# The Higher Education Institutions ecosystem factors and its impact on the entrepreneurship education, case study: North-Eastern Mexico

# Los factores del ecosistema de las Instituciones de Educación Superior y su impacto en la educación para el emprendimiento, caso de estudio: Noreste de México

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**Abstract**

Higher education institutions (HEIs) play a crucial role in the delivery of entrepreneurship education, as research shows that university incubators have a positive impact on students' entrepreneurial intentions. The objective of this article is to identify the internal and external factors of the HEI ecosystem and its impact on entrepreneurial education through the analysis of the perception of students graduated in 2021 from master's degrees in economic-administrative areas of North-Eastern Mexico. The methodological development consisted of two stages: the first was carried out in an exploratory manner, for this an instrument was created based on the literature review and the opinion of experts using the Delphi method, in the second stage a statistical analysis was carried out using structural equations, using partial least squares, using the Smart PLS software. 120 responses out of 156 from the statistical instrument were obtained. Three of the proposed hypotheses were positive, although four variables had to be eliminated as they were not accepted, two belonging to external factors of the HEI ecosystem and two to entrepreneurial education factors. The results will give a better understanding of the factors influencing the entrepreneurial mindset of the master students and a better connection with the factors of the HEI ecosystem.

**Resumen**

Las instituciones de educación superior (IES) juegan un papel crucial en la impartición de la educación empresarial, ya que las investigaciones muestran que las incubadoras universitarias tienen un impacto positivo en las intenciones empresariales de los estudiantes. El presente artículo tiene como objetivo identificar los factores internos y externos del ecosistema de las IES y su impacto a la educación emprendedora a través del análisis de la percepción de los estudiantes graduados en el 2021 de maestrías en áreas económico-administrativas del Noreste de México, el desarrollo metodológico constó de dos etapas: La primera se realizó de manera exploratoria para esto se creó un instrumento basado en la revisión de literatura y la opinión de expertos mediante método Delphi, en la segunda etapa se realizó un análisis estadístico mediante ecuaciones estructurales, utilizando mínimos cuadrados parciales, mediante el software Smart PLS. Se obtuvieron 120 respuestas del instrumento estadístico. Tres de las hipótesis planteadas resultaron positivas, aunque se tuvieron que eliminar cuatro variables al no ser aceptadas, dos pertenecientes a los factores externos del ecosistema de las IES y dos a los factores de la educación emprendedora, los resultados alcanzados dan una vista panorámica de los factores que influyen la cultura emprendedora de los estudiantes de maestría.

**Higher Education Institutions, Entrepreneurship Education, Entrepreneurship Ecosystem**

**Instituciones de Educación Superior, Educación emprendedora, Ecosistema emprendedor**

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## Introduction

The rise of entrepreneurship in the last decade has been a global phenomenon, Latin America and Mexico are no exception; this growing activity has caused the emergence of institutions that research and provide information for those seeking to start entrepreneurship.

In general terms, entrepreneurship is the transformation of an idea into a reality, through the creation of a company, in order to obtain economic benefits. This goal is achieved through innovation, which either can happen in relation to the creation of new products and services or with the definition of new processes or even business models, which invigorate the market and the global economic system (Schumpeter, 1934). In the same sense, Cuervo, Ribeiro, and Roig (2007), relate entrepreneurial activity with the creation of value through the transformation of existing resources in society. In this sense, the company is understood as the vehicle that converts existing inputs into outputs with economic value.

To understand the following analysis, two types of entrepreneurship are defined according to their nature, authors like Audretsch and Thurik (2001) affirm that the decision to create a business descends from two possible scenarios conditioned by the motivation of the individual. Thus, the conception of a business either comes from an unemployment situation or from the fear of falling into this condition, or it is produced by the discovery of an opportunity. This dichotomy is what Reynolds et al. (2002) recognize as entrepreneurship by necessity vs entrepreneurship by opportunity.

The entrepreneurship for need are all those activities that arise from the lack of formal employment, ranging from street sales to microenterprise. However, entrepreneurship by opportunities occurs when those activities are done by individuals who are wage/salary workers, enrolled in school or college, or are not actively seeking a job before starting businesses.

The university environment allows the emergence of opportunity ventures due to the training in different academic fields that the student receives, where many ideas arise and the entrepreneurial mindset is awakened. Convincing examples of this are the world's most successful ventures such as Facebook, Google, Microsoft, Apple, and Twitter, to mention some. Because of this, there are universities entrepreneurship with specialized support departments, which offer free services for their students in training and bonding primarily.

This research aims to analyze the ecosystem of university entrepreneurship in Mexico, the particular case of the Entrepreneurship Ecosystem through its support departments, and identify figures for the creation, survival, success, and failure of university entrepreneurial projects, analyze how it can be improved, to provide greater opportunities for success to the ventures that arise specifically in the entrepreneurship ecosystem North-East-Mexico.

In addition, this research attempts to help Higher Education Institutions to analyze and review their entrepreneurship programs and the impact they are having on the master graduated students. It might as well be useful for the other stakeholders in the entrepreneurship ecosystem such as companies and investors who can find or create potential opportunities to generate new businesses or social, governmental, or environmental solutions.

## Literature review

The new entrepreneurs, self-employed, freelancers, or start-uppers come with a new mentality and disposition. They are aware that the new society and new ways of working invite them to collaborate, meet, and share the projects and thoughts that come up in the mind of each one, instead of working alone and individually (Sørensen and Fassiotto, 2011).

According to the consulted bibliography (Isenberg, 2011, Neck, et al., 2004, Spilling, 1996), a business ecosystem contains and, at the same time, supports business activity in a particular geographical area. It is a set of complex relationships between entities and entrepreneurs with their technological, academic, social, political, and economic environments, stimulating the development of entrepreneurial initiatives (Valdés and Vidal, 2012). According to Berger (2009), these entrepreneurial ecosystems have two types of networks: an open network, through which entrepreneurs get in touch with customers, suppliers, and other support groups; and a closed network, where they transmit their ideas and problems in search of advice or feedback.

In the opinion of Isenberg (2011), an entrepreneurial ecosystem is composed of hundreds of factors that, depending on their role or function, can be classified into six general categories briefly described:

- Market: It includes the first customers and the networks that are fundamental for the development of a startup, in addition to entrepreneur networks.

- Policies: Covers the support of public authorities and bodies, both at the legislative level and creating a legal framework that enhances the creation of companies and their expansion.

- Financing: It refers both to access to private financing, as well as to business angels, with experience and venture capital entities capable of accompanying the growth of the startup.

- Culture: It encompasses giving visibility to the successes and raising the social status of the entrepreneur, as well as a culture of tolerance to risk and failure.

- Support: Includes both infrastructures and the presence of incubators, legal and financial advisers, mentors, etc.

- Human capital: Includes the talent and training of individuals and the quality of the education of the ecosystem.

The report made by Harrington (2017) mentions that the connectivity and collaboration between the entrepreneur development community, universities, and economic development organizations have a significant impact on ecosystem momentum.

Universities are important ecosystem players and need to be active in this collaboration they are crucial to a region's ecosystem; their participation in entrepreneur development strategies and programs ensures the connection of student programs and research commercialization activities to community-led Entrepreneur Development organizations. From this is said that collaboration is needed to have connectivity between the community, economic development, and university.

Most economic development and university activities ideas are more top-down, organization-initiated. Only 20 percent of their ideas came from individuals. Organization-initiated ideas often were spurred by grant or funding opportunities. At other times, ideas evolve from a strategic planning process or gap analysis of the ecosystem.

As an outcome of the previous statements, the entrepreneurs are seeking initiatives from entrepreneurship ecosystem stakeholders, to facilitate business stablishments and growth, therefore, the need to research HEIs ecosystem factors and their influence in the preparation of the master graduated students (usually within the age group from 24-46), becomes a key reason in the development of the entrepreneurial ecosystem in Mexico, either way, to start their business or get better preparation for higher job positions. Consequently, this study will meet the need to answer the research questions and provide solutions mainly for educators as well as for the entrepreneurial ecosystem stakeholders.

Entrepreneurial ecosystems value the relationships between the entrepreneurial process and its local environment; they are a policy tool to help regions catalyze a sustainable economy led by entrepreneurship and other stakeholders. The internal entrepreneurship systems, for their part, analyze how researchers and teachers undertake the task of searching more thoroughly what must be done to instill the entrepreneurial spirit in their students and that their projects are successful.

Universities and colleges can always do more to provide quality assistance for fostering their students' entrepreneurship, intention, and good career choice, in general. Ideally, it would offer an experiential context to test, where students can develop their entrepreneurial ideas with the support of teachers, teachers, practitioners, and others.

An entrepreneurial university strives to reconcile a wide range of external factors with institutional responses while maintaining academic quality (Clark, 1998). This can be challenging since colleges are increasingly expected to address regional concerns while also being influenced by the agendas of many stakeholders (Charles, et al., 2014; Stensaker & Benner, 2013). Universities, on the other hand, have limited capacity to adapt to external demands, particularly in conventional academic infrastructure (Clark, 1998). Consequently, this emphasizes the need for institutionalized methods to undertake community participation.

The most comprehensive study examining the influence of HEIs' ecosystem on entrepreneurship education (EE) and attempts to map the complex relationship between both is the one developed by Mukesh & Rajasekharan (2020). Through exploratory factor analysis, they identified six factors of EE and eight factors of HEIs' ecosystem; of these last four were grouped as external factors and another four as internal factors.

Based on the merits of the studies by Guerrero and Urbano (2012) and those of EE by Pittaway and Cope (2007), Mukesh & Rajasekharan (2020) merges these two theories and develops an integrated theoretical framework, which explains the relationship between the ecosystem of HEIs and EE. In the case of the study conducted in Mexico and presented in this paper, the authors considered an external entrepreneurship ecosystem in HEIs where -and following Mukesh & Rajasekharan (2020)- the variables are: promotional activities; attitude towards entrepreneurship; support for entrepreneurship and Governance structure.

To support the analysis of the university ecosystem, the entrepreneurial architecture approach of Nelles and Vorley (2010) is particularly attractive, due to the elaboration of different areas of action within the universities.

The concept of entrepreneurial architecture refers to the collection of internal factors that interact to shape entrepreneurial agendas and then inside universities (Nelles & Vorley, 2010).

In the case of internal entrepreneurship ecosystem in HEIs, the following variables are included: ability to connect startups with industry; teaching and staff; physical infrastructure and facilities, and financial support for entrepreneurship.

Therefore, considering the information presented above, it is possible to propose the following hypotheses:

H1: The higher the level of the External entrepreneurship ecosystem in HEIs, the higher the level of the Internal entrepreneurship ecosystem in HEIs.

H2: The higher the level of the External entrepreneurship ecosystem in HEIs, the higher the level of Entrepreneurship Education in HEIs.

H3: The higher the level of the Internal entrepreneurship ecosystem in HEIs, the higher the level of Entrepreneurship Education in HEIs.

**Problem Statement**

The deterioration in the economy and especially in the labor market, has led to the birth of a greater number of entrepreneurs in Mexico. INEGI (2019) mentions that 23% of Mexicans start a business out of necessity, while the remaining 77% due to opportunity. Entrepreneurs seek financing institutions or specialized entrepreneurial training because the national labor market does not represent a viable option for a quality life, so they self-employ themselves (Villa, et al., 2021). In this sense, the difference between an entrepreneur out of necessity and one out of opportunity is that the first one, starts a business in a hurry and without prior knowledge, while the second materializes an idea with great growth potential by getting involved with the entrepreneurship ecosystem, contacting stakeholders, etc.

Although the number of startups grew with the pandemic, unfortunately, a good number of these companies remain only in the initial stages and fail. Mexico is among the Latin American countries that during 2020 and 2021, even with the increase in ventures, saw more businesses stop than those that emerged. During 2021, 24% more new establishments emerged in Mexico, while 33% of existing establishments failed and disappeared, according to data from the Study on the Demography of Business (EDN) carried out by the National Institute of Geography and Statistics, (INEGI, 2021).

The ASEM (2020), reports the percentage of their survey with the highest difficult factors that affect the Mexican entrepreneurship ecosystem: the high access to financing supports 32%, the high costs of the tax and labor structure 33%, lack of education or preparation to start a business 36%, the corruption difficulty was also mentioned by 24% of the entrepreneurs surveyed, the crime and/or theft, a difficulty indicated by 17% of the entrepreneurs surveyed.

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**Aim of the research**

- To understand the internal, and external HEI factors and entrepreneurship education factors that influence master graduated students in applying for a degree in business/management fields.

The Objective of the study aims:

- To design a conceptual framework based on the most important factors of the Higher Education Institutions Ecosystem identified in the literature.

- To examine the Internal and External HEI factors that are perceived as an influence for the graduated students in NE of Mexico.

- To examine the effect of the Entrepreneurship Education factors that prepared and support the mindset of the master graduated students in NE of Mexico.

**Methodology**

This research project was focused on the analysis of two key factors in higher education institutions in North-East Mexico, one of them called the External entrepreneurship ecosystem in HEIs and the other Internal entrepreneurship ecosystem in HEIs, in order to evaluate their impact on Entrepreneurship Education in HEIs. The project involved different types of research: one qualitative (exploratory and descriptive), and another quantitative (relational, explanatory, and predictive). It was based on sources of documentary information, fieldwork, surveys, and the researchers' own experience.

This research applied a modified Delphi method. It consists of two consultation rounds to maintain the interest of the participants in the study. It aims to reach agreements on a given topic, facilitated by the use of the Internet and questionnaires (Almenara & Moro, 2014, Andrés, 2011).

The first questionnaire is composed of 9 questions, composed with help of program FORMS from Microsoft 365 Apps for Enterprise, and was sent via email to the panel of experts 27 participants in total. They were requested to complete the identification data of the participant remaining anonymous name, gender, and age, the only demographical questions are about the years of experience in the topic and the role they have in relation to the Higher Education Institute/University.

Questionary was sent specifically to experts in North-East Mexico that used to work in the former state program PRODEM dedicated exclusively to deal with entrepreneurship ecosystem programs in national and regional ranges. From this the conceptual framework that will be divided into three constructs was established.

The conceptual framework is shown in Figure 1, in a structural equation model two sub-models are always shown; "the inner model specifies the relationships between the independent latent variables, whereas the outer model specifies the relationships between the latent variables and their observed indicators" (Wong, 2019).
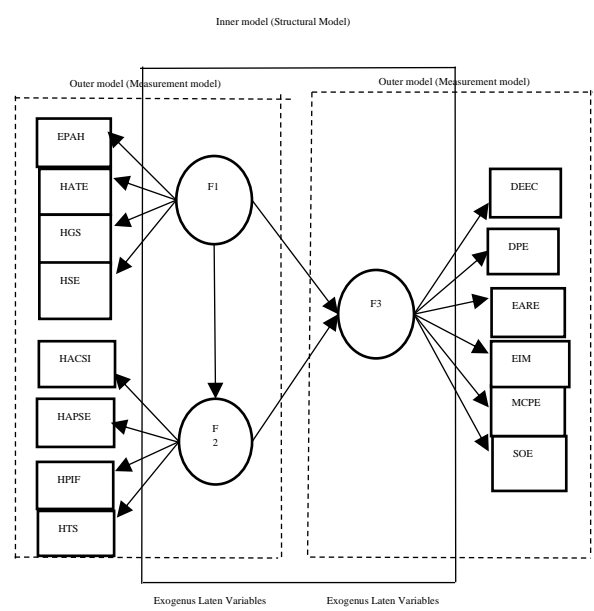


**Figure 1** Conceptual Framework
*Source: Own elaboration*

In the second stage of the methodology the survey with questions that are presented in Table 1 was created. The survey is based on the questionnaire that was sent via email on May 23, 2022 to the graduates with a master degree completed between 2020-2021 in Torreon Coahuila. In total the survey was sent to 156 individuals, all this with the help of the department of "follow-up graduates' program" in each faculty taking into consideration selected 6 High Education Institutes (6 private and 1 public) that offer master's degree in any of the following areas: economy, management, business, and finance.

The students were given 2 months for the completion of the survey, hence, this research survey was concluded with 120 responses out of 156, having completed the process on July 23, 2022, being more than the minimum sample for the confidence level of 95% (111) which is sufficient to proceed with the statistical calculations for the results and discussion part of this research.

The questionnaire that was used, is a multiple choice designed according to the literature review. All the responses are related within the context of entrepreneurial ecosystem factors, and the questions are arranged as closed questions. Students were asked to answer with a Likert scale a level of agreement from 1 to 5, being 5 Totally agreeing and 1 Definitely Not agreeing. For the calculations of the sample size the Sample Size Calculator (calculator.net) was utilized. The formula was made based on the data available from the National Association for the Universities and Higher Education Institutions of Mexico (ANUIES).

The following formula was used for the Sample calculations: The Universe population = fully completed the academic master program + graduated (who obtained the master's degree) between 2020-2021. The data was extracted from ANUIES Report 2021.

| F1 External entrepreneurship ecosystem in HEIs | EPAH | Entrepreneurship Promotional Activities by HEIs |
|---|---|---|
| | HATE | HEIs attitude towards entrepreneurship |
| | HSE | HEIs support for entrepreneurship |
| | HGS | HEIs & Governance structure |
| F2 Internal entrepreneurship ecosystem in HEIs | HACSI | HEIs ability to connect startups with industry |
| | HTS | HEIs' teaching and staff |
| | HPIF | HEIs physical infrastructure and facilities |
| | HFSE | HEIs financial support for entrepreneurship |
| F3 Entrepreneurship Education in HEIs | DEEC | Degree of entrepreneurial education in curriculum |
| | SOE | Student orientation on entrepreneurship |
| | DPE | department philosophy on entrepreneurship |
| | ETM | Entrepreneurial Teaching Methodologies |
| | MCPE | Mentoring and coaching programs for entrepreneurs |
| | EARE | Extra-curricular activity relating to entrepreneurship |

**Table 1** Questions for Indicator Variables
*Source: Own elaboration. Although with the same approach the title of the factors F1 and F2 has been modified.*

## Population object of study and data collection

This Research will focus only on the Graduated in Master programs related to Business, Management or Finance fields; any of those that had entrepreneurship topic included in their academic programs. The main interest of the author was to know the opinion and feedback of the graduates about their Higher Education Institution ecosystem factors as well the entrepreneurship education elements that helped to increase or decrease their entrepreneurial mindset in a holistic way. This research will use the case study of the graduates from 2020-2021 in the North-East Mexico (Torreon, Coahuila Mexico).

| Concept | Percentage | Number |
|---|---|---|
| Confidence Level: | 95% | |
| Margin of Error: | 5 % | |
| Population Proportion: | 44 % | |
| Population Size: | - | 156 |
| Result Sample size | - | 111 |

**Table 2** Population Sample
*Source: own elaboration. Used the website Sample Size Calculator (calculator.net)*

This means 111 or more measurements/surveys are needed to have a confidence level of 95% that the real value is within ±5% of the measured/surveyed value.

## Indicator reliability

Graph 1 shows the Histogram Outer Loadings, where two of the variables of the factor F1 External entrepreneurship ecosystem and two of Entrepreneurship Education in HEIs were discarded for having factorial load values below 0.7.
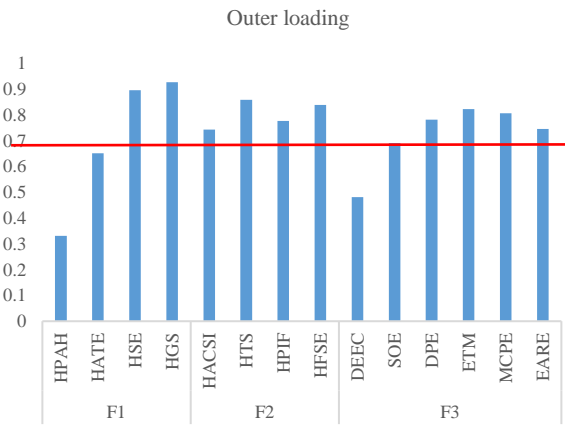


**Graphic 1** Histogram Outer Loadings
*Source: own elaboration. Note that the dropped variables are EPAH; HATE; DEEC, SOE*

Convergent validity is the extent to which the construct converges to explain the variance of its indicators. As observed in Table 3, the mean-variance extracted, Average Variance Extracted (AVE) for all the indicators of each construct is greater than 0.50, which indicates that the construct explains 50% or more of the variance of the indicators that make up the construct (Hair, 2011).

| Latent Variable | Indicators | Loading | Indicator reliability (Loading 2) | alpha de Cronbach | rho_A | (IFC) | (AVE) |
|---|---|---|---|---|---|---|---|
| F1 | HGS | 0.925 | 0.855 | 0.795 | 0.81 | 0,753 | 0,676 |
| | HSE | 0.895 | 0.801 | | | | |
| F2 | HACSI | 0.742 | 0.55 | 0.817 | 0.82 | 0,43 | 0,205 |
| | HFSE | 0.838 | 0.702 | | | | |
| | HPIF | 0.776 | 0.602 | | | | |
| | HTS | 0.857 | 0.773 | | | | |
| F3 | EARE | 0.745 | 0.555 | 0.821 | 0.839 | 0.405 | 0.165 |
| | ETM | 0.822 | 0.675 | | | | |
| | MCPE | 0.805 | 0.648 | | | | |
| | SOE | 0.846 | 0.715 | | | | |

**Table 3** Convergent validity
*Source: Own elaboration. In this matrix, the four variables that were eliminated for having a low factor load no longer appear. "AVE" number should be 0,5 or higher (Bagozzi & Yi, 1988)*

## Discriminant validity test

Fornell and Larcker (1981) suggest that the "square root" of AVE of each latent variable should be greater than the correlations among the latent variables Table 4.

| | F1 | F2 | F3 | |
|---|---|---|---|---|
| F1 | 0,91 | **0,911** | | |
| F2 | 0,809 | 0,804 | **0,809** | |
| F3 | 0,723 | 0,801 | 0,779 | **0,803** |

**Table 4** Discriminant validity
*Source: own elaboration. The criterion of Fornell and Larcker (1981) is met*

## Results

The proposed relationship model was contrasted, and the coefficient of determination ($R^2$) and the predictive validity of the model ($Q^2$) were obtained. The value of the coefficient of determination of the independent or endogenous variables must be equal to or greater than 0.1 (Hair, et al., 2011). The predictive validity of the dependent constructs was calculated using the Blindfolding technique.

The coefficient of determination of the endogenous or dependent variables ($R^2$) according to Hair and colleagues (2011), the values of 0.25, 0.50, and 0.75 have weak, moderate, and substantial significance respectively. On the other hand, what determines the prediction quality of the structural model is the value of the coefficient ($Q^2$) according to Stone (1974) and Geisser (1974). This test is used as a criterion to measure the predictive relevance of the dependent constructs and is calculated by means of the Blindfolding technique. A value of $Q^2>0$ indicates that the model has predictive relevance (Chin, 1998).

Table 5 shows how the $R^2$ value for the entrepreneurship education construct is 0.645, which means that the F3 factor explains 64.5% of the variance of F1 and F2. Based on this empirical criterion, all the constructs have acceptable predictive power and in all of them, the $Q^2$ values are positive.

| Construct | $R^2$ | $Q^2$ |
|---|---|---|
| Internal entrepreneurship ecosystem HEIs | 0,758 | 0,387 |
| Entrepreneurship education | 0,645 | 0,359 |

**Table 5** Explained variance and predictive validity of the model
*Source: Own elaboration*

Goodness of fit and hypothesis testing:Vinzi et al. (2010) suggest a global goodness-of-fit criterion for PLS structural models, they propose that the global goodness-of-fit index be given by means of the square root of the multiplication of the arithmetic mean of the extracted variance analysis (AVE) and the arithmetic mean of the coefficient of determination ($R^2$) of the endogenous or dependent variables.

Analysis of causal relationships and contrasting hypotheses:

The PLS methodology does not assume that the information is normally distributed, which means that, in order to assess the quality of the complete model, it is necessary to apply a non-parametric resampling technique called bootstrapping, which involves random resampling with replacement of the original sample, creating new pseudo-samples from the original sample in order to obtain sampling errors for hypothesis testing. (Cabana, Montero, & Aguilera, 2019).

Once the reliability and validity of the measurement model have been verified and the trajectory coefficient is adequate, the bootstrapping or resampling process was performed. "Re-sampling" positively validates the four hypotheses in Table 6.

| Hypothesis | Trajectory | Trajectory coefficient *p<0,05; **p<0,01; ***p<0,001 | "t" value |
|---|---|---|---|
| H1 | F1 External entrepreneurship ecosystem → F2 Internal entrepreneurship ecosystem | 0.000*** | 11.959 |
| H2 | F1 External entrepreneurship ecosystem → F3 Entrepreneurship education | 0.000*** | 19.701 |
| H3 | F2 Internal entrepreneurship ecosystem → F3 Entrepreneurship education | 0.000*** | 5.515 |

**Table 6** Hypothesis verification
*Source: Own elaboration*

Table 6 offers the "t" values of the bootstrapping or resampling process for the external model, showing that all the loadings are significant, which reinforces the conclusion of the reliability of the measurement model and the convergent validity. The results indicate that in the conceptual model, the adequate management of the External entrepreneurship ecosystem has a positive influence on the Internal entrepreneurship ecosystem, since (H1: $\beta$ = 0.871, p is=0.00 and t= 11.959) with which H1 is accepted. It is also verified that the External entrepreneurship ecosystem has a positive influence on Entrepreneurship education, since (H2: $\beta$ = 0.102; p < 0.001 and t= 19.701) H2 is verified. Finally, the Internal entrepreneurship ecosystem has a positive influence on Entrepreneurship education (H3: $\beta$ = 0.712, p < 0.01 and t= 5.515), and hypothesis H3 is also accepted.

Other values that check the fit of the model is the Standardized Root Mean Square Residual (SRMSR) test, which measures the difference between the observed correlation matrix and the implicit correlation matrix of the model. A good fit of the model should not exceed 0.08 (Hu & Bentler, 1995), in this case, the fit occurs with values of 0.09.

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Another measured value is the Normed Fit Index, (NFI) which Bentler and Bonnet (1980) recommend being above 0.9; in this case, the value reached is 0.72, which is low, but Ullman (2001) warns that this is generated when the samples are small and that, therefore, the fit is often underestimated.

Hypothesis H1 was accepted although, as a result of eliminating the EPAH and HATE variables (Entrepreneurship Promotional Activities by HEIs and HEIs attitude towards entrepreneurship, respectively), Isenberg (2011) alerts that the entrepreneurship ecosystem EE consists of a group of individual factors that combine in a complex way, separately, each of these factors drives entrepreneurship, but they are not enough to maintain it. However, all of them integrated into a holistic system, accelerate the creation and development of risky companies. In this same direction, Bischoff and colleagues (2018) point out that if a linkage in the ecosystem is broken, it is very difficult to recover, as Roundy et al. (2017) point out: any intervention program in this area must strengthen this ecosystem and not break the balance between its agents: institutions, public administrations, large companies, and the entrepreneurs themselves.

Undoubtedly, the results achieved could be better if the universities under study, together with their master's students, promoted more external activities through various means and forms. The training and promotion of entrepreneurship is a subject of study for all students in almost all educational institutions of upper secondary and higher level. On the other hand, the Ministry of Economy (2020) generates a 2020-2024 Economic Sector Program whose purpose is to articulate, at a conceptual and strategic level, the mission and efforts of this Ministry aimed at promoting the economic development of the productive sectors, increase innovation, promote competition in the domestic market and regulatory improvement, promote the creation and consolidation of productive micro, small and medium-sized enterprises (MIPYMES) and entrepreneurs.

For its part, the improvement of attitudes towards entrepreneurship, as Villa et al., (2021) point out, is the first characteristic to understand what a social enterprise is and that the initiative, whether individual or collective, has the purpose of solving a social problem. The second characteristic is that, once the problematic situation has been identified, the plan or project is prepared. The third characteristic is that respecting values and ethical principles must be developed with aspects of sustainability, and this can be done in a local, national, or international context. The authors of this article conclude that the first characteristic is key because if there really is no detected social problem on which to act, it could not properly be called social entrepreneurship. It is key to work in this direction so that the graduates of the master's degrees really identify the existence of a problem that can be solved from an entrepreneurial perspective in their theses.

In factor F3, Hypothesis H3 was accepted, although as a result of eliminating the variables DEEC and SOE (Degree of entrepreneurial education in curriculum and orientation on entrepreneurial, respectively). In the case of Mexico, the experiences that Iacobucci and Micozzi (2012) present in Italy at the University of the Marche with a course entitled "Economics Entrepreneurship and management of innovation and University of Naples II" and with a course entitled "Economics Entrepreneurship and innovation". According to authors, "In the case of Bologna, it was a two-year postgraduate course in management with a curriculum called "Firm and innovation". In Urbino there was a specific curriculum within a three-year first degree called "Entrepreneurship and small firms". In all other cases, entrepreneurship courses were part of curricula in general management.

When it comes to student entrepreneurship orientation, it is recommended to study the experiences of Tarapuez-Chamorro, and colleagues (2018) where in the article "Sociodemographic and family aspects and entrepreneurial intention among Master of Business Administration students in Colombia" they point out that, in particular, the presence of business friends increases the ability to guide the entrepreneurial intention in comparison with the other variables analyzed, such as age, gender, education, work experience, and behavior models.

They also conclude that women, and particularly those without work experience, graduated from entrepreneurship education programs with lower perceived benefits, particularly in terms of inspiration and slightly weaker perceived control for entrepreneurship, compared to men and graduates with some experience. Finally, they deduce that those students with expertise in some business process and who consequently have acquired entrepreneurial knowledge and skills from a family or acquaintance entrepreneur reveal higher predictive effects compared to those students who lack experience, and of whom it is feasible to infer that they need to complete their education process with professional practice before undertaking a business project on their own initiative. Although in their conclusions they warn that although the results of the research are conclusive in the sense of identifying factors that are associated with entrepreneurial intention in young people, the study does not control for the fixed effects specific to each city, which define institutional arrangements. that modify the incentives to undertake.

**Conclusions**

Based on the work presented and the results obtained, the following main conclusions can be drawn:

1) The research presented contributes to the knowledge of a study that shows the internal and external factors of the ecosystem of higher education institutions and their impact on entrepreneurial training through the analysis of the perception of graduate students in 2021 of master's degrees in economic-administrative areas of North-East Mexico.

2) The main characteristic of the methodology used lies in a significant reduction in the analysis and application time to be able to replicate this research either in a Mexican context or in other latitudes, due to the importance of spreading a culture of entrepreneurship.

3) The proposed technique is easy to use since it is enough to start with the research instrument that was used -which can be adapted according to the context where it is desired to apply- and the answers that are obtained, according to the population and sample to be analyzed and enter them in SmartPLS to obtain the validation of the hypotheses.

4) The results of the applied method and those obtained by the SmartPLS technique used to test the hypotheses are comparable within statistically acceptable intervals.

5) The methodology used, and the sample analyzed can be extended to other universities to improve the entrepreneurial training in their programs and extended to other stakeholders within the ecosystem like the professors, advisers, or any other person involved in the development of the topic.

6) Based on the results of the study, it was concluded that these studied Higher Education Institutions can improve both the external and internal factors of the entrepreneurial ecosystem if they introduce in their curriculum some subjects related to the entrepreneurial economy and innovation to enhance the entrepreneurship ecosystem of the region.

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