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Entrepreneurial university ecosystems: does the country's level of development differently affect the students entrepreneurial intention? A perspective from public universities in Spain and Mexico

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Abstract: Entrepreneurial ecosystems in universities are a trusted framework to analyse entrepreneurship as a viable career option, that can promote recovery from a crisis scenario. Particularly, after COVID-19 pandemic, the current situation demands intensifying all the agents involved to contribute to the recovery of the entrepreneurial ecosystem. However, public universities are vital institutions that provide education in all disciplines and receive young people interested in learning. Thus, one question comes to mind when the unit of analysis is the public university in a developed country. Does the country's level of development differently affect the student's entrepreneurial intention in public universities? This research frames a global sample of 436 students, 220 (Spain) and 216 (Mexico), students suitable for structural equation modelling. Our findings suggest a significant relationship between entrepreneurial university ecosystems and the entrepreneurial intention of students in public universities. Moreover the entrepreneurial university ecosystem influences student's entrepreneurial intention through attitude and self-efficacy. On the contrary, the different level of development across studied countries does not affect the university students' entrepreneurial intention. It contributes to understanding the entrepreneurial contexts for public universities and brings new insights into the classification of entrepreneurial university ecosystems.

Keywords: entrepreneurial university ecosystems; European university; entrepreneurial intention; public university; Spanish university.

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1 Introduction

The literature on entrepreneurship gives the environment a role of unquestionable relevance both in promoting entrepreneurial activity and its impact on a territory's economic development. Then, to achieve these goals, the institutional framework is required that facilitates and promotes an entrepreneurial culture in all areas: individual, organisational and territorial. The geographical dimension and the proximity have a critical role in understanding the growth dynamics and firm performance (Grillitsch and Nilsson, 2016; Molina-Morales et al., 2014). The importance and policy relevance of growth has been affirmed in the United Nations 'Agenda 2030', which identified 17 Sustainable Development Goals (SDGs) to be achieved. Goal 8 calls for 'sustained, inclusive and sustainable economic growth'. Growth is also a means or a prerequisite for achieving many of the other SDGs. As a growth driver, entrepreneurship might help address some of society's challenges, as stated by the SDGs.

The Global Entrepreneurship Monitor (GEM) project has proposed that the dynamics of entrepreneurship can be linked to conditions that enhance (or hinder) the creation of new businesses, called 'entrepreneurial framework conditions' [Bosma et al., (2020), p.68]. The combination of conditions in which entrepreneurial activities occur makes up the 'entrepreneurial ecosystem' (Kelley et al., 2016). Entrepreneurial ecosystem approaches seek to build an engaged community of entrepreneurial actors who can co-create the support required to help innovative new firms start and scale (Feld, 2012).

The current situation demands an intensification of all the agents involved to contribute to the necessary recovery of the entrepreneurial ecosystem, deeply damaged by the impact of the COVID-19 crisis. Within the 50 economies participating in the 2019 GEM research (Bosma et al., 2020), national experts from 54 economies were asked to assess the national environment for entrepreneurship in terms of 12 defined framework conditions by GEM. Physical infrastructure universally rates the most well-developed framework conditions that support entrepreneurship, with entrepreneurship education at the school level universally regarded as the least well-developed, weakest condition.

Entrepreneurship education is relevant at different levels, individual, organisational and social, concerning different achievements (Lackéus, 2015). Firstly, in job creation, more people are needed who are willing and able to create jobs, and the growing organisations even create more jobs. Thus, entrepreneurship and innovation (E&I) are the main paths to growth and job creation (Jones and Iredale, 2010; Kuratko, 2005; Wilson et al., 2009). Secondly, entrepreneurship can provide individuals with economic success. Furthermore, organisational renewal is critical to the long-term success of every company, and these processes are critical to the vitality of economies (Kuratko, 2005; O'Connor, 2013; Wilson et al., 2009). Thirdly, in the face of globalisation and innovation, people need entrepreneurial skills and abilities to thrive in a constantly changing world; entrepreneurial firms play a crucial role in changing market structures, which requires people with high-level general skills (Jones and Iredale, 2010; Kuratko, 2005). Fourthly, the creativity and happiness of employees are essential for the performance of new and existing organisations, and the economic wealth of nations is correlated with the happiness of their citizens (Amabile and Kramer, 2011). Finally, people can make a difference in society, and marginalised people can achieve economic success. Thus, companies can collaborate with small social entrepreneurship initiatives to create social value through social entrepreneurship, which addresses problems that the market economy has not addressed (Rae, 2010).

Universities play a crucial role in recovering the entrepreneurial ecosystem as entrepreneurial ecosystems themselves due to their research and education mission. On the one hand, universities are the vehicle for transmitting culture and transferring knowledge among young people, who are the future of society. On the other hand, universities have the responsibility of being the bridge that contributes to the progress of society and the sustainable development of its environment. Therefore, entrepreneurship education acquires a relevant role in which essential elements are acquiring entrepreneurial skills and promoting entrepreneurship. Entrepreneurial ecosystems in universities are a framework in which universities are more immersed since entrepreneurship is a viable career option. Nevertheless, public universities are strong institutions with a global view of all disciplines. Likewise, these institutions are the ones that receive the majority of the youngest people to improve their knowledge for a better future.

There is still a lack of empirical evidence to measure the relationship between growth in entrepreneurship and personal and environmental factors through education among university students (Peterman and Kennedy, 2003). However, within the literature, we find studies in which universities are compared because some generate more entrepreneurship than others (Di Gregorio and Shane, 2003) or studies in which the fact that the type of university if it is an element that is important for the study of entrepreneurial intentions (Zhang et al., 2014). However, there is a gap in the studies that address the influence of the regional ecosystem conditions on entrepreneurial university ecosystems from an international perspective that could provide insights to reflect on the dynamics of an EES. It promotes synergies with the regional level of entrepreneurship ecosystem and better shapes university students' entrepreneurial intention to upskill entrepreneurial education. These considerations frame our main research question: does it matter the country's development in the entrepreneurial intention of a public university?

The twofold purpose of this study is to test if the entrepreneurial university ecosystem (EES) influences the entrepreneurial intention of university students under a TPB model, particularly in public universities. Secondly, we apply an extended EI model based on the TPB (Ajzen, 1991) to understand how the entrepreneurial university ecosystem of public universities in countries with a different level of development might boost students' entrepreneurial intention. For this purpose, we undertake the study in two public universities entrepreneurial ecosystems from Spain and Mexico, respectively included according to the United Nations (2021) World Economic Situation Prospects on country conditions 'developed economies' and 'developing economies'. Furthermore, according to the GEM 2020 Global report (Bosma et al., 2020), Mexico rates as a middle-income level economy, while Spain has been included in the high-income level regions.

After this introduction, in which we affirm the importance of the subject addressed, Section 2 briefly contextualise differences in the entrepreneurial ecosystem conditions in Spain and Mexico. Section 3 provides a literature review on entrepreneurial university ecosystems models. Section 4 describes the theoretical framework and hypotheses, followed by the methodology used and results in Sections 5 and 6, respectively. Finally, the corresponding conclusions, relevance, practical implications of this study, and future research and limitations inherent to this study are in Section 7.

2 Contextualising entrepreneurial ecosystems in Spain and Mexico

United Nations (2021) World Economic Situation Prospects reflect basic economic country conditions that have been grouped as high-income, upper-middle-income, lower-middle-income, and low-income. These threshold levels of GNI per capita are those established by countries, those with between $1,036 and $4,045 as lower-middle-income countries, those with between $4,046 and $12,535 as upper-middle-income countries, and those with incomes of more than $12,535 as high-income countries. With these criteria, Spain is included in the 'developed economies', while Mexico is in the 'developing economies'. The per capita GNI level place Spain in the group of high-income and Mexico in the upper-middle-income.

The Global Competitiveness Report 2019 (Schwab et al., 2019) captures the determinants of long-term growth for 141 economies worldwide. The overall GCI 4.0 score (see Appendix A of the abovementioned report for the detailed composition and methodology) is the average of the scores of the 12 pillars. Spain is located in position number 23 (75.3/100) and Mexico in 48 (64.9/100).

According to the GEM 2020 Global report (Bosma et al., 2020), countries' classification into low-income, middle-income, and high-income level economies, Mexico rates as a middle-income level economy, while Spain has been included in the high-income level regions. Last year GEM introduced the National Entrepreneurship Context Index (NECI), a measure of the ease of starting and developing a business just introduced in the GEM 2020 report, summarises the assessment of entrepreneurship framework conditions into a single composite score of the ease of starting and developing a business. Nonetheless, the efficacy of framework conditions is only partly determined by wealth levels (Bosma et al., 2020). Low incomes in a low-supportive environment can be both the cause and the effect of high levels of entrepreneurial activity. The activity may be little more than low-growth-oriented self-employment, referred to as subsistence entrepreneurship, motivated by the lack of alternative income opportunities. Similarly, in a high-income and high-supportive environment for entrepreneurial activity, potential entrepreneurs may find it much easier to establish a business.

The GEM 2020 report (Bosma et al., 2020) score range for the 12 entrepreneurial framework conditions (EFCs) defined rank from 0 = very inadequate insufficient status to 10 = very adequate sufficient status. Spain scores three of them below 5: entrepreneurial education at school stage 2.65 (39/54), with higher scores close to 5, cultural and social norms 4.82 (29/54), and entrepreneurial finance 4.87 (23/54). On the other hand, the physical infrastructure 6.95 (27/54) and the commercial and legal infrastructure 6.04 (6/54) get the higher rates. The Spanish Government has committed itself at an institutional and business level, with the UN SDGs and the strategic promotion of SMEs and entrepreneurship, aligned with the policies of the European Union and regional governments. Such as strategic entrepreneurship, female entrepreneurship, self-employment, business management and talent, regulatory frameworks, financing, innovation and digitisation, sustainability and internationalisation.

The territorial governmental organisation in Spain is characterised by decentralisation, which implies the distribution of educational powers between the Ministry of Education and the autonomous communities' Departments of Education. At university levels, the Ministry of Universities is in charge of proposing and executing the government's policy on universities and their activities. As for general educational levels in Spain, 67.4% of students attend publicly owned centres, 25.2% at concerted private

centres, and 7.4% at non-concerted privately owned centres (Ministerio de Universidades, Gobierno de España, 2022). The Spanish university system (SUE) was made up in the 2019–2020 academic year by 83 active universities, 50 public and 33 private.

The EFCs in Mexico (Bosma et al., 2020), in striking contrast with Spain, score only three of over 5: physical infrastructure 7.08 (22/54), cultural and social norms 6.09 (13/54) and entrepreneurial education at post-school stage 6.04 (3/54). Expert opinions about Mexico's entrepreneurial ecosystem make it clear that there are three main areas requiring improvement: entrepreneurial education at school stage 3.12 (23/54), government policies around bureaucracy 3.65 (32/54), and R&D 4.14 (25/54). All of them are areas of particular interest as they attracted the highest scores for importance but the lowest scores for the country. As global economic growth continues to slow, and zero growth in 2019 seems plausible for Mexico, conditions for entrepreneurship worsen, necessity entrepreneurship increases, resulting in low-quality jobs. The SDGs promote sustained economic growth and higher productivity and technological innovation, prerequisites for achieving entrepreneurship outcomes.

On the other hand, the educational system in Mexico comes from a mixed system of government. In this hybrid system, education being considered compulsory, the state is also obliged to offer free education for the levels in which it is compulsory. But also, there is private education offered in those compulsory levels. However, higher education is not an obligation, but education is offered at this level for free. According to Muños Izquierdo and Silva Laya (2013), until 1990–1991, 81.9% of the studying population studied in public or 'government' schools. In 2012, it was being said that 69.6% do so in government schools. Thus, the percentage of students in higher education is changing in the options between public and private universities. Mexico's structure and regulation in education are managed through the Secretary of Public Education, better known as 'the SEP'. This organism is the highest body through which all levels of education offered in Mexico are regulated, and the education obtained is validated as official. If the statutes of this secretariat do not govern an institution, the degrees that can be obtained are not official.

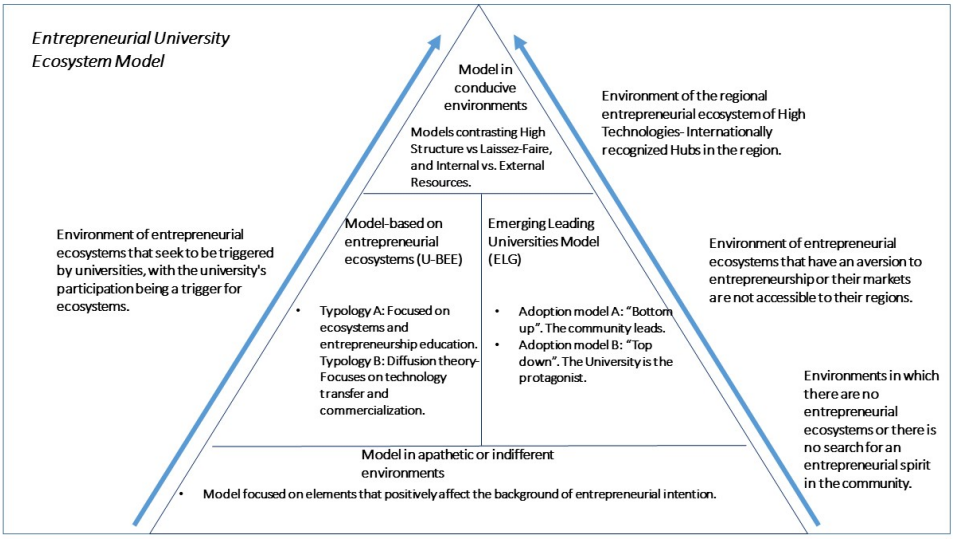
3 Literature review: entrepreneurial university ecosystems models

An entrepreneurial university provides a suitable environment for driving entrepreneurial initiatives contributing to economic and social perspectives. Studies have shown the regional impact of universities on new business creation and knowledge transfer (Etzkowitz and Klofsten, 2005) and the impact of the university's entrepreneurial activity on regional competitiveness (Guerrero et al., 2016). From an institutional perspective, the university itself is an ecosystem within another ecosystem (Feld and Hathaway, 2020).

The entrepreneurial ecosystem concept involves a dynamic and systemic nature, encompassing multiple actors, processes and institutions (Brown and Mason, 2017), a set of interrelated elements within a network, as Audretsch et al. (2019) state. Entrepreneurial ecosystems (EES) as the regional collection of actors (entrepreneurs, advisors, workers, mentors) and factors (cultural outlooks, policies, R&D systems, networks) that contribute to the creation and survival of high-growth ventures (Spigel et al., 2020). In an entrepreneurial ecosystem, actors and factors are mutually interdependent and co-evolved territory (Stam and Van de Ven, 2021).

The spatial unit of study mostly chosen has been the region under the entrepreneurial ecosystem approach. Nonetheless, there is no consensus upon the particular definition of this level, i.e., local, regional, or national (Liguori et al., 2018), or are not necessarily geographically defined (Isenberg, 2010). To characterise the different university entrepreneurial ecosystems, we follow the classification proposed by Huezo (2018), which mainly identifies four models, shown in Figure 1.

Figure 1 Entrepreneurial university ecosystems models (see online version for colours)



Source: Huezo (2018, p.86)

The 'model in conducive environments' corresponds with EES with a high level of development of technology transfer, where the generation of spin-offs is prevalent with the participation of both undergraduate and postdoctoral students (Boh et al., 2016). The university offers spin-offs an incubation period. Students and professors have the freedom to develop the technology and form their strategic plans, gradually reducing the market risk and the technology. In addition, they identify other programs and practices that improve entrepreneurial efforts to commercialise technologies in this type of university: Project-based technology commercialisation classes, mentoring programs, acceleration/incubation programs, business plan competitions, entrepreneurial education for students and teachers. In this model, the technology transfer offices (TTOs) evaluate projects, disseminate research and innovations, and register patents and licenses for commercialisation.

Within this model of EES, there are two different subcategories. The first of these, based on the development of their networks, systematic versus organic, depends on whether the institutions have systematically created a highly structured network for their entrepreneurial ecosystems. In contrast, other ecosystems develop more organically, related to culture: entrepreneurship and the robustness of the regional entrepreneurship ecosystem. The focus on internal connections versus external connections is the second category. Internally focused EESs cultivate their entrepreneurial resources within the university and make them available to university start-ups and spin-offs. There are also

the universities that focus on the external, seeking to take advantage of outside resources for entrepreneurship. Then, some institutions seem to focus internally and externally, creating connections between internal programs and people and collaborating with resources outside the university.

The 'emerging leading universities model' (ELG) focused on EES that find themselves in unfavourable and even adverse environments for entrepreneurship, typically characterised as cultures that do not support E&I, have geographic isolation, and/or lack venture capital. Nevertheless, a growing number of universities located within the most challenging environments are establishing strong profiles and good reputations in E&I. This emerging leaders group (ELG) offers ideas for the international academic community in two critical areas. Both areas are

a how to lead and manage a process of institutional transformation towards a more entrepreneurial model

b how university-based ecosystems can be nurtured in cultural, economic, and socio-political environments that may not be naturally conducive to E&I (Graham, 2014).

This group of model universities has adopted one of the two options identified by Graham (2014), closely linked to converting a traditional university towards a university with an E&I agenda. The 'bottom-up' adoption model, in which the community – students, alumni and entrepreneurs in the economic region – is the one who leads. The development of E&I is triggered by a desire to stimulate regional economic growth, job opportunities, research, and broader options that generate university support by creating a vibrant localised entrepreneurial ecosystem. Furthermore, the model 'from top to bottom', in which the university is the protagonist and is the one that directs through the established university structures, typically triggered by the desire to realise university research revenue, where the E&I agenda is driven by and to focus on a strong and ambitious TTO.

The 'model based on in entrepreneurial ecosystems', which Fetters et al. (2010) call 'university model based on entrepreneurial ecosystems' (U-BEE), presents a different orientation. A U-BEE is integrated and comprehensive, connecting teaching, research, and dissemination of research, extended throughout the community to foster entrepreneurial thinking and action (Fetters et al., 2010). Universities based on entrepreneurial ecosystems (U-BEE) are institutions that can be among a set of entrepreneurial ecosystems that, when all come together, can create a meta-entrepreneurial ecosystem that operates at a regional level and in some cases at a national level and overall. Thus, the emphasis is on the regional dimensions of entrepreneurial initiative, paying particular attention to the influence of regional attributes and exploring the interdependent relationships between the regional environment and entrepreneurial activities and their results (Sternberg, 2009). This U-BEE model is oriented towards two typologies of university ecosystems, called typology 'A' (opportunity-based business development), mainly oriented to the preparation before and after graduation of entrepreneurial students. Typology 'B' (transfer and commercialisation) refers to institutions with more significant concern in the transfer and commercialisation of entrepreneurship.

Model in apathetic or indifferent environments the EES model has also been developed in environments considered apathetic or even indifferent to entrepreneurship.

The model [Accelerating Collegiate Entrepreneurship (ACE), the University of Texas at San Antonio, UTSA] could be based on the scientific study of the variables that make up the entrepreneurial intention and the region's economic ecosystem in which it is implemented. Given the lack of resources, the application of the model will require the provision of tools, processes, and facilities to promote the growth of new technology-based ventures, products, and companies, which are the sources for job creation and the generation of wealth for the community.

According to the classification proposed by Huezo (2018), we consider that the Spanish University of Jaén (UJA) is framed as a U-BEE (Fetters et al., 2010). The typology suggested is 'B', mainly oriented to the preparation before and after graduation of entrepreneurial students, which refers to institutions with greater concern in the transfer and commercialisation of entrepreneurship. The university annually develops 'operational plans to support the transfer of knowledge, employability and entrepreneurship', with three main lines of action:

1 support for knowledge transfer activities

2 support for employability

3 support for university entrepreneurship.

The Uja has a TTO, two business incubators for co-working, pre-incubation and incubation and an entrepreneurship laboratory. The University of Jaén has fostered the creation of 26 knowledge-based companies, and 114 active patents, eight utility models, four registries of standard crops and plant varieties, eight trademarks, 14 computer programs, eight intellectual property registries and 19 files of transferred know-how. During 2020, it has promoted the sign of 165 service contracts with public and private companies and institutions.

The Autonomous University of San Luís Potosí (UASLP), in Mexico, presents characteristics in their university entrepreneurial ecosystem that are compatible with an U-BEE, typology 'B' (Fetters et al., 2010), despite their proximal regional environment is compatible with the apathetic or indifferent environments. The UASLP has an entrepreneurial development department and the business incubator and accelerator, whose mission is to train professionals with an informed and global vision of the world, entrepreneurs, ethical and competent in the knowledge society, under a model of social responsibility. In 2021, the UASLP established the entrepreneurship network and the first start-up programs that will promote and accompany students in establishing companies with the possibility of success. Last year, the entity trained 2,600 students and graduates in business idea workshops. Also, 800 companies received the business acceleration program. This network seeks to develop and consolidate the business incubation model by creating an ecosystem that allows students to generate innovative ideas for successful companies.

4 Theoretical foundations and hypothesis

We theorise the proposal using the theory of planned behaviour (TPB). The TPB construct is presented with attitude towards entrepreneurship (ATE), subjective norm (SN) and self-efficacy (SE). In an attempt to answer our research question, the above considerations can be formalised in the theoretical model used, and the description of the

hypotheses are shown in three figures. First, the entrepreneurial university ecosystem affects the entrepreneurial intention from a general perspective (this effect is depicted as the arrow labelled 'H1', Figure 2). The TPB model as a mediator between the entrepreneurial university ecosystem and the entrepreneurial intention (this effect is depicted as the TPB model labelled 'H2', Figure 3). The moderation effects of the public university in developed countries versus the public university in developing countries (this effect is depicted as the arrow labelled 'H3', Figure 4).

Figure 2 Entrepreneurial university ecosystem affecting entrepreneurial intention

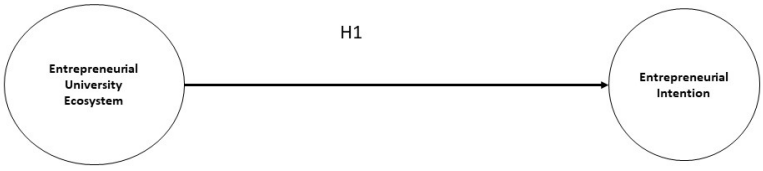


Figure 3 TPB as a mediator between entrepreneurial university ecosystem and entrepreneurial intention

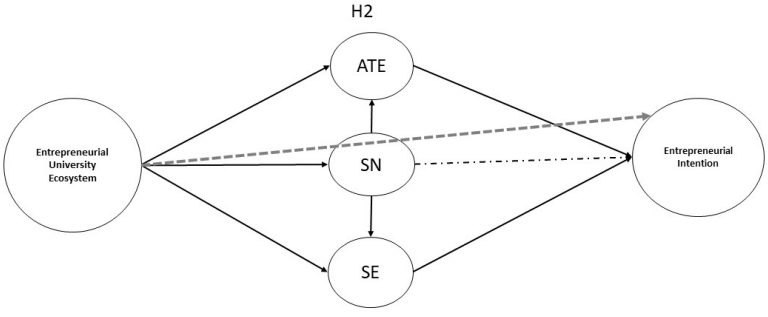
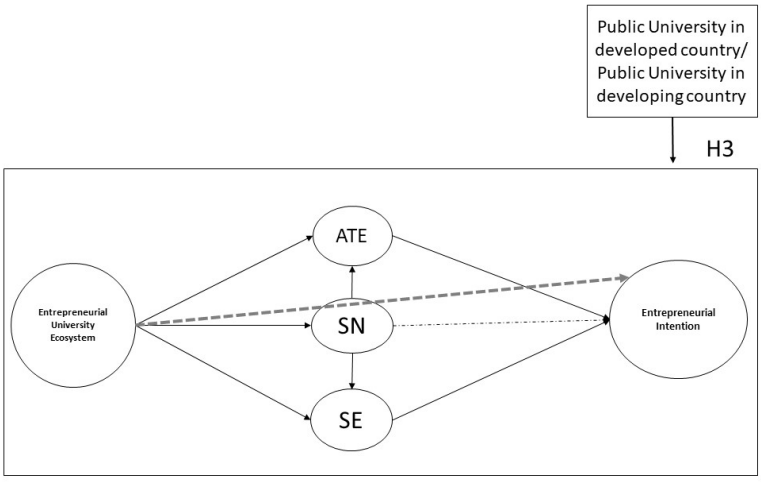


Figure 4 Public university in developed countries versus public university in developing countries as moderator of the entrepreneurial university ecosystem model



4.1 Entrepreneurial university ecosystems and the entrepreneurial intention drivers

According to Miller and Acs (2017), researchers, policymakers, and media members see job creation, economic growth and rising living standards as the result of two crucial institutions coming together, higher education and entrepreneurship. Thus, they proposed the entrepreneurial university campus with different frontiers connecting the campus ecosystems with student founders.

Da Rocha et al. (2021) confirmed the positive influence of perceived university support and entrepreneurial characteristics on entrepreneurial intention. Campos et al. (2021) find that the entrepreneurial university ecosystem has a positive influence on university student's EI, even though this effect is mostly perceived on the changing of student's entrepreneurial characteristics than on the direct promotion of EI, which is also influenced by the greater entrepreneurial ecosystem in which universities are embedded.

Bazan et al. (2019) find no direct influence of EES on students' EI, but a significant positive relation with students' perceived behavioural control and a positive but not significant influence on students' attitude towards the behaviour of starting a new business. Trivedi (2016) also finds no direct influence of EES on student's EI, and a university's EES positive relation with perceived behavioural control (PBC) but, in contrast with Bazan et al. (2019), not significant to ATE.

Then, we hypothesise that:

Hypothesis 1 (H1) Entrepreneurial university ecosystems affects positively the entrepreneurial intention of students in the public university positively.

Individuals may also be driven toward entrepreneurship because of behavioural characteristics, such as self-confidence, risk-taking ability and locus of control (Turker and Selcuk, 2009). Intention models based on TPB offer a sound theoretical framework that can specifically map out the nature of processes underlying intentional entrepreneurial behaviour (Krueger et al., 2000) and the relationship between individual thought and action (Mitchell et al., 2007).

TPB provides a more detailed analysis, a robust and coherent explanation of business intentions than other alternative models (Kautonen et al., 2013; Liñán et al., 2011; Van Gelderen et al., 2008). Moreover, in studies of EI, the TPB (Ajzen, 1991) has been successfully applied in a wide variety of fields (Harland et al., 1999; Karimi et al., 2014), incorporating entrepreneurial attitude (EA), SE and SNs as proximal predictors of EI.

There is also evidence in the literature that contextual and situational factors, e.g., the university's ESS, affect EI by influencing the precursors of intention such as ATB and PBC (Boyd and Vozikis, 1994; Krueger and Carsrud, 1993; Lee and Wong, 2004).

The daily exposure of students to the university context might shape their ATE, and the relationship between EI, and the scope of start-up activities will be positively moderated by the favourable university entrepreneurial environment (Shirokova et al., 2016). Pihie and Bagheri (2013) find out that university environments highly influence entrepreneurial regulation, SE, and EI in students. Zollo et al. (2017) research are consistent with a significant influence on the students' perceptions of the university's environment in their entrepreneurial ATE and EI.

Drnovsek et al. (2010) point out that, by understanding the nature of SE in entrepreneurship and the mechanisms through which it affects entrepreneurial intentions, the understanding of the effectiveness of the processes can be broadened. Moreover, SE is one of the strongest inducers of goal-oriented behaviour (Baum and Locke, 2004). Karimi et al. (2014) found that SE is the strongest predictor of EI among college students.

Although certain studies on entrepreneurship have shown the existence of a positive and direct relationship between SN and EI (Engle et al., 2010; Karimi et al., 2014; Kolvereid and Isaksen, 2006; Usaci, 2015; Fernández-Pérez et al., 2019), some authors have suggested that the SN may be the weakest of the three indicators in the conformation of the EI (Fini et al., 2012), in addition to being the cognitive factor that varies between different countries (Moriano et al., 2012). Other authors have found that SN have little or no effect in a specific context where individuals show higher levels of independence and individualism, and where emphasis is placed on the uniqueness of goals and achievements of individuals (Schlaegel and Koenig, 2014) and that SN loses its capacity to influence EI in the context of less economic development (García-Rodríguez et al., 2017).

The values transmitted by the perceptions of the reference persons improve the perceptions of SE (Fernández-Pérez et al., 2014; Matthews and Moser, 1995). Emotional or other support is often a key factor in the decision to move on or drop out (Liñán and Santos, 2007), especially among students, who in many cases depend emotionally and economically on their families. Ashraf and Merunka (2017) indicate that students continually redefine their group environment and adapt to the norms.

To test if the in entrepreneurial university ecosystems and the public university; the TPB is a relevant mediator, we hypothesise that:

Hypothesis 2 (H2) Entrepreneurial university ecosystems requires the TPB as a mediator to boost students' entrepreneurial intention.

4.2 The entrepreneurial ecosystem in the university in developed and developing countries

It could be expected that a robust entrepreneurial ecosystem can positively stimulate entrepreneurial activity and, therefore, may influence the development of any entrepreneurial university ecosystem. Academic research has mainly addressed studies on large urban centres located in developed countries (Roundy, 2017; Spigel, 2017), but as Brown and Mason (2017), entrepreneurial activity is a socioeconomic phenomenon embedded in local contexts, whereas heterogeneous regions tend to present different propensities toward the emergence of new ventures.

Guerrero et al. (2020) findings show why diversity in entrepreneurship and context is significant, showing a different set of favourable/unfavourable conditions on potential entrepreneurs in developed/developing regions/countries. Favourable conditions include professional support programs, networking events with diverse entrepreneurial actors, resources and capabilities to configure a favourable environment for academics to commercialise their research, R&D investments, the existence of incubators/accelerators, and entrepreneurial education in a context of developed regions/countries. Negative effects include a lack of funding sources, labour market conditions and social norms. In developing contexts, collaborative platforms to facilitate social entrepreneurship initiatives are viewed as a favourable condition. In contrast, unfavourable conditions

relate to public policies oriented to legal and tax regulations, the existence of market barriers does not support the entry of owner demographic groups, the prevalence of socio-cultural norms that reduce the participation of owner demographic groups, non-favourable perceptions/reputation of entrepreneurs in society, and inefficient entrepreneurial education programs in higher education.

Potential heterogeneities in terms of ecosystems' characteristics and maturity stages are needed to explain differences in the relationship between EES and EI. However, most initiatives promoting student entrepreneurship in developing countries try to emulate frameworks applied in developed markets without explicitly considering potential heterogeneities (Da Rocha, 2021). Fischer et al. (2019) study on academic entrepreneurship reveals the difficulty in adapting strategies that proved successful in specific universities from the context of a developed country, highlighting of the environment contextual influences on EI configuration.

García-Rodríguez et al. (2017) analysed the university's environment's role in the EI of young people in a peripheral and less innovative region in Spain. Results of their study show that the university's environment directly influences ATE, SE and motivation, and indirectly and moderately influences the EI of students.

Soria-Barreto et al. (2017) identified that the university environment in Chile and Colombia affects entrepreneurial intention through ATE, in addition, the family background turned out to be one of the most influential socio-demographic variables influencing their intention and with no gender differences. Soomro et al. (2020) worked with business graduate students from public and private Pakistan universities, founding a mediating connection between EI and entrepreneurial education towards students' attitudes.

Recent studies have positively linked the development of student entrepreneurial intention and entrepreneurial behaviour to U-BEEs and entrepreneurship education ecosystems (Morris et al., 2017). Therefore, to test if the in Entrepreneurial University Ecosystems and the public university; the TPB is a relevant mediator and the kind of country which will lead to getting insights in understanding the entrepreneurial contexts for public universities, we hypothesise that:

Hypothesis 3 (H3) The entrepreneurial university ecosystem better affects students' entrepreneurial intention in public universities in developed countries than in developing countries.

5 Research design and data

Due to the nature of the research problem, the approach used is quantitative, and according to the hypothesis, the design is cross-sectional, descriptive-causal, and based on the survey method. The sample type has a non-random design with 436 students from two universities, one located in Spain and another one in Mexico. Sample size corresponds to a 95% confidence level and a 5% margin of error.

5.1 Instrument and measurements

The instrument for collecting data was a questionnaire; the scales utilised for the TPB questionnaire were based on Mueller (2011), then adopted and proved in the work of

Huezo-Ponce et al. (2021). The scales of the entrepreneur support system (Bazan et al., 2019) was adapted for the university entrepreneurial ecosystem. The responses options were graded on Likert scales.

The data was collected during the pandemic of COVID-19 from February to April 2021. The application of the questionary was self-administered, and the invitation to participate was distributed through a link using the Qualtrics platform.

5.2 Techniques in the analysis of data

The analysis techniques used for descriptive statistics and multivariate analysis followed the process suggested by Orozco-Gómez (2016). We used the SPSS v22 program for descriptive analysis, and for an initial look at differences, we compared percentages and means. For the hypothesis test, a structural equation model (SEM) was made, testing in the first instance the relationship between variables and the confirmatory factorial analysis with the measurement model. For testing hypotheses, we use structured equation modelling with AMOS software 24.

6 Results

This section describes the sample characteristics, validity and consistency indicators, estimation of measurement and structural models, and a multi-group analysis between Spanish and Mexican students.

6.1 Background of the students

The demographics and characteristics of the sample are described in Table 1. We can observe that these are very similar in both groups, except for the difference in the percentage of father entrepreneurs, which is larger for the Spanish university (26% in contrast with 13% for the Mexican university).

Table 1 Frequencies and means of the sample

		Europe	*Latin America*
		Spain	*Mexico*
Sample size	N students	220	216
Age	Mean years	20.8	21
Gender	Female | Male	68% | 32%	62% | 38%
Education	Mean years	15	14
Education of the father	Mean years	10	12
Education of the mother	Mean years	11	12
Occupation of father entrepreneur	Percent	26%	13%
Occupation of mother entrepreneur	Percent	8%	8%

The estimation of the measurement model confirms the construct validity, and from this, the reliability, discriminant, and convergent validity can be evaluated. The model did not fit well when performing the chi-square test, X^2 (N = 436, df = 220) = 598.819,

$p < 0.000$. Nonetheless, the criteria of several authors are considered (Murnieks et al., 2014; Schlaegel and Koenig, 2014; Schumacker and Lomax, 2004), complementing the analysis of the model with other indicators such as the root mean square error of approximation (RMSEA), with a value of 0.063, indices of incremental goodness of fit – CFI, TLI, NFI all above 0.90, the statistical significance of the paths estimates and the magnitude and direction of these parameters. Based on these criteria, the model is adequate.

Table 2 shows the standardised coefficients. All of them are significant and above 0.7. The R^2 of each item is higher than the recommended value of 0.05, which indicates that the observed variables are significantly represented by their respective latent variables. Some items were eliminated from the model due to low loads on the factor.

We can observe that Cronbach's reliability alpha and composite reliability indicators are acceptable. Then, the average variance extracted (AVE) confirms the convergent validity of the constructs with a value greater than 0.5 (Fornell and Larcker, 1981).

Table 2 Measurement model

	Item	*t value*	*Standardised coefficient (β)*	R^2	*Cronbach alpha*	*Composite reliability*	*AVE*
Attitude	IE01_IE18_12	*	0.905	0.819	0.925	0.924	0.803
	IE01_IE18_11	26.877	0.874	0.764			
	IE01_IE18_10	29.22	0.908	0.824			
Subjective norm	IE01_IE18_2	43,742.417	0.936	0.877	0.916	0.917	0.846
	IE01_IE18_1	*	0.903	0.815			
Self-efficacy	SE01_SE05_5	*	0.848	0.718	0.934	0.935	0.742
	SE01_SE05_4	42.592	0.871	0.759			
	SE01_SE05_3	44.262	0.885	0.783			
	SE01_SE05_2	41.066	0.883	0.779			
	SE01_SE05_1	40.151	0.820	0.672			
Ecosystem	ESS14_14	*	0.814	0.662	0.950	0.950	0.656
	ESS14_12	17.843	0.749	0.561			
	ESS14_10	18.241	0.761	0.579			
	ESS14_8	18.834	0.779	0.607			
	ESS14_7	21.485	0.852	0.726			
	ESS14_6	21.738	0.859	0.738			
	ESS14_5	22.926	0.889	0.790			
	ESS14_4	20.630	0.830	0.688			
	ESS14_3	18.952	0.782	0.612			
	ESS14_1	36.412	0.773	0.661			
Entrepreneurial intention	IE01_IE18_6	*	0.888	0.788	0.883	0.891	0.733
	IE01_IE18_7	318.698	0.733	0.537			
	IE01_IE18_8	528.685	0.935	0.874			

Notes: *values were not calculated because the weight was set at 1.00 to fix the construct's variance.

In Table 3 we can observe that discriminant validity was evaluated using the criterion that considers that the AVE value must be greater than the square of the correlations between the factors, as mentioned by the authors Fornell and Larcker (1981).

Table 3 Discriminant validity

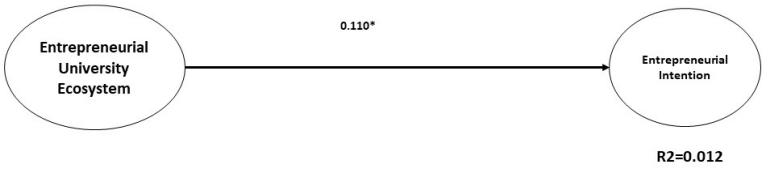
	Attitude	*Subjective norm*	*Self-efficacy*	*Entrepreneurial intention*	*Ecosystem*
Attitude	*0.803*				
Subjective norm	0.497	*0.846*			
Self-efficacy	0.338	0.277	*0.742*		
Entrepreneurial intention	0.702	0.407	0.394	*0.733*	
Ecosystem	0.030	0.040	0.048	0.015	*0.656*

Note: AVE in italic and square of the correlations below the diagonal.

6.2 Entrepreneurial university ecosystem and the public university

Analysis for Hypothesis 1 that states entrepreneurial university ecosystems positively affect the entrepreneurial intention of students in the public university is supported. The standardised regression weight is 0.110. The model explains 1.2% of the variance of entrepreneurial intention (R^2 = 0.012). The influence of entrepreneurial university ecosystems over entrepreneurial intention can be considered low. Thus Hypothesis 1 is supported.

Figure 5 Estimation of results of the influence of entrepreneurial university ecosystems over entrepreneurial intention (N = 436)



Notes: †p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001.
Hypothesis 1: supported.

6.3 Results in TPB as a mediator between entrepreneurial university ecosystems and the entrepreneurial intention

The estimates for structural model are illustrated in Table 4. There are three paths that are not statistical significant. Influence from entrepreneurial university ecosystem to attitude (1), the direct relationship from ecosystem to entrepreneurial intention (2), and the relationship from SN to entrepreneurial intention. The model explains 72.3% of the variance of entrepreneurial intention (R^2 = 0.723). Additionally, the goodness of fit analysis is evaluated with indicators such as the RMSEA, which had an acceptable level of 0.066 (Hair et al., 1999; Schumacker and Lomax, 2004). Finally, the model's incremental goodness of fit indices – NFI, RFI, IFI, TLI and CFI are also considered acceptable, all of which are above 0.9 – in a range between 0.919 and 0.953.

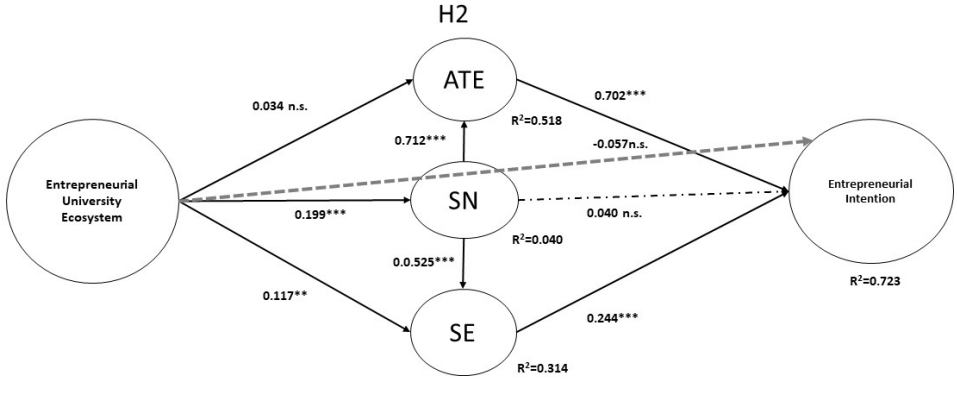
Table 4 Estimates for structural model

			Standardised regression weights	*P*
Subjective norm	←	Ecosystem	0.199	***
Attitude	←	Ecosystem	0.034	0.390^{ns}
Self-efficacy	←	Ecosystem	0.117	0.009**
Attitude	←	Subjective norm	0.712	***
Self-efficacy	←	Subjective norm	0.525	***
Entrepreneurial intention	←	Ecosystem	–0.057	0.078^{ns}
Entrepreneurial intention	←	Attitude	0.702	***
Entrepreneurial intention	←	Self-efficacy	0.244	***
Entrepreneurial intention	←	Subjective norm	0.040	0.478^{ns}

Notes: ^{ns}p > 0.06; *p < 0.05; **p < 0.01; ***p < 0.001.

In Figure 6 is presented the summary of the paths, its significance and R^2. This structural model allows evaluating the Hypothesis 2. This hypothesis is supported. We argue that based on the R^2 of entrepreneurial intention, in this model that considers TPB as a mediator (0.723), we can confirm that entrepreneurial university ecosystem requires the TPB as a mediator to boost students' entrepreneurial intention. Although not every postulated relationship is statistically significant is clear that entrepreneurial university ecosystem can affect entrepreneurial intention by influencing SN, SE, and then these variables, along with ATE, are capable of impacting the entrepreneurial intention of the students.

Figure 6 Estimation of results of the theoretical model (N = 436)



Notes: *p < 0.05; **p < 0.01; ***p < 0.001.
Hypothesis 2: supported.

6.4 Estimation of the intention model and entrepreneurial university ecosystem among university students: a multi-group analysis between public university in developed country and public university in developing country

An invariance test was performed to compare Spanish and Mexican universities, analysing the differences in the chi-square. With this test, an evaluation was made at two levels: model and path or local level. The unrestricted and restricted models were compared as proposed by Byrne (2010). The results of the chi-square difference test revealed that the model was not invariant for the two groups. However, the p-value of the chi-square difference test is not significant (see Table 5), so we can say that the model is not different between the country groups.

Table 5 Global invariance test for private and public universities

	X^2		*DF*
Unconstrained	943.373		442
Constrained	943.373		442
Difference	0.000		0
P-value		1.000	

Likewise, when observing the local test at the level of the paths (Table 6), it is confirmed that there is no difference at this level either. Thus Hypothesis 3 is not supported. There are no significant differences between both universities.

Table 6 Multi-group analysis between Spanish and Mexican universities

Path name	*Public university Spain*	*Public university Mexico*	*Difference in betas*	*P-value for difference*	*Interpretation*
Ecosystem → SN	0.193**	0.185*	0.008	1.000	There is no difference
Ecosystem → attitude	0.050	0.637***	0.014	1.000	There is no difference
Ecosystem → SE	0.154*	0.478***	0.029	1.000	There is no difference
SN → attitude	0.673***	0.035	0.180	1.000	There is no difference
SN → SE	0.479***	0.292***	0.186	1.000	There is no difference.
Ecosystem → IE	–0.014	–0.071	0.057	1.000	There is no difference
Attitude → IE	0.554***	0.718***	–0.163	1.000	There is no difference
SE → IE	0.219***	0.241***	–0.022	1.000	There is no difference
SN → IE	0.112	0.022	0.090	1.00	There is no difference

Notes: *p < 0.05; **p < 0.01; ***p < 0.001.

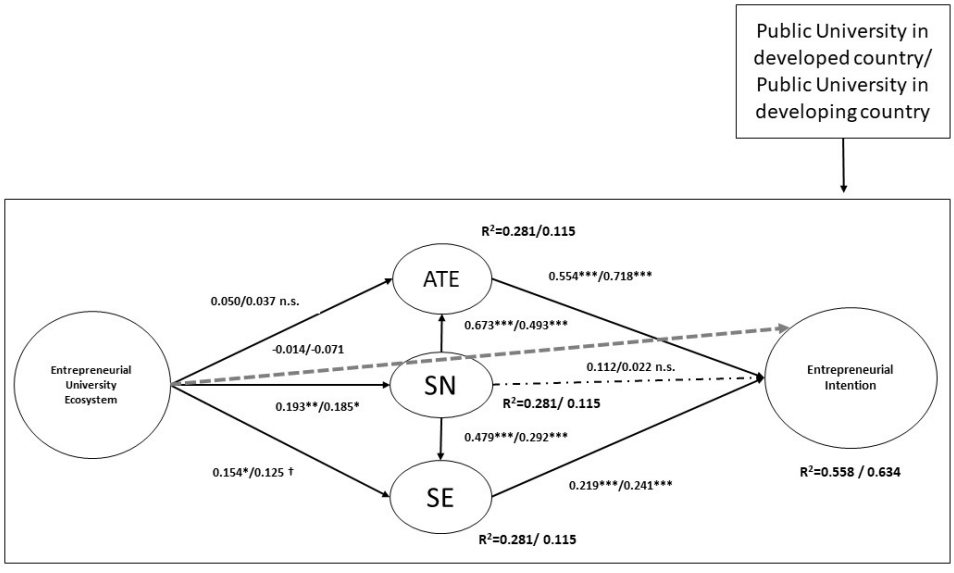
The visual model is expressed in Figure 7; we can observe no significant differences in the coefficients and R^2.

7 Conclusions, relevance, future research and limitations

Public universities have specific characteristics that allow them to prepare a critical percentage of the population of any country. So, preparation in public universities is

expected to be universal for any young person. On the one hand, it is recognised that universities in developed countries must have a more structured educational system that provides high-quality education to any student. On the other hand, unlike what is expected in developing countries, such as those in Latin America, where the quality of university educational systems is still under construction (Huezo-Ponce and Saiz-Álvarez, 2020). So, considering these differences, universities from different countries contrasting in the level of development, different results were expected from the entrepreneurial university ecosystem on the effect through TPB on EI. However, although the results obtained show no difference, this finding may contribute to advances in the knowledge of the U-BEE spectra and support understanding this kind of U-BEE better because it is still being sought (Hsieh and Kelley, 2020).

Figure 7 Universities multi-group – public univ. developed country/public univ. developing country (N = 220/216)



Notes: *p < 0.05; **p < 0.01; ***p < 0.001.

Advance in the TPB theoretical model is still present and confirms the force of the model as a mediator between the entrepreneurial university ecosystem and the EI. The EEs are significant with respect the EI. But, it only happens when the TPB is present. That means a cognitive effect through the EES towards the students' entrepreneurial intentions. It demonstrates an awareness rising for the entrepreneurial university ecosystems and how this variable could be manipulated (Russo and Schoemaker, 1992; Alonso-Galicia et al., 2015) to the purpose expected in universities.

As a practical suggestion in the context of developed countries, and even in developing countries if they want to improve their EEs, is to follow the key criteria of U-BEE of Hsieh and Kelley (2020) in their key pillars: policy, culture, human capital, finance, support and market.

In this research, as we see, EEs through the TPB improve the EI of university students. Thus working in this context will bring better opportunities for those who are

immersed in universities prepared to bring entrepreneurs and innovation to their countries.

7.1 Relevance for practice and policy

Suppose governments want to return to pre-pandemic stability, recover from the pandemic, or recover from a war. Economic growth is a driver of investment in education and human capital (Akwei et al., 2022). According to Guerrero et al. (2016), the role of universities is fundamental in their contribution to the growth of their nations. So, universities, through the capital they handle (human, knowledge and business) are critical institutions for the development and growth of countries. In that case, policymakers should write policies to support universities, especially public universities, to provide all the necessary facilities to strengthen their EEs and, moreover, to actively orchestrate (Thomas et al., 2020) the development processes by taking on leadership positions in the region and becoming promoters of collective actions and projects in the EEs network. Policies that support this type of context in universities will bring new job creation opportunities with companies that could develop these graduates. At the same time, working with this type of context in universities will bring an innovation ecosystem to the countries. Obviously, there is a previous need to identify the actors in their local-regional influence area of the university entrepreneurial ecosystem.

For example, universities in Europe require rapid action to provide opportunities for young people to develop new ventures. A crisis scenario can have a significant positive or a negative impact on the likelihood of launching new ventures when students perceive the crisis as a threat and an opportunity and only perceived educational support has a significant and positive effect on their entrepreneurial intention (Krichen and Chaabouni, 2022).

Promoting the effectiveness of entrepreneurial public policies will also require reinforcing the connection of teachers involved in entrepreneurship training with the local entrepreneurial ecosystem or providing work experience as entrepreneurs. The study carried out by Stephens (2020) reveals that, although the academics involved in entrepreneurship education indicated close connections to their local entrepreneurial ecosystem, only a low percentage of them reported using work experience.

To conclude, we reflect on the need for realistic entrepreneurial strategy implementation that considers the differences in the initial starting conditions of the potential entrepreneurs. Mainly, we are facing a population of university students with a more diverse age group, both in its socio-demographic characteristics and in their social origin.

7.2 Future research and limitations

To conclude this exploratory analysis, the main future lines and limitations are focused on more profound studies related to the study of entrepreneurial university ecosystems. A broader sample of universities should be considered. It is even required to study family backgrounds, culture, and gender in these studies. As a limitation, the study collected data in only one university in a developed country, and this university is in the countryside. Then, it will be interesting to work with another university in another environment to see if this similarity is still happening. The collecting of data also

happened during a pandemic situation, then the development of the universities are not similar as pre-pandemic times.

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