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A multilevel approach to understanding the relationship between entrepreneurship and the urban environment: empirical evidence from Colombia

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ABSTRACT

This document explores the relationship between the structure of cities and entrepreneurial intention EI, supporting empirical evidence of the incidence of exogenous regional factors on business activities. From a sample of Master Business Administration (MBA) students in fourteen cities in Colombia, EI is studied in an urban setting using a two-level binary logistic regression with random intercepts. The purpose of this document is to show empirical evidence for Colombia of the influence of the urban structure on entrepreneurial intention EI, disaggregating hard and soft factors and controlling the initial endowments of a sample of MBA students. At the individual level, EI is driven by gender, age and the presence of family entrepreneurs. In relation to the educational level of the fathers, the EI of the students is not being influenced by the academic training of the mothers. In the same way, our results suggest that the approximate urban structure of cities through hard and soft amenities stimulates EI in MBA students. Our results suppose systematic evidence in order to adapt the business ecosystem to the form and urban conditions of the main cities in Colombia.

Keywords: entrepreneurship; amenities; hard factors; soft factors; Colombia.
JEL classification: L26, O18, J24.
MSC2010: 62J02, 97K80, 03H10.

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Un enfoque multinivel para comprender la relación entre la intención empresarial y el entorno urbano: evidencia empírica para Colombia

RESUMEN

Este documento explora la relación entre la estructura de las ciudades y la intención empresarial IE soportando evidencia empírica de la incidencia de factores exógenos regionales en la actividad empresarial. De esta forma, a partir de una muestra de estudiantes de Maestría en Administración (MBA) en catorce ciudades de Colombia, se estudia la IE en un escenario urbano usando una regresión logística binaria de dos niveles con intercepto aleatorio. El propósito de este documento es mostrar evidencia empírica para Colombia de la influencia de la estructura urbana en la IE, desagregando factores duros y blandos y controlando las dotaciones iniciales de una muestra de estudiantes de MBA. A nivel individual, la IE está impulsada por el género, la edad y la presencia de empresarios familiares. En relación con el nivel educativo de los padres, la IE de los estudiantes no está siendo influenciada por la formación académica de las madres. De la misma manera, nuestros resultados sugieren que la estructura urbana de las ciudades aproximada a través de amenidades duras y blandas estimula la IE en los estudiantes de MBA. Nuestros resultados suponen evidencia sistemática para adecuar el ecosistema empresarial a las condiciones urbanas de las principales ciudades de Colombia.

Palabras clave: intención empresarial; amenidades; factores duros; factores blandos; Colombia.
Clasificación JEL: L26, O18, J24.
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1. Introduction

Recent studies on entrepreneurship suggest evidence regarding the heterogeneity of the phenomenon in the territory (Bosma & Sternberg, 2014; Roundy, 2017; Reissov´a et al., 2020) and therefore, this evidence exposes the importance of the characteristics of the regional economy in which the individual lives and performs their work and academic activities (Bosma & Sternberg, 2014). In this sense, the related literature has documented various incidence factors, which range from physical factors to the role of the attractiveness of urban places and other amenities that cities present (Storper & Scott, 2009; Audretsch & Belitski, 2017). In fact, according to Acset al. (2013), the ability to transform knowledge into economic knowledge implies not only a set of initial endowments of the individual, but also a local proximity to the source of knowledge. In this document, the knowledge variable is treated in a broader sense, proposed by Acs et al. (2010). In this way, the concept refers to the availability of information and business opportunities.

In general terms, the understanding of the contextual factors that affect entrepreneurial intention (IE) has prompted extensive cross-national research (Liñán & Chen, 2009; Munir et al. 2019), which has revealed empirical evidence about the differences in EI between developing and developed countries (Baluku et al., 2019). The results show consensus on higher EI in higher income countries. According to Aparicio et al. (2016) and Martínez-Fierro et al. (2016) the best performance in this group of countries could be explained by the quality of their institutions, the best infrastructure for entrepreneurship and the best financing mechanisms. In the same context, El Harbi and Anderson (2010) attribute the differences in the two groups of countries to the difficulties in finding salaried jobs in developing countries.

In line with the above, according to Audretsch and Belitski (2017), physical elements such as infrastructure and services (green spaces, theaters, museums, cinemas, cafeterias and art galleries) promote or limit the interaction between the agents of the entrepreneurial ecosystem. In fact, Audretsch et al. (2015) conclude that these elements promote the recognition of opportunities by the individual. In this context, in a seminal work in the area, Van de Ven (1993) states that entrepreneurs by themselves are not capable of controlling all the resources, institutions and commercial functions that are required for the development of a business idea. In relation, recent systematic evidence explains business decisions in a broader context that allows the consideration of spatial, social, economic and organizational dimensions (Zahra, 2007; Zahra et al., 2014; Woolley, 2017).

In consideration, in this study the key idea is that entrepreneurship should be studied in a local context, where entrepreneurship emerges. Thus, we propose to analyze the entrepreneurial intention (EI) in Master Business Administration (MBA) students in Colombia as a notion embedded in an urban-regional framework. Thus, we estimate the probability of EI in a student given their initial endowments and the effects of the city's structure, including soft and hard factors. Considering the foregoing idea, this document contributes to the literature in question from different points of view. First, the study provides empirical evidence in relation to the regional heterogeneity of EI in the case of Colombia, a developing country. Second, the regional approach is incorporated through the physical infrastructure and amenities of the places, supporting systematic evidence on the capacity of cities to develop a geographic community on the approach of new business ideas.

To this end, the empirical strategy is based on a multilevel econometric approach. Thus, this article uses data at the individual level of MBA students distributed in 14 Colombian cities. These data are combined with aggregated information at the city level on the amenities and physical infrastructure of the municipalities. In this way, the approach of the hierarchical model allows to establish the degree to which the EI of the individual is involved in regional characteristics.

According to our results, at the individual level, EI is driven by gender, age and the presence of family entrepreneurs. In relation to the educational level of the fathers, the EI of the students is not being influenced by the academic training of the mothers. In the same way, our results suggest that the approximate urban structure of cities through hard and soft amenities stimulates EI in students.

2. Theoretical background

Intentions are assumed as an aspect with the ability to predict human behavior reliably in multiple everyday situations, so that they can capture the motivational factors that influence the behavior of individuals (Summers, 2000). In this way, the field of intentions deals exclusively with the self-instruction of people to behave in a certain way (Landis et al., 1978). However, it is possible to extend its focus to the sum of all the conscious motivational attributions of human beings to perform deliberate actions (Triandis, 1977; Nuseir et al, 2020). In this sense, according to what Ajzen and Fishbein (2005) expressed, individual intentions arise from broad objectives that can be achieved through multiple and sustained behaviors, although their results are not entirely controllable since they may also require support from other individuals and external resources. In this way, as stated by Summers (2000), EI training is fundamental at making the decision to create a business, consequently, intention-based models have a meaningful potential to explain the entrepreneurial process early, even before the company arises.

The term EI has been used imprecisely to include a number of related but different concepts, such as career guidance, career aspirations, emerging entrepreneurs, self-employment perspective and the wish to have one's own business, among others (Thompson, 2009; Nuseir et al., 2020). In this sense, Thompson (2009) assumes specifically that EI forms a conviction recognized in an autonomous way by those who have the sensible purpose of founding a company and plan to do so in the future, that is, that EI refers to a prior stage to the creation of the company. In a complementary way, Bird (1988) points out that EI has attracted more and more attention as a key factor in predicting the behaviors of new business creation. In this sense, he defines EI as a state of mind that directs the attention, experience and individual actions of people towards the creation of a new company, as a specific way of voluntary and conscious behavior. This paper assumes that EI corresponds to an individual's plans to become an entrepreneur in the future.

In the study of the EI, the use of the Theory of Planned Behavior of Ajzen (1991) stands out. However, there are other theories that have begun to be used in his study, some of them highlight such as Schneider's Attraction-Selection-Attrition (Hsu et al., 2017), Cognitive Adaptability (Botha & Bignotti, 2017), the Cognitive Social Career (Dehghanpour, 2015), the Action Phase (Van Gelderen et al., 2017), Social Identity (Sieger et al., 2016), Motivation, Opportunity and Capacity (García et al, 2017), Behavioral Reasoning (Miralles et al., 2017) and Social Role (Tsai et al., 2016), among others.

Moreover, when trying to define what a city is, there is an apparently endless list of physical characteristics, human experiences, and urban images, however there are three aspects that can be definitive in this concept: a) how the essential elements of the city are produced, b) how they interact with each other or how they separate, and c) what are the consequences of these interactions or separations (Pile, 1999). Meanwhile UN-Habitat (2020) assumes that the city has become a positive and powerful force to promote sustainable economic growth, development and prosperity. Cities also encourage innovation, consumption and investment in developed and developing countries, and are spaces through which most of the challenges of this century can be addressed, such as poverty, inequality, unemployment, environmental degradation and climate change, among others, although the objectives set are not always achieved.

For most of the twentieth century, the structure of urban society was organized around the link between home and workplace. However, recent changes in information technologies altered the relationship between these two aspects. The growing increase in home work and the ability to use complex technologies without having to regularly go to a specific location, are factors that altered this relationship, at least for a segment of the population (Clark, 2015), without mentioning the most obvious effects that the COVID-19 pandemic had on the work-home relationship.

In this way, many activities benefit from being socially rooted in a specific place, in which the important relationships that have been formed over time support the competitiveness of companies and economic sectors. The spatial scale of these "places" can be quite vague in these types of situations, but

it is usually equated to the city or region. Even a micro-geographic site like the neighborhood can be defined as a small number of surrounding households or as a segment of a city. In this sense, there is still some confusion because the measures of neighborhood are highly correlated with those of other scales (Bailey, 2015).

Drawing on the pioneering work of Marshall (2009) on urban agglomerations as a mechanism for the accumulation of skilled labor and the contributions of Florida (2005) in relation to the link between the creative class and the city structure, the studyof the causality of urban factors on EI has emerged as a prominentfield of research.Meanwhile, in line with Stam (2015), the formation of EI is influenced by the development of the individual's own capacities and by regional objective factors. Thus, business behavior is motivated by the environment, institutions, market opportunities and resources that limit the preferences and capabilities of individuals. In this way, cities become places of convergence of economic agents that promote agglomeration (Ghani et al., 2014; Cabrera, 2019).

Thus, Zheng (2016) finds that young people with different educational levels prefer cities with more inhabitants, lower population density, more educated residents, racial diversity, lower income inequality and warmer Winter. In this sense, there is a regional dimension that complements the study of entrepreneurship, in such a way that the EI is conditioned by the demographic, economic, labor market characteristics of the region and by the levels of its business activity (Kibler et al., 2014), while entrepreneurial action also depends on the local context in which it is necessary to recognize the different histories, cultures, rules of each area and the different subjective meanings that entrepreneurs attribute to it.

Furthermore, recent considerations have discussed the role played by the regional environment on business activity (Capelleras et al., 2018; Audretsch et al., 2019; Del Monte et al., 2020). In fact, according to Audretsch and Keilbach (2008), the ability of regions to reapthe benefits of entrepreneurship depends largely on their ability to convert knowledge into innovation through its diffusion. In a complementary way, Huggins and Thompson (2015) consider that network capital (investments in strategic relationships to access knowledge) mediates the relationship between entrepreneurship and regional growth based on innovation, although peripheral regions are characterized by low innovative dynamism (García et al., 2017). Thus, a localized institutional approach can be an appropriate way to have higher knowledge about the factors that determine business behavior in a specific context, to the point of assuming that entrepreneurship is a process that depends on the geographical place where it originates (Lang et al., 2013). On the other hand, the regional social legitimacy of entrepreneurship can be understood as the convergence of regional beliefs that entrepreneurial activity is desirable, adequate or appropriate, and that it influences the degree to which a region provides a favorable environment to the rise of entrepreneurial behaviors (Kibler et al., 2014), since social interactions constitute a mechanism by which local entrepreneurship persists over time (Andersson & Larsson, 2014).

In relation, empirical works on regional or contextual causes have gained importance in explaining changes in business decisions (Bosma & Sternberg, 2014). In this sense, Cabrera (2019) argues that the permanent adaptation of the built urban landscape, urbanredesign, the complexities of real estate speculation and the search for new spaces for innovation constitute the modern challenges of the synergies between EI and city structure. In this way, Audretsch et al. (2019) suggest that the factors that influence business initiatives are disaggregated into exogenous factors (climatic conditions, geographical proximity to rivers and coasts) and endogenous (transport infrastructure, quality of housing and conditions of security).

In explaining the hard factors, Capelleras et al. (2018) treat population density as a key regional element. This in so far as it determines the structure of opportunities to be perceived from the point of view of demand and, on the other hand, determinethe attitudes of individuals towards entrepreneurship. In addition, the increase in the urban population is accompanied by a significant growth in consumption and production patterns (Kummitha, 2019), while the formation of new companies in urban regions

tends to be negatively influenced by the change in populationdensity, while the impact in rural regions remains positive (Delfmann et al., 2014).

Meanwhile, although a specific transmission mechanism between business dynamicsand population density is not perceived, in line with Adedeji et al. (2020), the concentration of people is a natural control on EI given that it determines the markets of consumption and the general availability of workers; likewise, population density has also been linked to stronger knowledge flows. In a complementary way, Ikeda (2012) argues that those city structures that reduce the average distance between economic agents increase the flows of relevant knowledge from the business point of view.

However, according to Delfmann et al. (2014), more than population density, age structures are the aspects that determines business initiatives considering the life cycles that enhance their development (Aristizábal et al., 2020). In acomplementary sense, Roundy (2017) highlights the prevalence of small cities globally and the growing recognition that entrepreneurship in these cities is a key determinant of their economic development. In this research we approximate the population density through the number of supermarkets per km^2 and the number of passengers mobilized in public transport.

On the one hand, the replacement of traditional supermarkets by modern supermarkets has become a popular urban development strategy in many cities in countries such as China (Chen & Liu, 2018). On the other hand, the approximation to population density through the number of passengers mobilized in public transport is consistent with the stylized facts that link the role of transport infrastructure in business decisions. Thus, the best transport infrastructure, in addition to reducing connectivity barriers, improving communication flows and information exchange, enhances the development of business activities. Along these lines, Ma et al. (2021) argue that the best transport infrastructure in addition to facilitating face-to- face interactions makes it possible for people to work and live in different cities. In application to the Colombian case, the previous mention is relevant given the proliferation of commuter cities. However, Audretsch et al. (2015) conclude that in terms of information flow, improvements in connectivity to an internet network are more relevant. From a broader approach, Ajide (2020), finds that infrastructures play an important role in improving business development. Specifically, it shows that transport, electricity, water and sanitation, information and communications technology ICT and broadband have a positive and significant effect on business creation.

On the other hand, recent literature has dealt with soft assets or amenities to explain the variations in business activity in a city. This group includes social and environmental factors and, in general, all the attractions that make up cities (Huggins & Thompson, 2015; Audretsch & Belitski, 2017), including cultural aspects such as art galleries, museums, operas and other heritage assets (Bauer et al., 2015).In relation to the attractiveness of cities includes a better public space capable of stimulating the consumption trends of the middle class and encouraging tourism. In fact, for the Colombian case, the "Colombia is passion" campaign was created in 2005, the purpose of which was to promote intangibles such as the sense of belonging in order to attract tourists and investors.

In the group of soft factors, the impact of culture on urban economies has been recently documented (Florida et al., 2016; Greffe, 2016; Qian & Liu, 2018). Thus, in a more general framework, the institutional environment masks persistent patterns such as legal aspects or social norms and values that affect the EI or characteristics of the institutional profile of each country (Dehghanpour, 2015). In a complementary way, the business culture of a village has an evolutionary origin and changes over time as the local "collective result" of individual decisions (Andersson & Larsson, 2014).

In this sense, the concentration of cultural goods and services channels a critical mass that facilitates the growth of creative economies and, therefore, EI (Patterson & Silver,2015). Along these lines, Del Monte et al. (2020) argue that creative people are attracted, among other elements, by cultural amenities. For this reason, inthis document we control the cultural elements associated with EI througha metric of goods of cultural interest, even more so when the cultural economy, which analyzes the

production, distribution and reception of symbolic content, is dominated by the welfare economy (Greffe, 2016) and also entrepreneurs constitute a crucial linkbetween creative activities, change and economic development (Heebels & Van Aalst, 2010)

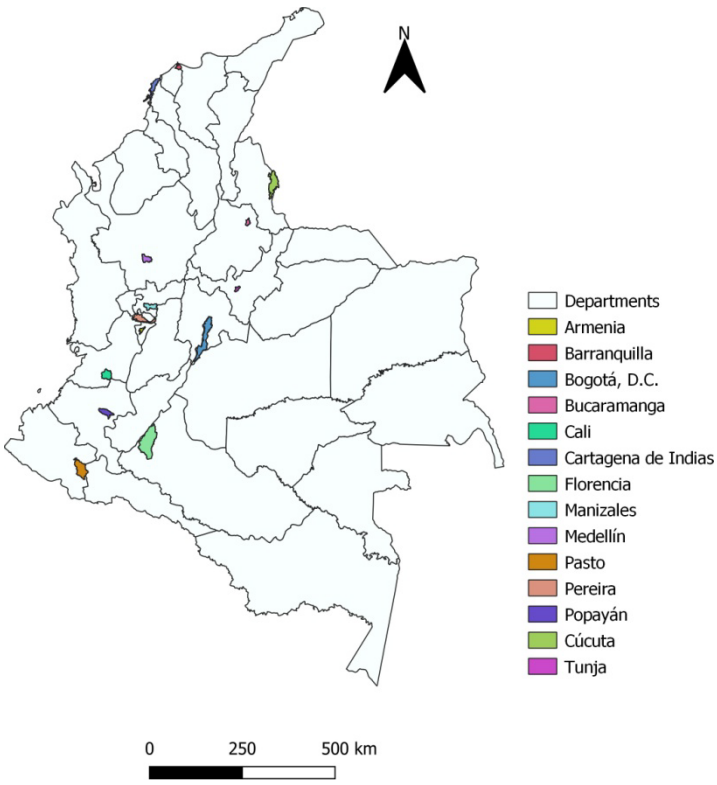
In continuity, according to He et al. (2019) the services and space for leisure are equivalent to the lifestyle services exposed by Florida et al. (2016). Therefore, cities are more attractive for the creative class and in general, for entrepreneurs due to the climate of entertainment and leisure. In fact, following the idea of Neff et al. (2005), public spaces for leisure constitute an important mechanism for establishing networks and other alternatives for the exchange of knowledge. Audretsch and Belitski (2017) mention the importance of the attractiveness and culture of cities to create an enabling environment in which competition, creativity and entrepreneurship flourish. Thus, in this document we control the square meters of leisure parks per capita as a soft factor that influences business intent.

3. Data and descriptive statistics

3.1. Study area

This document uses data from Colombia, a South American country member of the Organization for Economic Cooperation and Development (OECD). In 2018, Colombia had a population of approximately 48 million inhabitants and an area of 1.2 million km^2. In relation to its political-administrative organization, Colombia is divided into 32 provinces plus Bogotá as the Capital District (CD). According to Aristizábal and García (2020), this country shows a marked regional heterogeneity in cultural, economic and social terms.

Figure 1. Study area.



Source: Own elaboration.

The database used in this study is cross-sectional and was built from primary and secondary information. In particular, 36 MBA programs in Colombia distributed in 14 capital cities (Armenia, Barranquilla, Bogotá D.C., Bucaramanga, Cali, Cartagena, Cúcuta, Manizales, Medellín, Pasto, Pereira, Popayán, Florencia and Tunja) were analyzed. In this way, information was consolidated for 485 students. The methodological instrument from which information about the initial endowments and characteristics of the individual is captured has been previously validated by Tarapuez et al. (2015).

3.2. Data and descriptive statistics

In the variables referring to the initial endowments of the individual, first, a binary variable was included to control the effects of gender (1 refers to males). In continuity, a new dichotomous variable was used to operationalize the membership of an entrepreneur friend or family member. For its part, age was considered under the underlying relationship between the life cycle of the individual and the probability of starting a business. Finally, the effects of human capital endowments were controlled; for this purpose, binary variables were incorporated to control the educational level of the parental group (1 refers to graduated parents). Table 1 shows the descriptive statistics of the first-level variables used in the estimates.

Table 1. Descriptive statistics on individual level.

Variable	Frequency (%)
Gender (1 = Male)	55.67
Family businessman (1= Yes)	46.19
Friend businessman (1= Yes)	57.73
Father education (1 = Graduate)	58.56
Mother education (1 = Graduate)	29.69

Source: Own elaboration.

On the other hand, to analyze the effects of the hard and soft factors of the cities on the entrepreneurial intention, four variables were incorporated at the city level. The proxy variables for the selected hard factors were the number of supermarkets per km^2 and the number of passengers moved by public transport (Audretsch et al., 2019). The elements considered in the case of amenities or soft factors were the number of m^2 of leisure parks per inhabitant and assets of cultural interest. The information on the number of supermarkets per km^2 and the number of m^2 of leisure parks per inhabitant was obtained from base maps, superimposing layer data and displaying geographic information of interest. On the other hand, the number of passengers mobilized by public transport and goods of cultural interest has been taken from the Cities Competitiveness Index (CCI) prepared by the Private Competitiveness Council (PCC) of Colombia.

Table 2 shows the main descriptive statistics of the variables under analysis for the selected cities. Additionally, Figures 2 and 3 shows the relationship between an indicator ofEI constructed from the instrument applied to students and a variable selected for each group of factors.

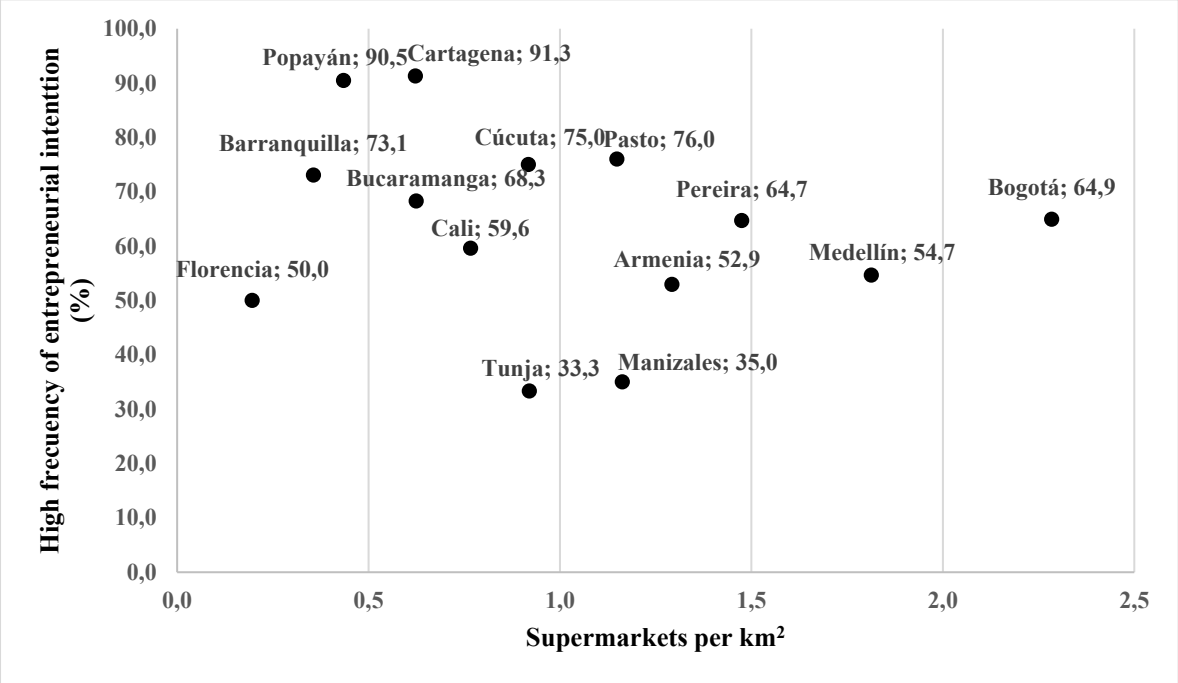
Figure 2, presented for descriptive purposes, shows that Bogotá and Medellín, the two most important cities in the country in terms of population and participation in gross domestic product (GDP), exhibit the highest number of supermarkets per km^2. In association with EI, these cities are below coastal cities such as Cartagena and Barranquilla and other border regions (for example, Cúcuta and Pasto). In contrast, the cityof Florencia (Province of Caquetá) located on the limits of the Amazon region has the lowest number ofsupermarkets per km^2. In addition, this city is in the group of the 3 cities with the lowest EI within the sample. The relationships in question are shown in Figure 2.

Table 2. Descriptive statistics on city level.

Variable	Mean	SD	p25	Median	p75	Min	Max	CV
Hard Factors								
No. supermarkets per km^2	1.31	0.66	0.76	1.16	1.81	0.19	2.28	0.50
Passengers mobilized by public transport	1.89	0.69	1.37	2.00	2.30	0.73	2.99	0.36
Soft Factors								
No. mts^2 to leisure per capita	2.61	2.30	1.34	1.69	2.83	0.40	8.35	0.88
Goods of cultural interest	21.15	23.91	10.41	13.15	18.83	5.41	97.65	1.13

Source: Own elaboration based on CPC (2016) and Map service.

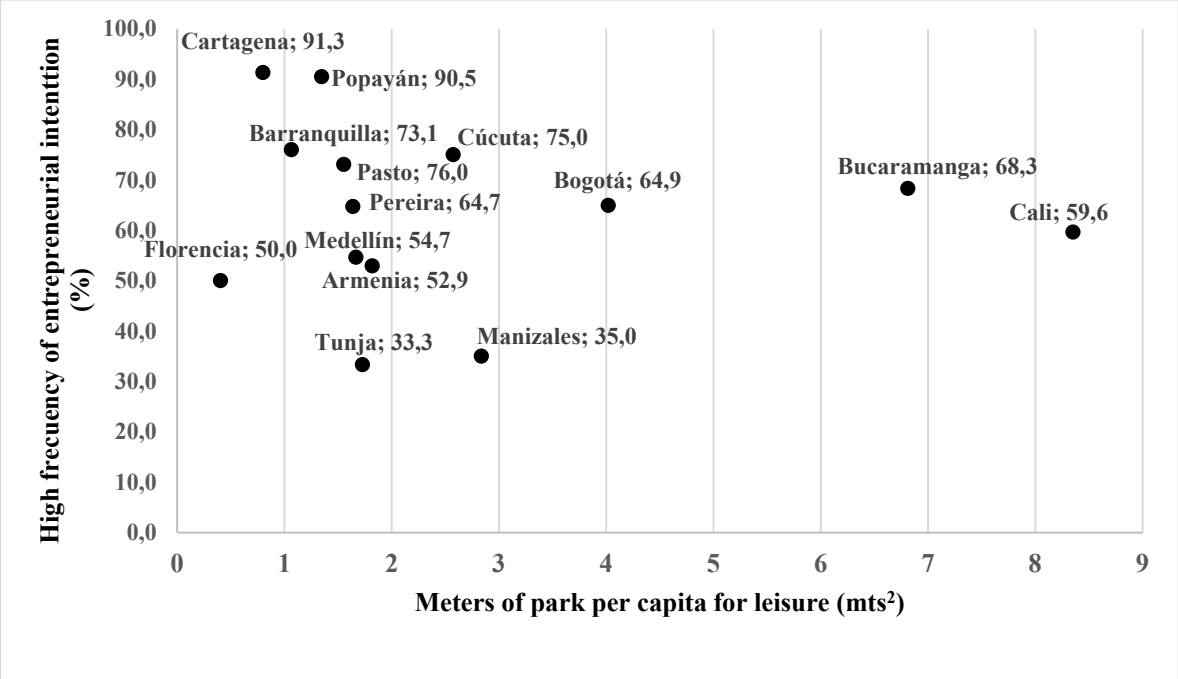
Figure 2. Relationship between EI and supermarkets per km^2.



Source: Own elaboration.

The relationship envisaged in Figure 2 raises two preliminary questions. First, the diversity generated by these large cities, expressed in the high rates of population density, makes it possible to gather likes, knowledge, needs, preferences and provisions. Thus, the spatial concentration of the population in an area stimulates a higher density of supermarkets. In particular, the cities with the highest population density generate a wide range of possibilities for observations before starting new projects. Second, the higher concentration of supermarkets reflects changes in income levels based on new consumption patterns. In this regard, the literature has indicated that entrepreneurship flourishes due to income flows (Moore et al., 2020). On the other hand, Figure 2 presents the relationship between EI and theindicator of m^2 of leisure parks per capita.

Figure 3. Relationship between EI and meters of park per capita for leisure.



Source: Own elaboration.

In contrast, an inverse relationship is configured in reference EI, which confirms that public parks in cities, far from transforming the essential qualities of the contours and automatically animating neighborhoods, are drastically affected by how they act on them theneighborhoods. In this way, Figure 3 exposes a certain connection between the EI of students and cities with fewer square meters of park for leisure. This can be seen in the case of coastal cities such as Cartagena and Barranquilla; Pasto, a peripheral city on the Pacific coast, also denotes this association. In consideration, it is inferred that, in general, the parks in the main cities in Colombia are embedded in an outline of functional monotony, which makes these spaces inexorably empty places, discouraging animation and variety and reducing behavior both social and economic of cities.

4. Empirical strategy

The data used in this document is cross-sectional and hierarchically grouped at the city level. In this logic, following the strategy used by Estrin et al. (2013), Autio et al. (2014), Bosma and Sternberg (2014) and Stuetzer et al. (2014), hierarchical linear modeling methods are used. The selection of the empirical strategy is based on the fact that traditional multivariate econometrics assumes the independence of the observations. Thus, according to Autio and Wennberg (2010), the hierarchical structure captures the way in which the environment affects the decisions of the individual.

Having stated the above, to estimate the probability of EI in a student given their initial endowments and the effects of the city's structure, including soft and hard factors, we estimate a hierarchical logistic model at two levels. According to Arrak et al. (2020), logistic regression allows evaluating the influence of independent variables on the probability of the appearance of binary dependent variables. In addition, random effects are included in the model to capture the importance of the heterogeneity of the structure of cities in Colombia.

In particular, this econometric specification enables the link between individuals and their interaction with the city ecosystem. In this way, level 1 contains information on the characteristics of the individuals. In this group, aspects such as age, gender, membership of business friends or family

members, and the mother's educational stock are controlled. On the other hand, level 2 groups the information at the city level regarding the factors that influence the EI of individuals in level 1. In consideration, the controls of the second level group include hard factors (passengers mobilized in public transport and the number of supermarkets per km^2) and soft factors (cultural interest goods and square meters of leisure parks per capita).

Following the strategy of Schmutzler et al. (2019) and Cueto et al., (2020), we estimate a two-level logistic regression model with a random intercept. With this specification, at level 1 nindividuals ($i = 1, \dots, n$) are identified, nested in j cities ($j = 1, \dots, J$) at level 2. Equation 1 describes the empirical strategy.

$$\Pr(y_{ij} = 1|x_{ij}, \xi_j^2) = \beta_i x_{ij} + \dots + \beta_n x_{nj} + \xi_j^2 \quad [1]$$

In equation 1, $\xi_j^2 \sim N(0, \psi^2)$, refers to the random intercept which captures the heterogeneity in level 2. From the above, ξ_j^2 is assumed independent between cities. In addition, $x_{ij} = (x_{ij}, \dots, x_{nj})$ is a vector that contains the set of previously defined characteristics of the individual. Finally, y_{ij}, is a dichotomous variable constructed from the EI revealed by the students. Equation 2 defines the decision rule.

$$y_{ij} = \begin{cases} 1 \text{ if } y_{ij}^* > 0 \\ 0 \end{cases} \quad [2]$$

In consideration, according to Cueto et al. (2020), equation 1 can be written as a latent variable model. Its representation is exposed in equation 3.

$$y_{ij}^* = \beta_1 x_{i,j} + \dots + \beta_n x_{nj} + \xi_j^2 + \varepsilon_{ij} \quad [3]$$

where ε is a standard logistic distribution with variance $\pi^2/3$ y β_n refers to the parameters to be estimated.

5. Results and discussion

In order to calculate the direct effects of the hard and soft factors on the EI of the students and at the same time, capture the regional heterogeneity of the environmental factors in Colombia, a specification of random effects in the intercept is chosen. The estimates were made in Stata software. Thus, according to Aguinis et al. (2013), whenever the analysis units are nested at a higher level, the random intercept facilitates the interaction between the levels.

To verify that the intercepts are independent and vary between cities, the variance was estimated from a null model (Model 1st, Table 3rd). According to Hox et al. (2017) and Sohns and Revilla (2018), the model without explanatory variables decomposes the variance between the individual and city levels, separately. In this logic, the intra-cluster coefficient ($\text{individual level} = \sigma 2i/\sigma 2i + \sigma 2j$) is analyzed, which, according to Hox et al. (2017) compares the variance at the group level in relationto the total variance. According to the ICC, 11.6 % of the students' EI can be explained by the presence of the city factors.

In this case, the results expose the relevance of the hierarchical model to another specification among the family of standard multivariate methods. In continuity, the model incorporates the endowments of individuals. In addition, city-level controls are presented in models 3rd, 4th and 5th. Thus, models 3rd and 4th capture the contribution of hard and soft factors, respectively, on the dependent

variable. Finally, model 5th incorporates the combined effects of both soft and hard factors on students' EI.

In relation to the specification of models 3rdand 5th, the likelihood ratio test is statistically significant. The above denotes a better specification once the effects of hard andsoft factors on students' EI are incorporated. In addition, although there are no clear indications of significant increases in the Pseudo-R^2 statistic when city effects are incorporated into EI, according to Nakagawa and Schielzeth (2013), this behavior is natural in hierarchical structures. Similar behavior of Pseudo-R2 is also observed in the work of Schmutzler et al. (2019).

The analysis of the set of factors at the individual level that affect EI shows the expected signs. Thus, the results denote a higher probability of EI in the case of males. This is consistent across all models, even when city effects are incorporated. Similar results have been documented in the work of Chipeta et al. (2020). For its part, the sign obtained for age is the expected one and consequently, the results of the model corroborate the presence of a life cycle in the development of business initiatives, the highest probability of which is documented in the 31- 40 age group. Similar findings are documented in the works of Aristizábal et al. (2021).

Table 3. Multilevel binary-logistic regression results.

	Model 1st	**Model 2nd**	**Model 3rd**	**Model 4th**	**Model 5th**
	Odds ratio	**Odds ratio**	**Odds ratio**	**Odds ratio**	**Odds ratio**
Individual characteristics					
Gender (1 = Male)		2.031***	2.023**	2.034**	2.008**
		(0.205)	(0.203)	(0.204)	(0.190)
Age (1 = 31–40 years old)		1.113*	1.165*	1.107*	1.112*
		(0.723)	(0.512)	(0.749)	(0.875)
Family entrepreneurs (1= Yes)		3.690***	2.983**	3.016**	3.45**
		(0.851)	(0.881)	(0.862)	(0.879)
Father education (1 = Graduate)		0.991*	1.079	1.095*	1.118*
		(0.639)	(0.705)	(0.412)	(0.488)
Mother education (1 = Graduate)		1.001	1.000	1.019	1.094
		(0.076)	(0.091)	(0.078)	(0.138)
Hard factors					
No. supermarkets per km^2			-0.876*		-0.861*
			(0.058)		(0.056)
Passengers mobilized by public transport			1.126*		1.591*
			(0.002)		(0.091)
Soft factors					
No. mts^2 to leisure per capita				0.913	-0.910*
				(0.634)	(0.592)
Goods of cultural interest				1.657**	1.583*
				(0.519)	(0.702)
Constants	0.002**				
Model fit statistics					
ICC City	0.116				
likelihood ratio test	93.67**	102.47*	106.01*	91.98	107.65**
Prob > chi2	0.052				
N	485	485	485	485	485

Notes: standard errors in parenthesis.
Dependent variable: Entrepreneurial intention.
∗∗∗p < 0.01. ∗∗ p < 0.05. ∗p < 0.1

Source: Own elaboration.

In continuity, according to the results shown in models 2nd, 3rd, 4th and 5th, the presence of a family member of the entrepreneur increases the probability of developing an EI. This may be associated. On the one hand, with the intergenerational transmission of the risks associated with being an entrepreneur and, on the other hand, participation at an early age in family businesses can affect attitudes towards entrepreneurial actions. These results confirm the findings of Agarwal et al. (2020) and Shrivastava and Acharya (2021). These works document the positive relationship between business intent and family business membership.

On the other hand, the results of the research in terms of the relationship between an entrepreneur friend and the EI are consistent with the works of Aloulou (2021). In relation, it is inferred that business decisions are measured by social norms, and thesein turn are influenced by the presence of business friends, among others. Finally, the results of the research show that in the case of MBA students in Colombia, the training of parents has no effect on attitudes towards entrepreneurial actions. In contrast, Tarapuez et al. (2018) find positive associations between the level of parental training and EI.

Exposed the above, the gender and business family variables associate higher conditioned probabilities on EI compared to the variables of age and educational background of the parents. In the case of gender, the greater probability could be associated with cultural components or the lower female participation in the labor market in Colombia. For its part, in the case of age, it can be explained by considering that the analyzed sample is closing the age peak where the largest business cycles are identified. Finally, although the predicted differences between educated fathers and educated mothers are not high, in the case of father's statistical significance is found at 10% in models 2nd, 4th and 5th. These results have been documented by Tarapuez et al (2018) and are explained, in the case of Colombia, by the predominant role of parents in household economic decisions.

6. Conclusions

Our document aims to capture the factors at different levels that affect the EI in a sample of MBA students. Thus, on an econometric strategy based on a two-level logistic regression, our estimates suggest that EI is affected by the initial endowments of individuals and by the urban context in which they coexist. The application was carried out in a sample of 485 MBA students distributed in 14 cities in Colombia.

According to our results, at the individual level, EI is driven by gender, age and the presence of family entrepreneurs. In relation to the educational level of the fathers, the EI of the students is not being influenced by the academic training of the mothers. In the same way, our results suggest that the approximate urban structure of cities through hard and soft amenities stimulates EI in MBA students.

In particular, the number of supermarkets per km^2 and the number of passengers moved by public transport drive EI in the student sample. The foregoing allows us to conclude that this type of amenities represents both a social and an economic utility for cities. The above transfers a mechanism to EI through the confluence of individuals who deliberately attract a sequence of ideas and the consequent identification of business opportunities.

On the other hand, in the case of the mts^2 of park for leisure, the negative sign shows the negative contribution of the open space for the stimulus of the EI. In this way, we infer that the public parks in the main cities in Colombia do not manage to transform the essential qualities of the contours and through this mechanism, the number and variety of users in the parks is limited. This in turn limits the potentials of population density on EI. In the strict sense, the considered leisure parks may be reflecting the underutilization and waste of economic, cultural and social opportunities.

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