College environment and entrepreneurial intention in high school

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Abstract

Purpose – There is no consensus on the most effective way to foster entrepreneurship in educational institutions, and educational policies on entrepreneurial activity differ significantly amidst organizations and contexts. Thus, the objective of this research is to analyze influence of the college environment and entrepreneurial characteristics on the entrepreneurial intention of Brazilian high school/technical students.

Design/methodology/approach – The empirical research used partial least squares structural equation modeling (PLS-SEM) and a sample of 384 students of technical courses, such as Administration, Systems Development, Chemistry, Secretariat, among others.

Findings – The proposed model was validated, and the hypotheses were confirmed, proving suitable for high school/technical education. Assessing the high school environment with this model can help determine each organization's strengths and weaknesses and, indeed, the impacts on the ecosystems in which it operates. The results of the multi-group analysis indicate differences concerning the courses as well.

Research limitations/implications – The main limitations involve non-probabilistic sampling procedures and the collection having been carried out with a single cross-section.

Practical implications – For managers and teachers, this article presents indicators to qualify the activities of the educational environment, considering teaching activities, extracurricular activities, fairs, actions of teachers and students, among other initiatives.

Social implications – The article contributes to high school managers, particularly in technical schools, so that they understand the factors that influence the profile and entrepreneurial intention of students; in other words, something that can impact the lives of thousands of students, teachers and the community itself.

Originality/value – This research presents a novel analysis of the antecedents that drive student entrepreneurship in an underexplored educational context in a developing country. The results show the necessary conditions for technical schools to foster entrepreneurial activity, feeding innovation ecosystems with entrepreneurial talent.

Keywords Entrepreneurial intention, Self-efficacy, Entrepreneurial characteristics, High school/technical, School environment, Secondary/technical education, Structural equation modeling

Paper type Research paper

1. Introduction

According to the academic literature, it is possible to identify studies that report education systems around the world applying the teaching of entrepreneurship at the secondary level (Pommer Barbosa, Silva, Gonçalves, & Morais, 2020; Tentama & Abdussalam, 2020).

When dealing with this subject, it is possible to find two strands: the author Hickie (2011) affirm that the adolescent who has contact with entrepreneurship in their high school education thinks about becoming the owner of their own business; as for Paço *et al.* (2011), they argue that this experience helps young people to develop specific characteristics by providing skills they will need when reaching adulthood regardless of whether they will continue their entrepreneurial career or not.

Research focusing on entrepreneurship in this environment is still in its infancy, and this is a gap in the literature on the subject (Peterman & Kennedy, 2003; Pommer Barbosa *et al.*, 2020; Tentama & Abdussalam, 2020). However, for higher education, studies have been carried out frequently and with promising results (Campos, Moraes, & Spatti, 2021; Da Silva, de Araújo Bispo, Rodriguez, & Vasquez, 2018; Fayolle & Liñán, 2014; Kuratko, 2005; Moraes, Iizuka, & Pedro, 2018; Moraes, Fischer, Guerrero, Rocha, & Schaeffer, 2021; Moraes, Iizuka, Rocha, & Diaferia, 2021; Rocha, Moraes, & Fischer, 2021; Simões & Silva, 2013).

The entrepreneurial ecosystem, which includes the ecosystem of universities, can positively affect the entrepreneurial behavior of students (Alves, Fischer, Schaeffer, & Queiroz, 2019; Campos *et al.*, 2021; Moraes, Fischer *et al.*, 2021; Pelegrini & Moraes, 2022; Rocha *et al.*, 2021; Salamzadeh, Farjadian, Amirabadi, & Modarresi, 2014; Tentama & Abdussalam, 2020). However, there is still no evidence that there is a correct way to promote entrepreneurship in educational institutions, and there is no consensus on this in the entrepreneurship literature (Fischer, Moraes, & Schaeffer, 2019; Moraes, Fischer *et al.*, 2021; Moraes, Iizuka *et al.*, 2021). Thus, educational policies on entrepreneurial activity differ significantly across organizations and contexts (Dana, Tajpour, Salamzadeh, Hosseini, & Zolfaghari, 2021; Guerrero & Urbano, 2019). Fundamental gaps remain in our understanding of high schools' abilities to set the right conditions for student entrepreneurship (Pommer Barbosa *et al.*, 2020; Tentama & Abdussalam, 2020). In the case of developing countries, this is particularly important, as these countries often emulate practices adopted in advanced economies without properly assessing their adequacy (Alves *et al.*, 2019; Fischer *et al.*, 2019; Moraes, Fischer *et al.*, 2021; Salamzadeh, Azimi, & Kirby, 2013).

Small and medium enterprises (SMEs) account for 62% of total employment and 50% of national added value in the Brazilian context. These values are slightly below the OECD averages of 70 and 55%, respectively. Brazil's GDP growth rate in 2017 was 1.32%, and in 2018 there was a drop of 0.01%, while in 2019, Brazil's GDP growth rate decreased by 0.18p.p. vs 2017, showing a rate of 1.14% (World Bank, 2020). This slight reduction in indicators may point to a reduced capacity of the economy to generate sufficient jobs, improve the quality of employment in current jobs, and share the benefits of economic growth (Fragoso, Rocha-Junior, & Xavier, 2020). Brazil still registers high unemployment rates in the adult population (11.9% in 2019) and particularly among young people (27.8% in 2019) (ILO, 2020). In this context, entrepreneurship plays a key role, as it supports innovation and establishes small and medium-sized companies (Coulibaly, Erbao, & Mekongcho, 2018) as being a possible economic solution, and as it has the potential to allow individuals – especially young – to acquire skills and establish their jobs, contributing to the reduction of the unemployment rate in the country (Coulibaly *et al.*, 2018). For this to happen, a fundamental step is developing entrepreneurial intentions and behaviors, as this process represents the first phase in the effective creation of a business, even in long-term perspectives (Fayolle & Liñán, 2014).

Based on these arguments, more sophisticated investigations into the effectiveness of educational actions in high schools for entrepreneurial activity are necessary (Pommer Barbosa *et al.*, 2020; Tentama & Abdussalam, 2020). Therefore, the contribution of this research is to fill this gap on the subject at the high school level and measure the influence that entrepreneurial characteristics and the school environment have on the entrepreneurial intention of students. The practical contribution is to bring managers' and teachers'

information about the students' level of interest, their profiles and how the environment influences them towards entrepreneurship.

This motivates the following question: to what extent can entrepreneurial characteristics and school environment influence the entrepreneurial intention of high school/technical students?

To carry out this research on the influence of entrepreneurial characteristics and school environment in entrepreneurial intention of high school/technical students, we study two State technical schools (Etecs): Lauro Gomes and Juscelino Kubitschek de Oliveira, from *Centro Paula Souza* (CPS), an autarchy of the government of the State of São Paulo composed of Etecs and Technology Colleges (Fatecs) created in 1969 with the objective of "promoting professional and technological public education within benchmarks of excellence, aiming at the technological, economic and social development of the State of São Paulo" (Souza, 2015).

In addition to bringing training aimed at the job market, CPS promotes entrepreneurship, taking it as one of its strategic objectives (Souza, 2015, 2017). Through fairs, events, projects, actions, covenants and partnerships, CPS introduces the culture of entrepreneurship into its institutions.

The article is structured as follows. After these introductory arguments, Section 2 articulates the literature review. From this literature review, hypotheses were formulated. Section 3 presents the research methodology and data collection procedures. Section 4 reports the description and analysis of empirical results. Section 5 presents the discussion and conclusions with final remarks, implications and avenues for future research.

2. Literature review
2.1 Middle-level entrepreneurship and the school environment
The entrepreneurship literature has focused on higher education institutions, and research on entrepreneurship in the high school environment is still embryonic. This is an essential gap in the entrepreneurship literature (Peterman & Kennedy, 2003; Pommer Barbosa *et al.*, 2020; Tentama & Abdussalam, 2020). This level of education is the ideal place to foster entrepreneurship, and this lack of research should not exist (Xu, Ni, & Ye, 2016).

In the national context, some surveys were found: one of them aims to investigate the competencies that make up Entrepreneurial Education. However, it addresses the three levels of education: elementary, secondary and higher (Zambon, 2014); the second study elaborates a proposal for the insertion of an entrepreneurship discipline in a high school institution (Mayer, 2001); another one used the same research object and set out to investigate whether professional education develops entrepreneurial skills – the analysis was restricted to alumni (Pereira, 2018); and the last, Pommer Barbosa *et al.* (2020), identified that entrepreneurial education acts on personality traits and positively impacts the entrepreneurial intention of young elementary and high school students, especially in the stages of entrepreneurial development and training.

On international level, research by Paço *et al.* (2011), Peterman and Kennedy (2003) and Xu *et al.* (2016) state the relevance of studying this topic in high school. The authors Filion (1994); Kourilsky and Walstad (1998) declare that the phases of childhood and adolescence are often identified as the preferred periods for the development of positive attitudes towards entrepreneurship and the acquisition of basic knowledge on the topic. Tentama and Abdussalam (2020) proved the relationship between the internal locus of control and entrepreneurial intention in vocational high school students, demonstrating the importance of understanding the entrepreneurial behavior of this student population.

National and international academic literature on entrepreneurship predominantly focuses on undergraduate and graduate courses. Content and activities are worked so that

the student links entrepreneurship with the creation of new businesses (Dana *et al.*, 2021; Fayolle & Liñán, 2014; Kuratko, 2005; Moraes, Iizuka *et al.*, 2021; Pelegrini & Moraes, 2022; Rocha & Freitas, 2014).

Research on entrepreneurship in high school addresses the issue through two strands: one of them in a playful, balanced and even subjective way so that the experience with entrepreneurship contributes positively, developing characteristics and skills that will help one in any context of life (Paço *et al.*, 2011); the other strand works on entrepreneurship in a more traditional and applied way, in which the environment will provide technical knowledge through workshops, projects and entrepreneurial activities, not with the same intensity performed at the higher level, the approach at the medium/technical level has the purpose of preparing young people for the professional market (Hickie, 2011). To exemplify this reality, Etec Antonio Devisate in the City of Marília created the Business Plan in Practice project in 2011, whose purpose was to improve student learning through the creation of a fictitious company. The challenge was to carry out a business plan for a donut company and present it to the entire school community. In some classes, students chose their theme and often linked it to personal goals. In testimonials, students told how the experience was, raising some aspects such as a much more comprehensive notion of starting a business, something that was considered complex to make easy, and a vision of how to create and run a business (Iizuka, 2015).

In the particular case of the studied environment, Etecs propose teaching and learning related to the second strand of entrepreneurship: applied and classic, thus meeting the objective of this research, which is to contribute to the advancement of knowledge concerning the entrepreneurial intention of high school/technical students.

2.2 Teaching and learning measured by entrepreneurial characteristics
The way we teach and learn is undergoing substantial changes. Covid-19 pandemic accelerated these changes, with the migration of the educational environment to collaborative learning environments and high technology use (Hodges, Moore, Lockee, Trust, & Bond, 2020). This abrupt change in how education is delivered demonstrated how much the learning experience needed to be enhanced for a new context (Garcia-Morales, Garrido-Moreno, & Martin-Rojas, 2021). Online emergency remote education has been an experience in all areas (Zimmerman, 2020).

In this context, the relevance of exploring all educational contexts grows. Entrepreneurship education in high school receives little credit. And considering the national and international literature surveyed, we did not find similar research on the high school educational environment. A lack of research makes it difficult to identify measurement mechanisms to assess which skills and competencies this teaching can promote.

We adopted a model tested and validated in higher education to investigate high school context, developed by Moraes *et al.* (2018). The model presents validated indicators for entrepreneurial characteristics and educational environment constructs. Model adaptations have already been used in several recent studies (e.g. Campos *et al.*, 2021; Rocha *et al.*, 2021; Moraes, Fischer *et al.*, 2021; Moraes, Iizuka *et al.*, 2021). In addition, the model proposed by the authors is the closest to the reality studied by this research.

The entrepreneurial characteristics used in the structural model to measure entrepreneurial intention were: self-efficacy, sociability, planning, leadership, innovation and taking calculated risks (Table 1).

Therefore, this research proposed to test whether entrepreneurial characteristics such as sociability, planning, leadership, innovation and taking calculated risks, positively influence self-efficacy; and if self-efficacy and the school environment positively influence the intention of entrepreneurship of high school/technical students, following the structural model of the authors Moraes *et al.* (2018) (see Table 1). In this case, the research was also willing to test

Construct	Description	Reference
Self-efficacy	People who are able to achieve the desired results. In the context of entrepreneurship, self-efficacy is regarded as the strength that a person has in believing that they are able to successfully perform various roles and tasks to open and manage their own business	Bandura (1986), Chen, Greene and Crick (1998)
Sociability	Communicate effectively with several people, making partnerships for the development of relationships and business networks, establishing trust and legitimacy in their negotiations	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
Planning	People who organize the activities necessary to achieve a desired goal. Anticipate events and have a future vision of the enterprise	Schmidt & Bohnenberger, 2009, Rocha and Freitas (2014)
Leadership	It is the practice of inspiring, motivating and guiding people, so that the goal is achieved	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
Innovation	People who apply new ideas, devices or methods	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
Take calculated risks	People who, in the face of a personal project, list and analyze the variables that can influence their result and, from there, decide the continuity of the project	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)

Source(s): Adapted by the authors from Moraes *et al.* (2018)

Table 1.
Entrepreneurial characteristics (constructs)

whether the variable course arises any difference between the relationships of all latent variables. The tested hypotheses are shown in Table 2.
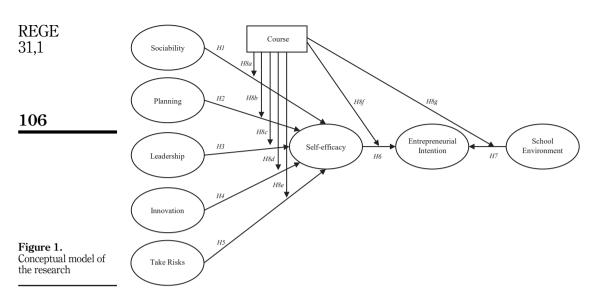
Figure 1 presents the research conceptual model.

3. Methodology

The quantitative method will develop the research using multivariate data analysis. The analysis was performed using Partial Least Square Structural Equation Modeling (PLS-SEM). The reasons for using PLS-SEM are: the research is concerned with testing a theoretical framework from a forecasting perspective; the survey features multi-group analysis; the model is complex (Hair, Hult, Ringle, & Sarstedt, 2022).

Hypotheses description	
H1	Sociability positively influences self-efficacy
H2	Planning ability positively influences self-efficacy
H3	Leadership ability positively influences self-efficacy
H4	The capacity for innovation positively influences self-efficacy
H5	Taking calculated risks positively influences self-efficacy
H6	Self-efficacy positively influences entrepreneurial intention
H7	The school environment positively influences entrepreneurial intention
H8a	There is a difference in the relationship between sociability and self-efficacy with regards to the course
H8b	There is a difference in the relationship between planning and self-efficacy with regards to the course
H8c	There is a difference in the relationship of leadership and self-efficacy with regards to the course
H8d	There is a difference in the relationship between innovation and self-efficacy with regards to the course
H8e	There is a difference in the relationship between take risks and self-efficacy with regards to the course
H8f	There is a difference in the relationship between self-efficacy and entrepreneurial intention with regards to the course
H8g	There is a difference in the relationship between school environment and entrepreneurial intention with regards to the course

Table 2.
Study hypotheses

Figure 1.
Conceptual model of
the research

The questionnaire and the model were created for research involving higher education students; however, there was a need for adaptation to the target audience of this research. We consulted two Etec teachers who teach entrepreneurship classes to verify the instrument. The teachers stated that the questions were in a structure in which students would understand the questionnaire. Therefore, a pre-test was conducted with ten high school students integrated into the technical Administration course. The result was positive; the students had no difficulties understanding the instrument (see Table 3).

To carry out this research, the final sample was 133 students from the Technical Course in Administration and 251 students from other courses, totaling 384 respondents. Data collection took place in February and March, 2019, with the help of teachers and school unit coordinators. The other courses in the sample were: (1) Regular High School; (2) Technician in Logistics, Systems Development and Secretariat and (3) Integrated Technical Education for Mechatronics, Industrial Automation and Chemistry.

More than half of the students in the sample are between 15 and 17 years old (73%), the rest of the sample was made up of students aged between 18 and 21 years old (18%), 22 to 25 years old (5%) and over 26 years old (4%). Regarding gender, students are homogeneously distributed, 51% are men and 49% are women.

The evaluation of the sample and the statistical power of the analysis was performed using the G*Power 3.1 software and recommendations by Hair *et al.* (2022). To perform the calculation, the largest number of arrows that reach a latent construct is considered. In the case of this study, there are five (greater number of predictors). With a significance level of 5%, the statistical power of 0.8 and average effect size ($f^2 = 0.15$, which is equivalent to $R^2 = 13\%$), it is known that the minimum sample size is 92. With the analysis of multi-groups double this value is expected. As the sample used was 384 students, it is suitable for estimation by PLS-PM. For the average effect size, the power is 0.99, which is well above the 0.8 recommended by Hair *et al.* (2022).

4. Description and analysis of results
The model presents only reflective indicators: Self-efficacy (SE), School Environment (EN), Take Risks (TR), Entrepreneurial Intention (EI), Innovation (IN), Planning (PL), Leadership

#	Question	Reference
LE1	I am often chosen as a leader in school activities or in other groups that I participate in	
LE2	People respect my opinion	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
LE3	I can convince people to overcome conflicts and work as a team to achieve a particular result	
LE4	I am able to encourage people to perform tasks for which they are unmotivated	Adapted from Schmidt and Bohnenberger (2009)
PL1	I always plan everything I do very well	
PL2	I always plan everything I do very well. When I have a goal, I try to define where I want to go and I detail all the steps I must follow	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
PL3	I know that I can define my plans for the short, medium and long-term future	
PL4	I like to set goals and targets to feel challenged	Moraes et al. (2018)
IN1	I prefer a job full of news, to a routine activity	
IN2	I like to change the way I work whenever possible	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
IN3	I like to improve the conventional way and correct activities, not strictly following the steps	Adapted from Schmidt and Bohnenberger (2009)
IN4	I bet on creativity when designing projects/activities	
TR1	I would assume a long-term debt, believing in the advantages that a business opportunity would bring me	
TR2	I agree to take risks in exchange for possible benefits	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
TR3	My decisions are not predominantly based on my comfort zone	Moraes et al. (2018)
TR4	I believe that if I am willing to take more risks, this can bring me more interesting results	
SO1	The social contacts I have are very important for my personal life	
SO2	I know several people who could help me professionally, if I needed it	Schmidt and Bohnenberger (2009), Rocha and Freitas (2014)
SO3	I relate to other people very easily	
SO4	I try to keep in constant contact with people in my network	Moraes et al. (2018)
EI1	I feel like I am ready to start my own business in the future	Liñán and Chen (2009)
EI2	I will do everything to create and maintain my own business	Saeed et al. (2015)
EI3	Even if I come to work for other companies, I will never abandon my dream of opening my business	Moraes et al. (2018)
EI4	My biggest achievement will be having my own business	Liñán and Chen (2009)
EI5	I intend to open my own business in the future	Liñán and Chen (2009)
SE1	I believe I have the ability to identify good opportunities in the environment in which I am inserted	
SE2	Comparing with the other people who live with me, I believe that I am a much more persistent person than the others	Rocha and Freitas (2014)
SE3	I always find creative solutions to problems I face	
SE4	I perform my tasks correctly, respecting the established deadlines	Moraes et al. (2018)
SE5	I can work productively under continuous stress, pressure and conflict	
SE6	I can develop and maintain favorable relationships with potential investors	
SE7	I can see new market opportunities for new products and services	

(*continued*)

Table 3.
Scale indicators

#	Question	Reference
SE8	I can recruit and train key employees	
SE9	I can develop a work environment that encourages people to try something new	
EN1	The school environment helped me to detect business opportunities	
EN2	The school environment helped me to be persistent	Moraes *et al.* (2018)
EN3	The school environment motivated me to want to open my own business in the future	Based on Fayolle and Liñán (2014)
EN4	The school environment improved my leadership skills	
EN5	The school environment has improved my ability to innovate	
EN6	The school environment improved my ability to plan	Moraes *et al.* (2018)
EN7	The school environment improved my creativity	Based on Fayolle and Liñán (2014)
EN8	The school environment taught me to make decisions when I face a problem, improving my ability to take calculated risks	

Note(s): Likert scale responses from 1 (totally disagree) to 5 (totally agree). The students responded how much they agreed with the statements

Table 3.

(LE) and Sociability (SO). Therefore, the criteria used for the analyses were: internal consistency (composite reliability); reliability of the indicator; convergent validity (average variance extracted) and discriminant validity (Hair *et al.*, 2022).

The first criterion analyzed was convergent validity, respecting the levels indicated for latent variables, referring that, indicators with loadings greater than 0.7 are significant. In contrast, loadings between 0.4 and 0.7 should be evaluated, as the removal of these indicators can affect the variance of the construct. Finally, loadings lower than 0.4 are recommended to be removed from the research (Hair *et al.*, 2022). Thus, the indicators with loadings between 0.4 and 0.7 were analyzed and some were excluded.

Another indicator necessary for model validation is the Average Variance Extracted (AVE). This indicator represents the average value of the square factor loadings of the indicators associated with the construct, whose value must be greater than 0.5. That is, an AVE of 0.5 or higher indicates that, on average, the construct explains more than half of the variance of its indicators (Hair *et al.*, 2022).

In analyzing the internal consistency of the model, we have two other criteria: Composite Reliability and Cronbach's Alpha. The first depicts the degree to which the indicators reflect the latent construct in common; the second provides an estimate of reliability based on the correlations of the observed indicator variables, assuming that all indicators are equally reliable. Both indicators work at the same level for validation, ranging from 0 to 1, in which the values closer to 1 show that the construct will be more internally consistent. Values above 0.7 are the most satisfactory; however, for exploratory research values between 0.6 and 0.7 are considered acceptable (Hair *et al.*, 2022).

The purpose of discriminant validity is to show that the measure of one construct is different from the other. That is, each construct is unique and captures the phenomenon not represented by other constructs in the model (Hair *et al.*, 2022). The indicators mentioned are presented in Table 4, and all are within the parameters established by Hair *et al.* (2022).

Bootstrapping technique was used for the evaluation of the structural model. This technique aims to analyze the significance of the indicators by means of the factor loadings, estimating the model by means of parameter estimates and their confidence intervals (Hair *et al.*, 2022). With this information, Student's *t*-test is calculated to assess the significance of each indicator weight, starting from the assumption that the correlation coefficients are equal to zero if the test results are greater than 1.96, indicating that the correlation is significant (Hair *et al.*, 2022).

Constructs	SE	EN	TR	EI	IN	LI	PL	SO
SE	0.717							
EN	0.502	0.711						
TR	0.375	0.332	0.742					
EI	0.452	0.573	0.325	0.881				
IN	0.476	0.336	0.324	0.352	0.762			
LE	0.426	0.355	0.253	0.283	0.385	0.765		
PL	0.361	0.434	0.267	0.343	0.294	0.310	0.753	
SO	0.447	0.357	0.271	0.341	0.318	0.390	0.363	0.760
Cronbach's alpha	0.762	0.785	0.735	0.925	0.639	0.651	0.751	0.636
Composite reliability	0.841	0.835	0.829	0.945	0.806	0.803	0.840	0.803
AVE	0.514	0.506	0.551	0.776	0.580	0.585	0.567	0.577

Source(s): Authors

Table 4.
Model measurement

Table 5 shows that all relationships obtained Student's t-test values above 1.96, with a significance level of 5%.

Other measures used to evaluate the structural model are the determination coefficient (R^2) and the Q^2. R^2 measures how much the model has predictive accuracy, with values ranging from 0 to 1. The R^2 values of the self-efficacy (0.391) and entrepreneurial intention (0.364) construct are both considered high, both considered high values.

The Q^2 indicator represents the predictive relevance of the model, values of Q^2 greater than 0 indicate the predictive relevance of the model, the Q^2 values of self-efficacy construct (0.183) and entrepreneurial intention (0.260) are within their respective parameters.

In the multi-group analysis we observe the relationship of the course variable in relation to the other latent variables, and we verify whether there are differences in the technical course in Administration in relation to the other courses. Values below 0.05 and above 0.95 show that differences are significant (Hair *et al.*, 2022). The results in Table 6 show that there are significant differences between leadership and self-efficacy and between sociability and self-

Relationship	Mean	Standard deviation	T test	P value
SE → EI	0.221	0.048	4.591	0.000
EN → EI	0.462	0.042	11.054	0.000
TR → SE	0.161	0.051	3.168	0.002
IN → SE	0.258	0.046	5.655	0.000
LE → SE	0.167	0.057	2.933	0.003
PL → SE	0.112	0.047	2.408	0.016
SO → SE	0.215	0.047	4.619	0.000

Table 5.
Structural coefficients
of the model

Relationship	Differences between coefficients – course	P value
SE → EI	0.101	0.169
EN → EI	0.019	0.416
TR → SE	0.055	0.707
IN → SE	0.036	0.662
LE → SE	0.204	0.025
PL → SE	0.095	0.157
SO → SE	0.149	0.950

Table 6.
Multi-group analysis

efficacy relationships. In this case, leadership and sociability in relation to the self-efficacy of students in the technical course in Administration are more intense than that of students of other courses.

Thus, Table 7 shows the results of the hypotheses tests of this study.

With this, it is possible to identify that the school environment is the construct that most influences entrepreneurial intention. This demonstrates that the high school student/technician, independent of the course in which they are inserted, develops an entrepreneurial behavior through the school environment. This result confirms what the authors Kourilsky and Walstad (1998) say, that entrepreneurship education in high school conducted in a supportive environment will increase students' interest in the subject as well as their preparation.

The self-efficacy construct was also validated. That is, the more the student believes that he/she is able to successfully perform various roles such as finding creative solutions, working productively and seeing new market opportunities, the greater their entrepreneurial intention.

Regarding the constructs that influence self-efficacy, what stood out the most was innovation. The more students feel creative and in search of news, the greater their self-efficacy. The second construct that most influenced self-efficacy was sociability. The larger the network of contacts and relationships, the more self-effective that student will be.

The leadership construct was also validated: the greater the student's influence on people, so that they can overcome conflicts and work as a team, the greater their self-efficacy. Then follows risk-taking construct, according to which the greater the willingness to take risks, leave the comfort zone, believe that this will bring advantages and opportunities, the greater the student's self-efficacy.

Finally, the planning construct, which refers to being able to anticipate events and have a future vision: in this case the greater the preparation of that student for the future, the more self-effective they will be.

When performing the analysis of the result of multi-groups, it was evident that there is a difference when it comes to the technical course in Administration compared to other groups.

Hypotheses	Description	Result
H1	Sociability positively influences self-efficacy	Confirmed
H2	Planning ability positively influences self-efficacy	Confirmed
H3	Leadership ability positively influences self-efficacy	Confirmed
H4	The capacity for innovation positively influences self-efficacy	Confirmed
H5	Taking calculated risks positively influences self-efficacy	Confirmed
H6	Self-efficacy positively influences entrepreneurial intention	Confirmed
H7	The school environment positively influences entrepreneurial intention	Confirmed
H8a	There is a difference in the relationship between sociability and self-efficacy with regards to the course	Confirmed
H8b	There is a difference in the relationship between planning and self-efficacy with regards to the course	Not confirmed
H8c	There is a difference in the relationship of leadership and self-efficacy with regards to the course	Confirmed
H8d	There is a difference in the relationship between innovation and self-efficacy with regards to the course	Not confirmed
H8e	There is a difference in the relationship between take risks and self-efficacy with regards to the course	Not confirmed
H8f	There is a difference in the relationship between self-efficacy and entrepreneurial intention with regards to the course	Not confirmed
H8g	There is a difference in the relationship between school environment and entrepreneurial intention with regards to the course	Not confirmed

Table 7.
Hypothesis test result

The contrast lays on relationships between leadership and self-efficacy and sociability and self-efficacy. The most significant difference was in the leadership indicator: students in the Administration course perceive themselves to have this more prominent feature than students in other courses. This can happen because one of the characteristics of the Administration professional is leadership, and the course also works through its basis and activities so that it can be awakened in students, or the student looking for this course already has predisposition or profile directed to this characteristic.

Regarding sociability, what may have happened is that the sample had courses such as chemistry, mechatronics, industrial automation and systems development, in which the student profile is of low social interaction.

5. Discussion
When teaching entrepreneurship in high school, one realizes that there are two approaches: the first is more playfully and subjectively, and the second is a more applied way, aimed at more traditional entrepreneurship. Secondary/technical education is more characterized by the second approach, as its objective is to train students for the professional market.

Through a model that proved to be appropriate for higher education and after an adaptation for high/technical school, it was possible to present the efficient results of this research, showing that the model was adequate for the study since national and international academic literature is limited and is at an early stage of research. We believe that the choice of Etecs and technical education students favored this result since such educational institutions, like colleges and universities, seek to prepare students for the world of labor.

The model's hypotheses regarding entrepreneurial characteristics have all been confirmed, and for sample quantity are consistent, reliable and statistically valid results.

In the multi-group analysis, we observed that the relationship of the constructs of leadership and sociability concerning self-efficacy indicated a difference in terms of courses. This result opens a space for research and analysis, as it is indicated that a more in-depth study should be carried out to understand; what are the factors that led this differentiation of the technical course in Administration compared to other courses, questioning the reason why these students had these characteristics more evident. For this, the sample should be expanded and tested in other technical courses and other Etecs.

The hypotheses that were not confirmed in the multi-group analysis indicate that the other entrepreneurial characteristics do not present differences. That is, regardless of the course, the students have the same perception; this must have probably occurred due to the environment being the same, the student's profile having socio-economic similarities, among other factors, something that can be tested with different student samples.

Regarding the practical contribution of the research, it can be certain that the two Etecs environment has influenced their students' entrepreneurial intention. For the managers and teachers of these institutions, this research is an indication that teaching, extracurricular activities, fairs, actions by teachers and students, among other initiatives, have had a positive effect (Paço *et al.*, 2011).

Thus, the assessment of the high school environment with this model can help determine the strengths and weaknesses of individual organizations and, in fact, their impacts on the ecosystems in which they are inserted. The relational skills developed by high schools to connect their student bodies to the broader context of ecosystems stand out as a key factor in entrepreneurial behavior (Moraes, Fischer *et al.*, 2021). Consequently, our results shed light on the mechanisms through which such connections can feed the productive structure with entrepreneurial talent. Thus, the model can be replicated in other Etecs to verify how much their institutions may be influencing entrepreneurial intention, as well as verifying whether the result achieved in these two schools is confirmed or not.

6. Conclusion and final remarks

Forming entrepreneurial behavior and encouraging entrepreneurship is essential for effective business creation. Our research helps fill a research gap on the relationships and effectiveness of educational actions for entrepreneurship in high school. This research presents a new analysis of the antecedents that drive student entrepreneurship in an underexplored educational context in a developing country. The results show the necessary conditions for technical schools to foster entrepreneurial activity, feeding innovation ecosystems with entrepreneurial talent. For managers and teachers, this article presents indicators to qualify the activities of the educational environment, considering teaching activities, extracurricular activities, fairs, actions of teachers and students, among other initiatives.

The research has limitations to be highlighted: the sample used was non-probabilistic, with the perception of only one Brazilian high school context; the collection was carried out in a single cross-section; the use of a model developed for the university context.

Thus, some suggestions for future research can be presented. At the national level, it is possible to reproduce it in other technical courses from the same education network and technical courses from other institutions, such as federal educational institutes (IFES); in regions and states, such as rural technical schools, analyzing whether the environment also impacts entrepreneurial intention. It is possible to test it in several countries where high school/technical education is part of youth training at the international level. Another possibility is to conduct longitudinal research to see how students' behavior changes over time.

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Associate Editor: Aidin Salamzadeh