

DOCTORAL (PHD) DISSERTATION

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**HIGHER EDUCATION INSTITUTIONS ENTREPRENEURSHIP ECOSYSTEM
AND ITS INFLUENCE ON THE ENTREPRENEURIAL EDUCATION
CASE STUDY NORTHEASTERN OF MEXICO**

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This dissertation aims to obtain a doctoral (PhD) degree in the scientific field of
„Management and Business”.

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DECLARATION

I undersigned **Karen Miriam González Flores** date of birth: 07/12/1988 declare under penalty of perjury and certify with my signature that the dissertation I submitted to obtain doctoral (PhD) degree is entirely my own work.

Furthermore, I declare the following:

- I examined the Code of the Károly Ihrig Doctoral School of Management and Business Administration and I acknowledge the points laid down in the code as mandatory.
- I handled the technical literature sources used in my dissertation fairly and I conformed to the provisions and stipulations related to the dissertation.
- I indicated the original source of other authors' unpublished thoughts and data in the references section in a complete and correct way in consideration of the prevailing copyright protection rules.
- No dissertation which is fully or partly identical to the present dissertation was submitted to any other university or doctoral school for the purpose of obtaining a PhD degree.

Debrecen, May 02, 2023.....



Karen Miriam González

Flores

signature

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
ANUIES	National Association for the Universities and Higher Education Institutions of Mexico
ASEM	Association of Entrepreneurs of Mexico
DEEC	Level of entrepreneurial education in the Curriculum
DPE	Entrepreneurship mission
EARE	Extra-curricular activity relating to entrepreneurship education
EDN	Demography of Business Study
EE	Entrepreneurship Ecosystem
EEd	Entrepreneurship Education
EPAH	Role models and Reward scheme
ETM	Entrepreneurial Teaching methodologies
GOVS	Government Support
HACSI	Alliances
HATE	Attitudes towards entrepreneurship
HEI	Higher Education Institutions
HFSE	Financial resources to support specifically entrepreneurship programs
HGS	Strategy Organization and Leadership
HIRE	History/Reputation of the Institution
HPIF	Location and infrastructure
HSE	Support for Entrepreneurship Cycle
HTS	Entrepreneurial Human Capital
INCO	Integration with the Community
INEGI	National Institute of Statistics and Geography
MCPE	Mentoring entrepreneurial programs
NE	Northeast
NEW	Entrepreneurship Trainee programs
PLS	Partial Least Squares
PRODEM	Mexican Entrepreneurship National Program
QEEC	Quality of entrepreneurial education in the Curriculum
SMEs	Small and Medium-sized Enterprises.
SOE	Student On-Boarding plan

INTRODUCTION

Entrepreneurship has become a global trend in the past decade, and Latin America and Mexico have also witnessed a surge in entrepreneurial activities. As a result, new institutions have emerged to conduct research and offer guidance to individuals interested in starting their own businesses.

A general definition of the concept of entrepreneurship could be expressed as the process of converting a novel idea or innovation into a viable business venture with the objective of generating economic value. This involves taking calculated risks and making strategic decisions to create, develop and manage a business venture. Innovation, in particular, is critical to the entrepreneurial process, as it stimulates the development of new services and products as well as the development of new processes and business models that can disrupt existing markets and it boosts the creation of new products and services.

According to Schumpeter (1934), entrepreneurship is synonymous with innovation and is an essential driver of economic progress. It enables entrepreneurs to identify and capitalize on unexplored market opportunities, resulting in the development of new products and services, which in turn can generate new industries and markets. The process of entrepreneurship can also lead to the transformation of existing resources in society. In this view, the business is perceived as the channel that converts resources into valuable outputs.

To provide a deeper understanding of the analysis that follows, it is important to define two distinct types of entrepreneurship based on their underlying motivations. Audretsch et al. (2022) in their comprehensive study mention that the decision to start a business can stem from one of two scenarios. The first is when an individual finds themselves in an unemployment situation or fears that they may become unemployed, prompting them to start a business to generate income. The second scenario is when an individual identifies a promising opportunity and takes proactive steps to pursue it through the creation of a business. This dichotomy is commonly referred to as entrepreneurship by necessity versus entrepreneurship by opportunity. (Nasiri & Hamelin, 2018).

Entrepreneurship by necessity encompasses a range of activities, such as street vending or starting a small business, that arise from the lack of formal employment opportunities. However, the concept of entrepreneurship driven by opportunity refers to the situation where people who are already employed or studying choose to establish a business, capitalizing on the discovery of a profitable market gap.

The university ecosystem can provide an ideal atmosphere for promoting entrepreneurship by providing opportunities for students to explore diverse academic disciplines and ignite innovative thinking. Well-known companies such as Facebook, Google, Microsoft, Apple, and Twitter originated from universities, revealing how these institutions can foster successful ventures. To foster student entrepreneurship, universities often have dedicated support departments that provide free training and networking services to encourage and support their endeavors (González Flores & Molina Morejón, 2022).

The goal of this study is to examine actual panorama of the entrepreneurship ecosystem in Mexico, furthermore, to focus on the higher education institutions entrepreneurship ecosystem (HEIs) with emphasis on their factors supporting the relationships between the stakeholder's departments; creating, sustaining, and determining the success or failure of entrepreneurial projects; aiming to identify areas of improvement and opportunities for increasing the probability of success for ventures.

Furthermore, this study aims to assist Higher Education Institutions in evaluating and assessing their entrepreneurship programs and their impact on their master's graduate students. Additionally, it could also prove to be valuable for other stakeholders in the entrepreneurship ecosystem, including businesses and investors who could influence the findings to identify or create new opportunities for generating businesses or addressing social, governmental, or environmental challenges.

Problem Statement

Mexico's economy and labor market have experienced a significant decline, resulting in a rise in entrepreneurial activity. Among the Mexican entrepreneurs 47% start businesses out of necessity (Molina, 2023). As a result of the limited options for a high-quality life in the national labor market, entrepreneurs are compelled to seek funding sources or specialized training. This highlights the importance of comprehending the factors that influence entrepreneurship and the supportive measures that can improve the success of entrepreneurial ventures. Villa Sánchez et al. (2021), considered that entrepreneurs in Mexico are increasingly choosing self-employment as a means of achieving a better quality of life.

The difference between an entrepreneur who starts a business out of necessity and one who does it out of opportunity is that the former typically launches their venture in a rushed and uninformed manner, whereas the latter takes a more deliberate approach to turn a promising idea into a thriving business, by proactively engaging with the entrepreneurship ecosystem, establishing connections with relevant stakeholders, and taking other similar measures.

Despite the increase in the quantity of startups during the pandemic, regrettably, a considerable proportion of these businesses stay in their early stages and fail. Mexico is one of the Latin American countries that witnessed a higher number of businesses shutting down than those that emerged, despite the surge in entrepreneurial activity in 2020 and 2021. Data from the Study on the Demography of Business (EDN) conducted by the National Institute of Geography and Statistics INEGI (2021) reveals that even though during the same period, there was 24% increase in the number of new businesses that were established in Mexico, while 33% of existing businesses failed and disappeared.

In Mexico, the culture of entrepreneurship falls behind in comparison with developed countries, and this is linked to the limited promotion of innovation and business creation in the education system (Liévano-Morales, 2021). In higher education, students are typically encouraged to join established companies as employees, rather than being encouraged to explore entrepreneurship as a practical career option. The current educational programs in Mexico do not focus on encouraging students to launch their own businesses during their studies or even after graduation, in consequence this is creating a gap in the culture of entrepreneurship. However, with the growing awareness and recognition of the economic and social benefits of entrepreneurship, there is a promising shift towards promoting and supporting entrepreneurial ventures in Mexico.

The report from the Association of Entrepreneurs of Mexico (ASEM, 2022), highlights numerous challenging factors within the Mexican entrepreneurship ecosystem in 2021. Among these, the difficulty in accessing financing support (32%) and high costs related to tax and labor structures (33%); in addition, the lack of education or training for starting a business (36%) is the most significant obstacle. Other challenges that entrepreneurs have to confront include corruption, which was mentioned by 24% of those surveyed, and crime and theft, indicated by 17% of respondents.

To address the issues mentioned earlier, entrepreneurs are looking for assistance from various stakeholders in the entrepreneurship ecosystem to make it easier for them to start and grow their businesses. As a result, it has become crucial to investigate the factors of the entrepreneurship ecosystem and how they influence the training of master's degree students (typically aged between 24-46 years old) in order to improve the entrepreneurial ecosystem in Mexico and better prepare students for higher-level job positions or starting their own businesses. This study intends to address the research questions and provide solutions, primarily for educators and other stakeholders in the entrepreneurship ecosystem.

For a better understanding of the research issue and goals the Figure 1 and 2, which provide visual support.

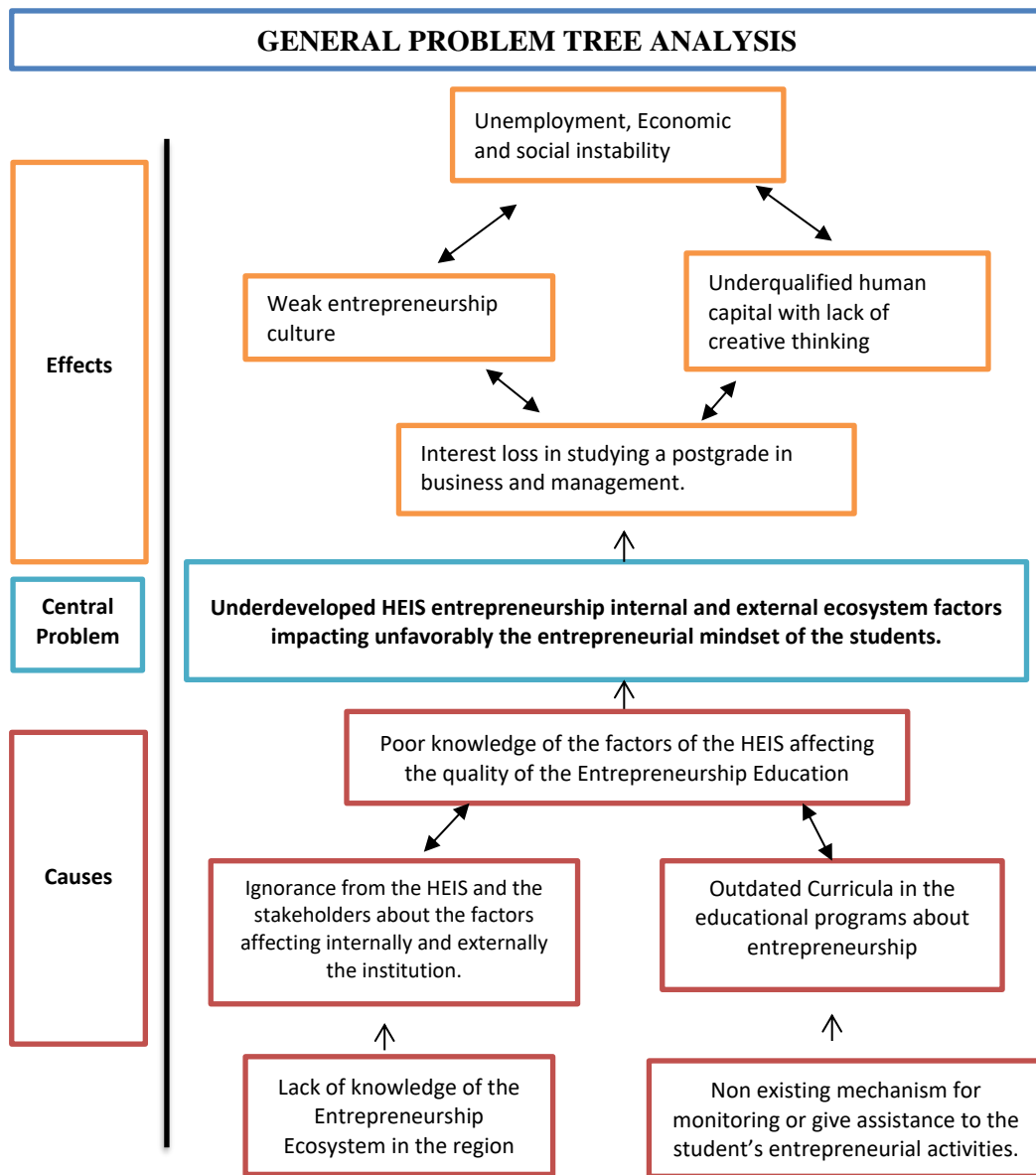


Figure 1. General Problem Tree analysis

Source: own edit.

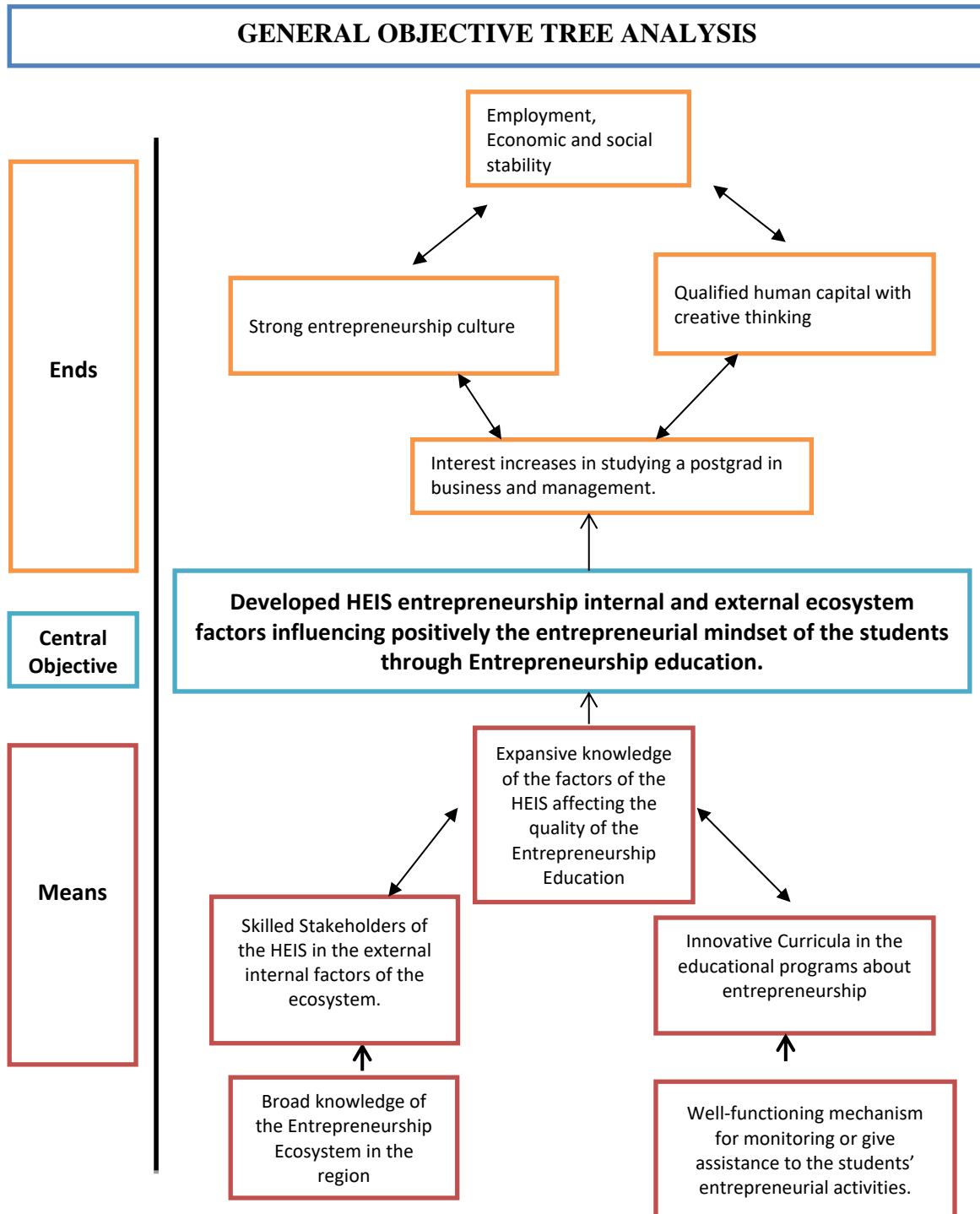


Figure 2. General Objective tree analysis

Source: own edit.

Research Questions

This research focuses on assessing the influence of Higher Education Institutions (HEI), in particular, to respond these questions:

1. How is the actual panorama of the Mexican entrepreneurship ecosystem?

2. Which Higher Education Institution ecosystem factors influence the mindset of entrepreneurship perceived by the master graduate students?
3. Which Internal or External ecosystem factors of the Higher Education Institutions are considered as important according to the master graduate students?
4. Do the External factors influence the Internal factors of the Higher Education Ecosystem?
5. Do the Higher Education Institutions factors influence the Entrepreneurship Education perceived by the master graduate students?
6. Are the Entrepreneurship Education curricula programs of the Higher Education Institutions preparing and supporting entrepreneurship perceived by the master graduate students?

Research Objectives

This research focuses on assessing the influence of Higher Education Institutions (HEIs) the **research objectives** are:

- Explore the actual Mexican entrepreneurship ecosystem.
- Explore the Internal, External HEI factors and entrepreneurship education factors that influence master graduate students in applying for a degree in business/management fields in the Northeast (NE) of Mexico.
- Explore whether the Entrepreneurship education factors influence the entrepreneurship mindset of the graduated students in the NE of Mexico.
- Create a new framework of the Higher Education Ecosystem factors and their relationship with the Entrepreneurial Education to be applied in the NE of Mexico.

Hypotheses

To achieve these research objectives, the dissertation prepared three main hypotheses:

- H1: There is a strong positive correlation between the level of the external entrepreneurship ecosystem factors in HEIs and the level of the internal entrepreneurship ecosystem factors in HEIs.
- H2: A strong external entrepreneurship ecosystem in HEIs is correlated with a higher level of entrepreneurship education.
- H3: A strong internal entrepreneurship ecosystem in HEIs is correlated with a higher level of entrepreneurship education.

1. LITERATURE REVIEW

In this chapter, the focus is on the main topics and subtopics that form the basis of the thesis. Through extensive analysis of various bibliographic materials, the authors that align with the main objectives of the research have been selected. The investigation progresses from general to specific, following the topics as represented in figure 3.

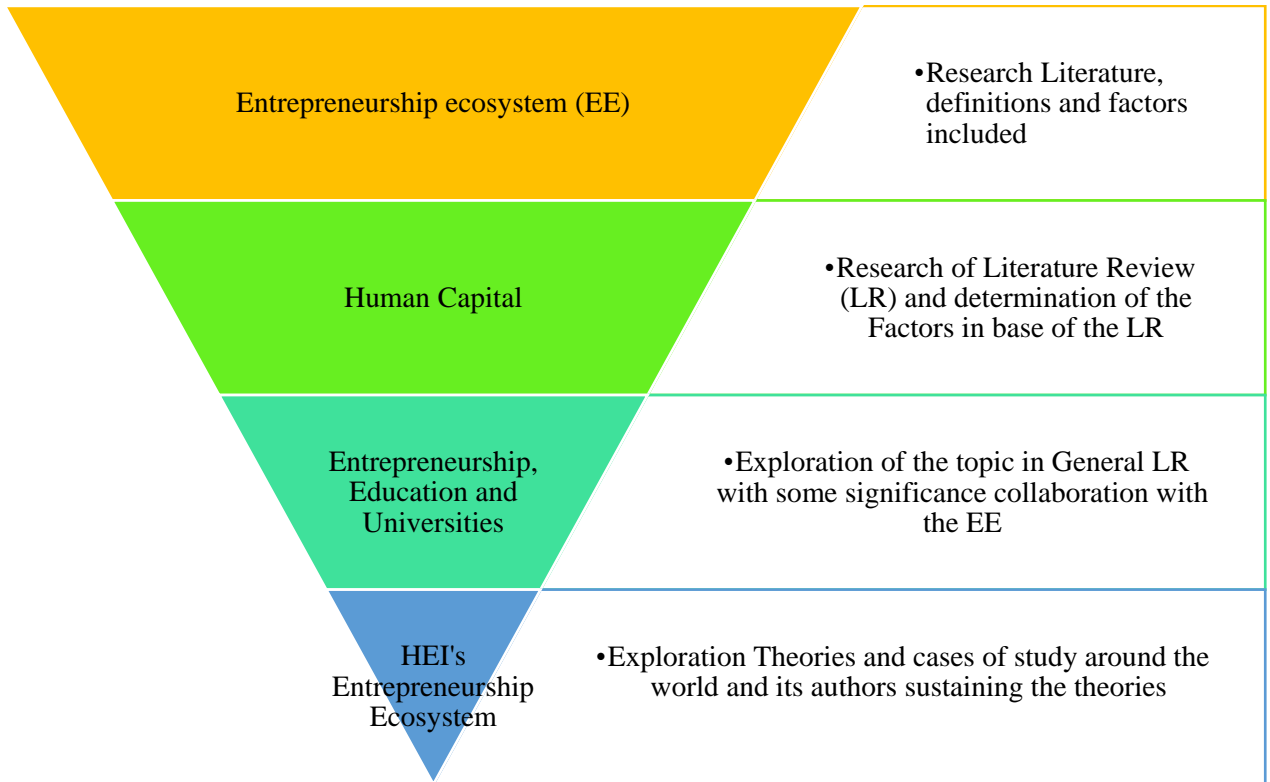


Figure 3. Particularities of the Literature Review

Source: own elaboration.

1.1. Entrepreneurship Ecosystem

Recently, there has been a raising interest regarding the significance of creating new businesses in terms of generating employment, fostering innovation, enhancing productivity, and developing a region. It is expected that there exists a positive correlation between the establishment of new companies and the progress of a country or region (Urbano et al., 2018; Hayter et al., 2018).

This trend has given rise to the formation of organizations and stakeholders that provide support for the establishment, growth, and development of enterprises. Consequently, the concept of Entrepreneurship Ecosystem has appeared as a supportive framework for the creation and expansion of businesses.

Sorenson (2018) highlighted that entrepreneurship is a crucial aspect of economic geography. However, past empirical studies conducted by economic geographers have predominantly focused on large corporations as major employers and players in the global economy. These corporations usually start small and then expand over time. On the other hand, new entrepreneurs, such as self-employed individuals, freelancers, and start-ups, possess a different mindset and attitude towards work. They understand that modern society and work culture encourage collaboration, teamwork, and sharing of ideas, rather than working in isolation and independently (Fini et al., 2020).

A business ecosystem, which involves and promotes business activities within a specific geographical area, has been defined in the literature (Isenberg, 2010; Theodoraki et al., 2017). It is composed of complex interconnections between businesses and individuals, as well as the different aspects of their technological, educational, social, political, and economic environment, that foster the development of entrepreneurial initiatives (Nambisan et al., 2019). Two kinds of networks exist within these entrepreneurial ecosystems: an open network, which enables entrepreneurs to connect with clients, suppliers, and other support groups, called as bridging social capital; and a closed network, which allows them to share their ideas and problems with others to seek advice or feedback, also called bonding social capital (Cantner et al., 2020).

The entrepreneurship ecosystem is composed of various individual factors that interact in a complex manner. Each of these factors is essential in driving entrepreneurship, but none of them can sustain it independently. When integrated into a holistic system, these factors collectively accelerate the creation and development of high-risk businesses (Isenberg, 2011). However, if any of the links in the ecosystem are broken, recovery can be extremely challenging (Bischoff et al., 2018).

Therefore, intervention programs aimed at supporting entrepreneurship must strengthen the ecosystem and maintain a balance between its agents, including institutions, public administrations, large companies, and entrepreneurs themselves (Roundy et al., 2017). By strengthening the ecosystem and its links, we can create an environment where entrepreneurship thrives and grows sustainably.

Isenberg (2010) explains that an entrepreneurial ecosystem contains numerous factors, which can be categorized into six domains based on their function and importance. These domains are:

- **Market:** This domain includes debate about the initial customers and networks interconnectivity and how crucial they are for the growth of a startup, along with entrepreneur networks.
- **Policies:** This domain covers the support provided by public authorities and organizations, such as the legislative framework and legal assistance, for promoting the establishment and expansion of companies.
- **Financing:** This domain relates to having access to private investment, business angels, venture capital firms, and other financial sources that can help in the development of a startup.
- **Culture:** This domain encompasses the visibility and recognition of entrepreneurial success, a culture of risk-taking, and tolerance for failure.
- **Support:** This domain comprises infrastructures and resources such as incubators, legal and financial advisors, mentors, and other support mechanisms.
- **Human capital:** This domain refers to the quality of education and training available to individuals, as well as the talent and skills of individuals present in the ecosystem.

Numerous entities, including nations, cities, regions, and universities, are working together to establish momentum in the ecosystem. In order to improve economies, societies, and institutions through connectedness, innovative companies must include entrepreneurial ecosystems as a key component of their innovation strategies. With an emphasis on the significance of connectivity within the ecosystem this section outlines three methods for assessing the connections among agents or institutions (see Figure 4).

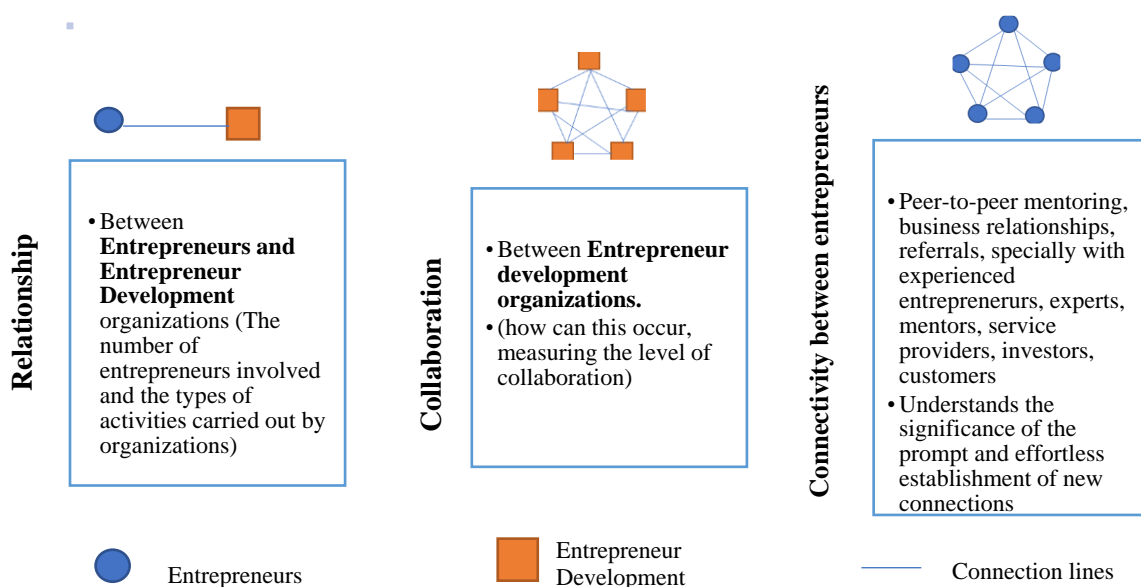


Figure 4. Connectivity between the agents or institutions

Source: own edit based on Harrington (2017).

1.1.1 Entrepreneurship Ecosystem Definitions

The concept of an entrepreneurial ecosystem is relatively new and has originated from a variety of sources. Only after Moore (1993) utilized the term "ecosystem" become prominent in a social science context rather than an ecological one. Moore's approach highlighted the business ecosystem as the external environment of an organization. Spigel (2017) observed that while parallels exist between entrepreneurial ecosystems and other models like industrial clusters, districts, and innovation systems, entrepreneurs and spin-offs play a more central role within entrepreneurial ecosystems.

Entrepreneurial ecosystems are intricate and diverse systems that require the engagement of several stakeholders as well as the integration of critical aspects in order to function properly (Erina et al., 2017). Unfortunately, the debate over entrepreneurial ecosystems has mostly focused on the necessary components rather than the procedures that combine them into a sustainable and thriving hub of entrepreneurial energy.

This perspective ignores the critical role that links and flows play in the evolution of an entrepreneurial ecosystem, which might vary over time. (Spigel, 2017; Stam, 2015). Notably, critical interactions may extend beyond the local ecosystem, involving fluxes to and from external places, emphasizing the need to take the ecosystem's broader context into account. The awareness that the entrepreneurial ecosystem is a system constituted of interconnected and interdependent elements is at the heart of the notion.

As stated by Stam (2015), the systemic conditions that enable the ecosystem include entrepreneurial networks, leadership, funding, talent, expertise, and support services. These factors' presence and interplay are the fundamental determinants of the ecosystem's success. Understanding and capitalizing on these systemic variables is therefore crucial to establishing a vibrant and sustainable business ecosystem.

The concept of "entrepreneurial ecosystem" emerged when Spilling (1996) introduced the term "entrepreneurial system," which was later implemented by Neck et al. (2004). Spilling (1996) mentioned that the entrepreneurship system is composed of a diverse mix of actors, functions, and external conditions that work together to influence the entrepreneurial outcomes of a certain area or community. The interaction of entrepreneurial ecosystem components and participants is critical, as the system's pieces and their relationships vary over time. Entrepreneurial ecosystems, also referred to as cumulative causation, can help to build, and sustain a dynamic local entrepreneurial process. (Malecki, 2018).

Stam (2015) noted that the absence of a commonly agreed definition for entrepreneurial ecosystems can be attributed to variations in research methodology, data utilization, and the scope of analysis. Therefore, several types of ecosystems, including the entrepreneurial one, exist (Acs et al., 2017; Gomes et al., 2016). As a result, there are multiple definitions available (Table 1). Some definitions emphasize the interaction and combination of different elements, contributing to shared cultural values that facilitate entrepreneurship.

Table 1 Definitions of Entrepreneurship Ecosystem

Author	Definition
Cohen (2006)	A sustainable entrepreneurial ecosystem refers to a group of individuals within a particular geographical area who are connected to each other and share a common goal of promoting sustainable growth as a result of its creation and facilitation of new sustainable business projects (page 3).
Isenberg (2014)	The author defines an entrepreneurial ecosystem as a constantly evolving, self-regulating system, composed of several elements. In any area with a concentration of entrepreneurial activity, there exist key individuals who are significant intermediaries and leaders, even if they are not entrepreneurs themselves. (p. 6).
Mason and Brown (2014)	A group of interrelated individuals and organizations involved in entrepreneurship, including both current and potential entrepreneurs, institutions such as universities and government agencies, financial entities, and various entrepreneurial processes.
Stam (2015)	Suggests that a productive entrepreneurial environment involves a network of interdependent factors and players working together. This concept highlights that entrepreneurship occurs within a community of interdependent individuals and organizations. (p. 1761, 1765)
Audretsch and Belitski (2017)	They proposed that entrepreneurship systems, also known as ecosystems, are composed of institutional, organizational, and other systemic factors that interact and impact the identification and commercialization of entrepreneurial opportunities (p. 2).
Roundy et al. (2017)	The authors describe entrepreneurial ecosystems as a collection of agents, social structures, institutions, and cultural values that work together to foster and promote entrepreneurial activity (p. 99).
Spigel (2017)	Describes entrepreneurial ecosystems as the integration of cultural perspectives, social networks, financial resources, academic institutions, and government policies that foster an environment conducive to innovation-driven businesses (p. 49).
Theodoraki and Messeghem (2017)	They stated that the entrepreneurial ecosystem consists of both tangible and intangible components. The intangible components include regulations and entrepreneurial culture that are linked to geographical characteristics (p. 57).

Feld (2020)	The author proposed the Boulder thesis, which outlines the four main characteristics of a prosperous entrepreneurial ecosystem. Firstly, such an ecosystem is led by entrepreneurs. Secondly, it is inclusive and welcomes everyone. Thirdly, the people involved are committed to the ecosystem for the long term, for at least 20 years. Lastly, there are numerous opportunities for gatherings and events. (pp. 25-28).
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Source: own elaboration based on Malecki (2018).

As entrepreneurship is considered as a complex phenomenon that is influenced by various factors, such as economic and market conditions, legal and regulatory frameworks, cultural and social norms, availability of funding, and supportive infrastructure, these elements are particularly crucial in shaping the entrepreneurship ecosystem.

Economic and market conditions have a substantial impact on entrepreneurship (Klofsten et al., 2019). Changes in the economy and market conditions can affect entrepreneurs positively or negatively. For example, during an economic downturn, finance may be scarce, making it harder for entrepreneurs to get the funds they require to establish or expand their enterprises. Changes in market demand or trend, on the other hand, might provide possibilities for entrepreneurs to offer creative products or services that address that specific need.

The legal and regulatory framework is also a critical external factor that significantly impacts the entrepreneurship ecosystem. Xie et al. (2019) highlighted the importance of this framework in shaping the entrepreneurial environment, as it can either facilitate or impede entrepreneurial activity. Regulations can act as a barrier to entry for new businesses, hindering their success, while favorable policies such as tax incentives and streamlined regulations can promote entrepreneurial activity and facilitate business growth. Therefore, policymakers need to consider the impact of regulations and policies on the entrepreneurship ecosystem when creating legal and regulatory frameworks.

Culture and social conventions also play a key role in shaping the entrepreneurial ecosystem. Entrepreneurship is influenced by cultural and societal norms and values, according to Maroufkhani et al. (2018).

The success of entrepreneurship heavily depends on the ability of funding. Metrick and Yasuda (2021) suggested that funding plays a key role in the success of entrepreneurial ventures. Funding can originate from multiple sources, such as government grants, venture capital, and angel investors. The accessibility of funding can be a determining factor in whether a business can launch and endure the initial phases of development.

According to Acs et al. (2018), a supportive infrastructure includes networks of mentors, incubators, and accelerators, as well as access to resources such as research facilities and co-working spaces. Such a supportive ecosystem encourages entrepreneurship by providing the necessary resources and support to help entrepreneurs develop and grow their businesses.

The following Table 2 presents a compilation of authors whose contributions have helped to identify the factors that are involved in the entrepreneurship ecosystem.

Table 2 Factors in the Entrepreneurship Ecosystem Insights from Authors

Factors	Description	Authors
Economic and Market Conditions	Changes in the economy and market conditions can have significant impacts on entrepreneurship, both positive and negative.	Klofsten et al. (2019) ; Bosma et al. (2018).
Legal and Regulatory Framework	Regulations and policies can act as barriers or facilitators for entrepreneurship.	Audretsch and Belitski (2017); Estrin et al. (2013).
Cultural and Social Norms	Entrepreneurship is influenced by cultural and social norms and values.	Maroufkhani et al. (2018); Brinckmann et al. (2010); Acs et al. (2018).
Availability of Funding	The accessibility of funding can be a determining factor in whether a business can launch and endure the initial phases of development.	Metrick and Yasuda (2021); Acs et al. (2018); Grant, Croteau & Aziz (2019).
Supportive Infrastructure	A supportive ecosystem encourages entrepreneurship by providing the necessary resources and support to help entrepreneurs develop and grow their businesses.	Acs et al. (2018); Guerrero et al. (2016).
Education and Universities	Academic brilliance at a university is a reality of achievement and a display of this university's highest performance educational metrics. This excellence attests to a university's leadership in one or more areas (educational quality, efficacy of scientific research, publication activity).	Guerrero et al. (2016).

Source: Own elaboration based on the Literature reviewed.

As stated in the literature review, access to resources is essential to entrepreneurial achievement. These resources can be classified into three categories: financial, human, and social capital. Financial capital includes funding from investors, loans, and grants. Human capital refers to the skills, knowledge, and expertise of the entrepreneurs and their teams. Social capital includes the network of relationships that entrepreneurs have built over time, which can provide access to critical resources such as customers, suppliers, and mentors. Will be explored each one of the resources needed to develop an entrepreneurial ecosystem.

Spigel and Harrison (2018), in their work, mention that financial capital is a crucial element for the development of entrepreneurship within an ecosystem. This type of capital comprises of the inner retained returns generated by a business itself, or the investments provided by investors and creditors to acquire the necessary funds or services for creating new goods or services. In the case of internal retained earnings, an entrepreneurial ecosystem can offer startups access to financial resources by providing access to big markets that have profits-paying customers. This allows for the creation of internal retained earnings and facilitates the growth of new businesses.

In the work of Oviatt and McDougall (2018), highlighted that the size of the market has a significant impact on entrepreneurship activity, as larger markets offer more opportunities for new ventures compared to smaller ones. This idea is further supported by Sternberg (2012), who found that larger markets facilitated the creation of new ventures. Bosma et al. (2015) also observed that large markets provided more variety on the demand side, which stimulated the formation of new startups. While previous studies have focused on measuring market size through population density and growth at the regional level, the World Economic Forum (WEF, 2014), proposed a more comprehensive measure of market size at the country level, using a combination of GDP and trade data to calculate the size of the market.

Kelly and Kim (2016) stated that financial capital is linked to the funds offered by investors and lenders, highlighting that providing financial capital to early-stage companies is crucial for the economic resources of an ecosystem. To support entrepreneurship, it is important for an ecosystem to have a well-developed financial market that provides access to capital from banks, structured financial markets, startup capital, and other financial products. Urbano et al. (2018) emphasized that having access to funding is a crucial factor that affects the achievement of entrepreneurs and contributes to productivity in a region. The presence of startup capital is essential in facilitating the entrepreneurial process.

New ventures need access to financial capital, which is critical for the growth of fast-growing industries like biotech and data storage (Cohen, 2006; Neck et al., 2004). Some

governments have tried to increase the supply of startup capital through government programs, to promote the growth of their local economies (Porter & Kramer, 2018). The literature has shown that startup capital-funded companies experience greater levels of occupation and sales expansion compared to average businesses (Higgins et al., 2020).

Financial returns of venture capital funds support these good qualities. Some specific variables that represent the presence of financial capital in a region include venture capital availability, angel investor availability, debt access, capital market depth, IPO level, acquisitions and mergers, debt and credit market activity, and the percentage of financial services employment in the financial services sector relative to total employment (Drover et al. 2017; Kelly & Kim, 2016).

As part of the resources in the entrepreneurship ecosystem is worth mentioning the knowledge capital, which is defined as the accumulation of expertise and skills that exist within an ecosystem. It can evolve conditionally based on the availability of qualified human capital in a region. Places with a higher number of skilled employees can establish a more favorable ecosystem for early-stage businesses. In this same approach, the work of González Flores and Molina Morejón, (2022a) indicated that entrepreneurs require access to qualified workforce to build thriving businesses.

The availability of information capital is also related to the presence of quality research universities in a region. Research institutes contribute to the overall competence level of the human capital and promote knowledge acquisition (Nicotra et al., 2018).

Young workforce, such as recent graduates, are frequently inclined to take risks and have the capability to obtain entrepreneurial skills. Therefore, young employees can be positively related to the creation of new firms (Ouimet & Zarutskie, 2014).

Furthermore, knowledge capital in an environment demonstrates the effort of engagement specific attitudes and abilities associated with entrepreneurship, as well as training, education, and teaching programs aimed at stimulating entrepreneurship (Martin et al., 2013). In the same sense, authors such as Pittaway and Cope (2007), observed a considerable positive relationship between entrepreneurial education and entrepreneurship.

As many studies have shown, individuals who have undertaken entrepreneurship courses in universities have a stronger desire to establish their own businesses compared to those who have not (Klofsten et al., 2019). Nabi et al. (2016) reinforce this idea and suggest that such individuals may also have better abilities in identifying opportunities than those who have not received entrepreneurial education.

Additionally, Nicotra et al. (2018) agree that institutional capital involves institutions and supporting systems which serve the "rules of the game" in society. These regulations can either encourage or discourage economic activity (Mathias et al., 2014). For the purpose of this research, supporting structures refer to organizations that are designed to provide resources and services to help the progress and success of startups. These resources could involve physical space, coaching, networking connections, and other essential services. Such structures are fundamental to tackle market breakdowns, those can inhibit the capabilities of high technology ventures, helping them to defeat uncertainties and challenges associated with the early stages of development (Stam, & Spigel, 2016).

Policies, regulations, and community rules can speed up or slow down the establishment and expansion of startups. Factors like the government and the creation of a regulatory framework can implement various mechanisms, such as providing tax incentives, business-friendly legislation, or infrastructure for new firms. Policymakers can also support entrepreneurship through programs or policies created to modify regulations, promoting value chain integration, expanding access to credit, or facilitating the business environment (Bamber et al., 2014).

Administrations have been more and more interested in creating a favorable environment for entrepreneurship by offering tax incentives and positive monetary support and by eliminating bureaucratic barriers to business creation, such as permit and license applications (Siegel et al., 2003).

As well, institutional capital in a region is accumulated through funding structures likes: co-working spaces, incubators, startup centers, scientific-technological parks, and accelerators, which facilitate the entrepreneurial process, particularly for ventures with high growth potential, and increase the chances of firm survival and growth, leading to an optimistic impact on the broader entrepreneurship ecosystem and encouraging the formation of new firms (Romano et al., 2014; Hansen et al., 2000; Thierstein & Wilhelm, 2001).

Further in the literature of the entrepreneurship ecosystem factors, the work of Bourdieu (1986) describes social capital as "the aggregate of the actual potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition." Indicating that the social capital is a tool used by goal-oriented actors and functions as a collective attribute. The trust-based foundation of social capital, as discussed in management revisions, refers to the relations between people and institutions, that simplify processes and create value, in this context, the network also provides

guidelines, principles, responsibilities, and opportunities to its members (Tsai, 2001; Macke et al., 2019).

Thus, the concept of social capital is closely tied to networking. Studies have shown that social interconnectedness and networking play a crucial role in an individual's decision to become an entrepreneur. By interacting with other aspiring entrepreneurs, acquire valuable information and skills, which in turn increase their perception of the feasibility and interest of starting a business. The presence of mentors and individuals with significant professional experience in an area is also an influential factor of entrepreneurial activity (Aldrich & Zimmer, 1986).

Nicotra et al. (2018) advise that measuring social capital can be a challenging task due to its multidimensional and qualitative nature. Nonetheless, using indicators aligned with theoretical definitions can help operationalize the variables. Furthermore, in the work of Singh et al. (2021) agreed that culture and values can play a significant role in social capital accumulation within a territory, encompassing values, norms, and knowledge at both individual and general levels. The culture represents the value system that distinguishes one group from another. also found that culture shapes entrepreneurs' inclination to innovate and create businesses (Cantner et al., 2020; Neck et al., 2004).

Beyond culture, ecosystem aspects such startup capitalists and business angels not only provide financial capital but also knowledge capital, as they assist new entrepreneurs with their expertise (Drover et al., 2017). Market access is another essential component of knowledge capital, facilitating technological spillovers, data exchange, and improved labor market matching among heterogeneous entrepreneurs and workers (Carlino et al., 2007).

As an outcome of the literature, the ecosystem factors must bloom not only with the typical factors such as economic funds, government contribution, and well-prepared institutions, but also with strong networking and social involvement, all of which play a necessary role in the decision to become an entrepreneur, as hopeful entrepreneurs gain knowledge, skills, and resources from interactions with the entire ecosystem.

The entrepreneurship ecosystem refers to the set of external and internal factors that influence the creation and growth of new businesses within a geographical place. It includes various components such as financial resources, human capital, infrastructure, institutions, and culture. The ecosystem is dynamic and continuously evolving, with each component impacting the others in complex ways. In the following sub chapters will be explain in detail the entrepreneurship ecosystem factors.

1.2 Human Capital

Since the beginning of the last century, governments have transferred their focus from industrial revolution, technology, and capital to human capital development. The concept of human capital was introduced in the mid-20th century, proposing that economic growth can be explained by the level of specialized training individuals within the society. Currently, training establishes an important part of public policies, while human capital is defined as an investment in knowledge, training, and information to individuals. This investment grants individuals a higher return and productivity in the modern economy and takes benefit of people's talent (Becker, 1964).

As we enter the knowledge and technology era, the concept of human capital becomes larger and more complex, needing the development of new definitions and concepts. Currently, economies face issues such as new labor reforms, the need for higher company productivity, and job recovery. These problems cause severe concerns to less economically developed areas and countries, especially as global competition intensifies, and new markets arise.

By becoming a pillar of the new economic model and labor relations, small and medium-sized firms (SMEs) provide a viable answer to these difficulties. Creative people might join existing entrepreneurs and contribute to professionalization of their businesses in areas that operate more productively through initiatives advocated by the scientific and research movement. The new entrepreneur operates as an economic stimulant, fostering flexibility in production, through creativity and invention, and promotes structural change in the local, regional, and national economies in conjunction with other economic policies.

1.2.1 Human Capital and Education

The concept of human capital, which focuses on education, is an important explanation for people's growth and development, which leads to higher salaries and a better quality of life and aids governments in combating poverty, supporting technological developments, and increasing productivity. Education is critical to a country's economic success since it is tied to economic progress. According to Becker (1986), "the growing importance of HC can be seen from the experiences of workers in modern economies who lack sufficient education and training in the job."

Becker (1964) differentiates general and specific schooling. General training boosts trainees' marginal output to the same level that company training does. On the other hand, certain types of training enhance productivity in firms that offer it more effectively than in those that do not. Specific education reinforces productivity in the companies that provide it, and it

is referred to specific training, when it has an effect on the productivity of trained employees only within the companies that provide the training.

Smith (1776) highlighted the value of education and learning supporting the idea of education's function in increasing human capabilities. He was obstinate that differences in inherent skills across individuals were less significant than we thought, and that the unique abilities that distinguish people in different fields were frequently the result of the division of labor, rather than the cause.

Strengthening the educational system is critical in creating the values and abilities required for today. It is not just about growing the educational system, but also about broadening the content of education. Academia should produce high-quality programs that promote and develop human capital in the region where they are located.

1.2.2 Entrepreneurial Human Capital

According to Kantis et al. (2019), entrepreneurial human capital (HC) includes a variety of competencies such as idea generation, problem solving, handling complex situations, and risk-taking. Gartner et al. (2010) assert that it also includes intellectual abilities, personality traits, behavioral tendencies, and attitudes. However, entrepreneurial HC is more than just cognitive and behavioral constructs; it entails putting them into practice in an organization to generate value and achieve long-term advantages.

In the work of González Flores and Molina Morejón, (2022a) pointed out that even if the approach of Human Capital focuses on the entrepreneur, it ignores their unique characteristics and personal competencies in favor of placing them in the context of an existing or potential organization. It also implies that entrepreneurs can invest in acquiring these competencies. This makes entrepreneurial HC a respected resource for organizations seeking sustainable benefits and better performance, a company's ability to effectively manage all resources depends on its entrepreneurial HC (Amit & Shoemaker, 1993; Riley et al., 2017).

Entrepreneurial human capital (HC) is essential for the conception, consolidation, and growth of new ideas, as well as for overcoming business challenges and achieving success (Kantis et al., 2019). Nonetheless, the impact of environmental and contextual factors on performance and behavior suggests that entrepreneurial HC productivity may vary by region (Shane & Venkataraman, 2007; Ucbasaran et al., 2001). Certain personal attributes or characteristics, according to Acs and Audretsch (2005), predispose individuals to have entrepreneurial behavior.

As Isenberg (2010) points out, resource restrictions can often stimulate entrepreneurship. Taiwan, Iceland, Ireland, and New Zealand, for example, have established resource-poor ecosystems based primarily on HC. A similar occurrence occurred in Israel throughout the 1970s and 1980s, when a combination of variables led to exceptional growth of its ecosystem, including spillover from military R&D, substantial diaspora links, and a culture that values education and prudence.

Therefore, to succeed, the ideal entrepreneurial HC should possess the specific characteristics needed for a particular region or industry and be capable of designing, operating, and developing a venture within a defined ecosystem. It cannot be assumed that the same entrepreneurial HC will thrive in all ecosystems.

To investigate the subject matter of this research, emphasis will be placed on education as a constituent of human capital. Furthermore, this research aims to explore the impact of education on human capital and its role in promoting entrepreneurship.

1.3 Entrepreneurship Education and Universities

The connectivity and collaboration among the entrepreneur development community, colleges, and economic development agencies has a substantial impact on ecosystem momentum. Universities play a vital role in the ecosystem and must participate actively in this collaboration. They are critical to the ecosystem of a region, and their engagement in entrepreneur development plans and programs guarantees that student programs and research commercialization activities are linked to community-led entrepreneur development organizations; this implies that collaboration is required for community, economic development, and university connectivity.

Most of the economic development and university activities concepts are more likely initiated by organizations. The Individuals provide only 20% of their suggestions. Ideas initiated by organizations were frequently sparked by grants or financing opportunities. At other times, ideas originated through a strategic planning process or gap analysis of the ecosystem (Harrington, 2017).

After the brief analysis of the factors that belong to the entrepreneurial ecosystem, the following section begins with the empirical framework, referring to the role played by education (University) in entrepreneurial ecosystems. Therefore, the university is an element that affects all the factors that Isenberg (2011) pointed out before. Following the context, the university has created a strong social network following the transformations in education to increase employability (Bailey et al., 2018).

Concerning politics, there are important aspects that are related, mainly, to what is developed within the universities: access to knowledge, to science, to the new elements of what is the social conscience. These have always been factors that directly affected universities. Many significant situations of university life have to do with the ideological and political factors of social events (Cohen, 2006).

Another fundamental aspect of the university is funding. The university has great financial support, involving a wide range of public and private investors that can be available to entrepreneurs who try to implement their ideas (Malecki, 2011).

Education is a fundamental right of humanity with the power to change the conditions of life in society, fight poverty and generate jobs is a fundamental element in the Entrepreneurship Ecosystem. It plays an important role in generating entrepreneurs with a business identity and creativity (Morris et al., 2013), which allows the entrepreneurs to act, reflect and negotiate in a series of experiences, increasing their entrepreneurial skills. Identifying the educational models that form the essence of the problem in recent years allowed several countries to develop an educational system that generates skills or competencies for future entrepreneurs.

The university as an element of the entrepreneurial ecosystem throughout history has experienced deep changes, in its levels of organization, competencies, and institutional goals. The old university institution concept has been radically transformed, from being the major source of knowledge to becoming one of the key agents of the process of social, economic, and cultural changes experienced by modern societies (Branscomb et al., 1999; Etzkowitz et al., 2000).

Today, the university is considered one of the best organized institutions to face the challenges in the society of the future and, above all, is recognized as a fundamental pillar of the new productive model that is articulated around knowledge, technology, and innovation (Organisation for Economic Co-operation and Development [OECD], 1999). The new knowledge-based economic model, these institutions play a fundamental role, in producing, transmitting, and disseminating knowledge to society, generating new ideas, training scientific and technical personnel, and transferring the results of research to the productive factory to solve problems and to advance society (Audretsch, 2014).

This new approach gives the university a much more active role in society, making it one of the principal drivers of the change process and driving economic, social, and cultural development (Espinoza, 2000). From this perspective, it places the University at the heart of

society, as a transversal axis of the development policies that make it advance, has given rise to the academic institutions of higher education acquiring a new function: the one that has been called the "third mission" of the University (Laredo, 2007).

Entrepreneurial University was a concept proposed by Etzkowitz (2004), where it was shown how the universities that have entered this field obtain a series of positive effects: the creation of a dynamic and enthusiastic atmosphere, the positive influence on research - basic and applied, an impact valuable in university education and, finally, the possibility of developing a thesis, research or internships for students in large companies using the theory learned in the university in real life.

The role of universities must be key in the promotion of entrepreneurship among both young researchers and teaching staff. In this sense, there are more and more researchers who risk taking the leap. Little by little they are seeing small advances and groups of research assets in technology transfer, with mature technology projects in demand by society and industry and embarking on the adventure of creating a company or university spin-off (Clarysse et al., 2011).

A university spin-off is a company that emerges from a research group and in consequence is an indicator of the "applicable" research that is being developed in the University. Spin-offs are established with the goal to capitalize on the university's expertise and technology. These are companies based on innovation that generate products, high-added-value services, and demand qualified employment (Mueller, 2006).

Spin-offs contribute to competitiveness and wealth, strengthen University-Business relations, and provide synergies for the generation of new investigations. They provide a working exit for researchers who finish their cycle as a formal researcher at the University. It is also an alternative future option for scholars, students, teachers, and researchers willing to abandon comfort and embark on the adventure of creating a company.

The crisis must be understood in terms of opportunities and change. "The University should serve as a catalyst to show opportunities in sectors technologies, as well as to favor the creation of mixed entrepreneurial teams and multidisciplinary" (Global Entrepreneurship Monitor [GEM], 2018). It is important to analyze the Innovation that is created by the spin-offs inside the Universities, for this is relevant to define the term.

It is possible to define innovation as "the introduction of a new, or significantly improved, product (good or service), process, method of marketing or organizational method, in the internal practices of a company, the organization of the workplace or international relations" (OECD, 2005). This definition appears in the Oslo Manual, which is the main

reference that defines, catalogs, and standardizes the criteria for innovative activities in an economy and has been adopted by governments and international institutions.

However, the term Innovation has been widely discussed and has generated several points of view with currently no consensus established. The vision offered by the Manual on innovation is deliberately broad and, despite the differences in its definition, fundamentally Innovation is understood as a process whose purpose is the resolution of a problem (Mytelka, 2004).

Among the characteristics of the Innovation process are the following:

- Relation to uncertainty: Innovation is related to carrying out activities that have no background. The development and commercializing of knowledge of this nature exposes the innovator not only to the risk of failing but also to achieving success, it can be imitated by a third party (Aiginger & Rodrik, 2020).
- Requirement of resources investment: an innovator needs to invest tangible and intangible assets (research, salaries, services, time, etc.) to carry out knowledge creation and marketing activities.
- Possibility of producing externalities: the benefits of an innovation are seldom appropriate in their entirety by the innovator. The launch of the product or service in the market can benefit the competitors since it is cheaper to imitate or copy the product than to develop it, therefore, those who innovate generally face a higher inherent risk than the general population.
- Provides a comparative advantage: innovating makes it possible for companies and individuals to obtain a comparative advantage and to be able to use the knowledge that increases the quality of its products, opens new markets, or reduces costs.

Innovation is relevant for the entrepreneurship ecosystem because it has the ability to produce substantial benefits and improvements for a society, its consumers, and entrepreneurs. Among them, evidence has been found of the effects of innovation in facilitating the development of favorable returns on investment, boosting job creation, and identifying market behavior patterns, among others (Carree & Thurik, 2010).

There is evidence that highlights the importance and input of new companies to employment, economic growth, innovation, and development in countries, states, and regions (Acs & Mueller, 2008; Capelleras & Rabetino, 2008). Additionally, Lederman and Maloney (2003) stated that by investing resources in R&D for activities of innovation, companies obtain an average return of 40% in the OECD member countries.

Entrepreneurship has as its central activity, but is not restricted to, the formation and development of companies. Timmons (1994) states that entrepreneurship can be understood as the "process of creation or taking advantage of an opportunity, despite the resources currently controlled. Similarly, to the work of Reynolds et al., (1999) they defined it as "any attempt to create a new business, including the self-employment, a new company or the expansion of an existing company, a process that can be implemented by one or several persons, independently or within a company in functioning". Gartner et al. (2010) mentioned that entrepreneurial behavior develops the actions of the individuals that are associated, through the creation of new organizations, in that activities are developed for the maintenance or change of established organizations.

Etzkowitz et al. (2000) declared that entrepreneurship allows improving innovation items and mechanisms related to the positioning of entrepreneurs in both the public and private sectors and has a favorable impact on at least five specific items: (1) the creation of job opportunities, (2) the reinforcement and growth of value chains at the local level, (3) the empowerment of women and men in economic and social involvement (4) education with effects on development and (5) the search for well-being and optimization of the quality of life levels.

The scopes of entrepreneurship can vary, for example in the creation of policies encouraging entrepreneurship activity, self-employment mechanisms, innovations in markets, etc. In any case, entrepreneurship is a concept that has allowed transcending aspects of action towards innovative mechanisms that allow the human being to determine a better capacity of generating alternatives to the everyday.

According to certain research, a comprehensive approach to entrepreneurship education may be required in order to reflect different levels of analysis. Entrepreneurship education may be seen systemically as the ability to recognize contextual elements, system inputs, educational processes, and various outcomes (Pittaway & Cope, 2007).

The systemic character of entrepreneurial education is hampered, however, by the lack of clarity about what the outputs are intended to 'be' (e.g., graduate ventures; general education; business education; improved employability; enterprise skills). This inconsistency regarding the desired effects results in significant gaps in the inputs (e.g., contradictory policies; major differences in pedagogy; and differences in institutional implementation). In this view, the concept of "entrepreneurship education as one thing" appears to be challenging, implying that more effort is needed to begin developing thorough taxonomies and typologies based on existing worldwide experience.

Based on the literature reviewed, it can be concluded that entrepreneurship education, as a research domain, needs to do more to integrate understanding across different levels of research effort and needs to be better linked into general debates on adult learning, management learning, and the role of higher education in general.

1.3.1 Entrepreneurial HEIs and the Entrepreneurial Ecosystem

Higher education institutions have major problems when it comes to transparency about their identity, operations, techniques, and goals. Moreover, the knowledge-based economy, economic instability, fast expansion of information and communication technologies, and reductions in government financing have resulted in new requirements for global tertiary education institutions (Lamidi & Williams, 2014).

University leaders play an important role in the academic departments that founded institutions. They manage everyday operations, employ professional staff, and collaborate closely with higher-level university executives (Goodall et al., 2014). For a long time, there has been a rising interest in the roles of leaders in tertiary education. In recent years, organizations have concentrated on changing the form of tertiary education leadership in response to industry-wide concerns. A university leader's work is enormous, difficult, and sometimes fraught with uncertainty (Cardno, 2014).

In recent years, governments have implemented higher education reforms and policies that have altered HEI independence, public finance, mission, and accountability. HEIs are now expected to venture and actively contribute to the growth of entrepreneurial ecosystems (Etzkowitz, 2019). The idea of the utopian paradigm of the entrepreneurial university integrates and transcends existing conflicts in a new synthesis: ivory tower-polytechnic, research-teaching. As a result, it offers HEIs a third mission: to react to societal financial, technical, and social demands by developing social, knowledge, and entrepreneurship capitals that drive innovations, increase competitiveness, and positively affect economic growth (Etzkowitz, 2004).

Nonetheless, the concept has been criticized for its validity and contradictions between the three purposes of higher education institutions (Philpott et al., 2011). Several HEIs have begun on a journey that includes difficult organizational adjustments in the absence of consensus (Mcgowan et al., 2008).

Based on developments at Stanford University and the Massachusetts Institute of Technology (MIT), the entrepreneurial university concept was initially offered in 1983. An institution that looked into new funding avenues like research contracts, patents, and industrial

alliances was known as an entrepreneurial university (Etzkowitz, 1983). In contrast to earlier perceptions, which saw MIT and Stanford as oddities that will eventually adhere to the research model (Etzkowitz, 2004), today it is believed that these universities are representative of the entrepreneurial university.

Their development and effort of MIT and Stanford influenced policy and inspired HEIs throughout the world to imitate them and Silicon Valley (Etzkowitz, 2019), causing the American academic model to change and play a role in culture and within innovation ecosystems (Sam and Van Der Sijde, 2014). In the United States, bottom-up management was viewed as an extension of a university's research purpose, but when it first emerged in Europe's welfare setting, it had to be developed as an extension of the teaching mission (Etzkowitz et al., 2000).

According to the research of Stolze (2021) he has managed to create an “action-framework, to transform HEIs into more entrepreneurial institutions, he based his work in existing framework models and concepts for HEIs' entrepreneurial approaches are notions that fall short of explaining how change occurs in practice and outlining the stages and actions that must be taken. There is, however, a general recognition of the complexity and non-linearity of this process, which is marked by experimental strategies in a continuous state of institutional change (Etzkowitz, 2013).

Clark (1998) has developed an innovative idea called "ways for transformation." Because the elements themselves would not be relevant but together form pathways to generating connections. In Clark (1998) work chose the following elements:

- "Strengthened Steering Core": a dynamic and adaptable decision-making process made possible by both official and informal leadership, regardless of whether the organizational authority structure is decentralized or centralized.
- "Enhanced Developmental Periphery": a matrixed organizational structure with units, centers, and parks that expand their limits to interact with the ecosystem. These features are outside the typical institutional frameworks.
- "Diversified Financial Base": less dependence on the government, increased independence, and active financial management to enhance the number of resources available through service commercialization and collaborations with the private sector.
- "Stimulated Academic Heartland," in which academic institutions and academics start their own businesses by interacting with the ecosystem and creating new revenue sources.

In an effort to comprehend how the theory was being applied in reality, Kirby (2006) identified the following strategic initiatives for forward-thinking British HEIs: endorsement from senior staff who serve as role models; integration of entrepreneurial principles into university levels/departments; development of entrepreneurial goals that are evaluated; effective communication, including publications; support tools via infrastructure, process, training, and mentoring; coordinated models for equity sharing and staff promotion; cross-disciplinary research and teaching; and promotion via competition and role models.

Another British example is Newcastle University's transition to entrepreneurship, which can be broken down into four main phases (Benneworth, 2007): "Naive" - the creation of services for local industries; "Growth" - the attempt to support its own spinoffs due to weak demand from local industries; "Consolidation" - knowledge transfer agreements made with big corporations to increase revenue; and "Reach-out" - the endeavor to open itself to outside users.

Nelles and Vorley (2010) in figure 5 is presented an alternative model that includes what they called "entrepreneurial architecture blueprint" that is represented in the figure and is made up of the following components:

- Structures (entrepreneurial support infrastructure, such as incubators and technology transfer offices).
- Systems (networks tying together various players/departments).
- Strategy (institutional objectives backed by strategies for persuasion and measurement).
- Leadership (instruction and encouragement from university administrators regarding the third mission).
- The culture (entrepreneurial attitude at institutional, departmental, and individual levels).

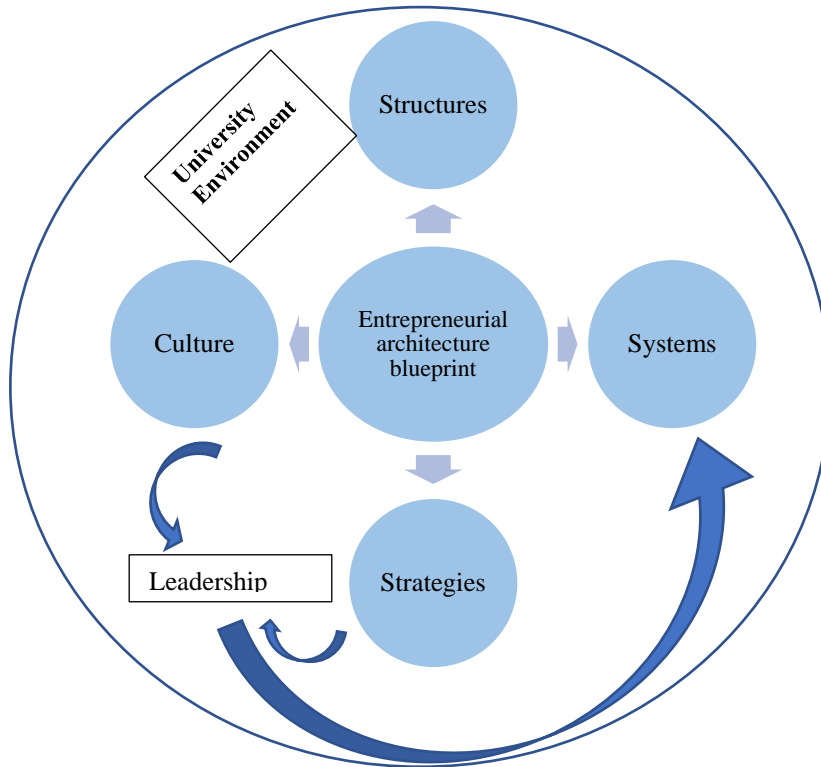


Figure 5. Entrepreneurial Architecture blueprint

Source: own creation based on the work of Nelles & Vorley, 2010

What influences the organizational architecture as is shown in figure 5, all the elements are related to each other, and the leader has a direct responsibility to create structure, strategy, and culture, and thus creating the entrepreneurial architecture.

Although the in the university “technology transfer offices” is frequently the foundation of the framework of the third mission at universities, it is neither the only nor the most significant factor affecting how well universities function in the field (Nelles & Vorley, 2010). In conclusion the idea of entrepreneurial architecture emphasizes that management of the HEI's control systems is also necessary for the third mission's successful execution.

Based on triple helix triangulation models reviewed by Farinha et al. (2014) they compiled insights from several authors including one of the most prominent authors in the field; including the Etzkowitz and Leydesdorff (2000) research where they conceptualized the triple helix models, combining the industry, the government and academy, creating a literature-based model figure that proposes three complementary and non-sequential developmental stages to broadly explain paths to the entrepreneurship and interrelated propositions that characterize entrepreneurial universities.

The methods in which higher education institutions/universities adapt to the social and economic needs of society are continuously on display. This covers a wide range of topics, such

as improving graduate employability, promoting social mobility, and expanding access to higher education for underprivileged groups, their short- and long-term contributions to local and national growth, how they are fostering the formation of new organizations, and how they are encouraging innovation in already-existing businesses.

The density of our environment presents higher education institutions with ongoing difficulties. Not all of them require immediate attention or can be resolved by institutes of higher learning. These difficulties fuel concerns about the sector's structure and existing makeup (Gibb et al., 2018).

In the literature, there is a variety of ways in which universities can act entrepreneurially and innovatively in their practices and strategies. For instance, by how they manage resources and build the organizational capability; the way that they involve external stakeholders in the leadership and governance of the institution; the way that they insert digital technology into their activities; how they create and raise synergies between teaching, research and their society, and finally the way that they promote entrepreneurship through education and business startup support as well as knowledge exchange to increase the innovation capacity of existing companies. Kromydas, (2017) stated that old-fashioned conceptual and organizational paradigms of higher education institutions require a deep, comprehensive, and urgent transformation.

The possibilities that the growing development of digital technology provides to all areas of the economy also have an impact on higher education. On the other side, digital transformation and capabilities support and maintain the growth of a creative higher education institution that is entrepreneurial (OECD, 2017).

Entrepreneurship education (EE) encourages student entrepreneurial mindset and has an impact on how well a new firm performs (Dickson et al., 2008; Galloway and Brown, 2002). Because of this, programs and pedagogies have been developed to encourage an entrepreneurial mindset and to make it easier for an individual's entrepreneurial aspirations to be realized. According to Fayolle (2013), there is a solid theoretical basis for understanding the ecosystem of entrepreneurship education, and this is mostly done by looking at real HEIs, teachers, and the methods that are really used in EE.

The most of study projects, however, have focused on assessing the impact of EE via students' entrepreneurial ambition (Liñán & Fayolle, 2015). The intention-focused studies document students' entrepreneurial intents, but none of them address how intentions or student

entrepreneurial outcomes may be improved or how intentions are transformed from intentions to practices. (Varamäki et al.,2015)

The most of EEd academics place a strong emphasis on the students (Liñán & Fayolle, 2015), while only slightly considering the other players in the ecosystem of entrepreneurship education. A few studies have found that academics and institutions provide a lot of scaffolding for achieving overall entrepreneurial achievements (Mukesh et al., 2018; Walter & Block, 2016).

Through incubation and training, HEIs encourage student entrepreneurship (Fenton & Barry, 2014). The involvement of institutions, academics, and other stakeholders working together has a substantial impact on the participants' ability to develop entrepreneurial abilities (Leffler & Näsström, 2014; Matlay, 2011). Having a curricula emphasized in academic entrepreneurship is a key factor for successful EEd (Gupta et al., 2015).

According to Hero & Lindfors, (2019) the academicians that have experience with entrepreneurship education and pedagogical approaches are key success factors for EEd in HEIs. Students' entrepreneurial initiatives and processes are significantly shaped by the ecosystem of higher education institutions and entrepreneurship instruction (Fayolle & Liñán, 2014).

Matlay (2008) and Isenberg (2010) considered that a variety of other stakeholders, including the government and corporate groups, may also be involved, increasing the efforts of academicians and institutions. Despite the apparent relevance of study, some scholars (Fayolle, 2013; Wright et al., 2017) have noticed a knowledge gap in the field. Specially Wright et al. (2017) have highlighted the absence of a conceptual framework that connects higher education institutions with entrepreneurship education. However, the complexity and challenging topic of EE at HEIs have also increased organizational issues (Fayolle et al., 2016).

The research conducted by Guerrero and Urbano (2012) has been one of the research projects that successfully had addressed a systematic picture of EEd and Universities, their work agrees with the idea that the HEIs constitute an ecosystem in which EEd takes place. The structure, character, and activities of this ecosystem may differ from those of the region. It is clear that exists a disconnection between what is practiced and what we know about the collaboration between Universities, Entrepreneurship Education, and the stakeholders (Matlay, 2011).

The fundamental understanding of the nature and structure of the connection adds to the body of knowledge and serves as a policy guide for HEIs in enhancing EE. Furthermore, the

study provides a novel way to address methodological difficulties mentioned by previous studies (Fayolle et al., 2016) and will serve as a model for future publications.

It is widely acknowledged that of the primary purposes of a university in many locations is to provide highly trained and specialized talent (Bramwell et al., 2008). Surprisingly, advanced students rather than university instructors emerge as key entrepreneurial agents for firm creation and spinoff development (Hayter et al., 2016). In the research of Raagmaa and Keerberg (2017), some colleges are distinguished to function not just as instructors but also as institutional entrepreneurs, proactively networking, establishing regional plans, and striving to modify local practices as well as national regulations.

Universities are surrounded by entrepreneurial areas, as Hayter (2016) discusses in the context of the relatively rare dynamic in an entrepreneurial university ecosystem.

The evolution of a university incubator, on the other hand, is described by Baraldi and Havenvid (2016) in terms of how it has assumed numerous new functions integrating it into both local and worldwide networks of entrepreneurs. Incubators, as described by Hechavarria et al. (2016) consist of resource networks, and know-how networks serve as the channels through which the community interacts with entrepreneurs and helps to develop an entrepreneurship ecosystem organically.

In the work of Theodoraki et al. (2018) the notion of an ecosystem based on social capital is discussed. This ecosystem is built on networks among ecosystem members to access resources, national and international networks to acquire foreign knowledge, and trusting that this will enable the ecosystem to be sustained over time as relationships develop between the stakeholders. Additionally, Theodoraki & Messeghem (2017) conceptualize the term ‘incubator’ as "a framework, a system, a structure, and a method for boosting the start-up, survival, growth, and success of initiatives". Nevertheless, incubators contrast in terms of the competence of the services they offer as well as the level of collaboration and synergy offered (Fernández Fernández, Blanco Jiménez, & Cuadrado Roura, 2015).

In addition to academic institutions, other service providers can define entrepreneurial networks by combining the roles of investors and entrepreneurs to act as agents and dealmakers (Feldman & Zoller, 2012). Brokers in non-profit organizations could be able to close the gap between information sources and entrepreneurs (Kirkels and Duysters, 2010). Community or social entrepreneurs are frequently needed for groundbreaking growth inside a community (Roundy, 2017).

It has long been recognized that the existence of intermediates, such as service companies, promotes entrepreneurship (Bahrami & Evans, 1995). Government agencies tasked with promoting economic growth are increasingly outsourcing services from private companies. In the ideal scenario, networks emerge connecting business owners, local service providers, and investors, this collaboration is called “the entrepreneurial life support system” (Pages et al., 2003).

Last but not least, the collection of products and services sold to aspiring and established entrepreneurs is referred to by Hunt and Kiefer (2017) as the "entrepreneurship industry." Non-technological, organizational, and stable demands are often not satisfied to the unique needs of small businesses. The fact that "intermediaries do not construct a cohesive system, using synergies, avoiding gaps and overlaps, because there was no central piloting of the system" is a significant issue (Nauwelaers, 2011).

In today's panorama, the Higher Education Institutions (HEIs) support entrepreneurial ecosystems and local economic growth in a variety of ways, including through instruction, spin-offs, staff or student start-ups, and partnerships with already-established companies, especially in knowledge-intensive industries. HEIs frequently serve as the hub of entrepreneurial activity, especially in areas with less developed entrepreneurial ecosystems.

According to Hayter in his research in 2016, states that in order to optimize both the entrepreneurial and inventive contributions of universities, so is good to say that the HEI entrepreneurial ecosystems are the outcome of the deliberate and coordinated efforts of multiple organizational components. For instance, to be sustainable, HEI entrepreneurial ecosystems need a range of stakeholders with a shared interest in fostering entrepreneurship in a certain region and ties to a particular institution.

The ecosystem method offers a more comprehensive framework and contradicts conventional thinking about how to design and comprehend incentives, structures, and regulations as separate objects and artifacts. A strong senior management team at the HEI, a departmental academic culture that encourages and rewards entrepreneurial behavior and entrepreneurial role models, collaboration among stakeholders, a brave, ambitious, creative, and highly connected group of entrepreneurial students, and long-term and mutually beneficial relationships with external partners and companies, who take an interest in the HEI's success, are the five key components that make up successful HEI entrepreneurial ecosystems.

The entrepreneurial architecture approach of Nelles and Vorley (2010) is particularly appealing to support the analysis of the university ecosystem because it elaborates on various

areas of action within universities. It refers to a collection of internal factors that interact to shape entrepreneurial agendas inside universities. It is well acknowledged that variables from the outside (external), including the political, economic, sociocultural, and technical surroundings, have a substantial impact on the entrepreneurial ecosystem of HEIs.

It is fundamental to clarify how the economic environment plays a crucial role in the constant growth of the HEIs' entrepreneurial ecosystem. The term "Internet society" alludes not only to how the rules of the game are changing, but also to how quickly innovations and applications are being developed in modern information society. Thus, there is a direct connection between the ecology of the system and the internalized economic environment.

Furthermore, a stable political climate is essential for the growth of the HEIs' entrepreneurial ecosystem. Studies that emphasize the influence of business relationships on investment and innovation decisions. Also, according to the literature previously reviewed showed that the political context has also an impact on the growth of HEIs.

The growth of the HEIs' entrepreneurial ecosystem is significantly influenced by several sociocultural settings. The most crucial factors are an innovative atmosphere that is welcoming and open and an entrepreneurial culture.

From the work of Theodoraki et al. (2018) mentioned that Many stakeholders "who share the same aim of entrepreneurial assistance within a local geographic location and who are affiliated with a certain institution" are necessary for the sustainability of HEI entrepreneurial ecosystems.

According to Graham insights says that successful HEI entrepreneurial ecosystems share five distinct factors (Graham, 2014):

- 1) Strong senior management at HEIs that actively supports the entrepreneurial agenda and promotes connections between staff, students, and the outside world.
- 2) Academic cultures inside departments that encourage and reward entrepreneurial activities and serve as role models for entrepreneurs.
- 3) Cooperation between numerous parties and assistance from different HEI organizational units throughout the whole entrepreneurial process.
- 4) A group of entrepreneurial students who are courageous, ambitious, inventive, and well-connected, and who are mentored by senior staff members and business owners.
- 5) Long-term, mutually beneficial partnerships with outside organizations and businesses that actively participate in campus life.

As has been revised in the literature the essential components in HEI entrepreneurial ecosystems should support and link other entrepreneurial ecosystems and must help to the local economic growth in a variety of methods, such as education, spinoffs, staff or student start-ups, and partnerships with already-existing companies, especially in knowledge-intensive industries (Audretsch, 2014). Particularly in areas with less developed business ecosystems, HEIs are frequently the hub of entrepreneurial activity (Graham, 2014).

In the following subchapter will be established the HEI Entrepreneurial concept to use and its framework based on the literature review

1.3.2 The Established HEIs Entrepreneurship Ecosystem Definition and Determined Framework

As the author Isenberg (2011) mentioned, each ecosystem is unique and, although the same criteria are considered to determine it, the matrix derives from the interaction of several elements in a very complex way, which makes it impossible to use generic templates.

Following this line of thought, Brown and Mason (2014) warned in their work that the rise of an EE depends on the particularity and idiosyncrasies that each region possesses in a singular way, due to the existence of unique factors that are difficult to replicate. This difficulty of reproducing and managing an ecosystem from one region to another is also mentioned by Neck and Greene (2011) based on a study carried out in the town of Boulder, Colorado, United States.

Therefore, from now on for this research is important to address that the concept of entrepreneurship ecosystem will be describing and representing the Universities /HEIs themselves as entrepreneurship ecosystems, based on the previous definitions concluding that fundamentally any geographical place can be considered as entrepreneurship ecosystem as long as encourages, connects, and supports entrepreneurial activities between the different stakeholders of the ecosystem.

In the work of Mukesh and Pillai (2020) they conducted a detailed investigation in Karnataka, India, where they examined the impact of HEI ecosystems on entrepreneurship education (EEd) and attempted to map the complicated relationship between both. They discovered six EEd elements and eight HEI ecosystem factors using exploratory factor analysis; the latter four were classified as external factors and the other four as internal factors.

The authors Mukesh and Pillai (2020) in their research combine the qualities of Guerrero and Urbano (2012) and Pittaway and Cope (2007) results of their study to produce an integrated theoretical framework that explains the synergy between the HEI ecosystem and EEd.

Corresponding to Guerrero and Urbano (2012) in their work defined a framework of the entrepreneurial universities, which for this research their model is a foundation for defining the variables of the HEIs ecosystem, in their study they divided it in Formal and Informal and Internal as part of the environment but separated at the same time, for this research have been modified to and will be called External and internal factors.

The following variables are included in the HEIs ecosystem are subdivided in two groups external and internal, the first one includes: entrepreneurship promotional activities, attitude towards entrepreneurship, support for entrepreneurship, governance structure; the internal factors in the HEIs: the ability to connect start-ups with industry; teaching and personnel; physical infrastructure and facilities; and financial assistance for entrepreneurship. (Mukesh & Rajasekharan, 2020; Guerrero & Urbano, 2012).

For the variables or factors in the entrepreneurial education, will be consider for this study: the degree of entrepreneurial education in academic program, extracurricular activities, department philosophy on entrepreneurship, mentoring and coaching programs for entrepreneurs, the student orientation, this conceptual framework was retrieved from the work of Pittaway and Cope (2007) and entrepreneurial teaching methodologies from Guerrero and Urbano (2012). In the following figure 6, was defined the framework that will be used in this dissertation.

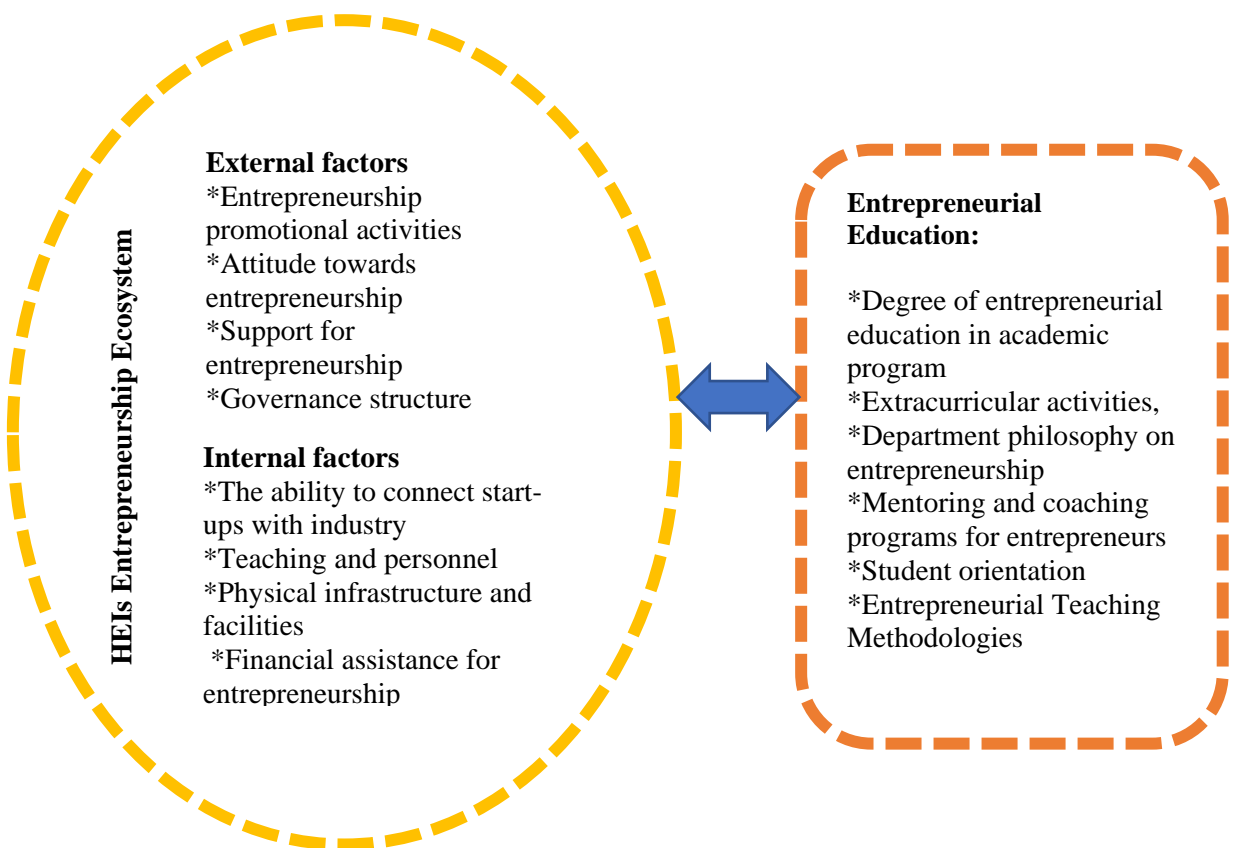


Figure 6 HEIs Entrepreneurial Ecosystem and Entrepreneurial Education framework
 Source: own creation based on the Literature Review.

2. MATERIAL AND METHODS

This chapter describes the details of the research methodology that is used in this dissertation. It intends to describe the data collection and methods. The final part discusses the description of statistical analyses, including the reliability and validity tests of the hypotheses.

2.1 Methodology Framework

The research methodology employed in this study consisted of both qualitative (exploratory and descriptive) and quantitative (relational, explanatory, and predictive) methods. The research was based on multiple sources of information including documentary sources, surveys, and the author's own experiences.

There were three steps of the process. The first step in explores different sources of information from national high impact reports about entrepreneurship ecosystems in Mexico, analyzes them and discover the actual panorama of the Mexican entrepreneurship ecosystem. The second step required the conduction of a survey using the modified Delphi method, a method that entails two rounds of consultation assisted by the use of the Internet and questionnaires in order to obtain consensus on a specific issue (Almenara & Moro, 2014). The FORMS tool from Microsoft 365 Applications for Enterprises, was used to create the nine optional questions in the first-round quiz. The expert panel included a total of 27 members. The survey was sent through email.

The second round of Delphi survey was applied to 21 experts who decided to continue and collaborate with this research. The experts panel were invited to complete the identification remaining anonymous, including gender, age, years of experience in the topic, and their role in relation to the Higher Education Institute/University. The survey was explicitly sent to experts in NE of Mexico who previously worked or were involved in the former state program PRODEM, which was dedicated exclusively to dealing with entrepreneurship ecosystem programs in national and regional ranges.

The third stage of the methodology was the theoretical framework, which was divided into three constructs using structural equations, and was completed with a survey. The survey was created based on the Literature Review consulted based on the constructs used in the work of Mukesh and Pillai (2020) combining the work and theory of Guerrero and Urbano (2012) and Pittaway and Cope (2007). The survey was sent to a specific sample to address the opinion and experiences from master graduates in any economic/business postgraduate program, being selected 156 for the sample, the rate of responses was only 120 participants.

This number was good enough to get significant results correlated to the sample of study. The tool that was used is Partial Least Squares (PLS) will be detailed later.

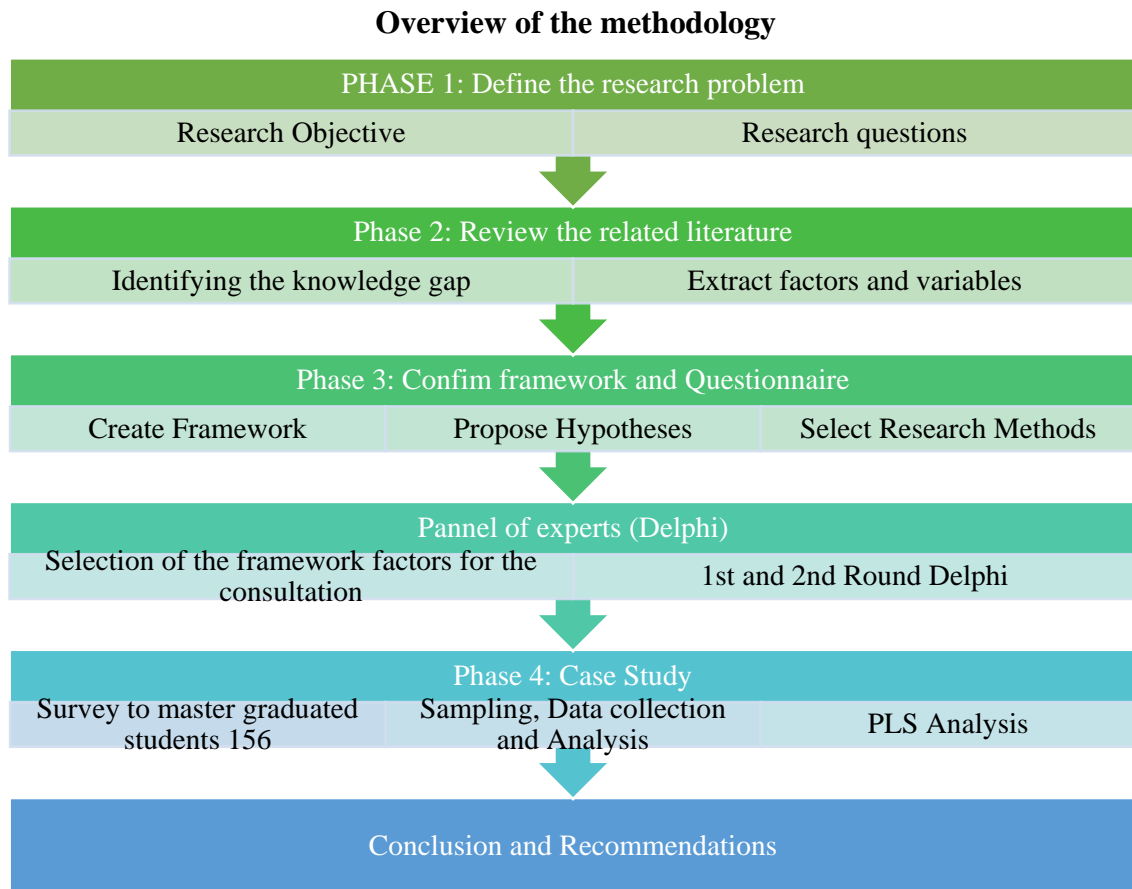


Figure 7 Research methodology

Source: own elaboration

2.2 Methods and Analysis

2.2.1 Delphi Method

In this research, the starting point was to define the concepts that would be used in the specific sample. The Delphi determined as the appropriate research method based on the literature review, and a modified Delphi method was applied to consult with a panel of experts. The Delphi method involves the discussion of a group of expert's opinions about a subject, conducted out in rounds of repetition and anonymity (De la Garza et al., 2015).

As shown by Hsu and Sandford (2007), the Delphi method uses questionnaires to gather information and aims to create consensus among the participants. According to Reguant Álvarez and Torrado Fonseca (2016) the procedure is broken down into steps that start with the definition of the research problem and continue with the creation of the expert group, rounds of consultation, and information analysis. The goal of applying the Delphi method was consulting with the experts about the understanding and conceptualization of the topic HEIs

entrepreneurship ecosystem and entrepreneurship education; it was also asked about the entrepreneurial human capital and the mission of the entrepreneurial university, the research was mainly looking for consensus on the definitions, continuing with the participation of the panel of experts. It also was important to know their opinion in two principal questions: What are the most significant factors shaping the entrepreneurship education, and what Higher Education Institutions ecosystem’s factors influence the Entrepreneurship Ecosystem?

The Delphi method is applicable in cases where arguments and individual opinions must be contrasted and combined to reach decisions that cannot be assumed unilaterally, such as the Role of the HEIS influencing the entrepreneurship ecosystem. It involves anonymously gathering the opinions of experts through a questionnaire, analyzing them, and then sending them a new questionnaire that contains a prior analysis of the findings from the information gathered in the first round so that they can change their opinion if they deem it necessary. The process is repeated several times, typically twice until the results consent on the occurrence of a particular sequence of events.

The fundamental idea of this method is that "group" knowledge is better than “individual,” and it is mostly used in areas where specific information is not available. Its most important characteristics include anonymity, "feedback,” the “group” response, and the tendency to consensus (Kaynak & Macaulay, 1984).

Adan (2018) in his work makes a compilation of the advantages and limitations of using the Delphi method in the following table 3 are pointed out:

Table 3 Delphi method: limitations and advantages

Advantages	Limitations
The subjective or experience-based opinion of a group of specialists will always be of higher quality compared to the opinion of a single specialist, due to the greater amount of information available to a group.	The results depend on the accuracy of the questions. That is, there is no doubt about its content because the interpretation must be unique.
Minimizes the influence of opinion leaders, allowing each participant to express themselves freely.	The length of the sentences must be carefully evaluated. The greater the number of words in a question, the greater the possibility of error in its interpretation.
The anonymity and confidentiality that must be maintained allows disagreement with opinions that are widespread and/or maintained over time as absolute truths. In the successive stages the participant will have the option to defend his position.	The bias of the participants due to their cultural background, age, and gender, can affect in some cases. For this reason, the choice of experts must be careful.

It is a useful method for decision making and its application is very wide in any field.	After the first round, some participants are tempted to join the score closest to that of the total group, without their own argument.
	It is an intuitive method rather than a rational one, but its value increases as the requirements to develop the method correctly in all its stages are met.

Source: own creation based on Adan (2018).

In short, the Delphi method is a prospective technique for obtaining qualitative or subjective information, relatively precise in contexts of imperfect information. It results from combining the knowledge and experience of experts in various fields in a way that tends towards the consensus of opinions of future specific effects, statistically quantifying their opinions through measures such as median, mean, quartiles, etc. Therefore, the forecasts are based more on experience and personal expectations than on scientifically proven theories.

Figure 8 provides a better view of the Delphi process.

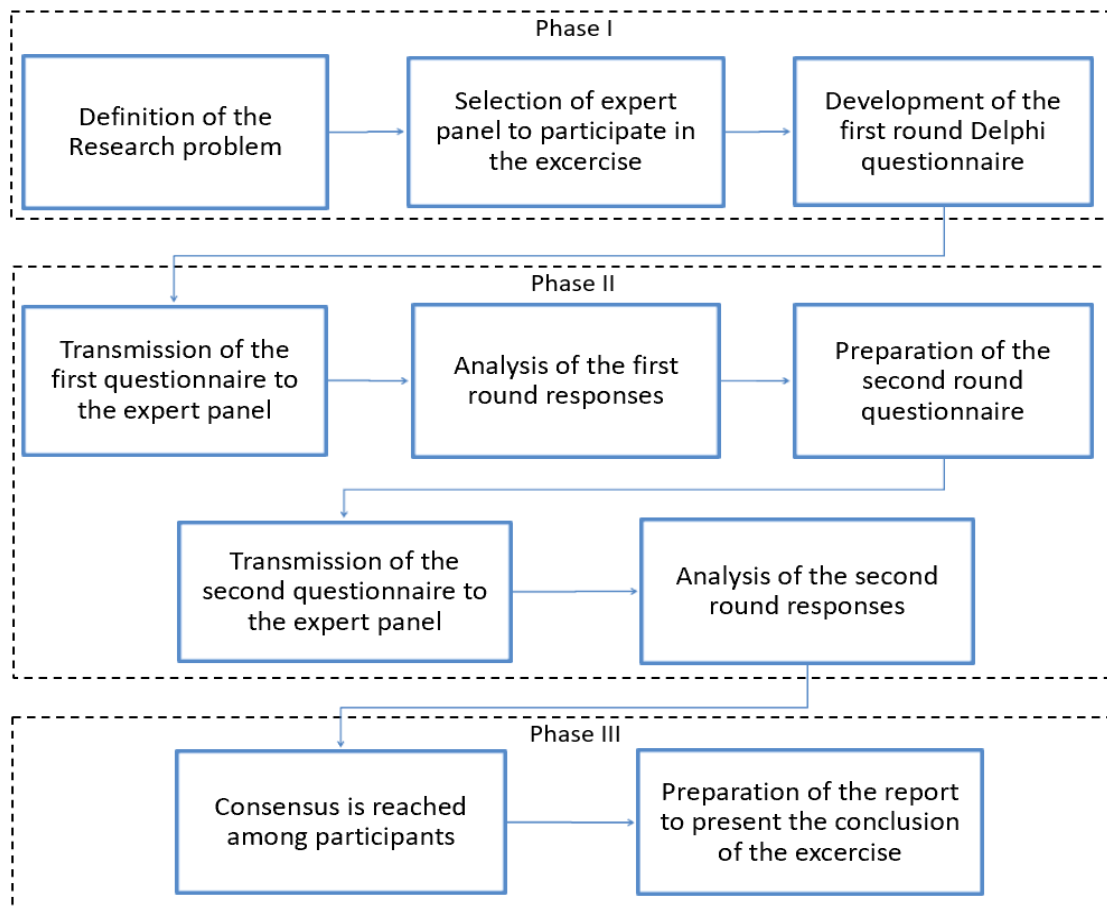


Figure 8 The Delphi Process

Source: Own creation based on the Literature reviewed

According to the literature, the number of applicants in Delphi method can range from 7 to 30, and the experts can be of two types: affected and specialists. The first type are individuals that the subject directly affects the outcome and the second type individuals who possess knowledge/expertise about the situation under study.

2.2.1.1 Data Collection and Sample for Delphi method

In this case, the participants were 27 stakeholders that are considered under the second type who had experienced working, studying, and/or developing projects in higher education institutions (HEIs) belonging to the former Mexican Entrepreneurship National Program (PRODEM). In the first round 27 experts participated and, in the 2nd, round, only 21 experts decided to continue the study, the 1st and 2nd round were sent in the first quarter of 2022.

In this study, the stakeholders/experts can be considered specialists in the entrepreneurship ecosystem, they could be entrepreneurship professors/researchers, specialist in incubators/accelerators, directors/high management of institutions, business owners that had worked or belonged to the PRODEM program.

This research further focused on analyzing the conceptualization and identification of the key factors in HEIs. Specifically, the study examined their opinions about conceptualizing HEIs ecosystems: external and internal factors and how in their experience impact these factors and/or interconnect with the entrepreneurship education factors.

The complete questions and results can be seen in the annexes section. From the first round was asked to the panel of experts the most accurate definitions in their experience and opinion.

2.2.2 PLS Methodology

The PLS (Partial Least Squares) methodology is a statistical tool that has been increasingly used in entrepreneurship research and analysis. The PLS methodology can be particularly useful in identifying the key factors that drive business success and in understanding the complex relationships among these factors.

In the research work of Hair et al. (2011), mention that the PLS methodology is particularly useful in entrepreneurship research because it allows researchers to examine a large number of variables simultaneously, making it possible to identify the most important factors that contribute to business performance. The PLS methodology is also flexible and can accommodate different types of data, including both categorical and continuous variables.

Rauch and Frese (2007) employed the PLS methodology to examine the correlation between entrepreneurial orientation and business performance in their research. Their findings revealed a beneficial impact of entrepreneurial orientation on business performance, which was facilitated by the strategic flexibility of the firm.

In their study Gholami et al. (2019) conducted an analysis using PLS methodology to investigate the correlation between entrepreneurial orientation and innovation performance in Iranian SMEs. The findings of the study revealed a strong positive relationship between entrepreneurial orientation and innovation performance, suggesting that entrepreneurs who prioritize innovation can significantly enhance their chances of success.

Martínez Ávila and Fierro Moreno (2018) made some annotations about the use of PLS method shown in the following table 4.

Table 4 PLS method: advantages and limitations

Advantages	Limits
It is objective, it only depends on the experimental results.	It only serves to fit linear models
It is reproducible, provides the same equation, no matter who performs the analysis.	It requires having at least ten measurements under the same experimental circumstances.
Provides a probabilistic estimate of the equation that represents some experimental data.	Such results must be described by a known probability distribution. The most common is the normal or Gaussian distribution.
Provides small error intervals	Some calculation software is required, otherwise it is very annoying.
PLS is known for its ability to handle complex relationships and multiple variables simultaneously	

Source: Based on the work of Martínez Ávila and Fierro Moreno (2018)

For the case of study, the constructs used in the work of Mukesh and Pillai (2020) will be used, in which they developed a theoretical framework that combines two widely cited theories to explain the relationship between the environment of Higher Education Institutions (HEIs) and Entrepreneurship Education (EEd). The authors emphasized the constructs for EEd based on the studies of Guerrero and Urbano (2012) and Pittaway and Cope (2007) to create an integrated framework. The authors identified several external factors in the entrepreneurship ecosystem of HEIs, including promotional activities, attitude toward entrepreneurship, support for entrepreneurship, and governance structure. These factors were used as variables in the study conducted by Mukesh and Pillai (2020) and reported in their research.

Regarding the internal entrepreneurship ecosystem in HEIs, the variables encompassed are the capacity to link startups with industry, faculty and instructional support, physical infrastructure and amenities, and monetary backing for entrepreneurship.

The following table 5 describes the constructs to use in the questions of the questionnaire.

Table 5 Indicator Variables and Dissertation framework

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

Source: own elaboration based on the work of Mukesh and Pillai, 2020; Guerrero and Urbano, 2012 and Pittaway and Cope 2007; although with the same approach the title of the factors F1 and F2 has been modified for this research.

The complexity of the topic required a careful approach, and as a result, this research relied on a conceptual framework and a specific methodology. Figure 1, which depicts a structural equation model, was utilized to illustrate two sub-models. As Wong (2019) explains, the inner model establishes the relationships between independent latent variables, while the outer model establishes the relationships between the latent variables and their observed indicators. By utilizing this methodology, the research was able to establish a clear and comprehensive understanding of the relationships between variables and their indicators.

It is observed the Structural model with all the constructs applied in the present research in figure 9.

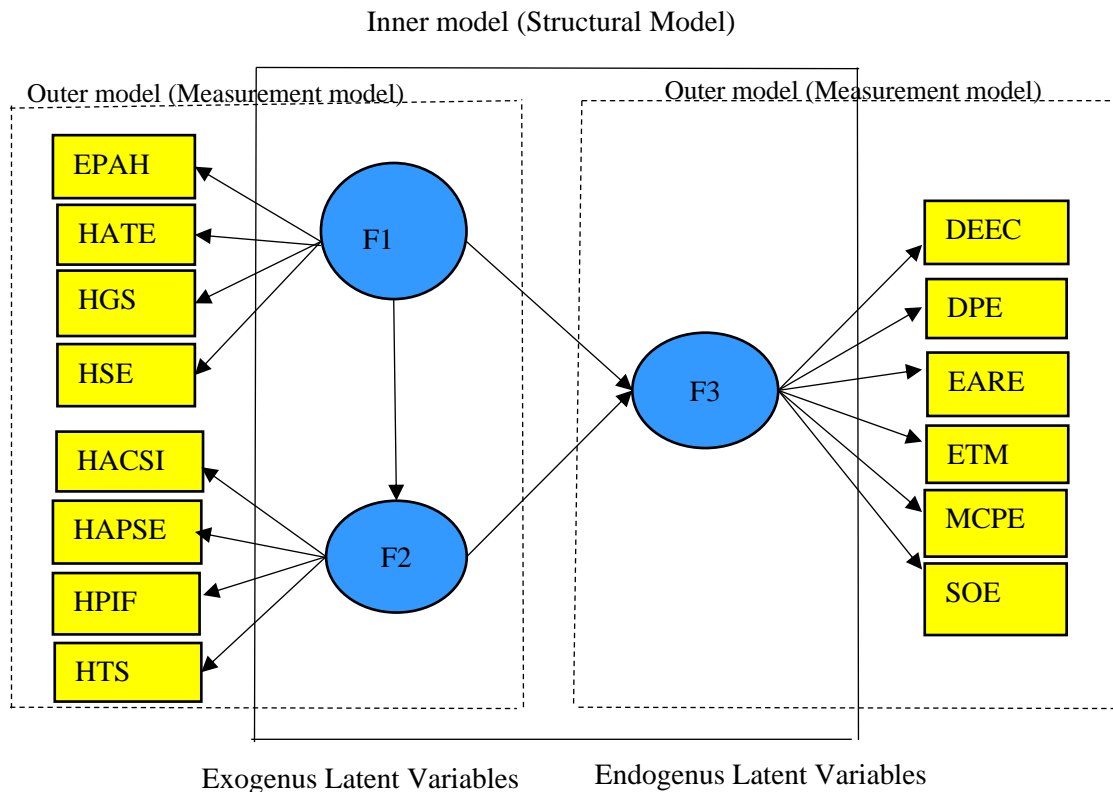


Figure 9 Structural model of the research

Source: own elaboration.

2.2.2.1 Data Collection and Sample for PLS

To conduct this research, a questionnaire was developed and distributed via email in the first quarter of 2022. The case study concentrated specifically to graduates who completed a master's degree in Torreon Coahuila between 2020-2021. The questionnaire was sent to a total of 156 individuals, with the assistance of the "follow-up graduates' program" department in each faculty. Six private and one public higher education institutes were selected for the study, all of which offer master's degrees in areas such as economy, management, business, and finance.

Finally, the participants were 120; more than the minimum sample size of 111 needed for a 95% confidence level, which is sufficient for statistical calculations in the results and discussion sections. The questionnaire used for the case study, included multiple-choice questions that were designed based on the literature review and related to entrepreneurial ecosystem factors.

The questions were arranged as closed questions, and students were asked to respond on a Likert scale from 1 to 5. To calculate the sample size, the Sample Size Calculator from calculator.net was used, based on data from the National Association for the Universities and Higher Education Institutions of Mexico (ANUIES) 2021 report. The formula used for sample calculations was based on the universe population of individuals who completed the academic master's program and graduated between 2020-2021, as provided by 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.

Population Sample

The main focus of this study is on individuals who have completed a master's program in the fields of Business, Management, or Finance. The author of this dissertation is interested in gaining insights into the perceptions and feedback of the graduates regarding the entrepreneurial ecosystem factors and the effectiveness of entrepreneurship education in shaping their entrepreneurial mindset holistically. This research used a case study approach that focuses on graduates from the NE region of Mexico (specifically, Torreon, Coahuila) who completed their master's program between 2020-2021.

Table 6 List of participants from the population sample

Name Of Higher Education Institute	Type of Institution	Women	Men	Total
Enseñanza E Investigación Superior, A.C.	Private	26	28	54
Master in Businesses Management focus in Quality and Productivity		8	15	23
Master in Businesses Management focus in Finance		11	10	21
Master in Businesses Management focus in Marketing		4	2	6
Master in Businesses Management focus in Human Resources		3	1	4
Instituto Internacional De Administración Estratégica	Private	3	2	5
Master in Strategic Management		3	2	5
Universidad Autónoma De La Laguna	Private	8	0	8
Master in Management		8	0	8
Universidad Del Desarrollo Profesional	Private	5	4	9
Master in Businesses Direction		5	4	9
Universidad Iberoamericana - Torreón	Private	10	7	17
Master in Project Management		3	1	4
Master in Executive Management		5	3	8
Master in Sociocultural Management		2	3	5

Universidad Autónoma De Coahuila	Public	11	16	27
Master in Management with focus in Finance and Human Capital		0	0	0
Master in Executive Management		9	12	21
Master in Business Taxation		2	4	6
Total		64	57	120

Source: Own edit.

Table 7 Population Sample

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

Source: Retrieved from González Flores & Molina Morejón (2022).

Indicator Reliability of the Methodology

The figure 10 shows the Histogram Outer Loadings, where two of the variables of the factor F1 External entrepreneurship ecosystem and two of F3 Entrepreneurship Education in HEIs were discarded for having factorial load values below 0.7 González Flores & Molina Morejón (2022).

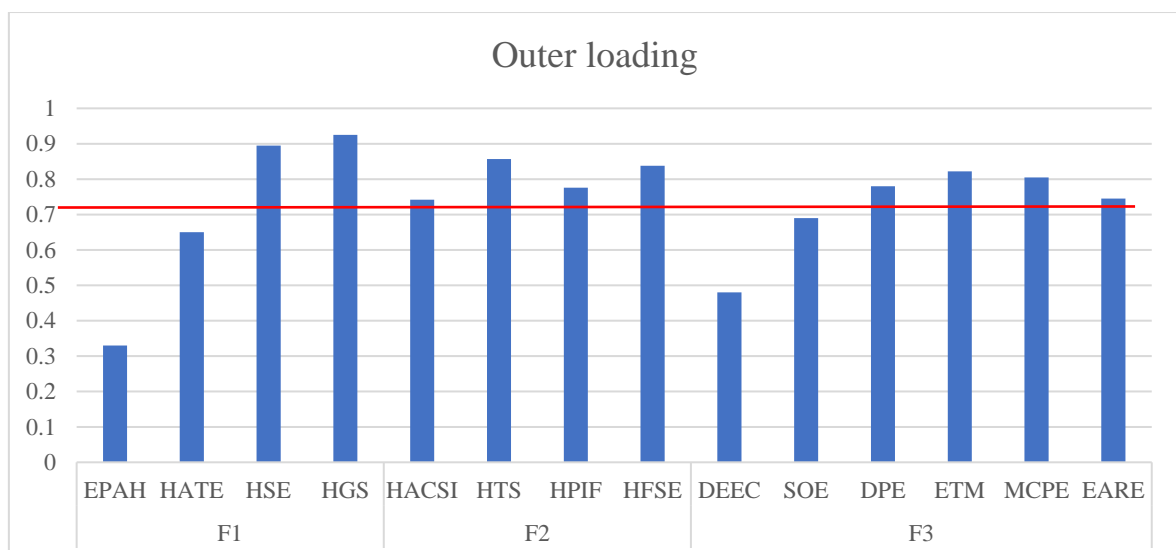


Figure 10 Histogram Outer Loadings

Source: Retrieved from González Flores & Molina Morejón (2022). Observe that were dropped variables: EPAH; HATE; DEEC, SOE.

The authors in the work González Flores and Molina Morejón (2022), agreed that convergent validity is the extent to which the construct converges to explain the variance of its indicators. As observed in Table 8, 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 et al, 2011). In this matrix (Table 8), the four variables that were eliminated (*EPAH*; *HATE*; *DEEC*, *SOE*) for having a low factor load, no longer appear. The “AVE” number should be 0,5 or higher to remain significant to the research (Bagozzi & Yi, 1988).

Table 8 Convergent validity

Latent Variable	Indicators	Loading	Indicator reliability	alpha de Cronbach	rho_A	(IFC)	(AVE)
			(Loading 2)				
F1	HGS	0.925	0.855	0.795	0.808	0.907	0.83
	HSE	0.895	0.801				
F2	HACSI	0.742	0.55	0.817	0.819	0.88	0.655
	HFSE	0.838	0.702				
	HPIF	0.776	0.602				
	HTS	0.857	0.773				
F3	EARE	0.745	0.555	0.841	0.87	0.885	0.645
	ETM	0.822	0.675				
	MCPE	0.805	0.648				
	DPE	0.780	0.608				

Source: Retrieved from González Flores & Molina Morejón (2022)

In table ,9 authors like 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, therefore the Fornell and Larcker parameter is achieved.

Table 9 Discriminant validity test

	F1	F2	F3	
F1	0.911	0.911		
F2	0.809	0.804	0.809	
F3	0.723	0.801	0.779	0.803

Source: Retrieved from González Flores & Molina Morejón (2022)

3. ANALYSIS OF THE RESULTS AND DISCUSSION

3.1 Entrepreneurship Ecosystem in Mexico

Latin America has seen a rise in entrepreneurship recently. Unfortunately, despite its promise, this region has not yet seen the growth of informal businesses and the vitality of invention that other regions have (Aparicio et al., 2016). The work of Amorós et al. (2019), mention that there are three key causes behind the region's slow development of innovative businesses:

- 1) Lack of links between research and development and the founding of new businesses, which prevents the transfer of knowledge.
- 2) Deficiency of technology application in business models; and
- 3) Absence of government regulations that encourage technology-based businesses.

The Mexican government established several entrepreneurship platforms to support the entrepreneurship ecosystem, with the creation of INADEM as an agency and component of the Economic Secretariat:

- The Entrepreneur Support Network, a project launched by the government and businesses to provide a single hub for entrepreneurs to access a variety of business services and support. Entrepreneurs can contact several programs and organizations with this assistance after registering. Via 82 000 active connections, 291 member organizations, and 465 mentors, the network currently has over 870 000 entrepreneurs as members (GEM, 2018).
- The National Entrepreneurship Observatory is a resource platform that disseminates statistics, studies, and research for the growth of entrepreneurial ecosystems (GEM, 2018).
Daily Justice for SMEs: an initiative started by INADEM in February 2016 with the goal of defending the rights of business owners, especially SMEs. It also examines current restrictions to see whether any have an adverse effect on small and medium-sized businesses compared to large ones (GEM, 2018).
- The National Program for the Formalization of Employment helps businesses boost their productivity and competitiveness through a combination of training, social services, and pensions, which helps to lower the rate of informality by 1% per year (GEM, 2018).

The government's actual emphasis on entrepreneurship, has an effect on economic growth not only because it has led to the establishment of numerous new enterprises, but also

because these corporations provide new employment opportunities and boost competition, innovation, and productivity (GEM, 2018).

According to ASEM (2022) in their report “Radiography of the Entrepreneurship in Mexico, 2021) Mexico has its majority of entrepreneurs between 26 and 35 years old with 41.4% of the total.

In the Global Entrepreneurship Survey (GoDaddy, 2022) reveals that in Mexico the 47% of entrepreneurs start their business out of necessity or the desire to have an extra income, while in other countries such as the United States, Canada, or Australia they start their companies pursuing a passion and not a need.

ASEM (2022) also mentions that the main motivations that the Mexicans have to start a business is the search for personal and professional growth as well the need to fix problems in the society or in the market, in the report as well mention some statistics like the 64% of the entrepreneurs have their business as main income, 22% of the entrepreneurs said that their business is their secondary income, and the 14% entrepreneurs consider their business as just an extra income, the sources for financing entrepreneurial ecosystem of Mexico during the first three years, are mainly from own resources, sales and utilities generated by the business, and/or from the family or friends resources (ASEM, 2022).

The National Institute of Statistics and Geography (INEGI, 2021) points out that the preferred areas for Mexicans to start a business are food, technology, and beauty. In technology, the Mexican entrepreneurs decide to start their business mainly in software, gadgets, videogames, and digital services, highlighting that the sales of beauty and personal care items grew by 8 % in 2021. Meanwhile, gastronomy represents 12.2% of all businesses in the country and generates just over two million jobs, according to INEGI (2021).

Is interesting to know that in the 2021 the fintech represented the 6.3% of the financial resource of the entrepreneurs, growing 3.5% compared to the 2020, in the contrary the banks decreased 4% of financial resource of the businesses in Mexico (ASEM, 2022).

In 2021, the percentage of companies that worked presential increased 10% compared to 2020, and 34% operated remotely, 32% operated in person, and 35% of the businesses operated in a mix scheme.

The same report was mentioning the digital presence of the Mexican entrepreneurial ecosystem, becoming essential, especially after the pandemic (COVID-19) begun; around 88% of companies in Mexico have a digital presence, which implies an advance of 2% compared to 2020, while the majority (74%) of the entrepreneurs surveyed specified that they have ensured that their companies have a digital presence (ASEM, 2022). This self-sufficiency in the

management of the digital presence of the enterprises could be due to the development and accessibility that various platforms and technological tools now offer.

The main digital channels used to disseminate their products and services are Facebook, website, Instagram, and WhatsApp Business. This last one, is an instant messaging app, which has been consolidated as the digital tool most used by entrepreneurs to sell online and as well used for customer service, although digital sales increased in the 2021 for 54% of companies, the number of companies that sell online decreased by 3% (ASEM, 2022).

Mexico is among the Latin American countries that during 2020 and 2021, even with the increase in the creation of enterprises, witnessed more businesses failing than those emerging.

During 2021, 24% new businesses appeared in Mexico compared to 2020, while 33% of existing enterprises failed and disappeared. According to data from the Study on the Demography of Businesses (EDN) carried out by the National Institute of Geography and Statistics INEGI (2021). Only Panama and Colombia had a greater number of new ventures than closed ventures, according to the Global Report 2020-2021 of the Global Entrepreneurship Monitor (GEM, 2021).

In the case of Mexico, among the most common causes of this failure is: the lack of liquidity. This factor could be linked to the 39% of companies that report having delayed invoice payments from their customers, lack of knowledge of the market and poor business management (ASEM, 2022).

Nevertheless, there is limited information about the contribution of entrepreneurs to the national economy, especially high value sectors such as technology and communications (GEM, 2018). The figure 11 represents the actual entrepreneurship ecosystem in Mexico. It indicates the number of economical units (businesses) from INEGI – DENUUE (2022) report.



Figure 11 Number of Economical Units (businesses) per state in Mexico 2022

Source: Retrieved from www.inegi.org.mx (INEGI, 2022).

The following figure 12 shows the number of active businesses per state in 2022 in Mexico.

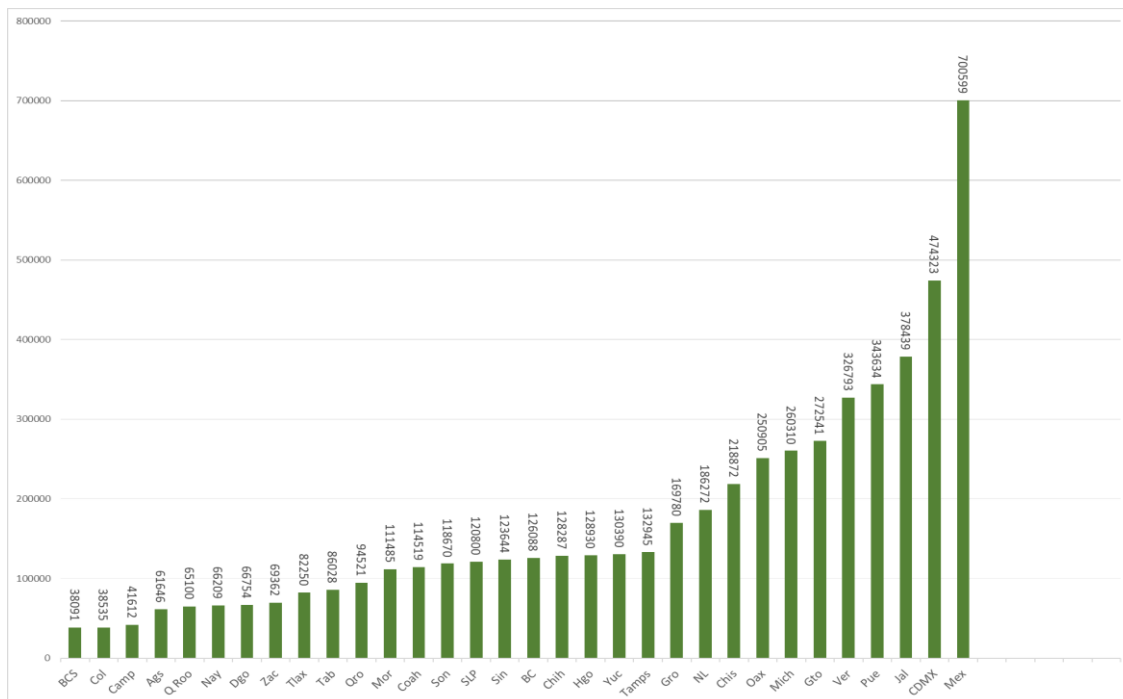


Figure 12 Number of businesses per state, active in 2022, in Mexico

Source: Retrieved from www.inegi.org.mx (INEGI, 2022).

The local, national, or international economy and society all have an impact on an entrepreneur's ability to succeed. The entrepreneurial "ecosystem" is this conglomeration of mindsets, assets, and infrastructure. A yearly index called the Global Entrepreneurship Index (GEI) rates the effectiveness of entrepreneurial ecosystems in 137 different nations.

The GEI technique gathers information on the local population's entrepreneurial attitudes, skills, and ambitions and compares them to the social and economic "infrastructure." Using this procedure, 14 "pillars" are created, including internet connectivity and transportation connections to external markets, which GEDI utilizes to measure the condition of the local ecosystem. Figure 13 is made based on the Data compiled by the GEDI (2022) about the Mexican Entrepreneurial Ecosystem.

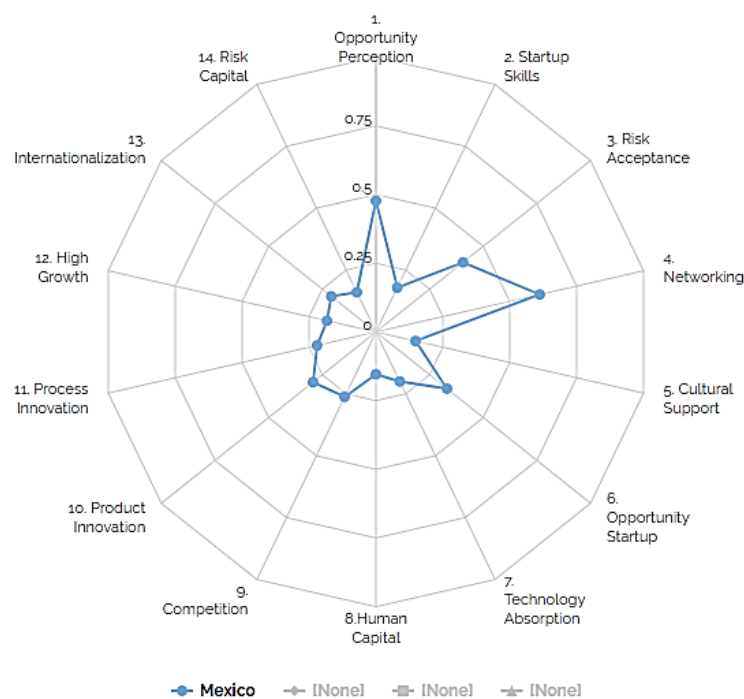


Figure 13 Mexican entrepreneurship ecosystem based on the GEDI (2022)

Source: Retrieved from <http://thegedi.org/tool/GEDI> (2022).

As is seen in the figure 13, the GEDI pillars of Mexico in 2022, the lowest qualified pillars were the human capital, cultural support, and risk capital while the highest qualified pillars were the networking, opportunity startup and opportunity perception according to the people surveyed.

After reviewing the Entrepreneurial Ecosystem In Mexico, as a continuity of the results and discussions have important implications for policymakers, HEIs, and other stakeholders

involved in promoting entrepreneurship education and developing the entrepreneurship ecosystem specifically for the Northeast region of Mexico.

3.2 Delphi Results and analysis

From the results of the Delphi method the following statements in the table 10, were the main demographic results for the first and second round.

Table 10 Role and years of experience of the panel of experts

Characteristics	Number of participants	
	First Delphi round	Second Delphi round
Role of the experts:		
Head of school	9	7
Professors	12	12
External stakeholders	6	2
Years of experience		
More than 3 years	17	14
1-3 years	7	4
Less than 1 year	3	3

Source: own edit.

The following table 11 shows the question number 3 about the opinion of the experts to define the most accurate definition for entrepreneurial human capital, based on their experience and the literature review.

Table 11 Defining entrepreneurial human capital (1st Round Delphi)

Q3	Which of the follow statements you consider that conceptualizes it the best? (Select only one) - <i>Defining Entrepreneurial Human capital</i>		
Option	Description	Freq.	%
A	The university creates ideas and competent human resources (adapted from: Fazlagic, 2005).	0	0%
B	Entrepreneurial human capital contains a collection of competencies, resembling to the ability to create ideas, find solutions, the ability to deal with complex circumstances in a determined place (adapted from Bacigalupo et al., 2016)	21	78%
C	The ideal entrepreneurial human capital should be prepared to shape, operate, and develop an entrepreneurial project in a defined ecosystem (adapted from Brian, 2007).	6	22%
D	Other	0	0%
Total		27	100%

Source: own edit.

According to The 78% of the experts panel responded that the concept B, Entrepreneurial human capital contains a collection of competencies, resembling to the ability to create ideas, find solutions, the ability to deal with complex circumstances in a determined place as it describes best the definition of entrepreneurial human capital.

The following table 12 shows the results about the expert's opinion to describe the mission of the university.

Table 12 The mission of the university (1st Round Delphi)

Which of the following statements would you apply to describe the mission of the University, within the Entrepreneurship Ecosystem context?			
Option	Description	Freq.	%
A	The role of universities must be key factor in the society, mostly in the promotion of entrepreneurial mindset between the young and with the researchers and teaching staff. (Adapted from: Cohen, 2006)	2	7%
B	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. (Adapted from: Clarysse et al., 2011).	23	85%
C	The University is a fundamental pillar of the new productive model that is articulated around knowledge, technology, and innovation (Adapted from Sam & Van Der Sijde, 2014)	2	7%
D	Other	0	0%
Total		27	100%

Source: own edit.

The 85% of the panel of experts considered that 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. As it describes best in their opinion the definition of the mission of universities.

The following table 13 shows the outcome about the expert's opinion to identify the most important internal factors influencing the entrepreneurial activity in the university.

Table 13 Internal Factors of the HEIs

From the following internal factors which ones you can identify as the most important according to your experience, to have a strong HEIs ecosystem (Is encouraged to select more than one)			
	Options	Freq.	%
UHC	University Entrepreneurial Human Capital (researchers, staff that are involve in the entrepreneurial education)	27	100 %
UFIN	University Financial resources to support specifically entrepreneurship programs	27	100 %
UA	University alliances (Connectedness with other Universities/institutions/research centers, to promote and create better entrepreneurship programs or activities)	27	100 %
ULOCI	University location and infrastructure (how well geographically is, if it is near to clusters, research centers etc., and how are installations and facilities of the institution)	20	74%

Source: own edit.

From the panel of experts, the majority (27 of them), agreed from the options given; that the internal factors of the entrepreneurial university are: UHC, the Human Capital, (UFIN) financial resources and (UA) alliances are the most important internal factors to have a strong entrepreneurial University.

The following table 14 shows the results about the expert's opinion to identify the most important external factors influencing the entrepreneurial activity in the university.

Table 14 External Factors of the HEIs

From the following external factors which ones you can identify the most with the HEI ecosystem? (Is encouraged to select more than one)			
	Options	Freq.	%
EPAH	Rewards Scheme	20	74%
HGS	Strategy Organization and Leadership	25	93%
INCO	Integration with the community	19	70%
GOVS	Government involvement with the ecosystem	26	96%
HATE	Attitudes towards entrepreneurship	19	70%
EPAH	Entrepreneurship role models	26	96%

Source: own edit.

From the panel of experts, the highest external factors identified were Government (GOVS) involvement, Role models (EPAH) following with the 93% of responses the strategy organization (HGS) and leadership. Being the less popular options the attitudes towards entrepreneurship (HATE) and integration with the community (INCO) among the experts.

Delphi 2nd results and analysis final round

For this final round only 21 experts continue participating from the first round, the main objective was to know the opinion about specific factors that were established based on the literature review and get an overall group consensus outcome.

The following table 15 shows the results about the expert's opinion to identify the most important external factors influencing the entrepreneurial activity in the higher education entrepreneurial ecosystem.

Table 15 R2. External factors of the HEIs Entrepreneurship Ecosystem

As we concluded in the first round of this survey results, A University requires structural organization to generate connection among teaching, research, knowledge transfer and society involvement, to generate a shared vision within the entrepreneurship ecosystem. Select all the external factors of the Higher Education Institute, that you consider essential for the entrepreneurship ecosystem:			
	Factors	Freq.	%
GOVS	Government Support	6	29%
HGS	Strategy Organization and Leadership	21	100%
INCO	Integration with the community	3	14%
HSE	Support for Entrepreneurship cycle	21	100%
HATE	Attitudes towards entrepreneurship	21	100%
EPAH	Role models and Reward scheme	21	100%
	Other	0	0%

Source: own edit.

According to the results the external factors that the experts concluded as the strongest were Strategy Organization and leadership (HGS), support for entrepreneurship cycle (HSE), attitudes towards entrepreneurship (HATE), and role models and reward scheme Org and leadership, support and the role models and reward scheme (EPAH). And being the weakest the (INCO) integration with the community.

The following table 16 shows the results about the expert's opinion to identify the internal factors that influence the most entrepreneurial activity in the higher education entrepreneurial ecosystem based on the results from the first round.

Table 16 R2 Internal Factors HEIs

	As we concluded in the first round of this survey results, The Internal factors in a Higher Education Institution; is about the strategic objectives within the institution, involving resources (staff, teachers, students, researchers, finances, etc.) that has an influence internally in the institution.		
	Factors	Freq	%
HTS	Entrepreneurial Human Capital (researchers, staff that are involve in the entrepreneurial education)	21	100 %
HFSE	Financial resources to support specifically entrepreneurship programs	21	100 %
HACSI	Alliances (Connectedness with other Universities/institutions/research centers, to promote and create better entrepreneurship programs or startups)	21	100 %
HPIF	Location and infrastructure (how well geographically are, if it is near to clusters, research centers etc., and how are installations and facilities of the institution)	21	100 %
HIRE	History/Reputation of the Institution	3	14%
	Other	0	0%

Source: own edit.

The results clearly show in table 17 that for the panel of experts the 3 strongest factors from the internal HEI ecosystem are financial resources (HFSE), human capital (HTS), location. (HPIF) and alliances (HPIF) and the least chosen internal factor was History/reputation of the institution (HIRE).

Table 17. Q5 Delphi 2nd Round About Entrepreneurial Education factors

	Entrepreneurial Education mission is to give the students' knowledge, skills and motivation to encourage entrepreneurial success. From the following Entrepreneurial education factors, which ones you consider are the most influential within the HEI (Is encouraged to select more than one)		
Abr.	Factors	Freq.	%
QEEC	Quality of entrepreneurial education in the Curriculum	5	24%
DEEC	Level of entrepreneurial education in the Curriculum	17	81%
ETM	Entrepreneurial Teaching methodologies	21	100%
NEW	Entrepreneurship Trainee programs	2	10%
EARE	Extra-curricular activity relating to entrepreneurship education	21	100%
MCPE	Mentoring entrepreneurial programs	21	100%
SOE	Student On-Boarding plan	21	100%
DPE	Entrepreneurship mission	21	100%

Source: own edit.

The results of the 2nd round with the experts shows that there was an agreement in most of the Entrepreneurial Education factors (DPE, SOE, MCPE, EARE, NEW, ETM, DEEC), being the least popular the (QEEC) Quality of entrepreneurial education in the curriculum and (NEW) Entrepreneurship trainee programs.

The figure 14, contains the results of the second round Delphi. The size of the circles corresponds to the results of the panel of experts showing graphically the model of the three factors interconnecting each other's and in creating relationships among the entrepreneurship education and the HEIs entrepreneurship ecosystem (internal and external).

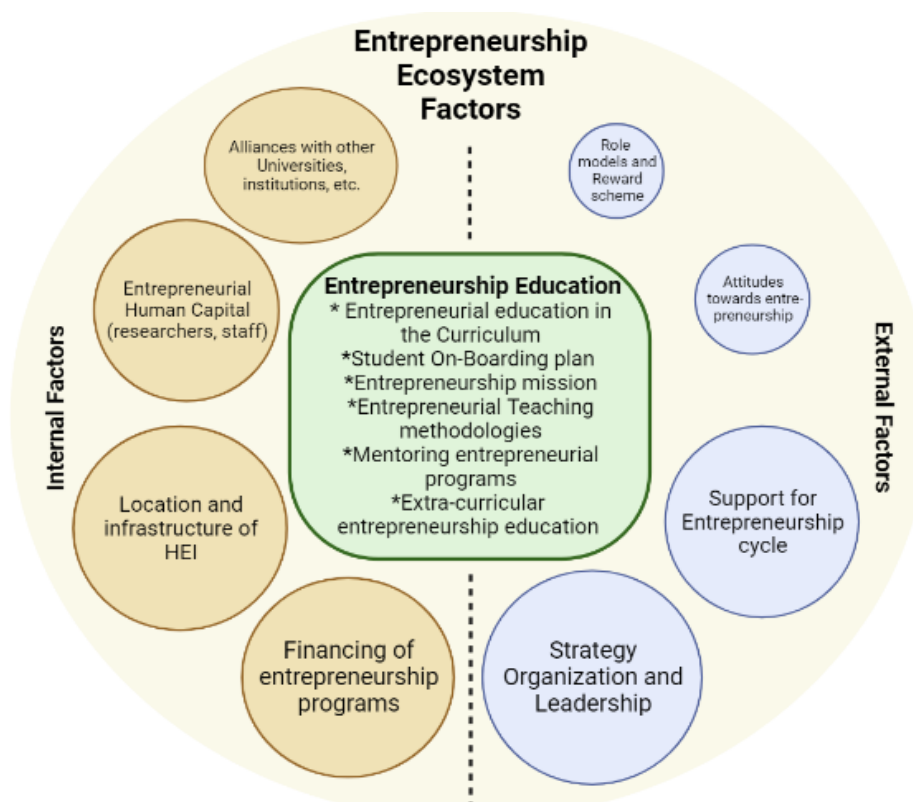


Figure 14 HEIS Ecosystem and EEd conceptualization based in the 2nd round Delphi results.

Source: Own creation.

3.3 PLS Resulting Variance and the Predictive Validity of the Model

The proposed relationship model that was contrasted in the methodology chapter (figure 10), referring to the results of González Flores and Molina Morejón (2022), mention that 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.

As stated by González Flores and Molina Morejón (2022) the coefficient of determination of the endogenous or dependent variables (R^2) according to Hair et al. (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 18 determines how the entrepreneurship education factor's R^2 value is 0.645, meaning that the F3 factor accounts for 64.5% of the variance in the F1 and F2 factors. According to this empirical standard, all the constructs have respectable predictive power, and the Q^2 values are all positive.

Table 18. Crosscheck and variance predictive validity of the model

Construct	SSO	SSE	R^2	Q^2 (=1-SSE/SSO)
(F1) HEIs External Entrepreneurship Ecosystem	242	242		
(F2) HEIs Internal Entrepreneurship Ecosystem	484	296.652	0.758	0.387
(F3) Entrepreneurship education	605	387.666	0.645	0.359

Source: retrieved from the results of González Flores & Molina Morejón (2022).

As compiled in the work of González Flores and Molina Morejón (2022), utilized the concepts of the goodness of fit and hypothesis testing by Vinzi et al. (2010) their work 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.

3.3.1 Analysis of Causal Relationship and Contrasting Hypotheses Results

The PLS-SEM 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 et al., 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 three hypotheses in Table 19.

Table 19 Hypotheses verification

Hypothesis	Trajectory	Original sample	Mean	Std. Deviation	"t" value	Trajectory coefficient P value *p<0,05; **p<0,01; ***p<0,001
H1	F1 External HEIs entrepreneurship ecosystem → F2 Internal HEIs entrepreneurship ecosystem	0.871	0.844	0.073	11.959	0.000***
H2	F1 External HEIs entrepreneurship ecosystem → F3 Entrepreneurship education	0.723	0.734	0.0337	19.701	0.000***
H3	F2 Internal HEIs entrepreneurship ecosystem → F3 Entrepreneurship education	0.712	0.735	0.129	5.515	0.000***

Source: retrieved from the results of González Flores and Molina Morejón (2022).

Table 19 provides the "t" values of the bootstrapping or resampling process for the external model, demonstrating that all loadings are significant, supporting the assertion that the measurement model is reliable, and that convergent validity holds relationship between the loadings.

The findings suggest that the conceptual model's proper management of the external entrepreneurship ecosystem has a beneficial impact on the internal entrepreneurship ecosystem because (H1: $\beta = 0.871$, $p = 0.000$, and $t = 11.959$), which accepts the hypothesis H1 is supported by the data. Additionally, the external entrepreneurship ecosystem's beneficial

impact on entrepreneurship education the hypothesis H2 is confirmed by the fact that (H2: $\beta = 0.723$; $p < 0.000$ and $t = 19.701$). Finally, hypothesis H3 is also accepted because the internal entrepreneurship ecosystem has a favorable impact on entrepreneurship education (H3: $\beta = 0.712$, $p < 0.000$ and $t = 5.515$).

The Standardized Root Mean Square Residual (SRMSR) test measures the discrepancy between the observed correlation matrix and the implicit correlation matrix of the model, and it is another value that evaluates the model's fit. In this case, the fit occurs at values of 0.09, which is above the recommended upper limit of 0.08 for a good model fit (Hu and Bentler, 1995). The Normed Fit Index (NFI), which is also a measured value, should, according to Bentler and Bonnet (1980), be above 0.9; in this case, the value reached was 0.72, which is low, but Ullman (2001) alerts that it could be because it was produced with small samples, and the fit was frequently undervalued.

Even if the hypothesis Factor F1 (external HEIs entrepreneurship ecosystem), the hypothesis H1 was accepted, Isenberg (2011) warns that the entrepreneurship ecosystem consists of a group of individual factors that combine in a complex manner; individually, each of these factors drives entrepreneurship, but they are not sufficient to maintain it. The EPAH and HATE variables (Entrepreneurship Promotional Activities by HEIs and HEIs attitude towards entrepreneurship, respectively) were eliminated from the analysis. The development of risky businesses such the creation of SMEs or startups is accelerated, however, when all of them are integrated into a comprehensive system working with all the stakeholders with a clear objective, the entrepreneurship ecosystem of the HEIs will thrive.

In a similar context, the Factor 2, hypothesis H2 was accepted, authors like Roundy et al. (2017) and Bischoff et al. (2018), point out that if a link/connection in the ecosystem is broken, it is very difficult to repair it. Therefore, any intervention program in this area must strengthen the ecosystem and maintain the balance between its agents, which include institutions, large businesses, public administrations, and the entrepreneurs themselves; studies like Gielnik, et al. (2015) and Guerrero et al. (2016) highlighted the importance of promoting entrepreneurship in higher education institutions and the potential benefits of doing so, both for the institutions themselves and entrepreneurship ecosystem.

Without a doubt, the outcomes could be improved if the universities under investigation, along with their master's students, supported more extracurricular activities in various ways. Nearly all higher education institutions require that all the students take a course in entrepreneurship education and entrepreneurial activity promotion.

On the other hand, the Ministry of Economy (2021) in Mexico, created the program called MIPYMES 2020-2024, its purpose is to articulate, at a conceptual and strategic level, the

mission and efforts of the Mexican Ministry of Economy, expects to promote the economic development of the productive sectors, increase innovation, advocating the competition in the domestic market and regulatory improvement, encourage the creation and consolidation of productive micro, small and medium-sized enterprises and entrepreneurs.

The improvement of attitudes towards entrepreneurship, as Villa Sánchez et al. (2021) point out, is the first characteristic to understand what entrepreneurship is. If the initiative, whether individual or collective, has the purpose of solving a social or economic 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 innovation, and creation of sustainable entrepreneurship and this can be done in a local, national, or international context.

The work of González Flores and Molina Morejón (2022) conclude that the first characteristic is key because if there is not clearly detected the problem on which to act or innovate, it could not properly be called entrepreneurship. It is key to focus on this direction so the graduates of the master's degrees genuinely identify the existence of a problem that can be solved from an entrepreneurial perspective in their beliefs and opinions.

Even though both variables DEEC and SOE (Degree of entrepreneurial education in curriculum and Student Orientation on Entrepreneurial activity,) were eliminated in factor F3, Hypothesis H3 was still accepted, because this case of study in Northeast of Mexico, the master's graduated students were not able to recall specifically entrepreneurial education in their academic programs neither the variable about orientation towards entrepreneurship, in the literature studied experiences like the researchers Iacobucci and Micozzi (2012) presented in Italy, at the University of the Marche with a class subject titled "Economics Entrepreneurship and management of innovation and University of Naples II" and with a course titled "Economics Entrepreneurship and innovation" can be an example of the viability of having these two variables involved in the academic programs in universities.

When it comes to student entrepreneurship orientation, it is recommended to study the experiences of Tarapuez-Chamorro et al. (2018) they point out that 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.

Tarapuez-Chamorro et al. (2018) draw the deduction that, compared to men and graduates with some experience, women, and particularly those without work experience, had graduated from entrepreneurship education programs with lower perceived benefits, particularly in terms of inspiration, and slightly weaker perceived attitude for entrepreneurial activity concluded that students with understanding of a particular business process and who

have subsequently learned entrepreneurial knowledge and skills from a family member or friend entrepreneur, showed higher predictive effects than students without experience, for whom it is conceivable to draw the conclusion that they need to complete their education entrepreneurship programs including professional practices before starting a business on their own.

Even though in the literature consulted, many of the authors warn that if the results of the research are conclusive in the sense of identifying factors that are associated with entrepreneurial intention in young people, the studies do not control the fixed effects and should be applied to a specific city or region, which should be defining institutional arrangements that adapt the incentives to undertake for improve the entrepreneurial mindset (González Flores & Molina Morejón, 2022).

4. CONCLUSION, RESEARCH LIMITATIONS, RECOMMENDATIONS AND FUTURE RESEARCH

4.1 Conclusion

The current global scenario of the industry and the digital revolution is expected to bring about significant changes in economic and social ecosystems, particularly in the labor sector. According to the World Economic Forum (WEF, 2023) in the future for job report, 2023, mentions that 69 million jobs will be created by 2027, but also will be eliminated 83 million jobs worldwide (this is the 2% of the actual occupation). The report also emphasizes the necessity for investment in training, reskilling, and social support networks to protect individuals' future of work. Also stated that startups can portray a key role, by educating and training with upskilling programs to workers who may be at threat of losing their employments due to shifting trends and technologies such artificial intelligence (AI) (WEF, 2023).

In this context, it is crucial that Higher Education Institutions (HEIs) integrate entrepreneurial skill development and mindset support into their academic programs. This will enable students to acquire not only business management skills but also the awareness and commitment required to navigate their ecosystem and contribute positively to the entrepreneurship ecosystem.

The academy faces three major challenges in this regard:

- 1) It must educate and coach better entrepreneurs, intrapreneurs, and future business leaders who are not only knowledgeable about business management but also committed to their ecosystem as was supported by the results of the hypothesis 3 and the approach of mentoring and coaching variable (MCPE)
- 2) Organizations and companies must be economically viable and take responsibility for addressing the significant social and environmental problems associated with the entrepreneurship ecosystem, as was discovered in the results of the panoramic view of the Mexican entrepreneurship ecosystem.
- 3) HEIs entrepreneurship ecosystem must contribute to strengthening and growing small and medium-sized enterprises (SMEs) and civil organizations through training and consulting services based on the knowledge and expertise of academics and researchers, as was proved by the results of the validation of the variables such as HSE (HEIs support for entrepreneurship) and well prepared HTS (HEIs teaching and staff).

Entrepreneurship has a substantial economic contribution, and its role in job creation is undeniable. However, it is vital that academia, the government, and the private sector

collaborate to support entrepreneurship activity, enabling them to become more productive, innovative, and competitive, ensuring their survival and growth over time. In doing so, they can offer quality jobs and transform their ecosystem positively. Countries that prioritize science, innovation, and entrepreneurship are likely to boost their economic and social development (Litsareva, 2017).

The integration of entrepreneurial skills development and mindset support in academic programs is crucial, given the changes that the digital revolution and automation are expected to bring about. By addressing the challenges, Higher Education Institutions can contribute to the growth and strengthening of businesses and civil organizations, foster innovation processes in all disciplines, and enable positive transformations of the entrepreneurship ecosystem, thereby boosting economic and social development.

4.2 Research Limitations and Recommendations

The presented research showed mostly informative and exploratory panoramic view of the actual entrepreneurship ecosystem as was important for me understand and have a general view of the national entrepreneurship ecosystem. Consequently, the study mostly focused on the internal and external HEIs entrepreneurship ecosystem factors affecting entrepreneurial education. Provides valuable insights to solve the main stated problem in the beginning of the research, while the findings of the study are significant and answered the research questions planned, there are still some limitations that must be addressed to gain a more complete understanding of the HEI entrepreneurial ecosystem.

One of the limitations of the research is that it was conducted in Northeastern of Mexico in 2022, and the findings may not be applicable to other regions or countries. To validate the generality of the results, further research needs to be carried out in different contexts and places and measure bigger sample to be able to find a more precise result.

Even though, while this study considered the perceptions of graduate students, and the opinions of stakeholders such as professors, advisors, and entrepreneurs, is recommended that future studies involve more diverse sample of stakeholders not only coming from the PRODEM program, to gain a more comprehensive and broader understanding of the entrepreneurial ecosystem.

Moreover, the proposed methodology used in the study only focused on analyzing the impact of internal and external factors on the entrepreneurial ecosystem on HEIs and entrepreneurship education and did not consider other variables that may influence entrepreneurship development. Future research could incorporate more variables to gain a further universal understanding of a bigger study case.

Furthermore, the study only used the PLS technique to validate the hypotheses, and other statistical techniques may provide different results. Therefore, future studies should consider using multiple techniques to validate the results and reach new discoveries.

While the presented research provides valuable insights into the factors that affect entrepreneurial training in higher education institutions, there are still some limitations that need to be addressed. Further research can build upon these findings to advance our understanding of the entrepreneurial ecosystem in other universities and different regions, and its influence on economic development of the country. By addressing these limitations, we can better equip the next generation of entrepreneurs to drive innovation, create jobs, and spur economic growth.

4.3 Future Research

The results of this study suggest that promoting entrepreneurship in higher education institutions can significantly contribute to the development of a robust entrepreneurship ecosystem. It is important to note that while the HEIs ecosystem factors, both internal and external, are necessary to drive entrepreneurship, they are not sufficient on their own. Instead, all these factors need to be integrated into a holistic system with an adequate way to teach and implement entrepreneurship education to accelerate the creation and development of innovative companies.

Furthermore, any intervention program in this area must strengthen the entrepreneurship ecosystem and not break the balance between its agents, such as institutions, public administrations, large companies, and entrepreneurs themselves (González Flores & Molina Morejón, 2022).

The author of this study recommends that higher education institutions, together with their master's students, should promote more external activities through various means and forms to improve the results.

It is important to recognize that the study did not control the specific circumstances of each HEIs entrepreneurship ecosystem, that may affect young people's willingness to pursue entrepreneurship. Thus, further research should consider these unique factors to gain a more nuanced understanding of the factors that influence entrepreneurial intentions. In general, promoting entrepreneurship in higher education institutions can have a substantial impact on cultivating a vibrant ecosystem, which, in turn, can accelerate the creation and growth of innovative companies in the region.

5. MAIN AND NOVEL FINDINGS OF THE DISSERTATION

Based on the results of the study, it was determined that higher education institutions can improve both the internal and external factors of the entrepreneurial ecosystem by introducing subjects related to the entrepreneurial economy and innovation in their curriculums.

5.1 Main findings

The presented research has several important conclusions:

Firstly, it gives an actual view of the entrepreneurship ecosystem in Mexico, shows that as a result of the efforts from the national programs; it has increased gradually the creation of new companies compared to previous years increased. It presents that the favorite areas to start a business are in three mainly: food, technology, and beauty. The majority of entrepreneurs are between 26 and 35 years old. The 47% of the entrepreneurs in Mexico start the business out of necessity not out of passion. This is reflected in the results showing not many innovative projects are created. As conclusion, analyzing the Mexican entrepreneurship ecosystem is important to have a brief view of the challenges and opportunity areas that the entrepreneurs and other stakeholders can improve. This was important for my dissertation to continue and get a better understanding of the HEIs Entrepreneurship Ecosystem and the entrepreneurial education, as was specified in the problem statement the lack of education and training is 36% part of the failure of the businesses in Mexico.

Secondly helps to understand the internal and external factors affecting the entrepreneurial training within higher education institutions' entrepreneurship ecosystem by analyzing the perceptions of graduate students in the economic-administrative areas of Northeastern Mexico in 2022. This research provides a comprehensive view of the ecosystem of higher education institutions and their impact on entrepreneurial training, which has significant implications for enhancing the culture of entrepreneurship in the region.

Thirdly, the methodology used in this study has a key characteristic of significant reduction in analysis and application time, making it easier to replicate this research in other Mexican contexts or even in other regions. This is essential as it can help spread the culture of entrepreneurship in different areas.

Fourthly, the proposed technique is user-friendly as it only requires the use of the research instrument, which can be adapted to any context, and the obtained answers, entered PLS software to validate hypotheses. This method simplifies the research process and can be used to test other hypotheses related to entrepreneurial training in other areas.

Fifthly, the results of the applied method and the PLS technique used to test the hypotheses are comparable within statistically acceptable intervals. This suggests that the methodology is reliable and can be used to draw valid conclusions.

Sixthly, the methodology used, and the sample analyzed can be extended to other universities and stakeholders within the ecosystem to improve entrepreneurial training. This means that the findings of this research can be applied to other higher education institutions, and stakeholders such as professors, advisers, and policymakers can use them to enhance the entrepreneurial ecosystem in their respective areas.

5.2 Novel Findings of the Dissertation

This dissertation helped to have an overall view of the Mexican entrepreneurship ecosystem showing statistics that are helpful to focus the entrepreneurship intentions to more innovative projects incentivizing the entrepreneurship for passion not only for need.

Furthermore, the findings of the study reveal that both internal and external factors in the HEIs Entrepreneurship Ecosystem, such as promotional activities, attitudes, support, governance structure, abilities to connect startups, professors and staff, infrastructure and facilities and financial support; significantly affect the graduate students to pursue a degree in business/management fields. Moreover, entrepreneurship education factors, such as curriculum design, orientation, entrepreneurial teaching methodologies, mentoring and coaching programs for entrepreneurs, and extracurricular activities, have a positive and significant impact on the students' entrepreneurial mindset.

The study also developed a new framework measuring the interconnectedness of Higher Education Institutions Entrepreneurship Ecosystem factors with Entrepreneurial Education constructs. It was modified specifically for the NE of Mexico. This structural framework that was presented in this research helps in the enhancement of successful programs and activities to expand the entrepreneurial education in the region (Figure 6).

Overall, the study's outcomes contribute to a better comprehension of the factors that influence graduate students' decisions to pursue business economic degrees, as a result the proposed framework is a beneficial tool for policymakers, educators, and stakeholders working to improve the HEIs entrepreneurial ecosystem of Mexico's Northeast.

SUMMARY

This work in the beginning provides an overview of the research, as well to know what the research problem is, examining the actual panorama of the entrepreneurship ecosystem in Mexico, then to focus on the Higher Education Institutions entrepreneurial ecosystem and its relationship with the entrepreneurship education.

Additionally in this research examines the theoretical background of the entrepreneurship ecosystem, human capital, higher education institutions entrepreneurship ecosystems, and the entrepreneurial education, all the concepts and definitions, serving as foundations for the collection of theories to be selected for the construction of the hypotheses and experimental testing.

As well in the methodology part explains the methods to use, the data collection and the sample of population to applied for responding the research questions and reach the objectives of the dissertation, the Sample for the Delphi method was applied in two rounds to a panel of 21 experts which were selected for their experiences with entrepreneurial projects and former stakeholders of the national entrepreneurial program (PRODEM), the continuation of the methodology corresponded to the creation of a survey based on the different theories established, and was sent to 156 graduated master students in businesses/administrative areas in the Torreon, Mexico, even though only 120 people respond back was enough to validate the hypotheses with statistics and the structural equation model

This research provides the analysis of the results divided in two parts; first an exploratory research for the entrepreneurship ecosystem in Mexico, taking data from prestigious global and national surveys, and through second part applying the Partial Least Square methodology, proving as result the level of interconnections between the HEIs Entrepreneurship ecosystem internal and external factors and entrepreneurship education constructs corroborating the hypotheses with the positive results statistically approved.

Furthermore, this research discusses the conclusion and recommendations of the dissertation; it is providing a study's overall conclusion of the HEIs entrepreneurial ecosystem, the practical implications of the case of study, and the research limitations and suggestions for the stakeholders, novel findings of the study, and the possible research future.

At the end of the dissertation is found the list of figures, tables, publications, and references used for the elaboration of the dissertation.

REFERENCES

1. Acs, Z. J., & Audretsch, D. B. (2005). *Handbook of Entrepreneurship Research*. Boston: Springer Editors, Ed.
2. Acs, Z. J., Autio, E., & Szerb, L. (2018). Entrepreneurship, institutional economics, and economic growth: An ecosystem perspective. *Small Business Economics*, 51(2), 501-514. doi: 10.1007/s11187-018-0028-3
3. Acs, Z. J., Stam, E., Audretsch, D. B., & O'Connor, A. (2017). The lineages of the entrepreneurial ecosystem approach. *Small Business Economics*, 49(1), 1-10
4. Acs, Z. y Mueller, P. 2008. "Employment Effects of Business Dynamics: Mice, Gazelles and Elephants", *Small Business Economics*, 30(1): 85-100.
5. Adan, J. L. M., (2018). El Método Delphi: Ventajas y limitaciones - Andaru Pharma. Andaru Pharma - Marketing y Comunicación salud. (Retrieved July 05 2023 from: https://www.andarupharma.com/metodo-delphi-proyectosmarketing-marketinghealthcare_marketingsalud-comunicacionsalud/
6. Aiginger, K., & Rodrik, D. (2020). Rebirth of industrial policy and an Agenda for the Twenty-First Century. *Journal of Industry, Competition and Trade*, 20(2), 189–207. <https://doi.org/10.1007/s10842-019-00322-3>
7. Aldrich, H. E., & Zimmer, C. (1986). Entrepreneurship through social networks. In D. L. Sexton & R. W. Smilor (Eds.), *The art and science of entrepreneurship* (pp. 3–23). Cambridge, MA: Ballinger.
8. Almenara, J. C., & Moro, A. I. (2014). Empleo del método Delphi y su empleo en la investigación en comunicación y educación. *EDUTECH. Revista electrónica de tecnología educativa*, (48), a272-a272.
9. Amit, R., & Shoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14(August 1992), 33-46.
10. Amorós, J., Poblete, C., Mandakovic, V. (2019). R&D transfer, policy and innovative ambitious entrepreneurship: Evidence from Latin American countries. *J. Technol. Transf.* 44, 1–20.
11. ANUIES (2021). Association of Entrepreneurs of Mexico. Reporte Anuarios Estadísticos de Educación Superior México: Asociación Nacional de Universidades e Instituciones de Educación Superior. Retrieved 2022, October from: <http://www.anuies.mx/informacion-y-servicios/informacion-estadistica-de-educacion-superior/anuario-estadistico-de-educacion-superior>
12. Aparicio, S., Urbano, D., Audretsch, D (2016). Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence. *Technol. Forecast. Soc. Change*, 102, 45–61.
13. ASEM -Asociación de Emprendedores de México. (2022, June 6). Radiografía del Emprendimiento en México 2022. <https://asem.mx/events/radiografia-del-emprendimiento-en-mexico-2021/> (Original work published 2022)(Accessed 2022, December 10).
14. Audretsch, D. B. & Belitski, M. (2017). Entrepreneurial ecosystems in cities: establishing the framework conditions. *Journal of Technology Transfer*, 42 (5). pp. 1030-1051. <https://doi.org/10.1007/s10961-016-9473-8>
15. Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer*, 39(3), 313-321.
16. Audretsch, D. B., Belitski, M., Chowdhury, F., & Desai, S. (2022). Necessity or opportunity? Government size, tax policy, corruption, and implications for entrepreneurship. *Small Business Economics*, 58(4), 2025-2042.

17. Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). *EntreComp: The entrepreneurship competence framework*. Luxembourg: Publication Office of the European Union, 10, 593884.
18. Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
19. Bahrami, H., & Evans, S. (1995). Flexible re-cycling and high-technology entrepreneurship. *California Management Review*, 37(3), 62–89.
20. Bailey, M., Cao, R., Kuchler, T., Stroebel, J., & Wong, A. (2018). Social connectedness: measurement, determinants, and effects. *Journal of Economic Perspectives*, 32(3), 259–280. <https://doi.org/10.1257/jep.32.3.259>
21. Bamber, P., Fernandez-Stark, K., Gereffi, G., & Guinn, A. (2014). Connecting local producers in developing countries to regional and global value chains. *OECD Trade Policy Working Papers*. <https://doi.org/10.1787/5jzb95f18851-en>
22. Baraldi, E., & Havenvid, M. I. (2016). Identifying new dimensions of business incubation: A multi-level analysis of Karolinska Institute's incubation system. *Technovation*, 50, 53-68.
23. Becker, G. S. (1964). *Human capital: a theoretical and empirical analysis, with special reference to education*, National Bureau of Economic Research, London.
24. Becker, G. S. (1986). *Human capital: A theoretical and empirical analysis, with special reference to education*, third edition. Chicago: The University of Chicago Press.
25. Benneworth, P. (2007). Seven samurai opening up the ivory tower? The construction of Newcastle as an entrepreneurial university. *European Planning Studies*, 15(4), 487-509.
26. Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588–606.
27. Bischoff, K., Volkman, C. K., & Audretsch, D. B. (2018). Stakeholder collaboration in entrepreneurship education: an analysis of the entrepreneurial ecosystems of European higher educational institutions. *The Journal of Technology Transfer*, 43, 20-46. <https://doi.org/10.1007/s10961-017-9581-0>
28. Bosma, N. S., Schott, T., Terjesen, S., & Penny, K. (2015). *Global entrepreneurship monitor*. Babson College, London Business School and Global Entrepreneurship Research Association (GERA).
29. Bosma, N., Sanders, M., & Stam, E. (2018). Institutions, entrepreneurship, and economic growth in Europe. *Small Business Economics*, 51(2), 483–499. <https://doi.org/10.1007/s11187-018-0012-x>
30. Bourdieu, P. (1986). The forms of capital. In: Richardson, J., *Handbook of Theory and Research for the Sociology of Education*. Westport, CT: Greenwood: 241–58. | socialcapitalgateway.org. (n.d.). <https://www.socialcapitalgateway.org/content/paper/bourdieu-p-1986-forms-capital-richardson-j-handbook-theory-and-research-sociology-educ>
31. Bramwell, A., Nelles, J., & Wolfe, D. A. (2008). Knowledge, innovation and institutions: Global and local dimensions of the ICT cluster in Waterloo, Canada. *Regional Studies*, 42, 101–116.
32. Branscomb, L.M.; Kodama, F. y Florida, R. (1999): “Industrializing Knowledge. University, Industry Linkages in Japan and the United States”, The MIT Press, Massachusetts.
33. Brian, K. (2007). *OECD Insights Human Capital How what you know shapes your life: How what you know shapes your life*. OECD publishing.
34. Brinckmann, J., Grichnik, D., & Kapsa, D. (2010). Should entrepreneurs plan or just storm the castle? A meta-analysis on contextual factors impacting the business planning–performance relationship in small firms. *Journal of Business Venturing*, 25(1), 24–40. <https://doi.org/10.1016/j.jbusvent.2008.10.007>

35. Cabana, S., Montero, J. M., & Aguilera, V. M. (2019). PLS-SEM for organizational research: A guide to data analysis using SmartPLS 3. BoD–Books on Demand.
36. Cantner, U., Cunningham, J. A., Lehmann, E. E., & Menter, M. (2020). Entrepreneurial ecosystems: a dynamic lifecycle model. *Small Business Economics*, 57(1), 407–423. <https://doi.org/10.1007/s11187-020-00316-0>
37. Capelleras, J.L. y Rabetino, R. 2008. “Individual, Organizational and Environmental Determinants of New Firm Employment Growth: Evidence from Latin America”, *International Entrepreneurship and Management Journal*, 4(1), 79-99.
38. Cardno, C. (2014). The functions, attributes and challenges of academic leadership in New Zealand polytechnics. *International Journal of Educational Management*, 28(4), 352–364. <https://doi.org/10.1108/ijem-11-2012-0131>
39. Carlino, G. A., Chatterjee, S., & Hunt, R. M. (2007). Urban density and the rate of invention. *Journal of Urban Economics*, 61(3), 389–419. <https://doi.org/10.1016/j.jue.2006.08.003>
40. Carree, M. A., & Thurik, A. R. (2010). The impact of entrepreneurship on economic growth. In *Handbook of entrepreneurship research* (pp. 557-594). Springer, New York, NY.
41. Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295-336). Lawrence Erlbaum Associates.
42. Clark, B. R. (1998). The entrepreneurial university: Demand and response. *Tertiary Education and management*, 4(1), 5-16.
43. Clarysse, B., Wright, M., & Van de Velde, E. (2011). Entrepreneurial origin, technological knowledge, and the growth of spin-off companies. *Journal of Management Studies*, 48(6), 1420-1442.
44. Cohen, B. (2006). Sustainable valley entrepreneurial ecosystems. *Business Strategy and the Environment*, 15(1), 1–14. <https://doi.org/10.1002/bse.428>
45. De la Garza, L. Y. A., Sancho-Vinuesa, T., & Zermeño, M. G. G. (2015). Indicadores de calidad pedagógica para el diseño de un curso en línea masivo y abierto de actualización docente. *RUSC. Universities and Knowledge Society Journal*, 12(1), 104-119.
46. Dickson, P. H., Solomon, G. T., & Weaver, K. M. (2008). Entrepreneurial selection and success: does education matter? *Journal of Small Business and Enterprise Development*, 15(2), 239–258. <https://doi.org/10.1108/14626000810871655>
47. Drover, W., Busenitz, L. W., Matusik, S. F., Townsend, D. M., Anglin, A. H., & Dushnitsky, G. (2017). A review and road map of entrepreneurial equity financing research: venture capital, corporate venture capital, angel investment, crowdfunding, and accelerators. *Journal of Management*, 43(6), 1820–1853. <https://doi.org/10.1177/0149206317690584>
48. Erina, I., Shatrevich, V., & Gaile-Sarkane, E. (2017). Impact of stakeholder groups on development of a regional entrepreneurial ecosystem. *European Planning Studies*, 25, 755–771.
49. Espinoza, R.L. (2000). *Universidad & Empresa en la Sociedad del Conocimiento*. Cuadernos IRC, Planificación, Gestión y Evaluación universitaria, no. 7.
50. Estrin, S., Mickiewicz, T., & Stephan, U. (2013). Entrepreneurship, Social Capital, and Institutions: Social and Commercial Entrepreneurship across Nations. *Entrepreneurship Theory and Practice*, 37(3), 479–504. <https://doi.org/10.1111/etap.12019>
51. Etzkowitz, H. (1983). Entrepreneurial scientists and entrepreneurial universities in American academic science. *Minerva*, 198-233.
52. Etzkowitz, H. (2004). The evolution of the entrepreneurial university. *International Journal of Technology and Globalisation*, vol 1, n. 1.
53. Etzkowitz, H. (2013). Anatomy of the entrepreneurial university. *Social Science Information* 52(3): 486–511.

54. Etzkowitz, H. (2019). Is silicon valley a global model or unique anomaly? *Industry and Higher Education* 33(2): 83–95.
55. Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university–industry–government relations. *Research Policy*, 29(2), 109–123. [https://doi.org/10.1016/s0048-7333\(99\)00055-4](https://doi.org/10.1016/s0048-7333(99)00055-4)
56. Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. R. C. (2000). The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research policy*, 29(2), 313-330.
57. Farinha, L., Ferreira, J. J., & Gouveia, B. (2014). Networks of Innovation and Competitiveness: A Triple Helix case study. *Journal of the Knowledge Economy*, 7(1), 259–275. <https://doi.org/10.1007/s13132-014-0218-3>
58. Fayolle, A. (2013). Personal views on the future of entrepreneurship education. *Entrepreneurship and Regional Development*, 25(7–8), 692–701. <https://doi.org/10.1080/08985626.2013.821318>.
59. Fayolle, A., & Liñán, F. (2014). The future of research on entrepreneurial intentions. *Journal of Business Research*, 67(5), 663–666. <https://www.sciencedirect.com/science/article/abs/pii/S0148296313003949>
60. Fayolle, A., Verzat, C., & Wapshott, R. (2016). In quest of legitimacy: The theoretical and methodological foundations of entrepreneurship education research. *International Small Business Journal*, 34(7), 895–904.
61. Fazlagic, A. (2005). Measuring the intellectual capital of a university. Trabajo presentado en Trends in the management of human resources in higher education. París, Francia.
62. Feldman, M. P., & Zoller, T. (2012). Dealmakers in place: Social capital connections in regional entrepreneurial economies. *Regional Studies*, 46(1), 23–37. <https://doi.org/10.1080/00343404.2011.607808>
63. Fenton, M. V., & Barry, A. (2014). Breathing space – graduate entrepreneurs’ perspectives of entrepreneurship education in higher education. *Journal of Education and Training*, 56(8/9), 733–744. <https://doi.org/10.1108/et-05-2014-0051>
64. Fernández Fernández, M. T., Blanco Jiménez, F. J., & Cuadrado Roura, J. R. (2015). Business incubation: Innovative services in an entrepreneurship ecosystem. *The Service Industries Journal*, 35(14), 783-800. <https://doi.org/10.1080/02642069.2015.1080243>
65. Fini, R., Grimaldi, R., & Meoli, A. (2020). The effectiveness of university regulations to foster science-based entrepreneurship. *Research Policy*, 49(10), 104048. <https://doi.org/10.1016/j.respol.2020.104048>
66. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 18(1), 39-50.
67. Galloway, L., & Brown, W. (2002). Entrepreneurship education at university: a driver in the creation of high growth firms? *Journal of Education and Training*, 44(8/9), 398–405. <https://doi.org/10.1108/00400910210449231>
68. Gartner, W. B., Carter, N. M., & Reynolds, P. D. (2010). Entrepreneurial behavior: Firm organizing processes. In Springer eBooks (pp. 99–127). https://doi.org/10.1007/978-1-4419-1191-9_5
69. GEDI. (2022). (GEI) The GEDI pillars. Retrieved January 2023, from <http://thegedi.org/global-entrepreneurship-and-development-index/>
70. Geisser, S. (1974). A predictive approach to the random effect model. *Biometrika*, 61(1), 101-107.
71. Gholami, R., Hosseinzadeh, M., & Azar, A. (2019). The effect of entrepreneurial orientation on the innovation performance of Iranian SMEs: A PLS analysis. *Entrepreneurship Research Journal*, 9(3).

72. Gibb, A., Hofer, A. R., & Klofsten, M. (2018). The entrepreneurial and innovative higher education institution: A review of the concept and its relevance today. HEInnovate. Available online: https://heinnovate.eu/sites/default/files/heinnovate_concept_note.pdf (accessed on 29 July 2021).
73. Gielnik, M. M., Frese, M., Kahara-Kawuki, A., Wasswa Katono, I., Kyejjusa, S., Ngoma, M., ... & Dlugosch, T. J. (2015). Action and action-regulation in entrepreneurship: Evaluating a student training for promoting entrepreneurship. *Academy of Management Learning & Education*, 14(1), 69-94.
74. Global Entrepreneurship Monitor (GEM) (2018). 2017/18 global report. Retrieved February 2020 from: <https://gemorg.bg/wp-content/uploads/2018/02/the-influence-of-gem-on-policy-2017-2018-1517558405.pdf>
75. Global Entrepreneurship Monitor (GEM) (2021). 2020/21 global report. Retrieved: January 25, 2023, from: <https://www.gemconsortium.org/report/gem-20202021-global-report>
76. GoDaddy's (2022) Global Entrepreneurship Survey. Retrieved January 25, 2023, from: <https://ae.godaddy.com/blog/godaddy-entrepreneurship-survey-2023/>
77. Gomes, L.A.V., Facin, A.L.F., Salerno, M.S., & Ikenami, R.K. (2016). Unpacking the innovation ecosystem construct: Evolution, gaps and trends. *Technological Forecasting and Social Change*.
78. Gonzalez Flores, K. M. (2023). The Use of Partial Least Squares to define the Characteristics in the Environment of Higher Education Institutions and their Effects on Entrepreneurial Academic Education, a Case Study: Torreon, Mexico. *International Journal of Engineering and Management Sciences*, 8(2), 1–14. <https://doi.org/10.21791/IJEMS.2023.2.1>.
79. González Flores, K., & Molina Morejón, V. (2022). The Higher Education Institutions ecosystem factors and its impact on the entrepreneurship education, case study: North-Eastern Mexico. *Journal of Microfinance Planning and Control*, 6(1), 1-12.
80. González Flores, K.M. & Molina Morejón, V.M. (2022a). Fundamentals of human capital and education elements of the entrepreneurship ecosystem. *Cross-Cultural Management Journal*, 2(2), 149-157.
81. Goodall, A. H., McDowell, J. M., & Singell, L. D. (2014). Leadership and the research productivity of university departments. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.2385160>
82. Graham, R. (2014). Creating university-based entrepreneurial ecosystems: evidence from emerging world leaders. MIT Skoltech Initiative.
83. Grant, K. A., Croteau, M., & Aziz, O. (2019). The Survival Rate of Startups Funded by Angel Investors. I-INC WHITE PAPER SERIES: MAR 2019, 1-21. Retrieved June 21, 2021 from <http://www.iincanada.ca/wp-content/uploads/2019/03/survival-rates-startups.pdf>
84. Guerrero, M., & Urbano, D. (2012). The development of an entrepreneurial university. *Journal of Technology Transfer*, 37(1), 43–74. <https://doi.org/10.1007/s10961-010-9171-x>
85. Guerrero, M., Urbano, D., & Fayolle, A. (2016). Entrepreneurial activity and regional competitiveness: evidence from European entrepreneurial universities. *Journal of Technology Transfer*, 41(1), 105–131. <https://doi.org/10.1007/s10961-014-9377-4>
86. Gupta, B., Goul, M., & Dinter, B. (2015). Business Intelligence and Big Data in Higher Education: Status of a Multi-Year Model Curriculum Development Effort for Business School Undergraduates, MS Graduates, and MBAs. *Communications of the Association for Information Systems*, 36. <https://doi.org/10.17705/1cais.03623>
87. Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.
88. Hansen, M. T., Chesbrough, H. W., Nohria, N., & Sull, D. N. (2000). Networked incubators. *Harvard business review*, 78(5), 74-84.
89. Harrington, K. (2017). Entrepreneurial Ecosystem Momentum and Maturity the Important Role of Entrepreneur Development Organizations and Their Activities.

90. Hayter, C. S. (2016). A trajectory of early-stage spinoff success: the role of knowledge intermediaries within an entrepreneurial university ecosystem. *Small Business Economics*, 47(3), 633-656.
91. Hayter, C. S., Lubynsky, R., & Maroulis, S. (2016). Who is the academic entrepreneur? The role of graduate students in the development of university spinoffs. *Journal of Technology Transfer*.
92. Hayter, C. S., Nelson, A. J., Zayed, S., & O'Connor, A. C. (2018). Conceptualizing academic entrepreneurship ecosystems: A review, analysis and extension of the literature. *The Journal of Technology Transfer*, 43, 1039-1082
93. Hechavarria, D. M., Ingram, A., & Heacock, J. (2016). Entrepreneurial ecosystems and entrepreneurship education: The role of universities in fostering ecosystem development. *Annals of entrepreneurship education and pedagogy-2016*, 305-322.
94. Hero, L., & Lindfors, E. (2019). Students' learning experience in a multidisciplinary innovation project. *Journal of Education and Training*, 61(4), 500-522. <https://doi.org/10.1108/et-06-2018-0138>
95. Higgins, M. J., Lacombe, D. J., Stenard, B. S., & Young, A. T. (2020). Evaluating the effects of Small Business Administration lending on growth. *Small Business Economics*, 57(1), 23-45. <https://doi.org/10.1007/s11187-019-00291-1>
96. Hsu, C. C., & Sandford, B. A. (2007). The Delphi technique: making sense of consensus. *Practical assessment, research, and evaluation*, 12(1), 10.
97. Hu, L.T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76-99). Sage Publications, Inc. [https://www.scrip.org/\(S\(i43dyn45teexjx455qlt3d2q\)\)/reference/ReferencesPapers.aspx?Referenc eID=1015696](https://www.scrip.org/(S(i43dyn45teexjx455qlt3d2q))/reference/ReferencesPapers.aspx?Referenc eID=1015696)
98. Hunt, R. A., & Kiefer, K. (2017). The entrepreneurship industry: Influences of the goods and services marketed to entrepreneurs. *Journal of Small Business Management*.
99. Iacobucci, D., & Micozzi, A. (2012). Entrepreneurship education in Italian universities: trend, situation and opportunities. *Education + Training*, 54(8/9), 673-696.
100. INEGI (2021). Instituto Nacional de Estadística y Geografía. (2021). Estudio sobre la demografía de los negocios 2021 (EDN): síntesis metodológica. México: INEGI Retrieved December 11, 2022, from <https://www.inegi.org.mx>
101. INEGI (2022). National Institute of Statistics and Geography. (2022). INEGI - Denué 2022: Economic units report [Reporte unidades económicas Denué 22]. Retrieved 2023 January 11, from <https://www.inegi.org.mx/app/descarga/?ti=6>
102. Instituto Nacional de Estadística y Geografía. (2015). Cuentas Nacionales de México, series históricas 1993-2013 [National accounts of Mexico, historical series 1993-2013]. Retrieved June, 15, 2022 from https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2015/cn_m/cn_m2015_02.pdf
103. Isenberg, D. J. (2011). The entrepreneurship ecosystem strategy as a new paradigm for economy policy: Principles for cultivating entrepreneurship. Babson Entrepreneurship Ecosystem Project. Babson College. Retrieved December 06, 2019, from <http://www.innovationamerica.us/images/stories/2011/The-entrepreneurship-ecosystem-strategy-for-economic-growth-policy-20110620183915.pdf>
104. Isenberg, D. J. (2010, June). The Big Idea: How to Start an Entrepreneurial Revolution. *Harvard Business Review*. Retrieved December 12, 2019 from <https://hbr.org/2010/06/the-big-idea-how-to-start-an-entrepreneurial-revolution>
105. Isenberg, D. J. (2014, May 12). What an entrepreneurship ecosystem actually is. *Harvard Business Review*. Retrieved January 12, 2021, from <https://hbr.org/2014/05/what-an-entrepreneurial-ecosystem-actually-is>.

106. Kantis, H., Federico, J., Ibarra, S., Gonzalo, M., Menéndez, C., & Álvarez, P. (2019). Condiciones sistémicas para el emprendimiento en América latina 2019. *Emprendimiento y digitalización: una agenda común de posibilidades y desafíos*.
107. Kaynak, E., & Macaulay, J. A. (1984). The Delphi technique in the measurement of tourism market potential: the case of Nova Scotia. *Tourism Management*, 5(2), 87-101.
108. Kelly, R., & Kim, H. (2016). Venture capital as a catalyst for commercialization and high growth. *The Journal of Technology Transfer*.
109. Kirby, D. A. (2006). Creating entrepreneurial universities in the UK: Applying entrepreneurship theory to practice. *The Journal of Technology Transfer*, 31(5), 599-603.
110. Kirkels, Y., & Duysters, G. (2010). Brokerage in SME networks. *Research Policy*, 39, 375–385. <https://doi.org/10.1016/j.respol.2010.01.005>
111. Klofsten, M., Fayolle, A., Guerrero, M., Mian, S. A., Urbano, D., & Wright, M. (2019). The entrepreneurial university as driver for economic growth and social change - Key strategic challenges. *Technological Forecasting and Social Change*, 141, 149–158. <https://doi.org/10.1016/j.techfore.2018.12.004>
112. Kromydas, T. (2017). Rethinking higher education and its relationship with social inequalities: past knowledge, present state and future potential. *Palgrave Communications*, 3(1). <https://doi.org/10.1057/s41599-017-0001-8>
113. Lamidi, K., & Williams, D. (2014). Leading transformational change in Higher Education: Discussion of literature and conceptual framework. In *Academic proceedings of the 2014 university-industry inter-action conference: Challenges and solutions for fostering entrepreneurial universities and collaborative innovation* University of Huddersfield. University of Huddersfield. <https://eprints.hud.ac.uk/id/eprint/24402/>
114. Laredo, P. (2007). *Toward a third mission for universities*. UNESCO Regional Seminar Globalizing Knowledge: European and North American Regions and Policies addressing the Priority Issues of other UNESCO Regions, Paris, Francia. Retrieved June 10, 2020, from <http://unesdoc.unesco.org/images/0015/001578/157815e.pdf>
115. Lederman, D., & Maloney, W. (2003). *Innovation in Mexico: NAFTA is not enough*. Washington D.C.: Policy Research Working Papers, World Bank.
116. Leffler, E., & Näsström, G. (2014). Entrepreneurial learning and school improvement: a Swedish case. *International Journal of Humanities and Social Sciences*, 1(11), 243–254. <https://www.arcjournals.org/pdfs/ijhsse/v1-i11/25.pdf>
117. Liévano-Morales, J. (2021, January 1). Factores de impacto en la información emprendedora en estudiantes de educación superior. Caso CETYS Universidad. <https://repositorio.cetys.mx/handle/60000/935> (Accessed 2023, July 5)
118. Liñán, F., & Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda. *International Entrepreneurship and Management Journal*, 11(4), 907–933. <https://doi.org/10.1007/s11365-015-0356-5>
119. Litsareva, E. (2017). Entrepreneurship Ecosystem: Analysis of Global Trends, Comparisons and Future Perspectives. *Journal of Entrepreneurship Education*, 20(2), 1-10.
120. Macke, J., Sarate, J. a. R., & De Atayde Moschen, S. (2019). Smart sustainable cities evaluation and sense of community. *Journal of Cleaner Production*, 239, 118103. <https://doi.org/10.1016/j.jclepro.2019.118103>
121. Malecki, E. J. (2011). Connecting local entrepreneurial ecosystems to global innovation networks: open innovation, double networks and knowledge integration. *International Journal of Entrepreneurship and Innovation Management*, 14(1), 36-59.
122. Malecki, E. J. (2018). Entrepreneurship and entrepreneurial ecosystems. *Geography Compass*, 12(3), e12359. <https://doi.org/10.1111/gec3.12359>

123. Maroufkhani, P., Wagner, R., & Ismail, W. K. W. (2018). Entrepreneurial ecosystems: a systematic review. *Journal of Enterprising Communities*, 12(4), 545–564. <https://doi.org/10.1108/jec-03-2017-0025>
124. Martin, B., McNally, J. J., & Kay, M. J. (2013). Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. *Journal of Business Venturing*, 28(2), 211–224. <https://doi.org/10.1016/j.jbusvent.2012.03.002>
125. Martínez Ávila, Minerva, & Fierro Moreno, Eréndira. (2018). Aplicación de la técnica PLS-SEM en la gestión del conocimiento: un enfoque técnico práctico. *RIDE. Revista Iberoamericana para la Investigación y el Desarrollo Educativo*, 8(16), 130-164. <https://doi.org/10.23913/ride.v8i16.336> (consulted 2023/07/05)
126. Mason, C., & Brown, R. (2014). Entrepreneurial ecosystems and growth-oriented entrepreneurship. Background paper prepared for the workshop organized by the OECD LEED Programme and the Dutch Ministry of Economic Affairs on Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship. Retrieved February 6, 2021, from <http://www.innovationamerica.us/images/stories/2011/The-entrepreneurship-ecosystem-strategy-for-economic-growth-policy-20110620183915.pdf>
127. Mathias, B. D., Lux, S., Crook, T. R., Autry, C. W., & Zaretzki, R. (2014). Competing against the unknown: The impact of enabling and constraining institutions on the informal economy. *Journal of Business Ethics*, 127(2), 251–264. <https://doi.org/10.1007/s10551-013-2030-6>
128. Matlay, H. (2008). The impact of entrepreneurship education on entrepreneurial outcomes. *Journal of Small Business and Enterprise Development*, 15(2), 382–396. <https://doi.org/10.1108/14626000810871745>
129. Matlay, H. (2011). The influence of stakeholders on developing enterprising graduates in UK HEIs. *International Journal of Entrepreneurial Behaviour & Research*, 17(2), 166–182. <https://doi.org/10.1108/13552551111114923>
130. McGowan, P., Van Der Sijde, P., & Kirby, D. (2008). The role of universities in the entrepreneurship industry: Promoting the entrepreneurship agenda in HEIs. *Industry and Higher Education*, 22(1), 49-59.
131. Metrick, A., & Yasuda, A. (2021). *Venture capital and the finance of innovation*. John Wiley & Sons.
132. Ministerio de Economía Mexicana. (2021) Mexican Ministry of Economy. Mapa de Empresas. Ministerio de Economía. Obtenido de <https://static.poder360.com.br/2021/02/mapa-de-empresas-2020ministerio-da-economia-2fev2021.pdf>
133. Molina, J. A. (2023, March 16). ¿En México emprendemos por necesidad o por perseguir nuestros sueños? *El Economista*. Retrieved: May 02 2023 from <https://www.economista.com.mx/el-empresario/En-Mexico-emprendemos-por-necesidad-o-por-perseguir-nuestros-suenos-20230315-0084.html>
134. Moore, J. F. (1993). Predators and prey: a new ecology of competition. *Harvard Business Review*, 71(3), 75–83.
135. Morris, M. H., Webb, J. W., Jun, F., & Singhal, S. (2013). A Competency-Based Perspective on Entrepreneurship Education: Conceptual and Empirical Insights. *Journal of Small Business Management*, 51(3), 352–369. <https://doi.org/10.1111/jsbm.12023>
136. Mueller, P. (2006). Exploring the knowledge filter: How entrepreneurship and university–industry relationships drive economic growth. *Research policy*, 35(10), 1499-1508.
137. Mukesh, H. V., & Pillai, K. R. (2020). Role of Institutional Ecosystem in Entrepreneurship Education: An Empirical Reiteration. *Journal of Entrepreneurship*, 29(1), 176–205. <https://doi.org/10.1177/0971355719893521>

138. Mukesh, H. V., Rao, A., & Pillai, K. R. (2018). Entrepreneurial potential and higher education system in India. *Journal of Entrepreneurship*, 27(2), 258–276. <https://doi.org/10.1177/0971355718781275>
139. Mytelka, L. K. (2004). *Designing a policy relevant innovation survey for NEPAD*. Maastricht: United Nations University Institute for New.
140. Nabi, G., Walmsley, A., Liñán, F., Akhtar, I., & Neame, C. (2016). Does entrepreneurship education in the first year of higher education develop entrepreneurial intentions? The role of learning and inspiration. *Studies in Higher Education*, 43(3), 452–467. <https://doi.org/10.1080/03075079.2016.1177716>
141. Nambisan, S., Wright, M., & Feldman, M. P. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, 48(8), 103773. <https://doi.org/10.1016/j.respol.2019.03.018>
142. Nasiri, N., & Hamelin, N. (2018). Entrepreneurship Driven By Opportunity and Necessity: Effects of Educations, Gender and Occupation in MENA. *Asian Journal of Business Research*, 8(2). <https://doi.org/10.14707/ajbr.180049>
143. Nauwelaers, C. (2011). Intermediaries in regional innovation systems: role and challenges for policy. In P. Cooke (Ed.), *Handbook of regional innovation and growth* (pp. 467–481). Cheltenham: Edward Elgar.
144. Neck, H. M., & Greene, P. G. (2011). Entrepreneurship education: known worlds and new frontiers. *Journal of Small Business Management*, 49 (1), 55-70.
145. Neck, H. M., Meyer, G. D., Cohen, B., & Corbett, A. C. (2004). An entrepreneurial system view of new venture creation. *Journal of Small Business Management*, 42(2), 190-208.
146. Nelles, J. & Vorley, T. (2010). Constructing an Entrepreneurial Architecture: An Emergent Framework for Studying the Contemporary University beyond the Entrepreneurial Turn. *Innovative Higher Education*, 35 (3), 161-176.
147. Nicotra, M., Romano, M., Del Giudice, M., & Schillaci, C. E. (2018). The causal relation between entrepreneurial ecosystem and productive entrepreneurship: a measurement framework. *Journal of Technology Transfer*, 43(3), 640–673. <https://doi.org/10.1007/s10961-017-9628-2>
148. OECD (1999): “University Research in Transition”. OCDE. Retrieved June, 2020
149. OECD (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* (3a ed.). Paris: OECD. Retrieved August, 08 2020
150. OECD (2017). *Key Issues for Digital Transformation in the G20.*, p.163. Retrieved August, 15 2020 from <https://www.oecd.org/internet/key-issues-for-digital-transformation-in-the-g20.pdf>
151. Ouimet, P., & Zarutskie, R. (2014). Who works for startups? The relation between firm age, employee age, and growth. *Journal of Financial Economics*, 112(3), 386–407. <https://doi.org/10.1016/j.jfineco.2014.03.003>
152. Oviatt, B. M., & McDougall, P. P. (2018). Toward a theory of international new ventures. In *JIBS special collections* (pp. 31–57). https://doi.org/10.1007/978-3-319-74228-1_2
153. Pages, E. R., Freedman, D., & Von Bargen, P. (2003). Entrepreneurship as a state and local economic development strategy. In D. M. Hart (Ed.), *The emergence of entrepreneurship policy: Governance, start-ups, and growth in the U.S. knowledge economy* (pp. 240–259). Cambridge: Cambridge University Press.
154. Philpott, K., Dooley, L., O'Reilly, C., & Lupton, G. (2011). The entrepreneurial university: Examining the underlying academic tensions. *Technovation*, 31(4), 161-170.
155. Pittaway, L., & Cope, J. (2007). Entrepreneurship education. *International Small Business Journal*, 25(5), 479–510. <https://doi.org/10.1177/0266242607080656>
156. Porter, M. E., & Kramer, M. R. (2018). Creating shared value. In *Springer eBooks* (pp. 323–346). https://doi.org/10.1007/978-94-024-1144-7_16

157. Raagmaa, G., & Keerbergh, A. (2017). Regional higher education institutions in regional leadership and development. *Regional Studies*, 51, 260–272.
158. Rauch, A., & Frese, M. (2007). Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business performance and cognitive variables. *Applied Psychology*, 56(3), 421–440.
159. Reguant Álvarez, M., & Torrado Fonseca, M. (2016). El método delphi. *Revista D'Innovació I Recerca En Educació*, 9 (1). <https://doi.org/10.1344/reire2016.9.1916>
160. Reynolds, P.; Hay, M.; Camp, R.M. 1999. “Global Entrepreneurship Monitor”. London School Business. Babson College, Kauffman Center for Entrepreneurial Leadership.
161. Riley, S. M., Michael, S. C., & Mahoney, J. T. (2017). Human capital matters: Market valuation of firm investments in training and the role of complementary assets. *Strategic Management Journal*, 38(9), 1895–1914. <https://doi.org/10.1002/smj.2631>
162. Romano, M., Catalfo, P., & Nicotra, M. (2014). Science and technology parks and intellectual capital: A model for intangibles representation, evaluation and control. *Journal of Intellectual Capital*, 15, 537– 553.
163. Roundy, P. T. (2017). Social entrepreneurship and entrepreneurial ecosystems: complementary or disjointed phenomena? Social Science Research Network. <https://doi.org/10.2139/ssrn.2893165>
164. Roundy, P. T., Brockman, B. K., & Bradshaw, M. (2017). The resilience of entrepreneurial ecosystems. *Journal of Business Venturing Insights*, 8, 99–104. <https://doi.org/10.1016/j.jbvi.2017.08.002>
165. Sam, C., & Van Der Sijde, P. (2014). Understanding the concept of the entrepreneurial university from the perspective of higher education models. *Higher Education*, 68(6), 891–908.
166. Schumpeter, B. (1934). *The Theory of Economic Development: An Inquiry Into Profits, Capital, Credit, Interest, and the Business Cycle*. 55.
167. Shane, S., & Venkataraman, S. (2007). The promise of entrepreneurship as a field of research. *Entrepreneurship: Concepts, Theory and Perspective* (pp. 171–184)
168. Siegel, D. S., Westhead, P., & Wright, M. (2003). Science parks and the performance of new technology based firms: A review of recent UK evidence and an agenda for future research. *Small Business Economics*, 20(2), 177–184.
169. Singh, S. K., Mazzucchelli, A., Vessal, S. R., & Solidoro, A. (2021). Knowledge-based HRM practices and innovation performance: Role of social capital and knowledge sharing. *Journal of International Management*, 27(1), 100830. <https://doi.org/10.1016/j.intman.2021.100830>
170. Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*. London: W. Strahan and T. Cadell.
171. Sorenson, O. (2018). Social networks and the geography of entrepreneurship. *Small Business Economics*, 51(3), 527–537. <https://doi.org/10.1007/s11187-018-0076-7>
172. Spigel, B. (2017). The relational organization of entrepreneurial ecosystems. *Entrepreneurship Theory and Practice*, 41(1), 49–72. <https://doi.org/10.1111/etap.12167>
173. Spigel, B., & Harrison, R. (2018). Toward a process theory of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal*, 12(1), 151–168. <https://doi.org/10.1002/sej.1268>
174. Spilling, O. R. (1996): “The Entrepreneurial System: On Entrepreneurship in the Context of a Mega-event”. *Journal of Business Research*. Vol. 36. No. 1.
175. Stam, E. (2015). Entrepreneurial Ecosystems and Regional Policy: A sympathetic critique. *European Planning Studies*, 23(9), 1759–1769. <https://doi.org/10.1080/09654313.2015.1061484>
176. Stam, E., & Spigel, B. (2016). *Entrepreneurial Ecosystems*. Utrecht University School of Economics, Utrecht School of Economics, Tjallinging C. Koopmans Research Institute. Discussion Paper Series, 16-13. University of Edinburgh Business School. Retrieved August 13, 2023, from <https://dspace.library.uu.nl/handle/1874/347982>

177. Sternberg, R. (2012). Do EU Regional Policies Favour Regional Entrepreneurship? Empirical Evidence from Spain and Germany. *European Planning Studies*, 20(4), 583–608. <https://doi.org/10.1080/09654313.2012.665030>
178. Stolze, A. (2021). A meta-ethnography on HEIs' transformation into more entrepreneurial institutions: Towards an action-framework proposition. *Industry and Higher Education*, 35(1), 14–27.
179. Stone, M. (1974). Cross-validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society: Series B (Methodological)*, 36(2), 111–147.
180. Tarapuez-Chamorro, E., Aristizábal-Tamayo, J. M., & Monard-Blandón, C. (2018). Aspectos sociodemográficos y familiares e intención empresarial en estudiantes de Maestría en Administración en Colombia. *Estudios Gerenciales*, 34(149), 422–434.
181. Theodoraki, C., & Messeghem, K. (2017). Exploring the entrepreneurial ecosystem in the field of entrepreneurial support: a multi-level approach. *International Journal of Entrepreneurship and Small Business*, 31(1), 47. <https://doi.org/10.1504/ijesb.2017.083847>
182. Theodoraki, C., Messeghem, K., & Rice, M. (2017). A social capital approach to the development of sustainable entrepreneurial ecosystems: an explorative study. *Small Business Economics*, 51(1), 153–170. <https://doi.org/10.1007/s11187-017-9924-0>
183. Theodoraki, C., Messeghem, K., & Rice, M. P. (2018). A social capital approach to the development of sustainable entrepreneurial ecosystems: an explorative study. *Small Business Economics*, 51(1), 153–170.
184. Thierstein, A., & Wilhelm, B. (2001). Incubator, technology, and innovation centres in Switzerland: Features and policy implications. *Entrepreneurship and Regional Development*, 13(4), 315–331.
185. Timmons, J. A. (1994). *New venture creation: Entrepreneurship for the 21st century*. Irwin.
186. Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, 44 (5), 996–1004.
187. Ucbasaran, D., Westhead, P., & Wright, M. (2001). The focus of entrepreneurial research: contextual and process issues. *Entrepreneurship theory and practice*, 25(4), 57–80.
188. Ullman, J. (2001). Structural equation modeling. U: BG Tabachnick, LS Fidel (ur.)-Using Multivariate Statistics. [https://www.scirp.org/\(S\(351jmbntvnsjt1aadkozje\)\)/reference/referencespapers.aspx?referenceid=854707](https://www.scirp.org/(S(351jmbntvnsjt1aadkozje))/reference/referencespapers.aspx?referenceid=854707)
189. Urbano, D., Aparicio, S., & Audretsch, D. B. (2018). Twenty-five years of research on institutions, entrepreneurship, and economic growth: what has been learned? *Small Business Economics*, 53(1), 21–49. <https://doi.org/10.1007/s11187-018-0038-0>
190. Varamäki, E., Joensuu, S., Tornikoski, E. T., & Viljamaa, A. (2015). The development of entrepreneurial potential among higher education students. *Journal of Small Business and Enterprise Development*, 22(3), 563–589. <https://doi.org/10.1108/jsbed-02-2012-0027>
191. Villa Sánchez, Aurelio; Arias Guzmán, Manuel de Jesús; Peña-Lang, María Begoña. (2021) Un modelo de formación para desarrollar el emprendimiento social. [A modelo f training for developing social entrepreneurship]. *Educación*, 2021, Vol. 57, n.º 1, pp. 97–116, <https://doi.org/10.5565/rev/educar.1153>.
192. Vinzi, V. E., Chin, W. W., Henseler, J., & Wang, H. (Eds.). (2010). *Handbook of partial least squares: Concepts, methods and applications (Vol. 2)*. Springer Science & Business Media.
193. Walter, S. G., & Block, J. (2016). Outcomes of entrepreneurship education: An institutional perspective. *Journal of Business Venturing*, 31(2), 216–233. <https://doi.org/10.1016/j.jbusvent.2015.10.003>

194. Wong, K. K. (2019). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, 24(1), 1-32.
195. World Economic Forum. (2014). (WEF) The Global Competitiveness Report 2014–2015. Insight Report. Retrieved 2023 from https://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf
196. World Economic Forum. WEF (2023). The Future of Jobs 2023. Retrieved in May 2023 from <https://www.weforum.org/reports/the-future-of-jobs-report-2023/>.
197. Wright, M., Siegel, D. S., & Mustar, P. (2017). An emerging ecosystem for student start-ups. *The Journal of Technology Transfer*, 42(4), 909–922.
198. Xie, X., Xie, X., & Martínez-Climent, C. (2019). Identifying the factors determining the entrepreneurial ecosystem of internet cultural industries in emerging economies. *International Entrepreneurship and Management Journal*, 15(2), 503–522. <https://doi.org/10.1007/s11365-019-00562-z>

LIST OF PUBLICATIONS



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Candidate: Karen Miriam Gonzalez Flores
Doctoral School: Károly Ihrig Doctoral School of Management and Business
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List of publications related to the dissertation

Articles, studies (5)

- Gonzalez Flores, K. M.:** The Use of Partial Least Squares to Define the Characteristics in the Environment of Higher Education Institutions and their Effects on Entrepreneurial Academic Education, a Case Study: Torreon, Mexico.
International Journal of Engineering and Management Sciences (IJEMS). 8 (2), 1-14, 2023.
EISSN: 2498-700X.
DOI: <http://dx.doi.org/10.21791/IJEMS.2023.2.1>.
- Gonzalez Flores, K. M.,** Molina Morejón, V. M.: Fundamentals of human capital and education elements of the entrepreneurship ecosystem.
Cross-Cultural Management Journal. 24 (2), 149-157, 2022. ISSN: 2286-0452.
- Gonzalez Flores, K. M.,** Molina Morejón, V. M.: The Higher Education Institutions ecosystem factors and its impact on the entrepreneurship education, case study: North-Eastern Mexico.
Journal of Microfinance Planning and Control. 8 (21), 31-43, 2022. ISSN: 2444-5037.
DOI: <http://dx.doi.org/10.35429/JMPC.2022.21.8.31.43>
- Gonzalez Flores, K. M.,** Katonáné Kovács, J.: Defining the entrepreneurship ecosystem.
SEA: Practical Application of Science. 6 (18), 299-306, 2018. EISSN: 2360-2554.
- Gonzalez Flores, K. M.:** Fintech overview in the Mexican entrepreneurial ecosystem.
Network Intelligence Studies. 6 (12), 141-148, 2018. EISSN: 2344-1712.



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List of other publications

Articles, studies (1)

6. Molina Morejón, V. M., Elizondo, M. M., Armenteros Acosta, M. d. C., **Gonzalez Flores, K. M.**,
Martínez Cabrera, H.: Propuesta de valor del modelo de negocios de las pyme: un estudio en
diversos sectores económicos de Coahuila = The value proposition of the business model for
smes: a study in different economic sectors of Coahuila.
Revista Internacional Administración & Finanzas. 9, 73-85, 2016. ISSN: 1933-608X.

Conference presentations (1)

7. Gonzalez, F. O., **Gonzalez Flores, K. M.**, Canibe, C. F.: Critical success factors on
internationalized SMEs. Exploration in Coahuila, Mexico.
In: Ferenc Farkas International Scientific Conference = Farkas Ferenc Nemzetközi
Tudományos Konferencia 2018. Szerk.: Dobrai Katalin, László Gyula, Sipos Norbert, Pécsi
Tudományegyetem Közgazdaságtudományi Kar Vezetés- és Szervezéstudományi Intézet,
Pécs, 175-186, 2018. ISBN: 9789634292388

The Candidate's publication data submitted to the iDEa Tudóstér have been validated by DEENK on
the basis of the Journal Citation Report (Impact Factor) database.

31 August, 2023



ANNEXES

Annex 1) Delphi questionnaire and analysis from the panel of experts:

Delphi First-round

Experts: 27

Q1: Role of the participants:

Head School/high management: 9

Researcher/professor: 12

External stakeholder: 6

Q2: Years of Experience:

- a) less than 1 year= 3
- b) Between 1-3 years = 7
- c) more than 3 years = 17
- d) other= 0

Question and analysis

Table 20 Q7. Panel of Experts if they would participate in the next Delphi round.

Q7	How likely would be for you to participate in a further survey in the near future? In the scale from 1-10 meaning zero as I don't want to participate in a further survey and 10 I would totally participate.									
	1	2	3	4	5	6	7	8	9	10
RESULT	2	0	0	0	2	3	3	1	4	12

Source: own edit

Analysis Q7: From the panel of experts, on this first round of the Delphi we can consider that 85% would like to participate in the Delphi round 2.

Q8: Any other questions or feedback you want to add? (Open response)

Results only 4 responses:

- Would be nice to add factors of the entrepreneurship education.
- Feeling good to be participating in this project.
- Please read my comment about the internal factors, thanks.
- Interesting topic

Annex 2. Compilation of results of the 2 rounds of Delphi method.

		Delphi 1 Round																										
		Total 27 participants																										
		Role of the participants:																										
		Head School/high management																										
		Researcher/professor																										
		External stakeholder,																										
		Panel of Experts																										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Entrepreneurial Education	Quality of entrepreneurial education in the Curriculum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Level of entrepreneurial education in the Curriculum	1	1	1	0	1	0	1	1	1	0	1	1	0	0	1	1	0	1	0	1	0	1	1	1	1	1	1
	Teaching entrepreneurial methodologies	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1
	Entrepreneurship Trainee programs	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
	Extra-curricular activity relating to entrepreneurship education	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
	Mentoring entrepreneurial programs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Student On-Boarding plan	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	1	1	1	1
	Entrepreneurship mission	0	0	1	0	1	1	0	0	1	1	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	1	1
Internal Factors	University Entrepreneurial Human Capital (researchers, staff that are involve in the entrepreneurial education)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	University Financial resources to support specifically entrepreneurship programs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	University alliances (Connectedness with other Universities/institutions/research centers, to promote and create better entrepreneurship programs or activities)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	University location and infrastructure (how well geographically is, if it is near to clusters, research centers etc., and how are installations and facilities of the institution)	1	0	1	0	0	0	1	1	1	1	1	1	0	1	1	1	1	0	1	0	1	1	1	1	1	1	1
Hel Ecosystem	Rewards Scheme	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
	Strategy Organization and Leadership	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1
	Integration with the community	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Government involvement with the ecosystem	0	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	1	1
	Attitudes towards entrepreneurship	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Entrepreneurship role models	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1
University ability to connect startup's with other investors	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

		Delphi 2 Round FINAL																										
		Total 21 participants																										
		Role of the participants:																										
		Head School/high management																										
		Researcher/professor																										
		External stakeholder,																										
		Panel of Experts																										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	LOW POPULARITY	HIGH POPULARITY				
Hel Ecosystem	Government Support	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	0	0	1	0	0	1	6				
	SOLE Strategy Organization and Leadership	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	SOLE Integration with the community	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3			
	SUEC Support for Entrepreneurship cycle	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	ATTE Attitudes towards entrepreneurship	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
RMRS Role models and Reward scheme	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Internal Factors	RHC Entrepreneurial Human Capital (researchers, staff that are involve in the entrepreneurial education)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	FISU Financial resources to support specifically entrepreneurship programs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	ALLI Alliances (Connectedness with other Universities/institutions/research centers, to promote and create better entrepreneurship programs or startups)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	LOIN Location and infrastructure (how well geographically is, if it is near to clusters, research centers etc., and how are installations and facilities of the institution)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Entrepreneurial Education	History/Reputation of the Institution	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1				
	LEVEL Quality of entrepreneurial education in the Curriculum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	5				
	ENTM Level of entrepreneurial education in the Curriculum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
	ENTM Entrepreneurial Teaching methodologies	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	ENTP Entrepreneurship Trainee programs	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2			
	EXEE Extra-curricular activity relating to entrepreneurship education	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	MEEP Mentoring entrepreneurial programs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	STU Student On-Boarding plan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
ENMI Entrepreneurship mission	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

Annex 3) Questionnaire sent to the master graduated students for the analysis with PLS.

Questionnaire

Dear Participant,

We cordially invite you to take part in a research study focused on the Higher Education Institution (HEI) entrepreneurship ecosystem and education. This study forms an integral part of a doctoral research project: "Higher Education Institutions Entrepreneurship Ecosystem And Its Influence On The Entrepreneurial Education Case Study Northeastern Of Mexico".

The survey has been divided into two sections, with the first section being an introduction, demographic data, and the second section related to your opinions about the Higher Education ecosystem factors and their impact on entrepreneurship education.

Warm regards,

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Please be assured that your responses will be handled with complete confidentiality and will only be used for research purposes. Your participation is voluntary, and you have the right to withdraw from the study at any time.

Thank you in advance for your valuable input, which will contribute significantly to this research project.

Dear Participant

We value your experience and opinion on the entrepreneurship ecosystem and education at your Higher Education Institution (HEI). As a graduate of the master's program, your feedback is especially important to us. Please rate the following statements on a scale of 1-5, where 1 is strongly disagree and 5 is strongly agree, based on your experience and opinion during your time in the program.

Section 2: Questions Items (3 Parts)

Please kindly mark the number that corresponds to your opinion in this section, as shown in the example below:

<i>Example:</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
In my experience HEIs are able to connect startups with industry.	1	2	3	4	5

Section 2: Question Items (3 Parts)

Part 1: This section of the questionnaire focuses on exploring the external entrepreneurship ecosystem in Higher Education Institutions (HEIs). It seeks to understand the various factors that influence the development of an entrepreneurial ecosystem in the external environment of HEIs, including government policies, industry linkages, funding opportunities, and support services for startups.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
In my opinion the entrepreneurial promotional activities organized by HEI are effective impulsing entrepreneurial projects	1	2	3	4	5
In my experience the HEIs demonstrate a positive attitude towards entrepreneurship.	1	2	3	4	5
I find that my HEIs provide sufficient support for entrepreneurship.	1	2	3	4	5
I believe that HEIs have a well-defined governance structure that facilitates entrepreneurship.	1	2	3	4	5

Part 2: In this section of the questionnaire, we aim to investigate the internal entrepreneurship ecosystem in HEIs. This section explores the role of HEIs in promoting entrepreneurship among students, faculty, and staff. It examines the various components of the internal ecosystem, including curriculum, research, mentoring, incubation, and networking, and their impact on promoting entrepreneurship.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
In my experience HEIs are able to connect startups with industry.	1	2	3	4	5
In my opinion HEIs have qualified teaching staff that are knowledgeable in entrepreneurship.	1	2	3	4	5
To me, it seems HEIs have adequate physical infrastructure and facilities to support entrepreneurship.	1	2	3	4	5
As I see it the HEIs provide sufficient financial support for entrepreneurship.	1	2	3	4	5

Part 3: This section of the questionnaire focuses on exploring the entrepreneurship education programs offered by HEIs. It seeks to understand the various aspects of entrepreneurship education, including curriculum design, pedagogy, and delivery modes. It also aims to examine the effectiveness of entrepreneurship education in promoting entrepreneurial mindset, skills, and behaviors among students, faculty, and staff.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Based on my experience the degree of entrepreneurial education in the curriculum is sufficient.	1	2	3	4	5
In my opinion the HEIs provide adequate orientation to students on entrepreneurship.	1	2	3	4	5
In my experience the department philosophy on entrepreneurship is aligned with the needs of the entrepreneurial ecosystem.	1	2	3	4	5
To me, it seems that the entrepreneurial Teaching Methodologies are effective in promoting entrepreneurship.	1	2	3	4	5
In my opinion Mentoring and coaching programs for entrepreneurs are effective in developing entrepreneurial skills.	1	2	3	4	5
Extra-curricular activities relating to entrepreneurship are effective in promoting entrepreneurship	1	2	3	4	5

Feel Free to add any additional comments:

Thank you for your time!

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Karen González