ROLE OF FAMILY BACKGROUND, SELF-
EMPLOYMENT, AND GENDER IN UNDERGRADUATE EDUCATION**

*INTENÇÃO EMPREENDEDORA ENTRE ESTUDANTES DE SISTEMAS DE INFORMAÇÃO:
INVESTIGANDO O PAPEL DO CONTEXTO FAMILIAR, AUTOEMPREGO E GÊNERO NA
EDUCAÇÃO DE GRADUAÇÃO*

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RESUMO

Esta pesquisa tem como objetivo investigar o papel do contexto familiar, auto emprego e gênero na educação de graduação em estudantes de sistemas de informação. Com relação à abordagem do problema, essa pesquisa caracteriza-se como quantitativa e quanto aos objetivos têm-se uma pesquisa exploratória. O procedimento técnico adotado foi o estudo de caso em estudantes do curso de sistemas de informação (número de respondentes igual a 100). Os principais resultados indicam que a maioria dos estudantes possui a intenção de se tornarem empreendedores no futuro: Estudantes que possuem família empreendedora tendem a apoiar mais o empreendedorismo; e comportamento empreendedor elevado no sexo feminino em relação ao sexo masculino. A importância desse estudo está em

indicar como tais fatores (contexto familiar, auto emprego e gênero) afetam estudantes de graduação contribuindo para os aspectos teóricos e gerenciais dos estudos em intenção empreendedora no contexto da região amazônica.

ABSTRACT

This research aims to investigate family background, self-employment, and gender in undergraduate students of information systems. Regarding the approach to the problem, this research is characterized as quantitative and as for the objectives, there is exploratory research. The technical procedure adopted was the case study in information systems students (number of respondents equal to 100). The main results that most students intend to become entrepreneurs in the future: Students who have a family background tend to support entrepreneurship more; and high entrepreneurial behavior in females concerning males. The importance of this study is to indicate how such factors (family background, self-employment, and gender) affect undergraduate students, contributing to the theoretical and managerial aspects of studies in entrepreneurial intention in the context of the Amazonia region.



Introduction

There is a relationship between innovation, creation of new markets, and entrepreneur action. The entrepreneur initiates a change in consumer behavior by creating a desire for new things or differentiating them from what these consumers would generally buy. In this context, the creative destruction would be the replacement of old products and consumption habits with new ones, and based on it the entire company should adapt to survive (Schumpeter, 1961; 1997).

The entrepreneur is a person with the vision to observe innovation and the ability to bring it to the market. Entrepreneurs are the bridge between invention and commercialization and maybe in sectors of high or low technology, as well as of no technology; without them, innovations remain in Research & Development (R&D) laboratories and universities (Ács *et al.*, 2017; 2018).

In 2019, Brazil ranked 118th in the Global Entrepreneurship Index among 137 countries evaluated. In Latin America, Brazil is only ahead of Venezuela. According to the National Entrepreneurship Context Index (NECI), in 2019 Brazil occupied 43rd position among 54 ranked economies. In Latin America, Brazil was only ahead of Paraguay. The NECI represents a composite index that presents the set of national conditions related to entrepreneurship (Ács *et al.*, 2019; Bosma *et al.*, 2020).

Innovative entrepreneurs have the task of locating new ideas and putting them into practice, in addition to leading and perhaps inspiring (Baumol, 2010). They show initiative, imagination and willingness to demand efforts in the pursuit of prosperity, power and prestige (Baumol *et al.*, 2009). Placing financial success as a key factor to explain the transversal differences in the entrepreneur's growth references, the intended size of the enterprise and the growth achieved (Cassar, 2007).

Entrepreneurs' ideas and intentions form the initial strategic template of new organizations and are important foundations for the development of new ventures. Entrepreneurial ideas start with inspiration, sustained attention, and intention is necessary to make them clear (Bird, 1988).

Several studies on entrepreneurial intention in students have been developed over the years to understand the factors that determine the entrepreneurial interest among a young population at a university in Nigeria (Osakede, Lawanson & Sobowale, 2017), with students from information systems and computer science (Kaltenecker, Hoerndlein & Hess, 2015), and agriculture students in Iran (Omidi Najafabadi, Zamani & Mirdamadi, 2016).

The entrepreneurial intention in students has already been studied considering aspects of spirituality and emotional intelligence (Rodrigues *et al.*, 2019), examining the link between intention-behavior as drivers of start-up activities (Shirokova, Osiyevskyy & Bogatyreva, 2015), possible differences in the entrepreneurial intention of students who were born in cities or villages (Kolosta *et al.*, 2018), exploring the level and determinants of interest in entrepreneurship (Wang & Wong, 2004) and testing comprehensive models on entrepreneurial intentions considering individual and environmental factors (Sesen, 2013).



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Shook and Bratianu (2010) examined the entrepreneurial intention in Romanian students, while Veciana, Aponte and Urbano (2005) evaluated and compared the attitudes of university students aiming at entrepreneurship training. Souitaris, Zerbinati and Al-Laham (2007) tested the effects of entrepreneurship programs on the entrepreneurial attitudes and intentions of science and engineering students. The choice of the central research theme to investigate the role of entrepreneurship in information systems students emerged from the above literature.

Three factors (gender, experience in the family business, and level of education) significantly affect the interest in starting your own business, while other factors, such as ethnicity, citizenship, and family income have little effect (Wang & Wong, 2004). This research aims to investigate the role of family background, self-employment, and gender in undergraduate education of information systems students at a university in the state of Amazonas/Brazil. The study consists of a quantitative approach with the execution of a case study to investigate the entrepreneurial intention of students through a survey consisting of 12 questions

The importance of this study is to indicate how such factors (family background, self-employment, and gender) affect undergraduate students, contributing to the theoretical and managerial aspects of studies in entrepreneurial intention in the context of the Amazonia region. The research is structured in four parts: (1) review of the literature presenting the state of the art concerning the entrepreneurial intention and the models and scales of entrepreneurship; (2) methodology, dealing with the characterization of the research and methods of data collection and analysis; (3) results; and (4) discussion and conclusion.

1. Theoretical Background

1.1 Entrepreneurship Intention

The success of entrepreneurship requires a wide variety of general skills and that technology has grown cumulatively and in an increasingly complex way, requiring more extensive educational preparation (Baumol *et al.*, 2009). The interpretation of entrepreneurs (Angel, Jenkins & Stephens, 2018) on the success criterion depends on their understanding of success and which can have four characteristics (individualist, tribalist, evolutionist, and revolutionist).

Entrepreneurial intentions are conscious states of mind that direct personal attention, experience, and behavior towards planned entrepreneurial behavior (Bird, 1988). Entrepreneurial education seeks to build knowledge and skills and also increase the likelihood of entrepreneurial success (Carayannis, Evans & Hanson, 2003). Ajzen argues that intentions, in general, depend on perceptions of personal attractiveness, social norms, and viability, while Shapero argues that entrepreneurial intentions depend on perceptions of personal desirability, viability, and propensity to act (Kruger, Reilly & Casrud, 2000). Student intentions related to entrepreneurial activities/decisions are influenced by socio-psychological constructs (Esfandir *et al.*, 2019). The issues involving sustainability and entrepreneurial intention are relevant, considering the positive hypothesis of the relationship between the individual's sustainable orientation and entrepreneurial intention in which knowledge of the individual's sustainable orientation can, in fact, add to the understanding of entrepreneurial intention (Kuckertz & Wagner, 2010).



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Studies indicate that participants with high entrepreneurial competence (leadership, invention, commercial activities, for example) between their 14 or 15 years old also have high entrepreneurial intent in adulthood (Obschonka, Silbereisen & Schmitt-Rodermund, 2016). Others offer an opportunity to develop a deep understanding of motivations, ambitions, aspirations, intentions, and achievements in interactions with external opportunities and resources (Hermans *et al.*, 2015), analyze the effects of psychological factors (Liang & Liang, 2015) or investigate the transition from academic scientist to entrepreneur (Goethner *et al.*, 2012). The national culture itself in the entrepreneurial activity has a fundamental role in the relationship between entrepreneurial intention-action (Bogatyeva *et al.*, 2019), in addition to the regional social capital it has a moderating role in the intention-behavior link in entrepreneurs (Weiss, Anisimova & Shirokova, 2019).

Entrepreneurial intentions are transmitted within families, highlighting the high complexity of intergenerational transmission of intentions within families (Laspita *et al.*, 2012), that is, the family environment together with self-concept, motivation, and risk-taking is likely to affect entrepreneurial intention (Herdjiono *et al.*, 2017; Johara, Yahya & Theseen, 2017). The entrepreneurial orientations of family businesses are impacted by the duality of a family's distinct intention to seek transgenerational succession and by the enterprise's unique capabilities to acquire external knowledge (Randolph, Li & Daspit, 2017). Social persuasion has a powerful influence on the entrepreneurial intention of young adults with entrepreneurial relatives (Bloemen-Bekx *et al.*, 2019). Students with entrepreneurs in their families are more likely to create a new venture (Veciana, Aponte & Urbano, 2005; Bako *et al.*, 2017; Nguyen, 2018). Therefore, parental role models are important in motivating children to follow family businesses, developing and strengthening specific entrepreneurial skills and interests, such as leadership, dominance, and perceived behavioral control (Palmer *et al.*, 2021).

The entrepreneurial intention between men and women can be influenced by the socially constructed stereotypes in entrepreneurship that consider predominantly male characteristics (Gupta *et al.*, 2009; Hamilton, 2013), patriarchal aspects also influence female participation in family businesses (Hamilton, 2006) and frameworks, models and theories about entrepreneurial leadership have been developed by men and are based on premises of male norms (Harrison, Leitch & McAdam, 2015). There is a false perception that female entrepreneurial businesses underperform, however, studies show that the performance between male and female entrepreneurs is equivalent (Marlow & McAdam, 2013). Therefore, entrepreneurial education can reduce gender differences for women to pursue an entrepreneurial career (Wilson, Kickul & Marlino, 2007).

Research findings have suggested that gender significantly moderates the relationship between students' entrepreneurial intent and their background (Bagheri & Pihie, 2014), however, it is necessary to consider the existence of gender inequality in the lives of women entrepreneurs (Braches & Elliott, 2016), since socially prescribed gender roles suppress women's intentions to enter entrepreneurship and also weaken their propensity to act according to their intentions (Shinnar *et al.*, 2018), considering the increasingly wealthy aspects of female entrepreneurship (Ahl, 2006). The direct effect of gender on entrepreneurial intention is observed and reveals a significant mediation effect of parental preference, that is,



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one of the factors of social persuasion studied, on the relationship between gender and entrepreneurial intention (Bloemen-Bekx *et al.*, 2019).

1.2 Models and scales of entrepreneurial intention

In the literature, entrepreneurial models have stood out over the years using approaches based on personality traits, demographics, or attitudes. Currently, the intention models are rigid, with an easy to measure variable and considerable empirical robustness (Krueger, 2017). In this case, two specific models of entrepreneurial intention (Theory of planned behavior - TPB and Shapero's model of the entrepreneurial event - SEE) will be considered.

The Theory of Planned Behavior is an extension of the theory of reasoned action. A central factor in the theory of planned behavior is the individual intention for the performance in a given behavior. Intentions are assumed to capture the motivational factor that influences behavior, that is, they are indications of how hard people are willing to try or how much of an effort they are planning to exert to perform the behavior (Ajzen, 1991).

TPB identifies three attitudinal antecedents of the interaction (Ajzen, 1991). Two reflect the perceived desirability of performing the behavior (attitude toward the behavior and subjective norm) and the third (perceived behavioral control) reflects the perceptions that the behavior has about the controlled personality, that is, it is the impact on intentions and actions. Perceived behavioral control reflects the perceived feasibility of performing the behavior and is thus related to perceptions of situational competence (self-efficacy).

Perceived behavioral control, together with behavioral intent, can be used directly to predict behavioral achievement. Attitude toward the behavior deals with a person's perception of the desire to perform the behavior. This attitude depends on expectations and beliefs about the personal impacts of the results arising from the behavior. In conclusion, subjective norm deals with how important people in the interviewees' lives think about the performance of a specific behavior. These normative changes are weighted by the strength of the motivation to comply with them (Ajzen, 1991).

In Shapero's model of the entrepreneurial event (SEE), the intention to start a business derives from the perception of desire, feasibility, and a propensity to act upon opportunities (Shapero, 1982). The model assumes that inertia guides human behavior until something interrupts or "displace" that inertia. Displacements are often negative, but they can easily become positive; displacements accelerate a change in behavior where the decision-maker seeks the best available opportunity for a set of alternatives (Katz, 1995).

The choice of behavior depends on the relative credibility of alternative behaviors in addition to the propensity to act. Credibility requires behavior that is desirable and feasible, so entrepreneurial events demand the potential to start a business (credibility and propensity to act) before the change and a propensity to act afterward (Shapero, 1982).

About the scales to measure the entrepreneurial intention or potential in Brazil, Inácio Júnior and Gimenez (2004) provided the translation, validation, and application of the Carland Entrepreneurship Index (CEI) as an instrument to measure the entrepreneurial potential. The



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sample consisted of respondents among undergraduate and graduate students in management and owner-managers companies.

Lopes Júnior and Sousa (2005) provided for the construction and validation of an entrepreneurial attitude measurement instrument applied to owner-managers of small retail companies. The survey was called the Entrepreneurial Attitude Measurement Instrument (IMAE).

Santos (2008) provided for the construction of a scale to assist in the identification of entrepreneurial potential in students, for training entrepreneurs, or the selection of candidates for admission to incubators. Alves and Bornia (2011) developed a scale to measure the entrepreneurial potential using the Item Response Theory (IRT). The results showed that the scale is more adequate to evaluate individuals with low to moderately high entrepreneurial potential, thus the Item Response Theory allows new items to be calibrated to measure entrepreneurs with high entrepreneurial potential. Vieira and Rodriguez (2014) presented the preliminary results of the ENGEmpreende research developed to analyze the perceived attitudes and values associated with entrepreneurship by engineering students.

2. Methodology

Regarding the approach to the problem, this research is characterized as quantitative due to considering that everything can be quantifiable, that is, translating opinions and information into numbers to classify and analyze them. As for the objectives, the research was exploratory in providing greater familiarity with the problem to make it explicit or to build hypotheses, thus exploring entrepreneurial characteristics of information systems students (Silva & Menezes, 2005).

The technical procedure adopted was the case study due to the search to examine contemporary events where the behavior of the research subjects cannot be manipulated, having a generalized character to the theoretical prepositions (Yin, 1994). This case study took place at a university located in the state of Amazonas/Brazil.

The approach used in the study to assess the entrepreneurial intention of students was presented in Vieira and Rodrigues (2014). The survey consisted of 12 (twelve) questions divided into two parts. The first part was called "Profile of respondents" and was composed of four questions related to age, gender, period the student was studying, and monthly family income.

The second part was called "Entrepreneurial intentions" Vieira and Rodrigues (2014) and consists of eight questions, with three questions to mark "x" and five questions filled in according to the level of agreement. For these questions, a Likert scale formed by five levels of the agreement was used, namely: 1 –high disagreement, 2 - disagreement, 3 - neutral, 4 - agreement, and 5 –high agreement.

The sampling of this research was intentionally non-probabilistic (Marconi & Lakatos, 2002). The sample was formed by information systems students (number of respondents equal to 100) at a university located in the state of Amazonas/Brazil, indicating a 95% confidence level.



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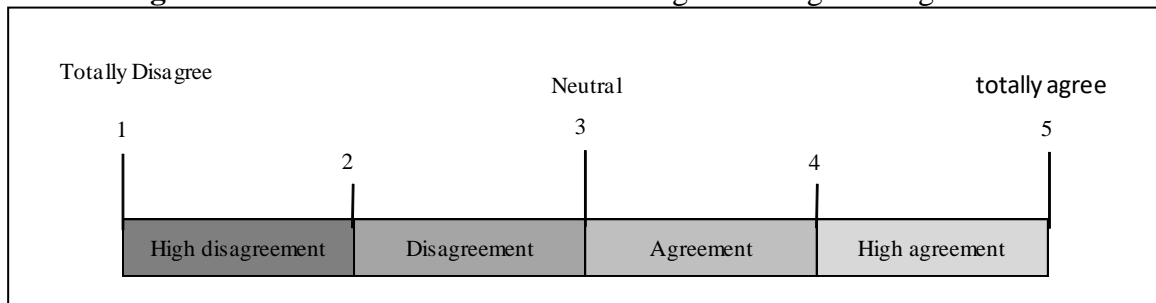
For data collection, the following research techniques were used, according to Marconi and Lakatos (2002): (1) indirect documentation through bibliographic research to become familiar with the theme and deepen it and (2) extensive direct observation, through the application of the entrepreneurial intention survey. The research was carried out in three moments: (1) students were made aware of the objectives of the study; (2) the entrepreneurial intention surveys were applied; and concluding, (3) tabulation and data analysis were performed.

For data analysis and interpretation, the following instruments were used: (1) position measures (average, median, and quartiles) to demonstrate how the data are distributed in the sample, (2) dispersion measures (standard deviation and boxplot) to assess the degree of variability of the research values (Marconi & Lakatos, 2002), and (3) graphs were used to better visualize the collected and analyzed data. The boxplot makes it possible to identify the center, dispersion, and distribution of data and outliers (extreme values). Boxplot is the graphical way to show the set of five (minimum, Q1, median, Q3 and maximum) statistical results and get direct information about the shape of the frequency distribution of the sample or variable (Lapponi, 2005). Considering the outliers in this type of analysis, it is relevant, as it highlights the relevant information and because it affects the mean and standard deviation values. Microsoft Excel® was used for analysis and interpretation of results.

Descriptive statistics were used which, according to Silvestre (2007), are concerned with measuring the characteristics of the elements of the entire population. The purpose of this type of analysis is to obtain the precise value of these parameters based on the observations made in all elements of the population. In short, descriptive statistics is concerned with the direct measurement of parameters in populations.

Regarding the classification of the level of agreement to entrepreneurship, the present study adopted for the classification of the results a scale of 1 to 5 (Likert scale) in which the values of 2 and 4 represent the reference points for the classification of the level of agreement of respondents to the topic, ranging from totally disagree (1) to totally agree (5) and presented graphically in Figure 1.

Figure 1. Classification of results according to the degree of agreement.



Source: Authors. Self-elaboration.

4. Results

4.1 Respondents profile

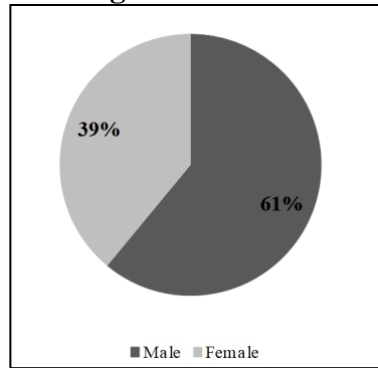
The research sample was formed by students of information systems (n=100). The sample used a 95% confidence level and a 5% margin of error. As for gender, 61% of the students are



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male and 39% female (Figure 2). As for the age group of those surveyed, 91% of students are up to 25 years old, 8% between 26 and 35 years old, and only 1% between 35 and 45 years old. The distribution by participants' monthly family income shows that 59% of the students have a monthly family income not exceeding R\$ 2,000.00.

Figure 2. Gender.



Source: Authors. Self-elaboration.

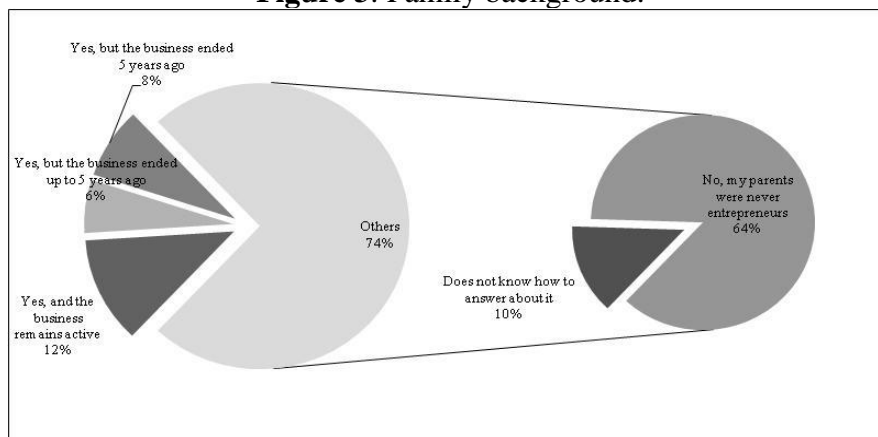
4.2 Entrepreneurial Intention

As for the analysis of the students' Entrepreneurial Intention, the following questions were asked and the following results were obtained.

Question 1: "Did you grow up in an entrepreneurial family? "

Figure 3 demonstrates the family background, where 64% of the respondents admitted that their parents were never entrepreneurs, while 12% stated that the parents own an enterprise and that it remains active, 10% do not know how to answer about the subject, 8 % that the business ended more than five years ago and 6% that the business ended up five years ago.

Figure 3. Family background.



Source: Authors. Self-elaboration.

Question 2: "Have you ever seriously considered starting your own business? "

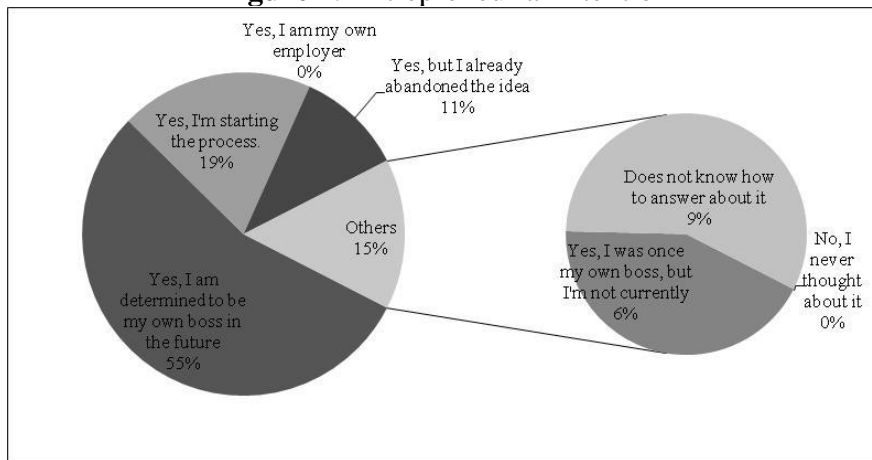
Figure 4 indicates that 51% of the students said they were determined to be their boss in the future, 18% said they are already starting the process, 10% said they were already thinking, but abandoned the idea, 8% did not know how to answer about the subject, 7% said they had



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never even thought about it and 6% said it was already the standard itself, but currently, it is no longer.

Figure 4. Entrepreneurial intention

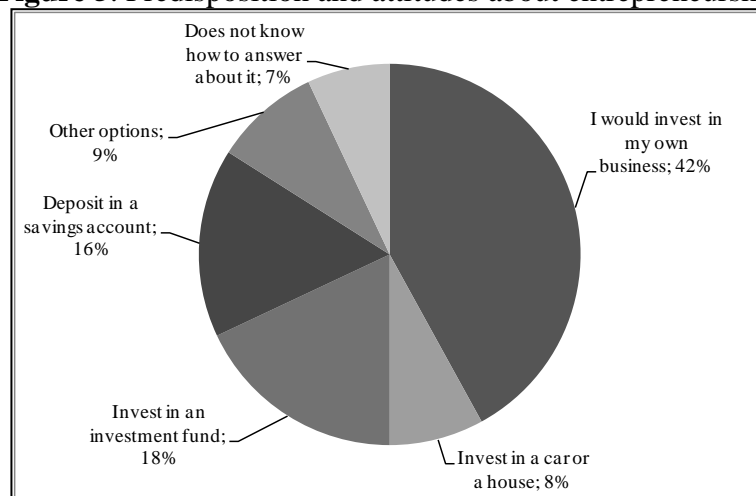


Source: Authors. Self-elaboration.

Question 3: “If you had 30,000 reais, how would you invest that money?”.

The data shows that 42% would invest in their own business, followed by 18% who would invest these resources in an investment fund, 16% who would deposit that amount in savings, 9% who would seek other options, 8% who would invest in a car or home and 7% who did not know how to answer (Figure 5).

Figure 5. Predisposition and attitudes about entrepreneurship



Source: Authors. Self-elaboration.

As for the attitude towards self-employment, the following items were considered in a degree of agreement from 1 (high disagreement) to 5 (high agreement): (1) I'd rather be my owner than have a secure job; (2) I'd rather build my enterprise than be the manager of an existing one; and (3) I can only make good money if I am my boss.

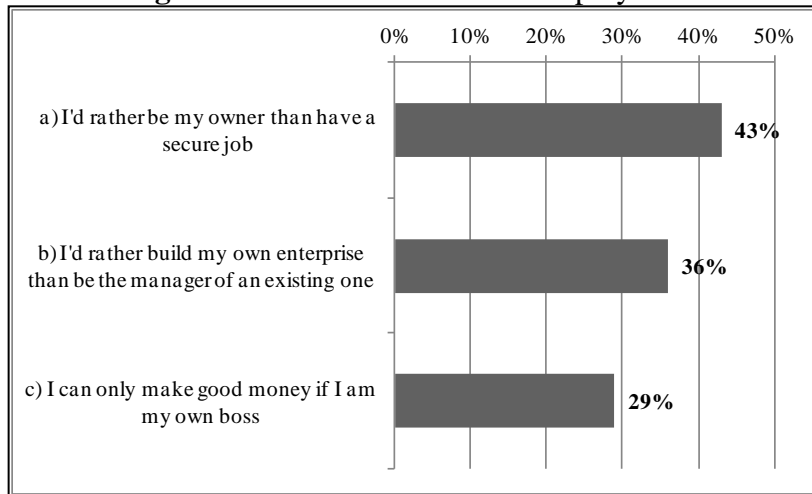
The results indicate, considering the positive evaluations 4 and 5, that 43% of the interviewees stated that they would prefer to be their boss than to have a secure job. In the second item, 36% answered that they would rather build their own company than be the



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manager of an existing one. Finally, in the last item, 29% of respondents said they were not sure if just being their boss can make good money (Figure 6).

Figure 6. Attitude towards self-employment.

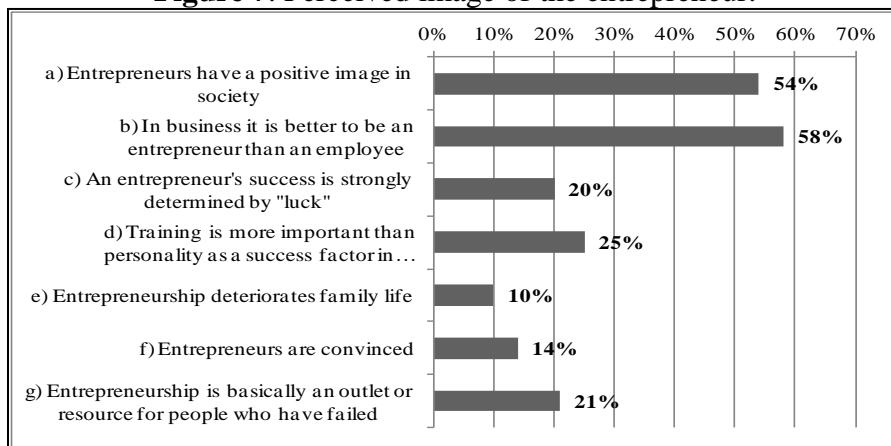


Source: Authors. Self-elaboration.

About the perceived image of the entrepreneur, the following items were considered in a level of agreement from 1 (high disagreement) to 5 (high agreement): (1) entrepreneurs have a positive image in society; (2) in business it is better to be an entrepreneur than an employee; (3) an entrepreneur's success is strongly determined by “luck”; (4) training is more important than a personality as a success factor in entrepreneurship; (5) entrepreneurship deteriorates family life; (6) entrepreneurs are convinced; and (7) entrepreneurship is an outlet or resource for people who have failed.

The results indicate, considering the positive evaluations 4 and 5, the questions that deal with the positive image of the entrepreneur and the preference of being an entrepreneur for whom the employer obtained the best positive results, 54%, and 58% respectively. The questions that deal with entrepreneurship as something that deteriorates family life, that consider entrepreneurs convinced and that treat entrepreneurship as an alternative for people who fail were also positively evaluated, in which case evaluations 4 and 5 have a negative character regarding perception (Figure 7).

Figure 7. Perceived image of the entrepreneur.



Source: Authors. Self-elaboration.



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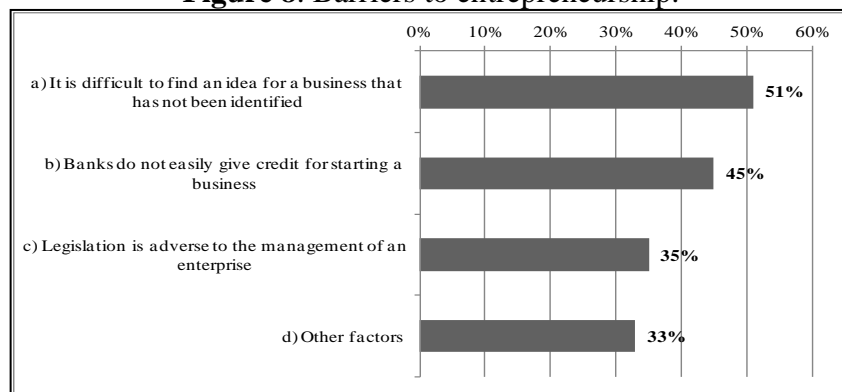
About barriers to entrepreneurship, the following items were considered in a degree of agreement from 1 (high disagreement) to 5 (high agreement): (1) it is difficult to find an idea for a business that has not been identified; (2) banks do not easily give credit for starting businesses; (3) the legislation is adverse to the management of an enterprise; and (4) other factors (Figure 8).

The results indicate, considering the positive evaluations 4 and 5, that 51% of the interviewees consider it difficult to find a new idea; 45% consider it difficult to obtain credit lines to start new companies; 35% recognize that the legislation is adverse to the management of an enterprise, and 33% said they considered other factors as barriers.

Regarding the perceived risks, the following items were considered in a degree of agreement from 1 (high disagreement) to 5 (high agreement): (1) I like challenges. Many of the best moments in life occurred when it struggled to achieve a difficult goal; (2) starting my own business is risky, I can lose everything; and (3) it is true that we are our boss, but running our own company involves a lot of work and only brings major headaches.

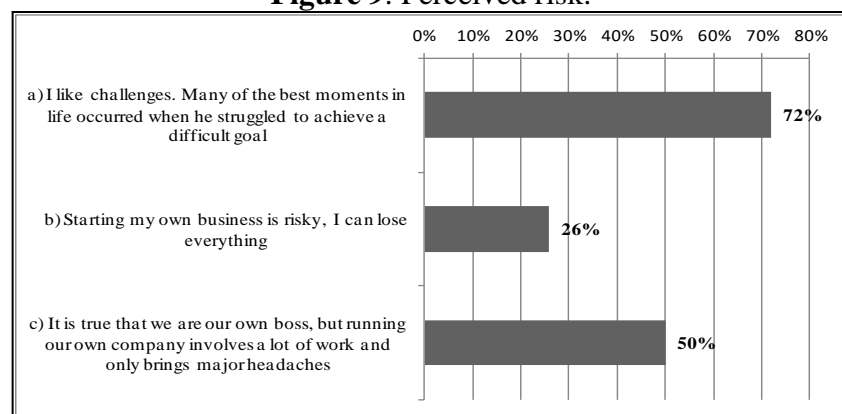
The results indicate, considering the positive evaluations 4 and 5, that 72% of the students said that they like challenges and that the best moments of their lives occur when they struggle to reach a difficult goal; 26% agreed that starting their own business is risky and may lose everything; and 50% of the students agreed that running the company itself involves a lot of work and responsibilities, bringing only headaches (Figure 9).

Figure 8. Barriers to entrepreneurship.



Source: Authors. Self-elaboration.

Figure 9. Perceived risk.



Source: Authors. Self-elaboration.

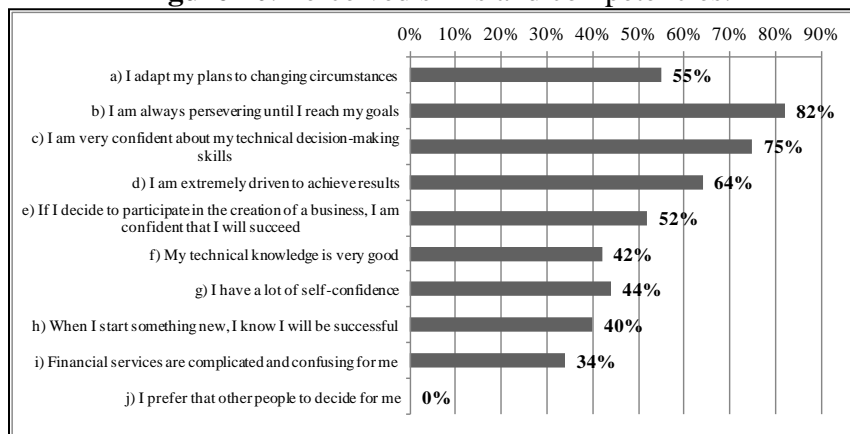


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Regarding the perceived skills and competencies, the following items were considered in a degree of agreement from 1 (high disagreement) to 5 (high agreement): (1) I adapt my plans to changing circumstances; (2) I am always persevering until I reach my goals; (3) I am very confident about my technical decision-making skills; (4) I am extremely driven to achieve results; (5) If I decide to participate in the creation of a business, I am confident that I will succeed; (6) my technical knowledge is very good; (7) I have a lot of self-confidence; (8) when I start something new, I know that I will be successful; (9) financial services are complicated and confusing for me; and (10) I prefer that other people decide for me.

The results indicate, considering the positive evaluations 4 and 5, that 55% of the students said they had a high agreement to adapt according to the circumstances; 82% consider themselves persevering to achieve goals; 75% are confident about their technical decision-making ability; 64% consider themselves oriented to achieve results; 52% are confident of success in creating a business; 42% consider themselves to have very good technical knowledge; 44% consider having self-confidence; 40% are confident of being successful when they start something new; 34% consider financial services complicated and confusing, and 0% of students prefer that other people decide for themselves (Figure 10).

Figure 10. Perceived skills and competencies.



Source: Authors. Self-elaboration.

The results related to the attitude towards self-employment indicate the items I1 (average 3.33) and I2 (average 3.04) have an average level of agreement close to neutral according to the classification of the level of agreement indicated in Figure 1. I3 indicates an average level of agreement classified as “Disagreement” (average of 2.60), which may indicate that students consider other ways to make good money, not just entrepreneurship (Table 1).

Table 1. Results obtained - Attitude towards self-employment

Itemnumber	Average	Standard error	CI - 95%	
			IL	UL
I1	3,33	0,12	3,09	3,56
I2	3,04	0,11	2,82	3,26
I3	2,60	0,13	2,35	2,85

Source: Authors. Self-elaboration.

The results obtained regarding the entrepreneur's perceived image indicate the items I5 (average 3.50) and I4 (average 3.33) with the highest averages indicating an average level of



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agreement classified in “Concordance”, however closer to a neutral position. Items from I6 to I10 (except for Q8) indicate an average level of agreement, classified as “Disagreement”, indicating a “positive” perception of the entrepreneur's image. The I8 (average 1.97) indicates an average level of agreement, classified as “High disagreement”, has the lowest mean in this parameter, suggesting a “positive” relationship between entrepreneurship and family life (Table 2).

Table 2. Results obtained - Perceived image of the entrepreneur

Item number	Average	Standard error	Confidence Interval - 95%	
			Inferior Limit	Upper Limit
I4	3,33	0,13	3,07	3,58
I5	3,50	0,12	3,26	3,74
I6	2,26	0,13	1,99	2,52
I7	2,66	0,12	2,43	2,89
I8	1,97	0,11	1,76	2,18
I9	2,28	0,12	2,05	2,50
I10	2,38	0,14	2,11	2,64

Source: Authors. Self-elaboration.

The results obtained from the barriers to entrepreneurship present the highest averages for I12 (average 3.37) and I11 (average 3.29), followed by I13 (average 3.20) and lastly I14 (average 2.97). Items I11 to I13 indicate an average level of agreement classified as “Concordance”, however again close to a neutral position. I14 indicates an average level of agreement, classified as “Disagreement”, very close to a neutral position as well (Table 3). The results suggest that the barriers are real obstacles in the case of Brazil for those people who wish to start an enterprise, being a negative aspect in the perception of the respondents (Table 3).

Table 3. Results obtained - Barriers to entrepreneurship

Item number	Average	Standard error	Confidence Interval - 95%	
			Inferior Limit	Upper Limit
I11	3,29	0,12	3,05	3,53
I12	3,37	0,09	3,20	3,53
I13	3,20	0,10	3,00	3,41
I14	2,97	0,12	2,74	3,20

Source: Authors. Self-elaboration.

The results obtained regarding the perceived risk indicate I15 (average 3.90) and I17 (average 3.18) with the highest averages indicating an average level of agreement classified as “Concordance”, with I15 closer to a classification of “High agreement” and I17 closer to neutral positioning. Item I16 indicates an average level of agreement, classified as “Disagreement”. The results suggest that the respondents have a risk-averse profile, where challenges are well regarded, which may be related to the age (generation) of the participants (Table 4).

Table 4. Results obtained - Perceived Risk

Item number	Average	Standard error	Confidence Interval - 95%	
			Inferior Limit	Upper Limit
I15	3,90	0,10	3,70	4,10
I16	2,69	0,12	2,46	2,93
I17	3,18	0,13	2,94	3,43

Source: Authors. Self-elaboration.



The results obtained regarding the perceived skills and competence indicate the items I19 (average 4.26), I20 (average 3.87), I22 (average 3.68) and I21 (average 3.67) with the highest averages indicating a level of agreement classified in “Agreement”, close to a classification of “High agreement”. The items I18 (average 3.52), I24 (average 3.31), I25 (average 3.29), and I23 (average 3.26) also indicate a level of agreement classified as “Agreement”, however close to more neutral positioning. Items I26 (average 2.70) and I27 (average 1.71) indicate a level of agreement classified as "Disagreement" and "High disagreement", respectively.

The results suggest that perseverance, technical capacity, results orientation and confidence are the skills and competencies most valued by students, while aspects related to financial capacity and delegating the decision-making process and achieving success are the biggest challenges in terms of doubts, development of competencies and skills (Table 5).

Table 5: Results obtained - Perceived skills and competencies

Item number	Average	Standard error	Confidence Interval - 95%	
			Inferior Limit	Upper Limit
I18	3,52	0,09	3,35	3,69
I19	4,26	0,09	4,08	4,43
I20	3,87	0,09	3,68	4,05
I21	3,67	0,12	3,44	3,91
I22	3,68	0,10	3,50	3,87
I23	3,26	0,07	3,11	3,40
I24	3,31	0,14	3,04	3,57
I25	3,29	0,12	3,05	3,52
I26	2,70	0,12	2,48	2,93
I27	1,71	0,08	1,55	1,88

Source: Authors. Self-elaboration.

The purpose of the boxplot is to verify three items: (1) the behavior of the data, (2) their dispersion around the average, and (3) the verification of the presence of outliers. Presenting the variability of the five aspects considered in this study, (1) concerning self-employment, (2) perceived image, (3) barriers to entrepreneurship, (4) perceived risk, and (5) skills and competencies, as shown in Figure 11.

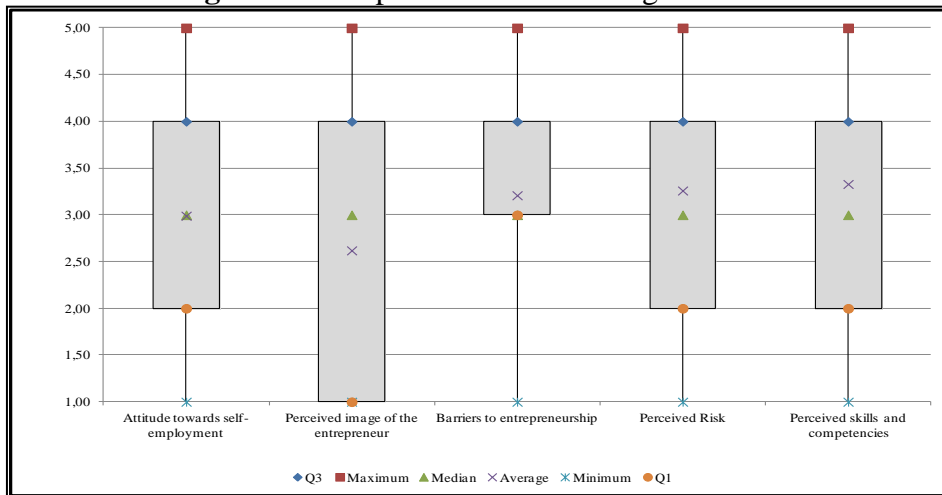
Boxplot represents that half of the evaluated sample has a response within the range of values for each aspect. The 3rd Quartile indicates that ¼ of the evaluated sample has responses above this value and the 1st Quartile indicates that ¼ of the sample has responses below this value.

The data indicate the asymmetrical distribution of values about the median in three aspects considered (attitude toward self-employment, perceived risk and skills and competencies) and asymmetric in the aspects of perceived image and barriers to entrepreneurship. The presence of upper and lower outliers (extremes) is verified in all domains. Aspects regarding self-employment, perceived risk, and skills and competencies have a central position with the median central place in the rectangle (representing symmetry).

The results indicate the average below the median in the perceived image aspect, with the box skewed to the right influenced by small outliers related to the entrepreneur's good image. There is a wide dispersion of data in four aspects, except for barriers to entrepreneurship, resulting from the diversity of responses from students (influenced by outliers). In the case of barriers to entrepreneurship, consensus on obstacles is evident, reflected in less dispersion.



Figure 11. Boxplot of the studied organization.



Source: Authors. Self-elaboration.

5. Discussion

Almost 2/3 of the students of information systems do not have entrepreneurial parents and only 12% still have an active enterprise. Even with a scenario in which students do not come from an entrepreneurial family, the vast majority of students intend to become entrepreneurs while less than 10% never thought about the subject and only 9% of students gave up on the idea of entrepreneurship.

The data indicate that 89% of students who do not have a family background support entrepreneurship, while 96% of students who have a family background support the concept. Students who have a family background tend to support entrepreneurship more than students who do not have a family background, however, it is worth mentioning that most students regardless of their origin support the idea (Lasпита *et al.*, 2012; Veciana, Aponte & Urbano, 2005; Bako *et al.*, 2017; Nguyen, 2018).

Comparing the entrepreneurial attitude (intention to undertake) for the period that the students attend, the results were homogeneous, however, when the entrepreneurial behavior (effective action of undertaking) was analyzed, the finalist students (ninth and tenth period) obtained superior performance. The study indicates a tendency for students to follow entrepreneurship in their predisposition and attitude about entrepreneurship, that is, almost half (42%) of them would invest if they had financial resources in their own business. Traditional investments, such as car, house, investment fund represented a significant part of their interest (42%).

The Female (26%) present entrepreneurial behavior slightly higher than male (22%). This result is related to the process of transforming entrepreneurial intention into entrepreneurial behavior as also observed in Bagheri and Pihie (2014), Braches and Elliott (2016), Shinnar *et al.* (2018), Ahl (2006) and Bloemen-Bekx *et al.* (2019), that is, there is a gap between the individual wishing to be an entrepreneur (most do) and becoming an entrepreneur (Shinnar *et al.*, 2018; Shirokova, Osiyevskyy & Bogatyreva, 2015). This gap can be better explained by entrepreneurial models such as Ajzen (1991), Shapero (1982) and Krueger (2009; 2017).

The study also points out a strong indication of self-employment among students, demonstrating that they see entrepreneurship as a journey to professional success as also



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observed in Osakede, Lawanson and Sobowale (2017), Kaltenecker, Hoerndlein and Hess (2015) and Omidi Najafabadi, Zamani and Mirdamadi (2016). Another finding of the study, entrepreneurship also projects a positive image among respondents; this image is related to success, journey, independence and professional and personal commitment, also observed in Baumol *et al.* (2009).

The study points out the profile of respondents who tend to face the risks, due in large part to the sample formed by the vast majority of young people, justifying this tendency to take risks. Half of the students consider starting their own business as being risky and may lose everything.

Concerning the perceived capacity and competencies, the study indicates that perseverance, confidence in its technical capacity, orientation towards results, and self-confidence are among the aspects best evaluated. Perseverance showed the best performance, that is, for more than 80% of students believe that to be an entrepreneur it is necessary to persist and continue with their ideas and convictions.

Conclusion

This study aimed to investigate the role of family background, self-employment, and gender in undergraduate education in students of information systems at a university in the state of Amazonas/Brazil. Given the results found, it is believed that the research objective was achieved.

The main results indicate that the majority of students intend to become entrepreneurs in the future. Students who have a family background tend to support entrepreneurship more than students without a family background. Finalist students have high entrepreneurial intent about beginning students and may be related to a longer time spent in the university's entrepreneurial environment. The results point to high entrepreneurial behavior in females about males, even considering all the predominantly male stereotype of the environment.

The theoretical contributions of the study reinforce the existing literature about factors family background, self-employment, gender even in the context of the Amazonia region. The managerial implications reinforce the need for entrepreneurial education throughout undergraduate courses to encourage students to start a business contributing to economic, technological, and innovation development.

As a limitation of the research, the sample considered only students from the information systems, therefore it is recommended for future studies the application of this instrument in other courses of the university and the region to obtain a more general view of the students' entrepreneurial intention. It is suggested to use qualitative methodologies and mixed methods to provide a more complete view of the antecedents and determinants of entrepreneurial intention.

The importance of this study is to indicate how such factors (family background, self-employment, and gender) affect undergraduate students, contributing to the theoretical and managerial aspects of studies in entrepreneurial intention in the context of the Amazonia region.



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