Institutional Strategies for Training in University Entrepreneurship. Analysis in a Public University

Sandra Milena Zambrano Vargas[1], Lina María Otálora Gómez[2], Efrén Ariolfo Báez Conde[3]

[1]Universidad Pedagógica y Tecnológica de Colombia (UPTC).
sandra.zambrano01@uptc.edu.co. ORCID:0000-0003-3492-6971
[2]Universidad Pedagógica y tecnológica de Colombia (UPTC), lina.otalora@uptc.edu.co. ORCID: 0000-0002-2656-2269
[3]Universidad Pedagógica y tecnológica de Colombia (UPTC), fren.baez@uptc.edu.co. ORCID: 0000-0003-3942-8912

ABSTRACT
In the Colombian context, entrepreneurship training has been consolidated as a relevant need for social and economic growth. The objective of this article is to analyze the experience developed by the Pedagogical and Technological University of Colombia in the implementation of an entrepreneurial training strategy that leads to a culture of entrepreneurship in the community. Methodologically, a single case study design was adopted, descriptive with a mixed approach, based on the application of a satisfaction instrument applied to 1,073 participants, highlighting the high acceptance and motivation of the population, who participated not only in training processes, but also in different actions carried out within the entrepreneurial ecosystem of the institution. Direct observation was also used, which helped in the improvement of didactic material depending on the results obtained and the level of satisfaction of the groups and individual entrepreneurs who received the training. The importance of strengthening the UPETECA entrepreneurial ecosystem is concluded, following the actions carried out so far and improving the interrelations of all the actors inclined to participate in it, including external actors from private companies and government entities.

Keywords: Entrepreneurship, agile methodologies, didactic tools, personal development

1. INTRODUCTION

Entrepreneurship has become a fundamental driver for economic, social, and territorial development, especially for young people who face different barriers to accessing formal jobs and development opportunities, because it is considered an engine of economic growth, creativity, and innovation (Bolldureanu et al., 2020). In recent years, entrepreneurship has been promoted by the United Nations (UN) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), which focus through the Sustainable Development Goals (SDGs) on promoting inclusive and sustainable economic growth, generating quality education and reducing inequalities (UN, 1995; UNESCO, 2025b).

In Colombia, tools and ecosystems have been established to support entrepreneurial projects. From the twenty-first century, entrepreneurship in the country has experienced significant growth, offering innovation opportunities for young people, with a global

vision (Pedroza & Araque, 2023). The entrepreneurial impact in Colombia has increased rapidly due to the change in mentality of adolescents, motivated to create their own businesses. Various entities, such as SENA's Entrepreneurship Fund and the Ministry of Commerce, Industry and Tourism, support entrepreneurship with seed capital.

However, there are entrepreneurship gaps in some regions of the country such as Boyacá, where it is stated that there is a low entrepreneurial culture, leading to slow economic progress, which is observed in a risk-averse mentality, with a prevalence of traditional businesses (Private Competitiveness Council, 2025).

To achieve long-term productive development in Boyacá, it is essential to have an entrepreneurial mass that generates value for society through the creation of new companies, generating formal jobs, and energizing production chains through innovation. The importance of entrepreneurs in regional progress requires strategic policies that promote entrepreneurial culture, supported by the development of a growing industry. In this context, the interconnection of three fundamental pillars to visualize a region with a great entrepreneurial force stands out: the young population, education, and entrepreneurship (Global Entrepreneurship Monitor, 2025).

Thus, entrepreneurship training not only provides them with practical tools to define and manage their own business ideas, but also helps them to cultivate critical thinking, the ability to adapt, which stand as essential skills within a dynamic and diverse business environment. Therefore, entrepreneurship training empowers young people individually, and promotes economic growth, through the generation of employment and in the construction of a dynamic society with an innovative mentality, necessary at the regional level, where services prevail and the development of technology-based and highly innovative companies is required, leaving universities the responsibility to help in this purpose through the entrepreneurship preparation of future professionals (Gonzalez et al., 2025).

With this vision, the Pedagogical and Technological University of Colombia (UPTC) adopted in 2022 its institutional policy of Research, Innovation, Technological Development, Creation and Entrepreneurship, recognizing entrepreneurship as a strategic dimension for professional training and as an articulating axis for the strengthening of its academic ecosystem.

In this framework, this article presents a case study that analyzes the experience developed by the UPTC in the design and implementation of an entrepreneurial training strategy aimed at students, teachers, administrators and graduates. It also examines the process of strengthening the entrepreneurial culture at the UPTC through the description, characterization and critical analysis of the institutional model of entrepreneurship training that has been implemented to date.

2. THEORETICAL FOUNDATION

2.1. Entrepreneurship

It is defined as the action of making and executing a business idea with resolution and commitment, which is a process of learning and hard work, which involves being an agent of change for society and the economy (Cruz, 2023). On the other hand, it can be a person who makes decisions to obtain resources, understanding that they have a financial risk where a price is paid and then a product or service is sold at a higher price.

With the above definitions, it can be said that the entrepreneur assumes a risk, whether

the business idea generates profits or on the contrary does not prosper and generates losses or debts, day by day it is a challenge to survive in the market, thanks to the investment of capital, own or by loan for the generation of profitability, jobs and the contribution to the improvement of the economic environment of the region and social levels (Dote et al., 2025). In order not to disappear, entrepreneurs have to aim for innovation, be willing to change, be creative, with a high motivation where they are leaders not only of people, but also of resources. Likewise, the entrepreneur is the creator of new initiatives in a virtuous circle that is intended to never end, he is the agent of economic imbalance, since he contributes to destabilizing the structure of the market through products or services, generating relationships between the different actors (Nazir & Das, 2025), this innovation-entrepreneurship relationship is confirmed by Drucker (1985) who states that entrepreneurs and businessmen take advantage of opportunities to produce changes and improvements in innovation, even beyond the economic sphere.

2.2. Theories on Entrepreneurship

The study of entrepreneurship, given its importance for the socioeconomic development of the world, has been full of multiple nuances that try to explain it, such as theories, theoretical perspectives, factors that promote it, types of entrepreneurs, among others. Authors such as Vallmitjana (2014), for example, define four theories: economic, psychological, sociocultural, and directive. Terán and Guerrero (2020) in their study grouped the theories that emerged to explain entrepreneurship. Four currents of research emerge from their study, each with a diversity of associated theories that try to explain the phenomenon of entrepreneurship: the theory of economic entrepreneurship classifies 10 associated theories; the theory of psychological entrepreneurship four; the theory of sociological entrepreneurship seven associated theories and finally the theory of entrepreneurship of business management five, which shows us a wide range of ways of understanding and helping to develop entrepreneurship. Roncancio et al. (2025) highlight the importance of using these theories for the teaching of entrepreneurship to provide a greater union between theory and practice, so that it is a priority within the curriculum for universities and with the possibility of transcending society in general.

2.3. Teaching Entrepreneurship

Knowledge is a very productive investment, both economically and socially, thanks to the offers of programs that promote society in the generation of sustainable business ideas that are environmentally friendly, innovative, creative, among other characteristics. The above is intended to favor society with stable economies, given the significant advances that entrepreneurship generates and the need to put into practice more advanced knowledge with a high scientific depth (Unesco, 2025a). Education manages to develop and enhance individual capacities, allowing society to overcome through the opportunities generated by the changing world (Peña & Villegas, 2020).

López and González (2025) state that the teaching of entrepreneurship must have a didactic approach, where learning is problem-based (PBL), but it must also be directed towards the training of entrepreneurial citizens from an autopoietic perspective, being of great importance not only the economic, but also the social and environmental. Today's world requires young people to identify and put into practice the rights and duties of all, in order to be able to solve problems in the best way and through creativity generate

aspects inherent to entrepreneurial training (Wu et al., 2025).
Syed et al. (2024) state that it is very important that teachers have the experience at least of being an entrepreneur or better still as a creator of a company because it is a necessary condition to be able to teach entrepreneurship and not as it is generally observed throughout history that teachers who are dedicated to entrepreneurship training are purely theoretical and their knowledge is based on academic training and business consultancies, the above is important, but unfortunately it is a perspective that will depend on the background and professional experience of each teacher.
Amaral et al. (2024) state that education is the pillar of entrepreneurial education; Blankesteijn et al. (2024) highlight that an indispensable role of the University is to train innovative and creative entrepreneurs, considering that for their training it is necessary to carry out a methodology that depends on people, but not on the type of person, but through business practice entrepreneurship can be taught in a better way. However, it is an obligation of the University to promote the entrepreneurial spirit through the use of various actions that contribute to the teaching of entrepreneurship (Martínez & Ortega, 2021), but unfortunately it is an area that is scarcely treated (Blankesteijn et al., 2024).
Benavides et al. (2023) state that entrepreneurship training should include business ethics, environmental protection, and commitment to sustainability, where entrepreneurs know that there are limits. The same authors also explain the importance of universities developing pedagogical strategies based on experience, where the development of soft and technical skills gives way to successful entrepreneurs. For their part, Hémbuz et al. (2020) emphasize the existence of a relationship between university education and the promotion of entrepreneurship, since the curriculum allows knowledge of the regional context and its possible solutions based on teaching-learning methods specific to each institution (Damián, 2023), where students according to Roncancio et al. (2025) must be closely connected to their environment, so that they can take advantage of opportunities.
Other authors such as Solarte et al. (2023) go even further and propose training in sustainable entrepreneurship, where not only students but entrepreneurs must create innovations that benefit the masses and that surpass purely economic ventures, where people are prepared to start a business from the creation of value, on the contrary, sustainable entrepreneurship seeks to start, guarantee and integrate; which leads entrepreneurs to think in the long term from sustainability.

2.4 Agile methodologies

Ghezzi and Cavallo (2020) state that, at the end of World War II, the development of solutions to market needs was so necessary, due to the unbridled way of the value generation approach, that the Lean philosophy created continuous activities where the objective was achieved by eliminating activities considered as waste. To reduce the risk that the offer of products or services would not be in line with the needs and tastes of customers, it is necessary to develop a clear vision to generate good market acceptance with a better business model design, so that agile methodologies based on hypotheses can be carried out and put into practice, which are tested through iterative validation processes (Silva et al., 2020). Golovin (2025) states that agile methodologies should consider a combination of tools and methods that generate flexible responses to the demands of entrepreneurship, in the same sense, Triana (2022), states that the use of these methodologies helps to understand entrepreneurship and its characteristics quickly

towards value creation in contexts of uncertainty, placing these resources as key elements in the training of new entrepreneurs based on the use of experiential education and practical tools that guide learning towards action (Rodríguez et al., 2019).

2.5 Training of Entrepreneurial Skills

The formation of entrepreneurial skills allows the generation of economic growth and social cohesion, due to the development of entrepreneurs' projects with clear objectives, a broad vision beyond the labor-business; which take into account the three dimensions of the sustainable development goals: social and environmental, economic and personal responsibility. Ortiz et al. (2013) talk about the concept of entrepreneurial skills, which they state are those that allow the successful development of tasks or missions that a certain task requires, this is achieved with significant real experiences, which are individual characteristics, that is, aptitudes and personality traits that if applied help in the acquisition of knowledge, without leaving aside personal and social experience, since they are essential to develop skills in real contexts, in other words, leave only training towards obtaining money and rather consider the acquisition of soft skills (Effio & Duran, 2025; Mei et al., 2020).

3. METHODOLOGY

This research is developed with a unique case study design because the choice is given of a single event where the particular characteristics to understand a phenomenon in depth are given (Yin, 2018); in this case, the entrepreneurship ecosystem developed at the UPTC.

Its purpose is to describe the dynamics, processes, and actors that make up the entrepreneurial ecosystem, following the logic proposed by Lijphart (1971) for this type of study. Therefore, a study is carried out under a mixed approach, with a descriptive predominance because it is based on characterizing the phenomenon and identifying the factors and causes that influence its development, and the way in which it is structured as a whole (Hernández & Mendoza, 2021).

Additionally, the satisfaction survey technique was applied, composed of quantitative items and open questions of a qualitative nature, which made it possible to collect direct information from users regarding their experience and perception of the strategies implemented in entrepreneurship activities. In addition, direct observation was used, which made it possible to record levels of participation, interaction and responses of the participants during the development of activities. It was configured as a cross-sectional case study, which allows analyzing the development of entrepreneurship training strategies at the University.

The quantitative data obtained from the surveys were analyzed using descriptive statistics, using frequencies and percentages to identify trends in the perceptions of the participants. For the qualitative and direct observation data, a content analysis was carried out, which allowed the responses to be categorized, strengthening the validity of the findings.

The target population of the study was made up of students, teachers and entrepreneurs who participated in entrepreneurship training activities, therefore, the sample was non-probabilistic for convenience, because it is made up of participants who agreed to answer the instrument.

Therefore, the article is structured in three phases, first documenting the institutional

conformation of entrepreneurship within the University, detailing the processes, structures and regulations. Second, the strategies implemented by the Entrepreneurship Unit are described through the analysis of management reports and structured surveys of the participating actors. Finally, the integration and analysis of the results is carried out, facilitating the understanding and achievement obtained, which corresponds to the logic of the case study methodology according to Lijphart (1971).

4. RESULTS

This section shows the results of the progress made by the Pedagogical and Technological University of Colombia in entrepreneurship until 2025, due to the programs that were defined to strengthen the entrepreneurial culture.

4.1. Background

The Entrepreneurship Unit was created in 2014 at the UPTC headquarters, as an initiative of the Business Administration program of the same headquarters. Since then, it has worked to support entrepreneurship with training for entrepreneurs and with the holding of entrepreneurship fairs. The main purpose of the Entrepreneurship Unit is: to promote and strengthen the entrepreneurial potential of the Upetecista community, through the processes of training, accompaniment and advice for the creation and improvement of companies.

In 2022, thanks to the work of the Vice-Rectory for Research and Extension, the institutional policy for Research, Innovation, Technological Development, Creation and Entrepreneurship was approved, giving entrepreneurship an important place within the academic work of the entire university.

With the above impulse, the House of Entrepreneurship and Innovation is designed and implemented in 2024, which stands as a learning scenario equipped with physical spaces Co-creation rooms, coworking rooms, prototyping room, auditorium, business office room, games room and the use of different methodologies for entrepreneurship training. There are three units that work together to care for entrepreneurship, each with its own characteristics: Entrepreneurship Unit, Business Consultation and Research Results Transfer Office.

The Business Clinic, like the Entrepreneurship Unit, arises as an initiative of the School of Business Administration of the central headquarters, providing consulting for students and professor of the subject of business management. In 2025, the institution approved its creation agreement and is operated by the same school for the central headquarters and with similar characteristics in all the sectional faculties of the university. The purpose of the Business Clinic is directed in two lines: free consulting to MSEs in the region and support in the preparation of business plans for UPETEC entrepreneurs.

The purpose of the Office for the Transfer of Research Results (OTRI) is to facilitate the effective transfer of knowledge and technology generated at the Pedagogical and Technological University of Colombia - UPTC to society and the productive sector, promoting innovation, economic development and social impact, it is operated under the leadership of the Vice-Rectory for Research and Extension.

4.2. Maturation Route of Upetecist Enterprises

The maturation route of UPETECISTA enterprises arose as a result of understanding the

needs of users (students, teachers, administrators and graduates) in relation to the promotion of institutional entrepreneurship. The contribution of the three units described above is available, each unit has clearly defined functions, which are set forth in the institutional creation agreements of each of them.

The purpose of the maturation route is to define key characteristics that are linked in the stages of ideation, pre-incubation, incubation and acceleration. To do this, the entrepreneur is given a diagnosis that shows what stage he is at and what training needs he has. With the above input, the Entrepreneurship Unit packages a program, which includes courses, application of tools and in general, the maturation route of your enterprise. The above without committing to provide pre-seed capital or seed capital resources, since, as a university, it is not our purpose, however, the possibility of managing resources to support entrepreneurs is always open from the Upetecista Entrepreneurship Ecosystem.

4.3. Linking different academic programs to entrepreneurship training

The UPTC is carrying out its academic reform process, which covers all the university's programs, which allowed the school of business administration of the central headquarters to include in its new curriculum, an entrepreneurship program that has four courses designed (within the core of deepening) which seeks to provide students with training in entrepreneurship in a logical way and that above all promotes the entrepreneurial culture. At the end of this program, students are expected to have a prototype and a business plan, so that the entrepreneurship unit can provide additional support for those who voluntarily wish to take their entrepreneurial project to the next level, depending on the stage in which it is (pre-incubation or incubation).

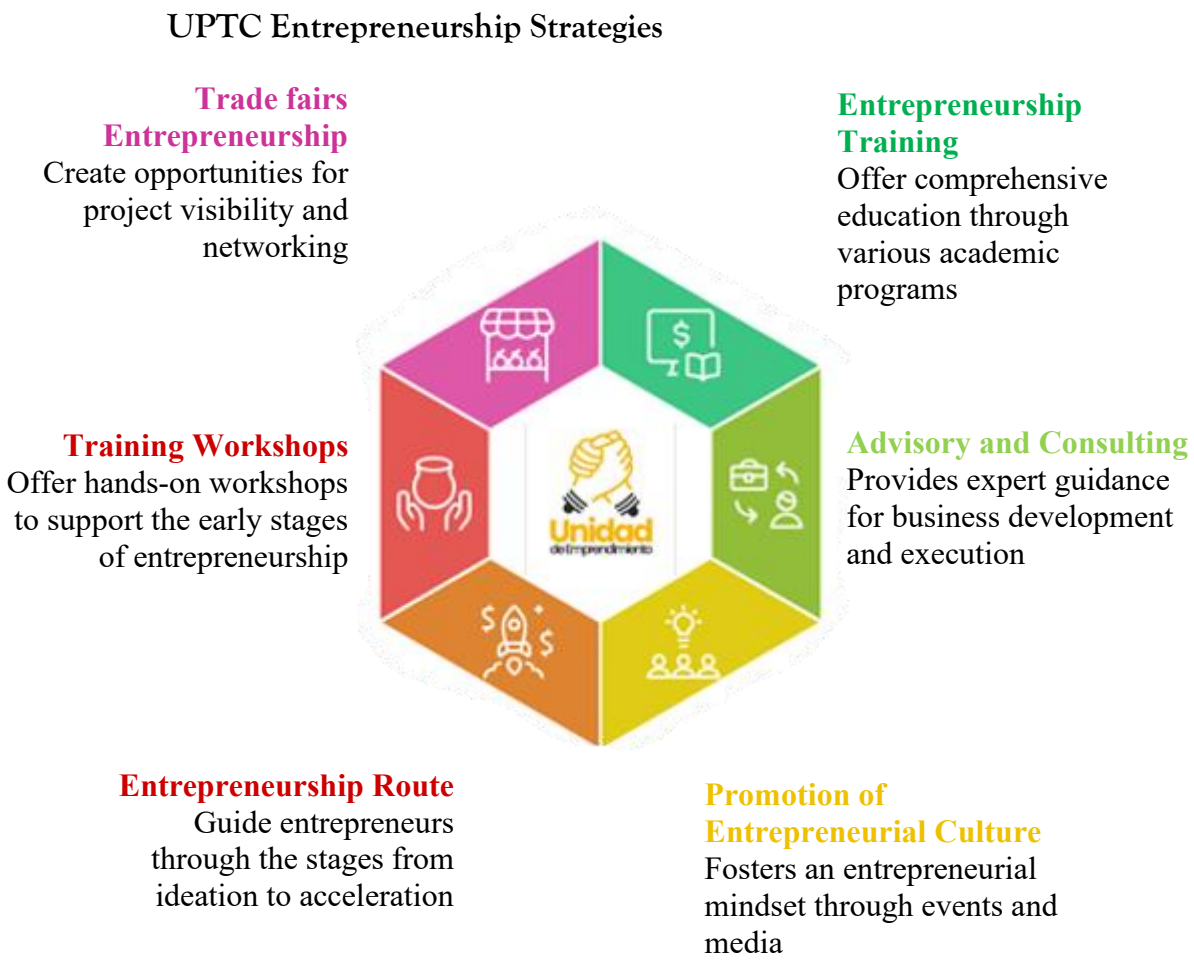
The other UPTC programs can also access these four courses as electives, especially the first of them, which has been called: institutional chair of entrepreneurship and innovation and whose objective is to promote entrepreneurial culture and sow a seed in young people to build their life project around an entrepreneurial project. This training strategy extends to the central headquarters and the three sectional faculties, since in all of them there are management schools with their own entrepreneurship programs who lead this process.

Since 2023, the university has promoted from the Vice-Rectory for Research and Extension and with the leadership of the entrepreneurship unit of the central headquarters, a continuous teacher training program for the teaching of entrepreneurship, in which teachers from all the university's administration programs have participated, promoting the creation of didactic material with defined methodologies and tools, but respecting teaching autonomy in the classroom.

4.4 Strategies developed by the Entrepreneurship Unit

The Pedagogical and Technological University of Colombia, within its framework built to comply with the promotion of entrepreneurial culture, is supported through the following strategies:

Figure 1 Entrepreneurship Strategies of the Pedagogical and Technological University of Colombia



Source: Own elaboration

- **Training in Entrepreneurship.** It is developed through the following activities: Institutional Chair of Entrepreneurship, in coordination with the Administration programs, the offer of electives and emphasis on Entrepreneurship, diplomas, courses, conferences, congresses, seminars, symposia, academic events, among others.

- **Advice and consultancies.** It is provided through business consulting and the advice that entrepreneurs need to achieve the development of business models and execute the business idea.

- **Promotion of Entrepreneurial Culture.** It is carried out through activities such as motivating the decision towards entrepreneurship through the different media of the UPTC, holding competitions on ideas and business plans, organizing meetings of entrepreneurs, dynamizing entrepreneurship inside and outside the University, with

participation in Entrepreneurship events in other networks, companies or institutions.

-Entrepreneurship route: This program aims to provide guidance, tools and training spaces to the university community, accompanying entrepreneurs according to the level of progress of their projects. Having four stages, the first stage is ideation where the idea is transformed into business opportunities, the second stage is the pre-incubation where the business model is validated and the prototype is built, stage three is the incubation where the business is launched to the market and the value proposition is validated and finally stage four is the acceleration where it scales and optimizes processes.

- Training workshops of the Entrepreneurship Unit: Given the responsibilities of the Entrepreneurship Unit, it has been oriented in the creation and implementation of workshops in the programs of the different Faculties and groups of visitors have been received at the House of Entrepreneurship and Innovation, giving workshops according to the needs of the group. For each workshop, didactic material is prepared and these packages of solutions are validated, which contributes to an improvement of the general aspects of the content and support material.

- Entrepreneurship Fairs: A scenario that allows projects to be made visible, generating contact networks, positioning and strengthening of the upetecista entrepreneurship ecosystem. Fairs or exhibitions are held during each semester inside and outside the University to provide an approach to the consumer and a positioning of the entrepreneur's brand or product can be developed.

4.5 Achievements obtained by the entrepreneurial ecosystem.

For entrepreneurship training strategies, the Institutional Chair of Entrepreneurship and Innovation has been developed in the first place, which by 2025 has been offered as an elective in the business administration programs of Tunja and Chiquinquirá and in the psychology program, for this the "student workbook" was designed and is being validated, where a logical process is followed in the stages of ideation and initially in the pre-incubation of an entrepreneurial project. The results are clear in showing changes in students in the possibility of considering entrepreneurship in their life project, for them often unthinkable.

In relation to the short training courses, they have been created as the needs of the community arrive, for example, with the University's Savings and Housing Employees Fund, a course was created to develop entrepreneurial skills in the participants of the cooperative, guiding them from the generation of innovative ideas to the structuring and initial validation of a viable business model, preparing their projects for the incubation phase.

On the other hand, academic events such as the International Congress of University Entrepreneurship are developed, where it is consolidated as an academic space of international scope, highlighting the active participation of institutions and experts from foreign universities in Mexico, Guatemala, Honduras and Panama, and with speakers from other countries such as Peru and Argentina, in addition to the collaboration of professors and students from the School of Business Administration. This leads to the strengthening of the exchange of perspectives and the development of academic

cooperation networks, enriching the dialogue on innovation, creativity and entrepreneurship in the university environment.
Another proposal implemented by the University is the training in entrepreneurship of the teachers who belong to the different Faculties, achieving training for 165 teachers, which generates an entrepreneurial spirit in each Faculty and also generates entrepreneurship skills for the professional and also knows pedagogical tools that can be applied in their subjects.

- **Advice and consultancies:** For the University it is important to develop strategies to accompany not only entrepreneurs but also small businessmen who want to develop and grow their companies, in this sense the institution created the Business Clinic that has managed in 2024 to accompany 34 entrepreneurs in consultancies throughout the semester and by 2025 it had the support of 40 businessmen and 20 entrepreneurs. This initiative was born from the subject of business management of the School of Business Administration where groups of students take a company during the semester and support them in the management and strengthening of business areas.

- **Promotion of Entrepreneurial Culture:** The main interest of the University is to generate an entrepreneurial culture in the community from the official, teacher, manager, student and graduate in order to develop skills and strengths that contribute to their professional life, for which this strategy is linked to all the others since each one contributes to the promotion of culture and from that point the Entrepreneurship Unit takes steps to participate outside the University in strategic points that this strategy contributes such as participation in Entrepreneurship Networks at the regional and national level, in companies that develop entrepreneurship programs from their programs and in events of other educational institutions that promote entrepreneurship. This has made it possible for entrepreneurs to participate in calls and manage to win financial resources to support their projects.

-**Entrepreneurship Route:** The University has its entrepreneurship maturation route composed of four stages, where calls are made and entrepreneurs are accompanied in each one, from ideation to acceleration. This year it was complemented with participation in the Boyacá Entrepreneur Route, which is organized by the Boyacá Regional Entrepreneurship Network and is made up of entities such as the Chamber of Commerce, the Mayor's Office of Tunja with ActivaT, the Government of Boyacá with the Secretariat of Business Development, Corpoboyacá and Universities of the region. Together the path was built by which the entrepreneurs participated in training on the topics of pre-incubation and incubation, within this route there was the participation of 156 young entrepreneurs of which 10 were upetecistas.

- **Training workshops of the Entrepreneurship Unit:** The Entrepreneurship Unit has a portfolio of services that includes different workshops: ideation workshop with the golden circle tool, discover your passions workshop with the Ikigai tool, value proposition workshop, market trends workshop, technological surveillance and market intelligence workshop, buyer persona, digital footprint and entrepreneurship with service. These workshops are offered to the UPETECist community and teachers, employees, students

and graduates have been incorporated.

The workshops have a total of 1740 participants during the four years, which shows that year after year they are increasing and generating greater participation. So far, students from the following programs have been trained: Agronomic Engineering, Civil Engineering, Architecture, Transportation and Road Engineering, Environmental Engineering, Metallurgical Engineering, Electronic Engineering and Systems Engineering, Veterinary Medicine and Zootechnics, Psychology, Nursing, Medicine, Bachelor's Degree in Natural Sciences, Chemistry, Biology, Bachelor's Degree in Social Sciences, Public Accounting and Business Administration, among others.

- **Entrepreneurship Fairs:** Entrepreneurs are encouraged by participating in fairs that contribute to their entrepreneurship, since in these events they can validate their product, sell it and give visibility to users. Within the strategies, fairs are developed to sell that are located in the center of the University and the community can come to buy, these are highly received by entrepreneurs because they achieve income in their projects. Also within the University, different fairs and entrepreneurship exhibitions are developed as an initiative of the areas of university welfare, human talent and different faculties, giving dynamism to upetecista entrepreneurship. Some of the entrepreneurship fairs are for example aimed at teachers or officials who have their entrepreneurship to make their talent visible and offer their products to the community, this takes place in special seasons such as December.
In addition, the business exhibition is held with the objective that the teachers who guide the institutional chair of entrepreneurship or a subject that develops entrepreneurship projects with their students in their curriculum, can make the results known to the community. Likewise, the participation in fairs is carried out outside the University, with the aim of giving greater visibility and positioning to entrepreneurs, this participation is done with shopping centers, Chamber of Commerce, Mayors of different municipalities, Government of Boyacá and Universities.

Participation in fairs and exhibitions has had, during the last two years, an interesting reception, becoming a strategic point for UPETEC entrepreneurs to publicize their products, consolidate their value proposition and strengthen the proximity with their segment. This process has transcended the regional level, achieving participation in scenarios such as the Entrepreneurship Fair of the National University of Colombia, which shows a recognition and scope of these initiatives. During this period, 538 entrepreneurs participated, a figure that demonstrates the interest and consolidation of this activity with the community.

Within the activities carried out in the Entrepreneurship Unit, the design and application of a satisfaction survey was carried out taking as a reference the study by Gao et al. (2021), who developed an instrument to evaluate the satisfaction of university students with entrepreneurship activities and courses. Based on this research technique, this survey incorporated questions related to the level of satisfaction with the activity, the recommendation to another and the assessment of the significant elements of the experience, guaranteeing validity in the field of university entrepreneurial education. This

instrument was applied to the community with a response from 1073 participants.

The first question is related to the level of satisfaction with the workshop and the results obtained show that 92% of the respondents report a high or very high level of satisfaction with what they have seen or learned in the activity. 54% are very satisfied and 37% satisfied, while 7% of the respondents have a moderately satisfactory satisfaction and 2% have low satisfaction.

They were then asked if they would recommend this activity to others and 98% of the participants show a positive disposition to recommend it, since 77% answered *yes* and 21% with a *maybe*, this shows the acceptance of the training process in entrepreneurship and generates a positive perception in the community.
After this question, it was asked why they would recommend the workshop to others, to which the main reasons that the respondents wrote were that what they learned is useful, that it develops entrepreneurial skills, that it is recommended because it gives clear guidance to start a business, in addition to that some showed a positive opinion about the institutional accompaniment and that it generated personal motivation for entrepreneurship. This shows the importance of the activities carried out that generate a strengthening of entrepreneurial capacities and the motivation of the community.

To deepen the answers, they were asked what they liked most about the workshop, which gave rise to answers such as that it is practical and can be applied to their entrepreneurship, clarity and mastery of the expert, the dynamic and participatory methodology and also that it can be applied to their profession or life, these answers can be perceived with a motivational approach that is coherent with the objective of the entrepreneurial culture of the University.
To conclude with the satisfaction survey, suggestions were asked about improving the activities carried out, to which the participants responded that they would like to increase the duration of the workshops, increase the dynamics within the activities, improve the articulation between theory and real cases, offer specialized workshops by specific areas of profession. These suggestions are inputs for continuous improvement for the training offer and allow the methodologies, times and contents of the workshops and activities carried out to be adjusted
The results showed a high level of satisfaction on the part of users with the strategies implemented, especially in relation to the relevance of the contents and how they can apply it in a practical way to their venture or idea. These findings suggest that the methodological approach adopted favors understanding and facilitates its appropriation in real contexts, which is consistent with the objective of the institution.
The data obtained show that the active methodologies are positively valued by the participants who expressed greater interest and commitment during the development of the activities, this achieves experiential learning that contributes to the appropriation of knowledge and allows improving the competencies and skills of the community.
Within the direct observation, high levels of participation, interaction and response of the participants were identified, taking into account that semester by semester it has been increasing due to the same interest of the community in participating, which leads to expand the work of the Entrepreneurship Unit and create tactics that can be applied to a

greater number of participants and achieve better results.
Direct observation also allowed the recognition of collaborative work during activities and favorable attitudes towards problem solving and idea generation. This technique complemented the results of the surveys, by evidencing behaviors consistent with the reported levels of satisfaction and provided important information to generate continuous improvement such as the creation of didactic material and pedagogical strategies.
With this section, it can be concluded that the advances in entrepreneurship achieved by the Pedagogical and Technological University of Colombia until 2025 show the consolidation of a robust, articulated ecosystem in permanent transformation and growth, achieving a high level of satisfaction and recommendation from the community.
The creation of the Entrepreneurship Unit, Business Consultancy, OTRI and House of Entrepreneurship and Innovation, added to the institutional policies, has made it possible to integrate entrepreneurship as a strategic axis. These results translate into broad training for the community and effective accompaniment for small businessmen and entrepreneurs, which generates a culture that develops an entrepreneurial spirit in each upetecista and that is perceived when the dependencies, faculties and other parts of the University carry out entrepreneurial activities during each year.

5. DISCUSSION

Higher education institutions have a great responsibility to society and their academic community regarding entrepreneurship training. However, many of them consider that teaching a related subject is sufficient to fulfill this purpose and leave aside the promotion of entrepreneurial culture. The results observed so far in this case study show that training provided through experiential methodologies and with the help of agile tools, favors the formation of entrepreneurial skills in young people beyond the pure transmission of knowledge. As expressed by Effio and Durán (2025), it is of high importance to build in students a positive attitude towards risk, innovation, and the achievement of opportunities, which can be made a reality with these new methodologies, which are widely disseminated due to their practicality. This contrasts with what was stated by Vilca et al. (2025), who emphasize that entrepreneurship should be transversal in the curriculum and not just a loose subject with no major significance in the academic program.
The results corresponding to the training both in the entrepreneurship and innovation chair guided by the management schools, and in the training workshops directed by the entrepreneurship unit, show a positive attitude of the students, who often go from not knowing anything about entrepreneurship to having a concrete entrepreneurial idea and a first version of the business model through these exercises. In addition, other efforts made by institutions are prioritized to promote autonomy, self-confidence and, in general, skills in students to create an entrepreneurial culture that helps them to realize an entrepreneurship, as stated by Effio and Duran (2025) when highlighting the need to reform curricula in accordance with the needs demanded on the road to sustainability.
The results show that institutional entrepreneurship training strategies, together with methodologies and support, favor the development of competencies in real contexts and the high level of satisfaction of the participants confirm the integration between theory and practice as it strengthens skills such as creativity, decision-making, and problem-solving. This reinforces the role of higher education institutions as key actors in the

promotion of an entrepreneurial culture oriented towards innovation and regional development (Yoon et al., 2024; Morocho & Flores, 2023).

6. CONCLUSIONS

This article explains the formation of the UPETECA entrepreneurial ecosystem based on clearly defined strategies and the way in which they collaborate harmoniously in entrepreneurship training at the Pedagogical and Technological University of Colombia. The strengthening of the entrepreneurial culture of the UPTC is an evolving process that has allowed the consolidation of training and the entrepreneurial spirit, which is achieved by the initiatives of the institutional directives that generate the policies, regulations, processes and support to develop it. The change is taking place little by little and more strategies will continue to be built to strengthen entrepreneurship and not only at the institutional level but also in the region.

The six strategies created in the Institution manage to develop an accompaniment in the entrepreneur from the moment he shows a small interest without having a clear idea, to formalizing his company and generating income and economic development in the community.

It is interesting to note that entrepreneurship is currently a topic that attracts the attention not only of young people but also of officials and professionals from various careers who want to generate their income or economic independence in a way that aligns with their life goals. Encouraging a biologist, mathematician, engineer or doctor demonstrates the potential of entrepreneurship in cities and regions, which not only stays in administrative sciences, but also reaches professionals who develop entrepreneurial skills and enhance their entrepreneurial spirit.

This case study allowed us to analyze the institutional strategies of entrepreneurship training implemented at the University, showing that the combination of active methodologies, relevant content and accompaniment favors the development of competencies in the university community. The results confirm that entrepreneurship training is more effective when it is oriented from a practical and experiential approach.

The implementation of agile methodologies, which are practical, interactive and didactic in the educational environment of higher education, contributes to the development of entrepreneurial skills and transversal competences among young people. This includes the promotion of critical thinking, adaptability and teamwork, essential in a dynamic business environment and in today's society. Each activity provides a possibility to explore the innate skills of the participants and allows them to orient themselves towards new horizons, which they had already contemplated in their daily lives. This is demonstrated through the responses of the participants who claim to have been motivated to undertake and the inspiration that the activities exert to carry it out.

At the institutional level, the findings highlight the importance of universities assuming an active role in the promotion of entrepreneurship, not only as an academic component, but as a cross-cutting strategy for innovation, employability and regional development.

This case study demonstrates that entrepreneurship must be accompanied by practical tools that foster creativity, generate critical thinking and the ability to transform ideas into viable projects. Entities are needed that not only stay in a workshop but go further and strengthen the ecosystem that can support the entrepreneur from different points. However, challenges persist in the measurement of the impact and the systematization of

learning, which is being built a new longitudinal research to be able to generate a more in-depth analysis of the results presented so far.

7. REFERENCES

1. Amaral, D. T., Nieuwenhuizen, C., & Schachtebeck, C. (2024). Assessing the influence of entrepreneurial education on individual entrepreneurial orientation of university students. *Journal of Innovation and Entrepreneurship, 13*, 70. https://doi.org/10.1186/s13731-024-00432-1
2. Benavides, E., Castro, C., & Quintero, M. (2023). Competencies for closing gaps in technology-based entrepreneurship in universities with limited track records: perspective of Colombian experts. *Revista Científica, 47*(2), 87–100. https://doi.org/10.14483/23448350
3. Blankesteijn, M., Wang, X., & Haddad, H. (2024). The mediating and moderating roles of entrepreneurship education in entrepreneurial learning and knowledge acquisition. *Journal of Innovation & Knowledge, 9*(3), 100645. https://doi.org/10.1016/j.jik.2024.100645
4. Boldureanu, G., Ionescu, A. Bercu, A., Bedrule, M. & Boldureanu, D. (2020). Entrepreneurship Education through Successful Entrepreneurial Models in Higher Education Institutions. *Sustainability,* 12, doi:10.3390/su12031267
5. Private Competitiveness Council. (2025). *Subnational Entrepreneurship Index (ISEM) 2025: Results and analysis of the entrepreneurial ecosystem in 23 cities in Colombia.* https://compite.com.co/indice-subnacional-de-emprendimiento/
6. Cruz, K. (2023). Factors influencing youth entrepreneurship. *Ciencia Latina Revista Científica Multidisciplinar, 7*(4), 2887- 2914, https://doi.org/10.37811/cl_rcm.v7i4.7146
7. Damián, J. (2022). Teaching entrepreneurship: Between politics and educational praxis. *Analytical Archives of Educational Policies, 30*(148), 1-23. https://doi.org/10.14507/epaa.30.7078
8. Dote, J., Ortiz, V., Peña, V., Severino, P., Contreras, J. y Ramírez, R. (2025). Innovative Entrepreneurship and Sustainability: A Bibliometric Analysis in Emerging Countries. *Sustainability, 17*(2), 658. https://doi.org/10.3390/su17020658
9. Drucker, P. (1985). *Innovation and the innovative entrepreneur*. Edhasa Publishing House
10. Effio, A., & Duran, K. (2025). Education and entrepreneurship: between innovation and survival. *Journal of History, Human Sciences, and Critical Thinking, 5*(9), 962-989 https://doi.org/10.5281/zenodo.14567257
11. Gao, S., Zhuang, J., & Chang, Y. (2021). Influencing factors of student satisfaction with the teaching quality of Fundamentals of Entrepreneurship course under the background of innovation and entrepreneurship. *Frontiers in Education, 6*, Article 730616. https://doi.org/10.3389/feduc.2021.730616
12. Ghezzi, A., y Cavallo, A. (2020). Agile Business Model Innovation in Digital Entrepreneurship: Lean Startup Approaches. *Journal of Business Research, 110*, 519-537. https://doi.org/10.1016/j.jbusres.2018.06.013
13. Global Entrepreneurship Research Association. (2025). *Global Entrepreneurship Monitor 2024/2025 global report: Entrepreneurship reality check* [Informe global]. GEM Global Report. https://www.gemconsortium.org/report/gem-20242025-global-report-entrepreneurship-reality-check-4

14. Golovin, T. Y. (2025). *Lean Startup methodology as a base for an entrepreneurship opportunity model. Journal of Economy and Entrepreneurship, 19*(7), 814–831. doi:10.34925/EIP.2025.180.7.142.
15. Gonzalez, S., Mielgo, A. y Molina, M. (2025). Higher education quality as a driver of entrepreneurship. *International Journal of Quality and Service Sciences*, 17(5), 20-40. DOI 10.1108/IJQSS-10-2024-015
16. Hernández, R., & Mendoza, C. (2021). *Research Methodology: The Quantitative, Qualitative, and Mixed Routes* (2nd ed.). McGraw-Hill.
17. Hémbuz, G., Sánchez, A., & Bermeo, V. (2020). Influence of higher education on youth entrepreneurship in university students: a theoretical approach. *Revista Boletín Redipe, 9*(8), 166-180. https://doi.org/10.36260/rbr.v9i8.1049
18. Lijphart, A. (1971). Comparative politics and the comparative method. *American Political Science Review, 65*(3), 682–693. https://doi.org/10.2307/1955513
19. López & González, J. (2025). PBL an innovative strategy to awaken the entrepreneurial spirit. *Revista Espacios, 46*(01). https://www.revistaespacios.com/a25v46n01/25460112.html
20. Martínez, J. & Ortega, L. (2021). Educational models that promote entrepreneurship in higher education institutions. *Journal of scientific and technological dissemination,* 7(3), 32-40. Doi: https://doi.org/10.51896/TECTZAPIC/PMWZ1743
21. Mei, H., Lee, C. & Xian, Y. (2020). Entrepreneurship Education and Students Entrepreneurial Intention in Higher Education. *Education Sciences, 10*(257), 1-18. Doi:10.3390/educsci10090257
22. Morocho, M., & Flores, L. (2023). Competencies that promote entrepreneurship in Higher Education. *Revista Enfoques,* 7(26), 128–142. https://doi.org/10.33996/revistaenfoques.v7i26.159
23. Nazir, J. y Das, P. (2025). A systematic literature review on factors of perception impacting entrepreneurial success based on PRISMA framework. *Journal of Innovation and Entrepreneurship, 14*, 49. https://doi.org/10.1186/s13731-025-00491-y
24. Organización de Naciones Unidas. (1995). *World programme of action for youth to the year 2000 and beyond* (ST/DESA/09/WPAY). United Nations. https://www.un.org/esa/socdev/unyin/documents/wpay_text_final.pdf
25. Ortiz, M., Rodríguez, S., & Gutiérrez, J. (2013). The place of entrepreneurship in higher education institutions in Colombia. *Gestión & Sociedad, 6*(2), 159-174 https://revistas.lasalle.edu.co/index.php/gs/article/view/4380
26. Pedroza, A. & Araque, F. (2023). Entrepreneurship at the service of economic growth, human development and social happiness. *Económicas CUC, 45*(1), https://doi.org/10.17981/econcuc.Org.4610
27. Peña, A. y Villegas, H. (2020). Evaluation of the influence that higher education boosts on students' entrepreneurial proclivity: Evidence from Mexico and Spainy. *The International Journal of Management Education*, 18(3), 1-21. Doi: 10.1016/j.ijme.2020.100404
28. Rodríguez, P. y Pastor, M. y Alonso, P. (2019). University entrepreneurship: how to trigger entrepreneurial intent of undergraduate students. *Journal of Science and Technology Policy Management,* 10(4), 927–950. https://doi.org/10.1108/JSTPM-04-2018-0037

29. Roncancio, J., Rodríguez, N., & Pomares, X. (2025). Research development on university education in entrepreneurship in Colombia. A Systematic Review of Literature. *Revista Política, Globalidad y Ciudadanía, 11*(21), 170-184, https://doi.org/10.29105/rpgyc11.21-344
30. Silva, D. S., Ghezzi, A., Aguiar, R. B., Cortimiglia, M. N., & otros (2020). Lean Startup, Agile Methodologies and Customer Development for business model innovation. *International Journal of Entrepreneurial Behaviour & Research, 26*(4), 595–628. https://doi.org/10.1108/IJEBR-07-2019-0425
31. Solarte, C., Rivera, G., Viveros, L., & Urresta, R. (2023). Sustainable entrepreneurship: a systematic review of the literature. *Revista Gestión y Desarrollo Libre, 8*(16), 1-21. https://doi.org/10.18041/2539-3669/gestionlibre.15.2023.10543
32. Syed, R. T., Tariq, U., Arnaut, M., & Agrawal, R. (2024). Entrepreneurship educator: A vital cog in the wheel of entrepreneurship education and development in universities. *Journal of Innovation and Entrepreneurship, 13*, 66. https://doi.org/10.1186/s13731-024-00433-0
33. Terán, E. & Guerrero, A. (2020). Theories of entrepreneurship: critical review of the literature and suggestions for future research. *Revista Espacios, 41*(7) https://www.revistaespacios.com/a20v41n07/20410707.html
34. Triana, K. (2022). Agile methodologies and training for entrepreneurship. In: The University as a manager of entrepreneurial development. UNAD, Bogotá. https://doi.org/10.22490/9789586518970.02
35. UNESCO. (2025a). Education for Sustainable Development: Report and Guidelines to Empower Citizens of the Twenty-First Century. UNESCO. Retrieved from https://www.unesco.org/es/educacion-desarrollo-sostenible
36. Unesco. (2025b). *Youth Impulse – Because Youth Matter*. https://www.unesco.org/es/youth/matter
37. Vallmitjana, N. (2014). *The entrepreneurial activity of IQS graduates*. [Doctoral thesis, Universitat Ramon Llul]. http://hdl.handle.net/10803/145034
38. Vilca, Y., Torobisco, W., Vilca, C., & Salguero, G. (2025). Entrepreneurship in education: a comprehensive analysis of its importance and development. *Impulso, 5*(10), 186-198 https://doi.org/10.59659/impulso.v.5i10.110
39. Wu L, Jiang S, Wang X, Yu L, Wang Y and Pan H (2022) Entrepreneurship Education and Entrepreneurial Intentions of College Students: The Mediating Role of Entrepreneurial Self-Efficacy and the Moderating Role of Entrepreneurial Competition Experience. *Frontiers in. Psychology, 12*, 1-9. doi: 10.3389/fpsyg.2021.727826
40. Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.
41. Yoon, N., García, V. & Solórzano, W. (2024) Education for entrepreneurship in Higher Education. Multidisciplinary Peer-Reviewed Scientific Journal PENTACIENCIAS, 6(5), 366-376. Doi: https://doi.org/10.59169/pentaciencias.v6i5.1277