

Competitiveness of Rural Enterprises Run by Millennials in Antioquia *

Competitividad de empresas rurales impulsadas por millennials en Antioquia

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Abstract

Business competitiveness is defined as a company's capacity to participate in the market with an competitive advantage. It can be analyzed using different approaches such as the Resource-Based View (RBV) and measured from a multidimensional perspective. This paper aims to examine the competitiveness of rural enterprises run by a millennial population consisting of undergraduate students and graduates from different faculties of agricultural sciences in Antioquia (Colombia). A

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total of 1242 emails were sent asking to fill out an online questionnaire, and 432 people responded (34.78%), with 11.91% already having a business in operation (148 enterprises). Once the competitiveness index was calculated, a multidimensional statistical analysis was performed to identify differences between regions, economic sectors, status (formal or informal), number of employees, and age of the company. According to the results, service companies in rural areas, enterprises registered at the chamber of commerce, and those with a higher number of employees and longer time in the market exhibit a better competitiveness index. The main limitations, however, are observed in the competitive strategy and marketing components. Since the competitiveness index can have a maximum value of 10, values in the range of 5.68 to 6.79 indicate a medium level of competitiveness and, therefore, imply that the other components of the competitiveness index must be improved to achieve higher levels of competitiveness.

Keywords: Young population, Generation Y, entrepreneurship, rural enterprises.

JEL Classification: L26, O18, R51.

Highlights

- The *competitive strategy* and *marketing* components limit a better performance in the competitiveness index.
- Marketing and market access hamper an increase in the competitiveness of rural enterprises.
- A lack of preparation in entrepreneurial activities causes entrepreneurs to focus more on productive aspects rather than on value generation.

Resumen

La competitividad empresarial se define como la capacidad de una empresa para participar en el mercado con una ventaja competitiva. Dicha competitividad puede analizarse por medio de diferentes enfoques como la visión basada en recursos (RBV, por sus siglas en inglés) y medirse desde una perspectiva multidimensional. Este estudio tuvo como objetivo examinar la competitividad de empresas rurales dirigidas por una población milenaria conformada por estudiantes de pregrado egresados de diferentes facultades de ciencias agrícolas en Antioquia (Colombia). Se enviaron un total de 1242 correos electrónicos solicitando diligenciar un cuestionario en línea, respondiendo 432 personas (34.78%), de las cuales el 11.91% ya tiene un negocio en funcionamiento (148 empresas). Una vez calculado el índice de competitividad, se realizó un análisis estadístico multidimensional para identificar diferencias entre regiones, sectores económicos, estado (empresa formal o informal), número de empleados y edad de la empresa. De acuerdo con los resultados, las empresas de servicios en áreas rurales, aquellas inscritas en la cámara de comercio y aquellas con mayor número de empleados y más tiempo en el mercado presentan un mejor índice de competitividad. Las principales limitaciones, no obstante, se observan en los componentes *estrategia competitiva* y *marketing*. Dado que el índice de competitividad puede tener un valor máximo de 10, valores en el rango de 5.68 a 6.79 indican un nivel medio de competitividad y, por lo tanto, implican que los demás componentes del índice de competitividad deben mejorarse para lograr mayores niveles de competitividad.

Palabras clave: población joven, generación Y, emprendimiento, empresas rurales.

Clasificación JEL: L26, O18, R51.

Highlights

- Los componentes *estrategia competitiva* y *marketing* restringen un mejor desempeño en el índice de competitividad.
- El *marketing* y el acceso a los mercados son factores que obstaculizan el incremento en la competitividad de las empresas rurales.
- La falta de preparación en actividades de emprendimiento hace que los emprendedores se enfoquen más en aspectos productivos que en la generación de valor.

1. INTRODUCTION

In Colombia, 99.6% of the territory is rural (Instituto Geográfico Agustín Codazzi [IGAC], 2015), with 40.1 million hectares available for the development of agricultural activities, of which an estimate of 6.6 million hectares were abandoned or dispossessed due to the armed conflict (Roper Beltrán, 2016). This resulted in population displacement and decreased investor interest in agricultural developments (Restrepo & Bernal Morales, 2014). In addition, during the armed conflict, this situation contributed to a decrease in the value-added of the agricultural sector (from 27.97% in 1964 to 5.44% in 2014) as a percentage of the national Gross Domestic Product (GDP). However, since the signing of the peace agreement, this trend has begun to reverse, breaking the downward trend and reaching 6.61% in 2016 (see Figure 1).

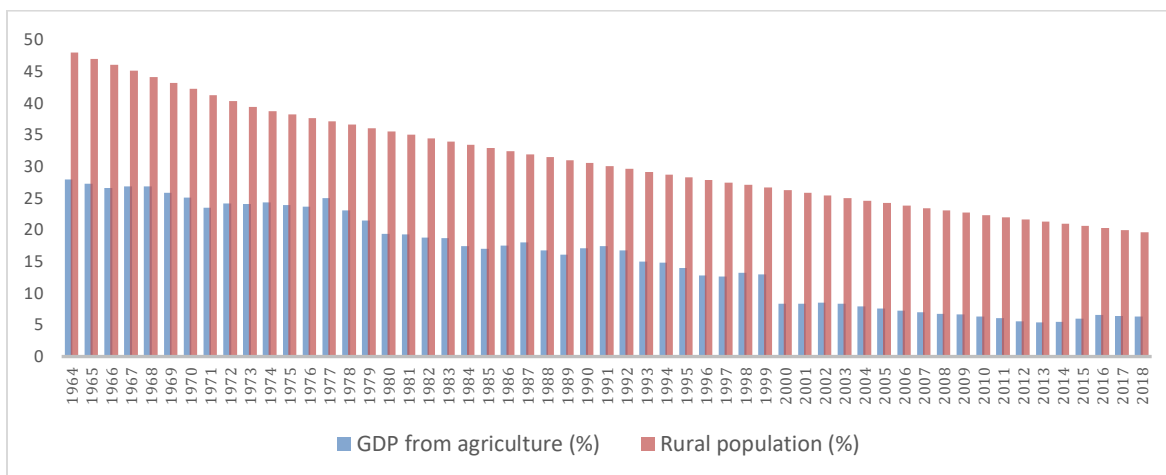


Figure 1. Evolution of the GDP from agriculture and the rural population between 1964 and 2018

Figura 1. Evolución del PIB del sector agrícola y la población rural entre 1964 y 2018

Source: Created by the authors based on data from the World Bank (2019) and the Economic Commission for Latin America and the Caribbean (CEPAL, 2019).

Colombia has been recognized as one of the few countries that, agriculturally speaking, can produce all year round thanks to its agro-ecological conditions and geographical location that is not affected by seasons (Sánchez Castañeda, 2017; Betancur Giraldo et al., 2018). Additionally, it still has an agricultural frontier to develop, which could contribute to solving future food shortage problems (FAO, 2019). For this reason, countries such as China are investing heavily in the purchase of land

(Puyana & Costantino, 2015), as well as Mexico, Peru, the United States, Korea, and Chile (Gomez-Suarez et al., 2016; Serrano & Brooks, 2019; Urueña, 2016).

The aforementioned has been favored in a post-conflict context due to an improvement in the perception of security as a result of the signing of the peace agreements in La Havana. This, however, has also generated debate on the high concentration of land in the hands of few, leaving a large number of Colombians with difficulties in accessing land despite the already existing processes of land restitution for victims of dispossession (De la Cruz Martínez & Ariza Goenaga, 2017; Suarez et al., 2018).

Five decades of armed conflict brought several consequences: a marginalized, impoverished, and disconnected countryside with problems in terms of infrastructure, public utilities, government presence, security, and high inequality (LeGrand et al., 2017; Roper Beltrán, 2016). This has caused rural dwellers to migrate to urban areas, a process that has undergone notorious changes. In 1960, 52% of rural residents moved to urban regions, and this figure reached 80.7% in 2019 and could reach 83.6% in 2029, according to estimates by the United Nations (CEPAL, 2019).

Paradoxically, this large population tends to be located in 0.3% of the Colombian territory declared as urban (IGAC, 2015). Hence, a coordinated strategy is needed to reverse the depopulation of rural areas in Colombia and seize the opportunities that this offers for economic growth and the development of such territories (Arias et al., 2020).

Colombian rural areas with high agricultural potential should grow to provide and complement nonexistent services that will attract new people from urban and other rural areas. This would generate new types of businesses to energize the territories (Ribes Giner & Arias, 2018) and enable counter-urbanization processes (Bosworth & Atterton, 2012; Stockdale, 2016) while seeking mechanisms to retain the current population and prevent their migration (Kristensen & Birch-Thomsen, 2013; Liu, 2011).

One of the possibilities of revitalizing rurality is rural entrepreneurship (Gorbuntsova et al., 2018), which is defined as "the creation of a new organization that introduces a new product, serves or creates a new market, or uses a new technology in a rural setting" (Wortman, 1990, p. 330). Although there have been additions to this definition regarding the role of rural entrepreneurship in the use and generation of resources for rurality itself and its inhabitants (McElwee & Atherton, 2011; Pato & Teixeira, 2016), it can contribute to improving the competitiveness of rural territories (Apostolopoulos, 2017). To that end, it is necessary to foster an investment climate that is favored through the formulation of specific public policies for the development of entrepreneurship in the rural sector (Sur et al., 2014).

Colombia has made progress in the creation of a regulatory framework to encourage entrepreneurship, and the government is working to do so. For instance, Law 1780 of 2016 was recently approved. This law promotes employment and entrepreneurship for young people between 17 and 28 years old due to the difficulties they face in accessing formal jobs (Congreso de Colombia, 2016). Despite this, there is still a need to develop a public policy that boosts rural entrepreneurship while also taking into account the vastness of the national territory (Arias & Ribes-Giner, 2019).

According to the Global Entrepreneurship Monitor (GEM) report for Colombia, young people aged 18 to 34 years old contributed the most to national entrepreneurship, with 42% of ventures and an Entrepreneurial Activity Rate (EAR) above 20% (Global Entrepreneurship Monitor [GEM], 2017; Laverde et al., 2019). Individuals who are mostly classified as millennials, i.e., those born between 1980 and 2000 (Aleksić & Rangus, 2020; Holt, 2018) and whose own characteristics make them digital natives, like technology and innovation; have high job expectations; promote just causes; have a high sense of social and environmental responsibility; look for a meaningful lifestyle (Liu et al., 2019); and prefer the support of a guide or a mentor (Zhang & Acs, 2018). Moreover, since they like to manage their own time, they are prone to entrepreneurship (Koe et al., 2012).

Various studies in the literature highlight millennials' appreciation for entrepreneurship in rural areas. This is explained by their interest in favoring communities through the creation of companies and the development of social enterprises, with access to financing conditions, opportunities, and public services (especially the internet) being a determining factor that connects them with a more relaxed lifestyle away from urban contexts (Anthopoulou et al., 2017). The dominant premise in this age group appears to be "working to live and not living to work" (Liu et al., 2019).

Young people from rural territories are different from those of urban areas in that the former generally want to migrate to seek opportunities in cities (Ye et al., 2019), while others prefer to stay to preserve their lifestyle and traditions (Dos Santos, 2007). Urban youth have traditionally had better opportunities, are academically trained, and sometimes have work experience (Anthopoulou et al., 2017); they, thus, look for ways to develop entrepreneurship in rural areas (Gómez Gras et al., 2015).

The purpose of this study is to understand the competitiveness of rural ventures promoted by undergraduate and graduate students from different faculties of agricultural sciences in Antioquia whose age ranges between 20 and 40 years old and who are considered millennials. For this purpose, we considered ventures in different sectors such as agriculture, livestock, agro-industry, commerce, industry, services, and mixed activities. The aim is to better understand the competitiveness of such companies from a systemic and multidimensional perspective based on the Resource-Based View (RBV).

2. THEORETICAL FRAMEWORK

The theory of competitiveness has been analyzed from different approaches, starting with David Ricardo's comparative advantages; Porter's competitive advantages (Porter, 1990); the resource-based approach (Grant, 1991); systemic competitiveness (Esser et al., 1996); the five-level analysis (Bianco, 2007); the double diamond-based nine-factor model (Cho et al., 2009); and the perspective of the World Economic Forum, which examines competitiveness based on 12 pillars (Bhawsar & Chattopadhyay, 2015).

Competitiveness has been given several definitions (see Table 1), with no consensus on a single accepted one (Solleiro Rebolledo & Castañón, 2004), whose relevance changes over time. This concept has been extensively studied from different perspectives and levels (Bhawsar & Chattopadhyay, 2015), including the product, the company, the industry, and the nation (Chang Moon & Peery, 1995). In addition, there is a close relationship between all levels of competitiveness (Anca, 2012).

Table 1. Some definitions of competitiveness
 Tabla 1. Algunas definiciones de competitividad

Definition	Author
"International competitiveness refers to the ability of a country's producers to compete successfully in world markets and in their domestic market with imports. Competitiveness is generally measured by the actions that a country achieves in its markets, taking into account its size and stage of development. In this broad sense, competitiveness becomes synonymous with overall performance".	(Treasury, 1983) cited in (Capobianco-Uriarte et al., 2019, p.1)
"Competitiveness is the ability to sustain and increase participation in international markets, accompanied by an increase in the population's standard of living. The only way to accomplish this is through increased productivity".	(Porter, 1990, p.778)
"Competitiveness provides the basis for increasing people's incomes in a noninflationary way. It increases value-added and growth potential by stimulating not only resource-saving innovation but also investment to expand capacity and create jobs".	(European Commission, 1995, p.6)
"Competitiveness is the extent to which a nation, under free and fair market conditions, produces goods and services that meet the test of international markets while maintaining or expanding the real incomes of its citizens".	(United States, 1985, p.101)
"Competitiveness is a multidimensional and complex concept".	(Chaudhuri & Ray, 1997, p.83)
"Competitiveness is the ability of companies engaged in value-added activities in a specific industry, in a particular country, to maintain this value-added over long periods despite international competition".	(Chang Moon et al., 1998)
"Competitiveness can be defined as the ability to face competition and succeed when faced with it".	(Latruffe, 2010, p.5)
"Competitiveness is a multifaceted concept whose understanding comes from economics, management, history, politics, and culture".	(Waheeduzzaman, 2011, p.137)
"National competitiveness refers to a country's ability to provide an environment conducive to the growth of its businesses, and therefore its industries. The goal is to assist in creating value, generating profits, and raising national prosperity at the same time".	(Bhawsar & Chattopadhyay, 2015, p.665)
"Competitiveness is a set of ten mutually dependent pillars: human capital, product, internal market, networks, technology, decision making, strategy, marketing, internationalization, and online presence, which enable a company to compete effectively with other companies and serve customers with valuable goods and services".	(Moreno-Gómez & Lafuente, 2019, p.339)

Source: Created by the authors.

According to Latruffe:

(...) Competitiveness is therefore a relative measure. However, it is a broad concept and there is no agreement on how to define it and how to measure it accurately. There are a large number of definitions with studies often adopting their definition and choosing a specific measurement method (Latruffe, 2010, p.5).

Business competitiveness

Business competitiveness is based on a company's ability to remain and grow in a market (Solleiro Rebolledo & Castañón; Rehman et al., 2020), and it can be viewed from a financial and nonfinancial

perspective (DeBoer et al., 2020). In addition, it has to do with how the company performs in a market in an advantageous manner (Jiang et al., 2016), thus being able to compete and outperform its competition (Capobianco-Uriarte et al., 2019).

Considering the foregoing, aspects that are in line with the creation of shared value for those involved in the business should also be examined (Porter & Kramer, 2019; Varum et al., 2020; Rubio-Andrés, 2020), in addition to the respect for the environment that society demands (Lee & Lee, 2017). The aim of this is to ensure the sustainability of entrepreneurship over time (Moya-Clemente et al., 2019).

There is an interest in focusing on the company and its resources when analyzing competitiveness (Ismail et al., 2012; Nájera Ochoa, 2015) because companies are the ones that compete and make the country that hosts them competitive (Saavedra, 2014). For this reason, the Resource-Based View (RBV) has begun to gain ground as one of the dominant theoretical frameworks for analyzing business competitiveness, a concept that can be seen from a systemic and multidimensional perspective to assess the level of competitiveness (Moreno-Gómez & Lafuente, 2019).

Competitiveness, rural entrepreneurship, and youth

Urban agglomeration boosts the competitiveness of businesses that are dispersed in rural areas and tend to be less competitive (Aryal et al., 2018). Rurality, however, has several attractions such as living conditions, heritage, culture, and resources (Švagždienė & Perkumienė, 2018), which attract some sectors of the population, including young people seeking a better lifestyle (Akgün et al., 2011) and even seeking to explore alternatives to enter the labor market through the development of entrepreneurship in rural areas (Zaremohzzabieh et al., 2016).

In this context, young people categorized as millennials, i.e., were born between 1980 and 2000, and considered digital natives in the literature can help improve the competitiveness levels of rural enterprises because they have the advantage of easily adopting changes (Liu et al., 2019), are prone to entrepreneurship, are creative, and frequently seek to innovate (Koe et al., 2012; Dougherty & Clarke, 2018). Therefore, a counter-urbanization strategy among urban youth that promotes migration to rural areas to start businesses (Anthopoulou et al., 2017) could contribute to revitalize rurality (Tunberg, 2014).

Millennials are not limited to traditional careers; they seek innovative ways to combine profit and purpose, as illustrated by concepts such as social entrepreneurship (Satyalakshmi, 2017). There must be, however, minimum conditions, "as to whether people stay in the rural environment or decide to leave depends on whether their life prospects are guaranteed within basic standards" (Caamaño Diaz, 2017, p. 11), for which there must be public policies that stimulate and create conditions for rural entrepreneurship (North & Smallbone, 2006; Strochenko & Koblianska, 2016) and consequently establish the necessary conditions to revitalize rural spaces (Avramenko & Silver, 2010).

In order to compensate for remoteness and enhance trade (Koyana & Mason, 2017), young entrepreneurs in rural areas are often focused on seeking to improve business prospects through innovation, insertion in collaborative networks (Akgün et al., 2010), and the use of social media and the internet (Deakins et al., 2016). Nevertheless, effective strategies must be sought to improve the use and adoption of technology by rural communities (Salemink et al., 2017), as well as the transfer

of knowledge management and innovation to these territories (Bonfiglio et al., 2017). The aim is to reduce existing imbalances in market access, which is to be compensated for through collaborative work, networking, and multi-activity, and try to improve the competitiveness of rural businesses (Arias & Ribes-Giner, 2019).

3. METHOD

A database of students in their final semesters (both undergraduate and graduate) and graduates from different faculties of agricultural sciences in Medellín was gathered for this study. These students were contacted via email to participate in a survey on rural entrepreneurship that measured sociodemographic, psychological, motivational, and business information variables, including competitiveness. For this purpose, 1242 emails were sent. Random sampling with a 95% confidence interval was used, which required 295 questionnaires to be completed. A total of 430 responses (34.78%) were received, i.e., 135 more than those required by the sampling. According to the results of the questionnaires, 11.91% of the respondents had an active business (148 companies) and were either starting a business or already had an established one.

To measure the competitiveness of the companies, the enterprise competitiveness index, which is based on the RBV and the configurational theory and was developed within the framework of the global competitiveness project (<https://www.sme-gcp.org/>), was used. It has the advantage of being a multidimensional and systemic index (see Equation 3) that includes 46 variables in 10 competitive pillars, whose values must be normalized between 0 and 1 (Lafuente et al., 2016).

To normalize the values of the variables using a Likert scale from 1 to 5, where 1 indicates that the variable is of little relevance and 5 means that it is relevant (see Equation 1), we used the following equation:

$$X_{i,j}^* = \frac{X_{i,j}}{\max X_j} \text{ for } j = 1, \dots, J \text{ y } i = 1, \dots, N \quad (1)$$

Lafuente et al. (2016) proposed a penalty function to compensate for underperforming pillars (see Equation 2). In this equation, $h_{i,v}$ is the v -th value of the pillar and $\min p_{i,v}^*$ is the lowest pillar value for the analyzed company (i). The correction function of the pillars, due to the bottleneck, would be given by

$$h_{i,v} = \min(p_{i,v}^*) + \left(1 - e^{-(p_{i,v}^* - \min(p_{i,v}^*))}\right) \quad (2)$$

The competitiveness index (see Equation 3) is then calculated using the following mathematical equation (Moreno-Gómez & Lafuente, 2019):

$$CI_i = \sum_{k=1}^{10} h_{i,v} \quad (3)$$

The equation resulting from combining Equations 2 and 3 to calculate the competitiveness index (CI_i) of company i would be

$$CI_i = \sum_{k=1}^{10} \min(p_{i,v}^*) + \left(1 - e^{-(p_{i,v}^* - \min(p_{i,v}^*))}\right) \quad (4)$$

Once the competitiveness index of the companies is calculated, a multidimensional analysis is performed, separating entrepreneurs into three groups following the proposal of the Global Entrepreneurship Monitor: nascent entrepreneurs (0–3 months), new entrepreneurs (up to 42 months), and established entrepreneurs (more than 42 months) (GEM, 2017).

T-tests and analysis of variance (ANOVA) were employed after constructing the competitiveness index in order to identify differences between regions, economic sectors, registration at the chamber of commerce, number of employees, and age of the company. Before applying these tests, normality and homoscedasticity between the groups were first verified using the Kolmogorov–Smirnov and Shapiro–Wilk tests for the first assumption and the Levene test for the second.

Subsequently, a Multivariate Analysis of Variance (MANOVA) was carried out to test the equality of the means of the different components that make up the competitiveness index between the two groups defined based on the companies' age.

4. RESULTS

The data reported by the owners of the 148 enterprises were grouped based on characteristics such as location in the department of Antioquia, economic sector, registration at the chamber of commerce to support their formal status, number of employees, and age of the company (see Table 2). The aim was to identify those factors that help explain the differences between the competitiveness indices calculated here.

Table 2. Characteristics of the study sample

Tabla 2. Características de la muestra

Groups	Region	Percentage
1	Eastern Antioquia	18.92
2	Aburrá Valley except for Medellín	19.59
3	Medellín	21.62
4	Southwestern and northern Antioquia	22.97
5	Others	16.89
Groups	Economic sector	Percentage
1	Agriculture, livestock, agro-industry	40.54
2	Services	35.14
3	Trade and mixed activities	24.32
Groups	Registration at the chamber of commerce	Percentage
1	Yes	61.49
2	No	38.51
Groups	Number of employees	Percentage
1	1 employee	32.43
2	2 and 3 employees	34.46
3	4 or more employees	33.11
Groups	Age of the company	Percentage
1	0 to 42 months	47.97
2	> 42 months	52.03

Source: Created by the authors.

First, normality was tested by means of the Kolmogorov–Smirnov test (for degrees of freedom greater than or equal to 50) and the Shapiro–Wilk test (for degrees of freedom less than 50). As can be seen in Table 3, the data is supported at a significance level of 0.05 for all groups, except for region 4 (southwestern and northern Antioquia). This region reports an average competitiveness index of 6.08, which is lower than that of the other regions (see Annex 1), and a p-value of 0.017. Table 3 also presents the results of testing the homogeneity of variances using Levene’s statistic. The results support the fulfillment of this assumption at a significance level of 0.05.

Table 3. Tests for normality and homogeneity of variances
Tabla 3. Prueba de normalidad y homogeneidad de varianzas

Region	Test for normality			Test for homogeneity of variances			
	Statistic*	gl	Sig.	Levene’s statistic	gl1	gl2	Sig.
1	.966	28	.482	1.576	4	143	.184
2	.978	29	.790				
3	.964	32	.342				
4	.921	34	.017				
5	.964	25	.505				
Sector							
1	.087	60	.200*	2.112	2	145	.125
2	.083	52	.200*				
3	.988	36	.955				
Registration							
1	.057	91	.200*	1.177		146	.280
2	.087	57	.200*				
Number of employees							
1	.970	48	.252	.476	2	145	.622
2	.079	51	.200*				
3	.982	49	.634				
Age of the company							
1	.058	71	.200*	.505		146	.478
2	.082	77	.200*				

Source: Created by the authors.

Note: The Kolmogorov–Smirnov test was used to test group normality in each of the sample's characteristics when the degrees of freedom were greater than or equal to 50 and the Shapiro–Wilk test when the degrees of freedom were less than 50.

According to Table 4, there are no significant differences in the average competitiveness indices between the different regions ($F = .799$, $p\text{-value} = .527 > .05$). Differences, however, are observed between the different sectors ($F = 3.188$, $p\text{-value} = .044$) and the groups defined based on the number of employees ($F = 5.520$, $p\text{-value} = .005$). In order to determine which averages were different, Tukey's post-hoc tests were used, and the difference in averages between economic sector 2 (services) and economic sector 3 (trade and mixed activities) was 0.75 ($p\text{-value} = 0.044$). This indicates

a higher average competitiveness index (see Annex 2) for service companies (6.7961) than for agricultural companies (6.2047) and companies dedicated to trade and mixed activities (5.9236).

Table 4. Analysis of variance for three or more groups

Tabla 4. Análisis de varianza para tres o más grupos

Classification	Origin	Sum of squares	gl	Half a square	F	Sig.
Region	Between groups	6.815	4	1.704	.799	.527
	Within groups	304.799	143	2.131		
	Total	311.614	147			
Sector	Between groups	13.125	2	6.563	3.188	.044
	Within groups	298.489	145	2.059		
	Total	311.614	147			
Number of employees	Between groups	22.046	2	11.023	5.520	.005
	Within groups	289.568	145	1.997		
	Total	311.614	147			

Source: Created by the authors.

As for the differences between the groups defined based on the number of employees, Tukey's test yielded a difference of .89 (p-value = .007) and .74 (p-value = .026) for half group 3-half group 1 and half group 3-half group 2, respectively. Hence, we may conclude that ventures with 4 or more employees have a higher average competitiveness index than those with up to 3 employees.

Table 5 reports the differences in averages between the two groups defined based on registration status (registered and not registered at the chamber of commerce) and the two groups defined based on age of the company. As observed, the average competitiveness index is higher for companies registered at the chamber of commerce (t = 2.913 and p-value = .004), as well as for those that have been in the market for a longer time (t = -2.423, p-value = .017).

Table 5. T-test for the difference in averages between two groups

Tabla 5. Prueba t para la diferencia en la media entre dos grupos

Classification	t	gl	Sig. (bilateral)	Mean difference	Difference in standard error
Registration	2.913	146	.004	.69876	.23991
Age of the company	-2.423	146	.017	-.57110	.23568

Source: Created by the authors.

Competitiveness index analysis based on age of the company

The GEM project classifies entrepreneurs depending on the number of months their initiative has been operating, with a nascent entrepreneur having less than 3 months, a new entrepreneur having from 3 to 42 months, and an established entrepreneur having more than 42 months (GEM, 2017b).

In light of the above and based on the ten components that make up the competitiveness index (Lafuente et al., 2016), we calculated the average competitive index for each group of entrepreneurs (see Table 6), with the maximum possible scale for the competitiveness index (CI) being equivalent to a value of ten (Moreno-Gómez & Lafuente, 2019).

Table 6. Average of the components and competitiveness index according to the GEM criteria
 Tabla 6. Promedio de los componentes e índice de competitividad según los criterios del proyecto GEM

Pillar	Nascent entrepreneurs	New entrepreneurs	Established entrepreneurs
Human capital	0.6190	0.6533	0.7057
Product	0.6185	0.7115	0.7076
Domestic market	0.7161	0.6843	0.7197
Networks	0.5871	0.5588	0.6071
Technology	0.4948	0.6073	0.6442
Decision making	0.5844	0.6314	0.6795
Competitive strategy	0.5510	0.6246	0.7172
Marketing	0.5704	0.5562	0.6393
Internationalization	0.4816	0.4606	0.5247
Online presence	0.4652	0.5545	0.6136
CI	5.6880	6.0425	6.5587
Number of businesses	11	60	77

Source: Created by the authors.

To make the samples more homogeneous for the analysis in terms of number of companies, nascent and new entrepreneurs were grouped together, for a total of 71 companies, while established entrepreneurs included 77 companies. Then, a multivariate analysis was conducted to determine which of the ten components that make up the competitiveness index explain the difference in averages between the two groups defined based on age of the company. Hence, we consider the ten components to be the dependent variables, and the age of the company to be the independent variable.

A MANOVA was carried out to test the equality of the means of the different components that make up the competitiveness index between companies with up 42 months of being created (11 companies in the category of nascent entrepreneurs with 0–3 months and 60 companies in the category of new entrepreneurs with up 42 months) and companies with more than 42 months of being established (77 companies in this category).

In light of the above, the compliance of the assumptions of normality and homogeneity of variances between the two groups defined based on age of the company was verified. These assumptions must be supported to perform the MANOVA. Additionally, the Box's M test was employed to validate the assumption of equality of covariances of the dependent variables across the two groups ($F [55, 67903.815] = 0.950$; Sig. = 0.5804).

Wilks' Lambda was the contrast statistic used to verify if there were significant differences between the groups, yielding a value of .464 ($F = 17.679$; gl of the hypothesis = 9; gl of the error = 138; $sig. = .000$). With this result, it is reasonable to continue the analyses in order to establish where the difference lies. Figure 2 illustrates the estimated marginal means for each of the ten components of the competitiveness index. As can be seen, companies with more time in the market have a higher marginal mean than those with less time in the market, which, according to the classification of the GEM project, corresponds to the category of established entrepreneurs with an activity of more than 42 months paying salaries.

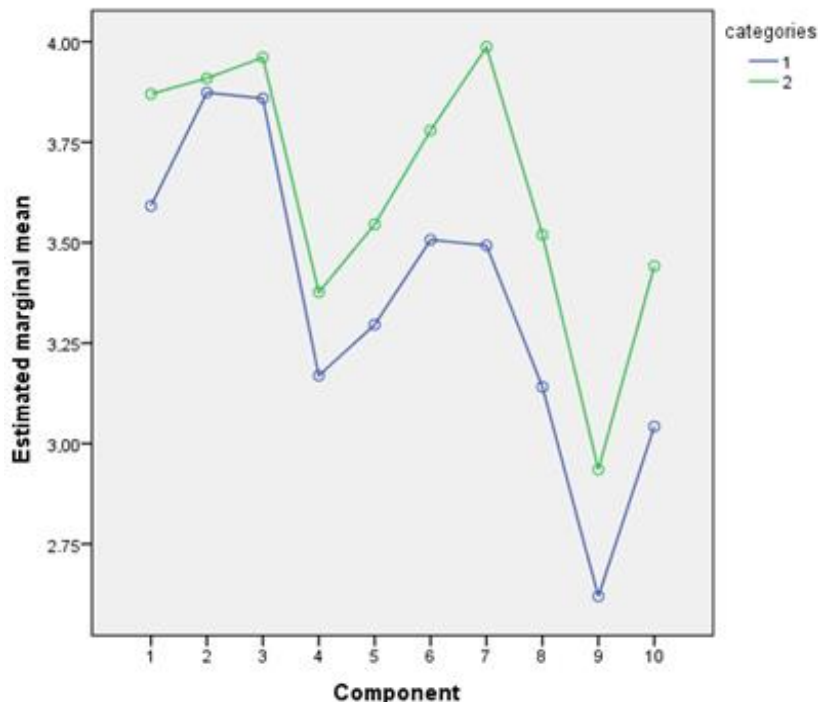


Figure 2. Estimated marginal means of competitiveness

Figura 2. Medias marginales estimadas de competitividad

Source: Created by the authors based on data from the World Bank (2019) and the Economic Commission for Latin America and the Caribbean (2019).

The MANOVA results (Annex 3) show significant differences in the *competitive strategy* and *marketing* components across both groups at a significance level of 0.05. Therefore, these two components are the ones that essentially limit a better performance in the competitiveness index.

5. DISCUSSION

The competitiveness index (CI) developed by Lafuente et al. (2016) has become a useful tool to measure business competitiveness on a scale from 0 to 10. In this study, the application of said instrument to rural entrepreneurship revealed that southwestern and northern Antioquia presents a significant difference with respect to the other regions in terms of rural entrepreneurship, with companies having an average competitiveness index of 6.08. The competitiveness index of

companies in the other regions that are closer in distance to Medellín is higher because these companies are closer to the capital or have greater links. In this regard, Debolini et al. (2015) show that peri-urban agriculture plays a key role in this dynamic, operating in a complex system that includes a large and diverse set of stakeholders acting to provide environmental and economic services to cities, thus improving competitiveness. Another important aspect highlighted in the literature is the possibilities of locating companies in rural contexts, which must be more competitive due to lower production costs (Phillipson et al., 2019).

According to the results of Tukey's post hoc tests, the difference in means between economic sector 2 (services) and economic sector 3 (trade and mixed activities) was 0.75 (p-value = .044). This suggests that service companies have a higher average competitiveness index (6.7971) than companies engaged in agricultural activities (6.2047). This situation also occurs in other contexts, as reported by Ferrando Perea (2015) and Ajaz et al. (2019). As noted by these authors, agricultural companies face greater difficulties due to their production factors. For their part, service companies, particularly in the field of tourism, promote the competitiveness of rural areas and their diffusion (Serrano-Amado et al., 2018).

Another notable aspect occurs with business formalization associated with companies that are registered at the chamber of commerce ($t = 2.913$ and $p\text{-value} = .004$), and it is also higher for companies that have been in the market for a longer time ($t = -2.423$, $p\text{-value} = .017$). After reviewing the parameters of the GEM project, Varela et al. (2020) pointed out that the level of competitiveness of the rural companies under analysis increases as they gain greater experience in their operation, with a competitiveness index of 5.68 for companies with less than 3 months of being created, a competitiveness index of 6.04 for those with 3 to 42 months of being established, and a competitiveness index of 6.55 for those with more than 42 months of being created. This is consistent with the findings of Baporikar (2021), who stated that gaining experience allows business to grow stronger.

The MANOVA results showed significant differences in the *competitive strategy* and *marketing* components across the groups defined based on age of the company at a significance level of 0.05. These two components, thus, limit a better performance in the competitiveness index. According to various authors, marketing and market access have been one of the main challenges in improving the competitiveness of rural enterprises (Arias & Ribes-Giner, 2019; Marques et al., 2019; Piabuo et al., 2020). Likewise, a lack of preparation in entrepreneurial activities causes entrepreneurs to focus more on productive aspects rather than on value generation, which is usually capitalized by intermediaries who do have opportunities of advantageous access to markets, while entrepreneurs tend to stay in small and local scenarios (Pato & Teixeira, 2016).

6. CONCLUSIONS

The competitiveness index was useful in understanding the performance of different sectors in which students in their final semesters and graduates from different agricultural sciences programs have ventured in the department of Antioquia. One of the most significant findings is the fact that the closer the companies are to Medellín (preferably in the eastern region of Antioquia), the higher their competitiveness. In addition, this finding reaffirms the fact that when a high level of business formalization is achieved, this has an impact on the competitiveness of business initiatives.

Among the various sectors considered in this study, service companies tend to be more competitive than agricultural enterprises located in rural areas of Antioquia because the latter depend on production factors in a context of uncertainty, which lowers their competitiveness indices. When analyzing the performance of the competitive index's pillars, difficulties were observed in competitive strategy and marketing, which may be explained by the fact that entrepreneurs are usually trained in technical but not in business matters. This should be reviewed in the curricula of the faculties of agricultural sciences in order to complement this missing knowledge and, thus, improve the future performance of enterprises.

A direct correlation between level of business formalization and age of the company could be here established, with the competitiveness index increasing consistently from 5.68 for new companies to 6.55 for established companies (with more than 42 months of being operating) as they register at the chamber of commerce and grow older.

Considering the foregoing, it can be concluded that companies founded by agricultural sciences students, whose ages fall within the millennial age group, can be considered to be at a medium level of competitiveness, with the need to improve factors such as product, innovation, networking, and aspects associated with business management, as shown in Table 6, where the values of the pillars were below 0.7 in all cases. This should motivate work routes for those who participate in the ecosystem of rural entrepreneurship promotion, with the aim of boosting the economic and social development of these territories.

7. LIMITATIONS OF THE STUDY

Of the 1242 questionnaires sent, 432 (34.78%) were responded, of which 11.91% (148 enterprises) were new or already established businesses. Likewise, only 11 companies fell within the category of 0 to 3 months of operation, while 60 fell within the category of 3 to 42 months of operation and 72 within the category of more than 42 months of operation. Future research should, thus, be able to include a larger sample of nascent companies.

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CONFLICTS OF INTEREST

The authors declare no conflicts of financial, professional, or personal interests that may inappropriately influence the results that were obtained or the interpretations that are proposed here.

AUTHORS' CONTRIBUTIONS

All authors made substantial contributions to the research. Each of their contributions are specified below.

Francisco Javier Arias-Vargas: Conceptualization, validation, formal analysis, investigation, resources, writing-original draft preparation, writing-review and editing, visualization, supervision, project administration, funding acquisition.

Gabriela Ribes-Giner: Conceptualization, methodology, validation, investigation, resources, supervision, project administration, funding acquisition.

Luis Fernando Garcés-Giraldo: Conceptualization, methodology, software, validation, data curation, writing-review and editing, visualization.

Diana María Arango-Botero: Conceptualization, validation, data curation.

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ANNEX

ANNEX 1. Average competitiveness index by region
 ANEXO 1. Índice de competitividad promedio por región

	Eastern Antioquia	Valle de Aburrá except for Medellín	Medellín	Southwestern and northern Antioquia	Others
Human capital	0.6962	0.6531	0.6485	0.6826	0.7182
Product	0.7032	0.7164	0.7780	0.6371	0.6781
Domestic market	0.6673	0.7373	0.7041	0.7383	0.6664
Networks	0.5925	0.5612	0.5744	0.6071	0.5938
Technology	0.5945	0.6076	0.7079	0.5802	0.5934
Decision making	0.6216	0.6567	0.6834	0.6401	0.6622
Competitive strategy	0.6120	0.6810	0.6920	0.6789	0.6660
Marketing	0.5797	0.6234	0.6495	0.5261	0.6357
Internationalization	0.4994	0.4191	0.5595	0.4987	0.4936
Online presence	0.5416	0.6167	0.6650	0.4945	0.5795
CI	6.1081	6.2725	6.6622	6.0837	6.2868

Source: Created by the authors.

ANNEX 2. Average competitiveness index by economic sector
ANEXO 2. Índice de competitividad promedio por sector económico

	Agriculture, livestock, and agro-industry	Services	Trade and others
Human capital	0.6819	0.7386	0.6453
Product	0.6965	0.7703	0.6622
Domestic market	0.7090	0.7569	0.6599
Networks	0.5970	0.7019	0.5100
Technology	0.5962	0.6892	0.6027
Decision making	0.6582	0.7137	0.5990
Competitive strategy	0.6684	0.6605	0.6449
Marketing	0.5914	0.6885	0.5547
Internationalization	0.4964	0.4407	0.4686
Online presence	0.5097	0.6358	0.5764
CI	6.2047	6.7961	5.9236

Source: Created by the authors.

ANNEX 3. MANOVA results
ANEXO 3. Resultados del MANOVA

Origin	Dependent variable	Type III sum of squares	gl	Root mean square	F	Sig.
Age of the company	HUM_CAP	2.867	1	2.867	2.302	.131
	PRO	.047	1	.047	.049	.824
	DOM_MARK	.383	1	.383	.446	.505
	NETW	1.592	1	1.592	.937	.335
	TECH	2.303	1	2.303	1.633	.203
	DEC_MAK	2.736	1	2.736	2.482	.117
	COMP_STRAT	9.017	1	9.017	12.334	.001
	MARK	5.296	1	5.296	4.161	.043
	INT	3.673	1	3.673	2.100	.149
	ONL_PRE	5.890	1	5.890	3.498	.063
Error	HUM_CAP	181.856	146	1.246		
	PRO	140.223	146	.960		
	DOM_MARK	125.475	146	.859		
	NETW	248.050	146	1.699		
	TECH	205.880	146	1.410		
	DEC_MAK	160.993	146	1.103		
	COMP_STRAT	106.733	146	.731		
	MARK	185.812	146	1.273		
	INT	255.408	146	1.749		
	ONL_PRE	245.860	146	1.684		
Total corrected	HUM_CAP	184.723	147			
	PRO	140.270	147			
	DOM_MARK	125.858	147			
	NETW	249.642	147			
	TECH	208.182	147			
	DEC_MAK	163.730	147			
	COMP_STRAT	115.750	147			
	MARK	191.108	147			
	INT	259.081	147			
	ONL_PRE	251.750	147			

Source: Created by the authors.