STRATEGIC GROUPS IN PRIVATE HIGHER EDUCATION

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(GRUPOS ESTRATÉGICOS EN EL SECTOR PRIVADO DE LA EDUCACIÓN SUPERIOR)

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ABSTRACT

This paper aims to characterize institutional diversity in the private side of the Colombian higher education system. The classification techniques that are used in the existing literature compare private higher education institutions with their public counterparts and run the risk of underestimating the impact of the market as a source of institutional differentiation. We propose an alternative classification that allows to overcome this limitation. We obtain a multidimensional classification of private higher education institutions and analyze the relation between their institutional characteristics and sources of differentiation. The study focused on the Colombian higher education system because it is among countries with the highest rates of privatization worldwide. We identified five strategic groups of private higher education institutions. Options such as distance education, technical and technological programs, and postgraduate training are key factors in determining the differences across Colombian private higher education institutions. The approach followed in this paper could be used to identify potential paths for the development and expansion of private higher education institutions, further contributing to the sustainability and competitiveness of higher education systems.

KEYWORDS

Strategic groups, private sector, Higher Education, university classification

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RESUMEN

El objetivo de este artículo es identificar grupos estratégicos en el sector privado de un sistema de educación superior. Las técnicas de clasificación tienden a comparar conjuntamente a las instituciones de educación superior privadas con sus contrapartes públicas, y corren el riesgo de subestimar el impacto del mercado como fuente de diferenciación institucional. En este artículo, se propone una clasificación que permite superar estas limitaciones. Para ello, se aplican técnicas de clasificación basadas en indicadores de la oferta de formación como variables explicativas de las estrategias de absorción de la demanda. Como resultado, el artículo ofrece una clasificación de las instituciones privadas en un conjunto de grupos estratégicos, y analiza la relación entre sus características institucionales y las estrategias que las diferencian. La aplicación empírica se ha llevado a cabo en el sistema de educación superior colombiano, ya que cuenta con uno de los mayores índices de privatización en el mundo. Nuestros resultados indican que la educación a distancia, la oferta de programas técnicos y tecnológicos, y la formación posgradual, son estrategias determinantes en la diferenciación de las instituciones colombianas. La aproximación empleada en el artículo podría utilizarse para abordar las posibles vías de crecimiento o expansión de las instituciones privadas en función de su identidad estratégica, contribuyendo así a la a la sostenibilidad y competitividad de los sistemas de educación superior.

PALABRAS CLAVE

Grupos estratégicos, sector privado, Educación Superior, clasificaciones universitarias

INTRODUCTION

Diversity analyses have been applied in many fields of higher education (Huisman, Lepori, Seeber, Frølich, and Scordato, 2015). However, despite their relevance in the growth and sustainability of higher education systems (Kwiek, 2018), there are not many examples of their implementation in the private sector (Álvarez, 2013; Levy, 2009). The literature focuses primarily on typology designs that classify private higher education institutions (PHEIs) alongside their public counterparts, considering private and public institutions as being homogeneous among themselves (e.g., Navas *et al.*, 2020), which is far from the reality. PHEIs, by their very nature, must implement strategies to compete for the best resources, students, and teachers (Brunner, 2009). When resources are scarce, private institutions must develop educational offerings that reach other market niches and attract new users (Teixeira, Rocha, Biscaia, and Cardoso, 2012; Wilkins, 2019). The present study

analyzes the diversity of the private sector, focusing on whether the differentiation of educational offerings reflects the strategies adopted by PHEIs.

In practice, the available typologies have limited use in assessing the private sector (Álvarez, 2013). This is because, first, most of them assume a "one size fits all" institutional profile (Sánchez-Barrioluengo, 2014) and do not consider university strategies to be a qualifying principle (Benneworth, Pinheiro, and Sánchez-Barrioluengo, 2016). Second, they tend to be static typologies that do not reflect the dynamics of PHEIs between market segments[i] (Texeira *et al.*, 2012; Wilkins, 2019) or the emergence of new academic products and services (Brunner, 2009). To address this gap in the literature, PHEIs are classified by introducing the concept of strategic groups that originates from Porter's theories and is widely discussed by Meilich (2019). From this perspective, a strategic group brings together a homogeneous set of PHEIs that have educational offerings structured in a similar way and achieve comparable enrollment rates because they pursue identical strategies. In this sense, this article offers an initial reflection on whether or not the private sector is segmented into PHEI groups that reflect their adoption of common strategies.

To achieve this objective, the characteristics that explain the private sector's segmentation are analyzed using an empirical study of Colombian PHEIs. In turn, the differentiation of these institutions is assessed to determine if it is linked to their institutional profile or to the strategies they follow. The situation in Colombia constitutes an ideal scenario for this article's objectives. In the last decade, Colombia is among countries with the highest rates of privatization according to figures published by the Organization for Economic Cooperation and Development (OECD, 2018).

In this article, PHEIs are classified by applying a multidimensional, descriptive methodological approach (La Torre, Casani, and Sagarra, 2018). This methodological alternative was chosen because it can be used to establish typologies of PHEIs based on the differences or similarities among the multiple dimensions that make up their educational offerings. The article contributes to the literature by characterizing the private sector from a strategic perspective. Adopting the concept of strategic groups provides information about which groups are models in the sector (Ketchen, Snow, and Hoover, 2004), the potential paths of evolution for the groups, and the type of barriers that can influence their evolution (Meilich, 2019). Therefore, the article's objectives could be useful for education sector

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administrators in designing their organizational strategies, as well as for public managers in designing or improving policies that affect the performance and sustainability of higher education systems (Ketchen *et al.*, 2004).

The article is organized as follows. Section 2 presents a review of the literature on institutional diversity and differentiation in the private sector. Section 3 describes the specific characteristics of the empirical analysis covered in the article. Section 4 presents the results of the empirical study. The final section discusses the results obtained in light of the state of the art.

Institutional diversity in the private sector

Institutional diversity is defined as the variety of HEIs that exist at a given time in a system (here, the PHEI) based on their institutional characteristics (Van Vught *et al.*, 2010). The literature offers different methodological approaches to measure the diversity of higher education systems (Huisman *et al.*, 2015). The most recognized are related to the differentiation processes that occur in HEIs (Rossi, 2009) in a horizontal or vertical dimension (Daraio *et al.*, 2011).

A strategic group is defined as a subset of institutions (here, PHEIs) that have similar characteristics and that differ from other institutions/groups in the same industry (i.e., the private sector of higher education) (Meilich, 2019). This definition assumes that the industry is heterogeneous and made up of groups. It also assumes that these groups are made up of institutions that follow similar strategies (Ketchen *et al.*, 2004). Thus, it is reasonable to assume that there will be strategic groups in the private sector to the extent that there is sufficient heterogeneity in consumer markets and academic products or services as demonstrated by Dan *et al.*, (2009), Duan (2019), and Wilkins (2019).

Traditionally, the private sector in higher education is distinguished strictly in terms of legal ownership (Levy, 2013). In this sense, the literature refers to PHEIs as non-profit institutions (although more and more countries are encouraging the existence of for-profit PHEIs), which are autonomous in decision-making and governance (Raza, 2009). These institutions emerge mainly in environments in which the regulatory framework assigns them an institutional profile (e.g., academic nature and institutional quality, among others) or they decide autonomously on the social and economic segments to which they are directed (Levy,

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2009). Demographic changes, a growing diversified labor market for graduates, and the emergence and growth of new disciplines have supported increased differentiation of PHEIs (Carpentier, 2018). However, other dynamics coexist in which competition, regulation, and academic interests generate imitative behaviors (Darraz and Bernasconi, 2012). These are conditions that have been unfavorable for diversity in the private sector as less adaptable PHEIs leave the market (Kwiek, 2017).

The literature describes two approaches when classifying the private sector (Álvarez, 2013). In the first and most common approach, PHEIs are compared together with public institutions (e.g., Aldas, Escribá, Iborra, and Safón, 2016). Studies point to PHEIs as a strategic group whose institutions are differentiated primarily by their specialization in their teaching mission (particularly graduate studies) and their high concentration in certain knowledge fields. In the second, more uncommon approach, the literature describes typologies only of PHEIs. In this sense, the most well-known classification is from Levy (2009), who proposes a typology based on PHEIs' ability to attract and select students. Based on his proposal, the terms "elite universities" and "non-elite or demand-absorbing universities" were coined. The former refers to PHEIs that compete for both elite students and prestigious academics. In contrast, "non-elite" universities are those that tend to be less selective in student admissions and in which short-term and low-cost programs predominate, especially in the fields of social and administrative sciences. However, when the aim is to evaluate the private sector in a particular context, this classification is only indicative. Therefore, it is necessary to classify PHEIs and review the effectiveness and validity of the types identified by the literature (Álvarez, 2013).

EMPIRICAL ANALYSIS

Colombian private sector

Historically, most of the Colombian higher education system has been private (Levy, 2013). The percentage of PHEIs compared to their counterparts in the public sector was 71.1% in 2018. In Colombia, the majority of PHEIs are universities[ii], recognized as university institutions/technological schools (hereinafter, "UIs") and universities, which combined represent 69% of the system.

Academic nature and the size of the organization are the factors typically used to classify Colombian HEIs (Navas *et al.*, 2020). Based on regulations, the distinction between UIs and universities has clear implications with regard to how these institutions introduce and develop their academic offerings. Universities must explicitly incorporate doctoral educational offerings, closely related to research and service missions, while UIs can introduce these missions into academic training gradually and with fewer requirements. Over the years, this has led the number of private universities to remain constant in Colombia, and they have expanded to open new campuses. In contrast, UIs have doubled in number and now dominate the Colombian private sector.

In the 2018 academic year, 153 PHEIs were active in Colombia. The sample used in this empirical analysis is comprised of 144 PHEIs that meet the following criteria: 1) PHEIs that are legally incorporated by economic or social sectors independent of the state; 2) their academic nature corresponds to that of UIs and universities; 3) PHEIs that fulfill the three higher education missions (i.e., teaching, research, and service); 4) the dominant educational offerings correspond to academic programs at levels 6, 7, and 8[iii]; and 5) PHEIs with current enrollment to provide higher education in Colombia and that have valid (active) qualified enrollment to provide at least two university undergraduate programs (level 6). The descriptive statistics of the Colombian institutions are available in the attached documentation (Appendix 1).

Differentiation: variables and indicators

This article focuses on a dimension of diversity known as "horizontal differentiation." This concept describes the variation of core activities by PHEIs that are offered to well-defined target audiences (Daraio *et al.*, 2011). The analysis is limited to characterizing this dimension in terms of the existing educational offerings in the private sector and their relation with enrollment rates, which the literature finds to be the most appropriate dimensions to assess the diversity in the private sector (Álvarez, 2013). To classify and characterize the PHEIs, the variables directly related to the strategies they apply are chosen, which are sources of differentiation (Huisman *et al.*, 2015; Rossi, 2009). They also explain the market share that the PHEIs are targeting (Brunner, 2009; Levy, 2009). Producing doctoral academic offerings and the number of doctoral students are considered indicators of PHEIs' participation in research (Huisman *et al.*, 2015; Sánchez-Barrioluengo, 2014). The 25

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variables used are shown in Table 1. To ensure that the results are independent of the measurement scale, the variables are standardized in a distribution with a mean of zero and a variance equal to 1.

The academic offerings produced are calculated as the total sum of the number of academic credits taught per year (Sav, 2016). This measure was chosen over other measures used in the literature because the production effort among PHEIs can be standardized. It also reflects the close relationship that exists between the results, the requirements, and the total costs associated with offering these programs (*ibid*). The diversity of educational offerings is described based on three aspects: education levels, delivery methods, and fields of study[iv]. The GINI index was used to characterize PHEIs' concentration in education levels (including the delivery method) and the degree of disciplinary specialization (fields of study) (Huisman *et al.*, 2015; Rossi, 2009). These indicator values range between 0 and 1, and when the PHEIs obtain a value close to or equal to 0, they are called generalists because the disciplinary distribution or levels of education tend to be similar to the distribution among the private sector in general.

The institutional profile was defined based on each institution's academic nature, years established, territorial scope, and size. Three ranges for years established were determined, which differentiate between pre-1991, post-1991, and old HEIs (i.e., over 50 years old) related to the enactment of higher education Law 30 in 1991. The size was defined based on the total number of students enrolled, and four size ranges were established: small (i.e., less than 5,000 students), medium (i.e., between 5,000 and 10,000), large (i.e., between 10,000 and 40,000), and very large (i.e., more than 40,000 students). The territorial scope is described in terms of the size and urban development of the city where the PHEI is located (i.e., large, intermediate, or small city) or if it is located in several cities (i.e., multi-campus).

A database was developed with the above variables from 2014 to December 2018. This time period was chosen because it corresponds to the implementation of policies and strategies for the widespread availability of higher education in Colombia (OECD, 2016). The information was extracted from public reports generated by the National Information System for Higher Education ("SNIES" in Spanish) and administered by the Ministry of National Education ("MEN" in Spanish) in Colombia. To ensure proper management of institutional information, the PHEIs are identified using coded assigned by the SNIES.

Classification of Private Higher Education Institutions

The empirical analysis was carried out in two stages. First, the multidimensional scaling technique (MDS) was applied to test whether or not the Colombian private sector is heterogeneous. The MDS is a robust technique to analyze variables with outliers and redundant variables. In turn, it does not require compliance with the assumption of normality in the original data. In addition, the results that it yields are not influenced by the number of variables (Borg, Groenen and Mair, 2012)

The MDS assumes that similar PHEIs tend to be close in the resulting multidimensional space (Sagarra, Mar-Molinero, and Rodríguez-Regordosa, 2015). This involves reducing the dimensionality of the 25 selected variables and measuring the distances between the PHEIs. To decide the number (m) of dimensions that optimally explains the multidimensional space, different dimensions are modeled in the MDS until the best fit model is obtained, using the *Stress-1* statistic as reference. The distances between PHEIs are calculated using the Euclidean distance. This is an appropriate measurement for the purposes of this article because it identifies significant differences between two PHEIs that are isolated and, in turn, ignores the small differences that may exist between similar PHEIs (Borg *et al.*, 2012). Based on these results, a symmetric matrix of proximities and another matrix of distances were generated. These matrices are used to configure the multidimensional space.

We propose identifying the groups using a dual logic, that is, that they are internally homogeneous and heterogeneous among themselves. With this objective in mind, a cluster analysis was conducted on the coordinates of the PHEIs in the m-dimension space resulting from the MDS. The groups are formed by applying Ward's method to maximize the homogeneity within each group and the heterogeneity among them. The degree of distortion between the resulting dendrogram and the original relationships between PHEIs is determined using the cophenetic coefficient. To confirm whether the resulting groups coincide with the proposed dual logic, an analysis of similarities (ANOSIM) was applied to the normalized distances between PHEIs in the space formed by the m-dimensions. Using the R statistic, the hypothesis of homogeneity within groups and heterogeneity between groups was tested.

A fit analysis (*Profitt*) was used to identify the variables that characterize the resulting groups. This analysis consists of a linear regression between the coordinates resulting from

the MDS (x-*axis*) and variables (*y-axis*) for each PHEI. The standardized regression coefficients ($\beta_{1\ m}$) allow the position, direction, and length of the variables' vectors to be shown with respect to each *m*-dimension. To test whether the institutional profile explains the resulting clustering, an external Profitt analysis was performed (Sagarra *et al.*, 2015). The F and R^2 statistics are used as regression fit indicators. In addition, an ANOVA is performed, and the F and Levene statistics are used to test the hypothesis that the differences between the means can be explained by the groups.

To test whether the resulting groups represent strategic groups, considering the definition provided above, the relationship between the distinctive characteristics of educational offerings and enrollment rates was evaluated. A linear regression analysis was conducted, and the correlation coefficients were used as indicators (values close to 1) of the strategic characteristics in each group. The coefficient's statistical validity was assessed using the *p-value* from the F statistic.

RESULTS AND DISCUSSION

In the Colombian private sector, the number of students enrolled for the first time has increased between 2014 and 2018. In this period, graduate enrollment increased by approximately 25%, and undergraduate university enrollment continues to grow (7% increase) after a scholarship program was launched for low-income students interested in attending accredited private universities. However, the number of students enrolled in technical and technological programs decreased by 1% because of Colombian students' preference to enroll in professional degree programs. In the same period, the total number of academic programs increased by 20%, especially those designed to offer remote education, which doubled in number. However, while distance education growth rates exceed in-person ones, figures from other countries indicate that remote education in Colombia could grow even faster (OECD, 2016).

Table 1 presents the descriptive statistics of the educational offerings in the Colombian private sector between 2014 and 2018. An initial analysis indicates that there are differences between UIs and universities. On average, Universities tend to have more undergraduate students and more diverse educational offerings than UIs. The results obtained by the Levene statistic show that academic nature is significantly related to a PHEI's number of years established and size (i.e., number of enrolled students), which are commonly used

in the literature to characterize institutional profiles. Statistics also show that there are significant differences in the number of graduate students, academic programs, and academic credits awarded[v]. However, it is important to pay close attention when attributing these differences to academic nature because in these cases, the aggregate variance is greater than the total variance (Table 1. With these results, it can be concluded that the data aggregated by academic nature can disguise the dynamics of institutional differentiation. Therefore, they do not allow noting the existence of other factors that are key in classifying PHEIs.

Table 1
Descriptive variables and statistics

Aspect		Variable description	Ave.	Dev.	Academic Nature Comparison	
					ANOVA	Levene
Institutional Profile		Academic nature				
		Territorial scope				
		Year established				
	V1	Years established through July 2019	36.0	16.9	0.000**	0.800 [a]
Size 2014–2017	V2	Total number of students enrolled	7769.2	12463.2	0.000**	0.633 [a]
	V3	Undergraduate	6987.8	11735.5	0.002**	0.782 [a]
	V4	Graduate	781.6	1440.9	0.000**	0.000
	V5	Total number of programs	24.0	55.7	0.000**	0.000
	V6	Undergraduate	16.0	21.1	0.000**	0.270 [a]
	V7	Graduate	12.0	44.4	0.000**	0.000
In-person activity (2014–2017)	V8	Total sum of in-person academic credits	1515.0	1714.2	0.000**	0.000
	V9	Undergraduate (except health)	527.6	541.0	0.000**	0.000
	V10	Undergraduate, health	104.9	83.5	0.001**	0.000
	V11	University majors	419.8	609.4	0.000**	0.000
	V12	Master's	369.2	429.1	0.000**	0.000
	V13	Health majors	746.5	914.2	0.001**	0.000
	V14	Doctorate	105.5	99.5	0.000**	0.000
Remote activity (2014–2017)	V15	Technical	113.3	148.7	0.364	0.043 [a]
	V16	Technological	167.0	161.6	0.180	0.038 [a]
	V17	Technical academic credits	91.0	64.3	0.374	0.059 [a]
	V18	Technological	99.8	74.0	0.631	0.234 [a]
	V19	Undergraduate, all campuses	148.4	126.2	0.657	0.707 [a]
	V20	University majors	96.6	85.6	0.025	0.237 [a]
	V21	Master's	76.0	72.3	0.000**	0.000
Major (GINI Index) and Diversity (H index)	V22	Major educational offerings	0.9	0.1	0.000**	0.753 [a]
	V23	Diversity educational offerings	4.0	2.8	0.000**	0.119 [a]
	V24	Curriculum major	0.9	0.1	0.000**	0.949 [a]
	V25	Curriculum diversity	7.0	4.2	0.000**	0.746 [a]

[a] Indicates the homogeneity of variances. ** The difference in means is significant at the level of 0.05.

To test whether the Colombian private sector is heterogeneous, an MDS was modeled for spaces formed between *1*-dimension and up to *7*-dimensions. The *Stress-1* statistic gradually decreases until the lowest values are found in the *6*-dimension and *7*-dimension models. Between the two, the *7*-dimension model was discarded because the value of the *Stress-1* statistic increases slightly. The goodness and fit measure of the *6* dimensions equals 0.05, which is considered excellent based on Kruskal's classification (Borg *et al.*, 2012). Therefore, it is estimated that it is an optimal solution to represent the heterogeneity of the Colombian private sector.

The following examines whether groups of PHEIs exist in the 6-dimensional space by applying a cluster analysis. To find which of these institutions tend to be grouped based on their proximity, the six coordinates that position each PHEI in the MDS are used as reference measures (see **¡Error! No se encuentra el origen de la referencia.**). The result of this analysis divided the PHEIs into five groups (Figure 1). Initially, four groups were identified (distance of 4). However, the larger group was subdivided into two groups using a shorter distance. The cophenetic coefficient (value 0.82) was used to conclude that the dendrogram offers an optimal solution to characterize the resulting groups. When comparing the degree of similarity between groups, they were found to be different ($R = 0.71$). Based on this result, the 5-group model was chosen because the mean range between groups is significantly higher than within groups. This result supports the idea that the five resulting groups respond to the dual logic that is required to establish strategic groups.
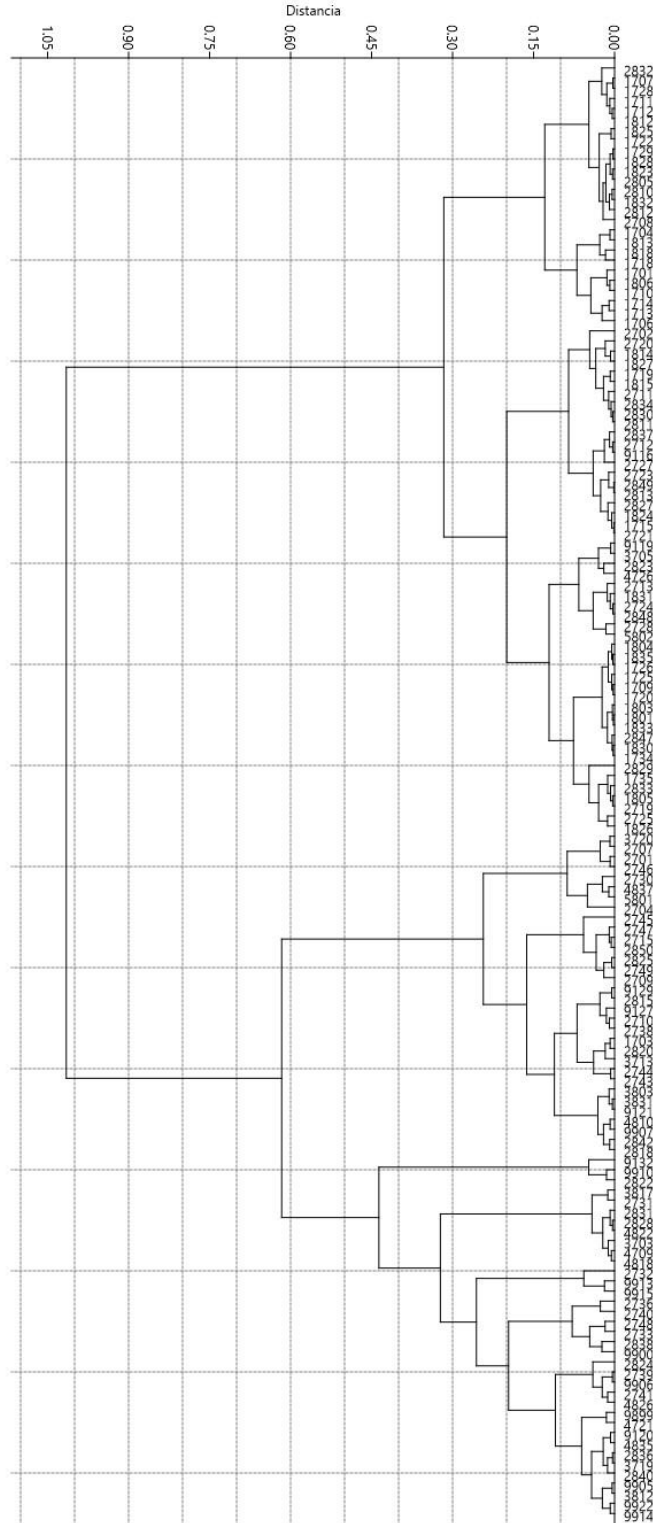
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Figure 1. Dendrogram

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The groups identified correspond to a common institutional profile. The characterization of the groups based on the PHEIs' academic nature, years established, territorial scope, and the size provided the following profiles. The first Group (C1) combines the oldest universities, primarily multi-campus and of large or medium size. The second (C2) groups has six UIs, including the three largest and those that have been established the longest in the country (pre-1991). The third Group (C3) is made up of UIs and medium to small universities with a track record in the sector (pre-1991) and located in intermediate or small cities. The fourth group is subdivided into two groups. The first subgroup (C4) includes the smallest UIs in the sector found in large cities, while the second subgroup (C5) includes UIs and some small universities with experience in the sector (pre-1991) located primarily in small cities.

An initial analysis of the MDS showed that the proximity of PHEIs in Dimension 1 is primarily defined by size, placing small PHEIs on the right side and larger institutions on the left (Figure 2). However, when comparing the degree of similarity between groups, the ANOSIM result shows that some are closer than others (Table 2). First, it is clear that the groups with medium and small PHEIs (groups 3, 4, and 5) are close and that this proximity is independent of their academic nature. The results also show that the two groups with larger PHEIs (groups 1 and 2) differ from each other and from other groups in that universities tend to differ from UIs when working at higher enrollment rates. This result has two implications using the perspective of strategic groups adopted in the article. First, the scale of work represents one of the key factors in classifying Colombian institutions, as reported by Navas *et al.* (2020). Second, the academic nature can become a barrier to the evolution of PHEIs that operate at larger scales (Meilich, 2019). Thus, the division of labor between universities and non-universities is clear among larger PHEIs, while in medium and small PHEIs, the limits seem blurred, similar to what occurs in other emerging countries (Arimoto, 2014).

Table 2
Similarity analysis

| | | R statistic | | | | |
		C1	C2	C3	C5	C4
	NoPHEIs	13	6	33	59	33
Bonferroni Sig.	C1		0.757	0.804	0.925	0.981
	C2	0.002		0.949	0.974	0.993

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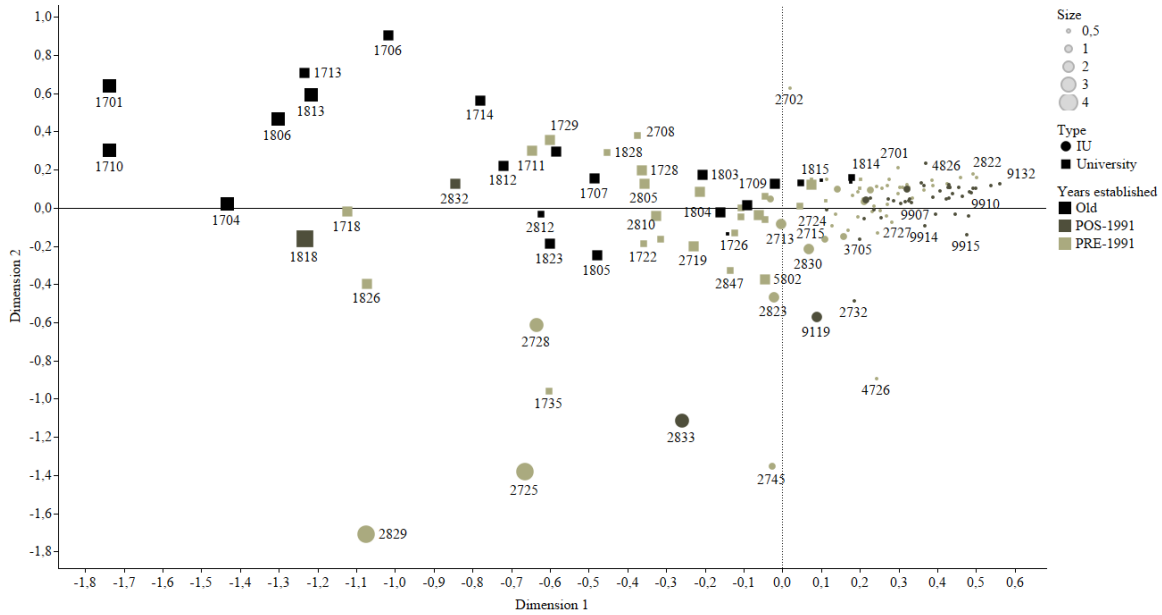|					
C3	0.001	0.001		**0.396** [a]	0.859
C5	0.001	0.001	0.001		**0.574** [a]
C4	0.001	0.001	0.001	0.001	

[a] High similarity

Figure 2. Institutional Profile Distribution in MDS

The Profitt analysis is used to understand the characteristics of the educational offerings that differentiate the groups and various types of PHEIs (**¡Error! No se encuentra el origen de la referencia.**). This analysis coincides with the vector that each variable represents through a 6-dimensional space so that a particular characteristic of the PHEIs grows in the same direction as the vector. To more easily interpret them, the vectors were represented in the first two dimensions, and the PHEIs were differentiated by group (Figure 3).
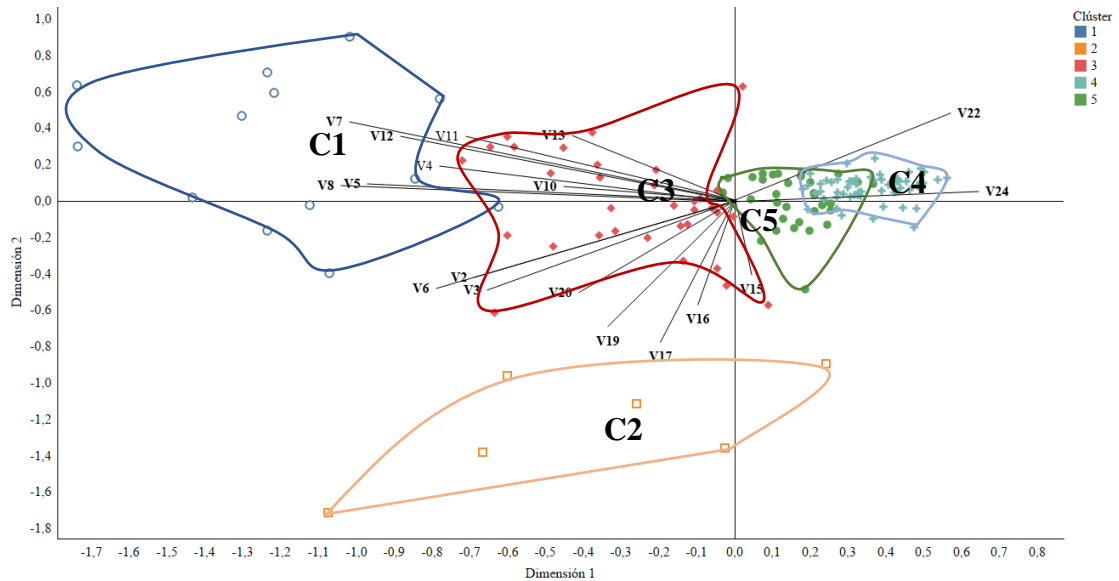
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Figure 3. PHEI group in multidimensional space (MDS)

The distribution of PHEIs in the Dimension 1 is primarily determined by two factors. The first factor corresponds to the volume of academic offerings produced, explained in terms of the total number of programs and the total sum of academic credits. PHEIs that offer the largest number of programs and have high production levels in academic credits per year are placed on the left. The second factor is the degree of specialization in their educational offerings, with the right side showing UIs specialized in a few training levels or a single field of study. In contrast, the left side shows universities with diverse academic production in both training levels and fields of study. *This suggests that Dimension 1 can be labeled "volume of educational offerings vs. specialization."* Analyzing the Dimension 2 (Figure 3), it can be seen that the lower part includes institutions with more educational offerings in technical and technological areas, both in-person and remotely. The PHEIs found here (Group 2) are, among others, the largest and fastest-growing UIs in remote education. At the top of this dimension are primarily universities of graduate studies, particularly majors and master's degrees (groups 1 and 3). *This suggests that Dimension 2 can be interpreted as aimed at offering widely available technical and technological training vs. graduate education.*

To examine whether the different educational offerings reflect the strategies that the identified groups adopt in competing for students, the variation in the number of programs is

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correlated with the variation in enrollment rates for each group. In total, three regressions were performed, using total enrollment rates (regression 1), undergraduate rates (regression 2), and graduate rates (regression 3). The results obtained from these regressions served to identify the strategies that the groups adopted to attract more students (Table 3). The regression for total enrollment revealed three strategies. The first strategy focuses on increasing and consolidating graduate program offerings, which positively and significantly affects the total enrollment rates of Group 1's PHEIs. Based on the correlation coefficient with graduate enrollment rates, this strategy is confirmed as primarily related to the increased supply of master's programs. While the increased number of university majors, doctorates, and medical majors also contributes to growth in enrollment, this ratio drops.

Table 3.
Regression coefficients

Dimension	Programs	C1	C2	C3	C4	C5
ENROLL_Total	N5-2018	−0.727	−0.255	**0.581***	0.148	0.148
	N5-2010	−0.383	**0.914***	0.267	0.024	−0.044
	N6-2018	−0.16	0.598	**0.468***	0.122	−0.061
	N6-2010	−0.357	**0.788**	−0.02	−0.275	−0.115
	N71-2018	0.1	0.409	−0.118	−0.093	0.012
	N71-2010	−0.385	−0.055	0.042	0.174	0.199
	N72y8-2018	**0.604**	0.253	−0.171	−0.157	0.057
	N72y8_2010	**0.747***	**0.805**	−0.176	−0.023	**0.304***
	Distancia-2018	0.045	−0.296	0.168	**0.416***	**0.279***
	Distancia-2010	0.091	**0.678***	0.068	−0.003	0.064
ENROLL_UNDER	N5-2018	−0.67	−0.259	**0.573***	0.153	0.158
	N5-Total	−0.614	0.102	**0.588***	0.141	0.116
	N6-2018	−0.166	0.597	**0.438**	0.112	−0.055
	N6-Total	−0.461	**0.845**	0.285	−0.173	−0.163
	Distancia5y6-2018	0.072	−0.3	0.24	**0.42***	**0.26***
	Distancia5y6-Total	0.081	0.125	0.241	**0.38***	**0.215***
ENROLL_GRAD	N71-2018	**0.398***	**0.647**	−0.023	**0.271**	**0.357**
	N71-Total	0.223	−0.018	0.11	**0.377***	**0.412***
	N73-Total	0.317	−0.698	0.031	0.017	.
	N72-2018	**0.721***	0.509	0.017	−0.353	0.217
	N72-Total	**0.705***	0.545	0.005	−0.283	0.26
	N8-2018	**0.381***	0.143	−0.315	**0.2***	0.153
	N8-Total	**0.52**	0.24	−0.296	**0.2***	0.153

Significance level: ***0.005; **0.05; *0.1

The second strategy focuses on increasing and consolidating undergraduate educational offerings, which positively and significantly affects total enrollment rates in Group 2's and 3's PHEIs. On the one hand, the increased technical, technological, and university undergraduate programs contribute significantly to increased enrollment in Group 3's PHEIs. On the other hand, consolidating in-person or remote university undergraduate programs supports enrollment growth in Group 2's PHEIs, which are the largest.

Finally, the third strategy is related to increasing remote educational offerings that are present in groups 4 and 5. The increase in remote technical, technological, and university undergraduate programs has significantly supported enrollment rate growth in Group 4's PHEIs and to a lesser degree in Group 5's PHEIs. In addition, the increased number of in-person undergraduate programs does not positively and significantly affect increased enrollment in Group 4's and Group 5's PHEIs.

The proposed strategic group's identity is as follows: the first group includes 13 universities. They are the oldest and the largest. *The strategic identity of this group is strongly focused on attracting graduate students for in-person learning.* Their educational offerings are dominated by graduate programs, in particular master's degrees and university majors. They have the most doctoral programs. Therefore, their educational offerings are based on the development of the research mission. Between 2014 and 2018, the growth dynamics in graduate educational offerings were related to the increased total number of students. As a result, there are more students at these training levels than in other groups.

Group 2 comprises UIs with the highest number of enrolled students, and they are based in large cities. *The distinctive feature of this group is undergraduate training, supported primarily by university professional training*. This group also has the highest levels of activity in producing academic offerings for technical and technological training, both in-person and remotely. However, because new undergraduate students were attracted by consolidated offerings before 2010, this is not considered to be part of the current strategic identity. However, while graduate training is emerging, the dynamics of growth in the number of university majors suggest that this is a growth strategy in enrollment that this group's PHEIs are implementing.

Group 3 is made up of 33 PHEIs. It consists primarily of universities and some small and medium-sized UIs, located primarily in intermediate and small cities. Compared to the

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other groups, *the distinctive feature of this group is undergraduate training*, *supported both in professional programs and technical and technological training programs.* However, it is striking that the number of graduate students has increased in recent years while program offerings have remained stable. This finding implies a greater intensity in the frequency in which programs are delivered, particularly in short cycles such as university majors. This fact highlights another possible growth strategy, which is to achieve a higher ratio of the number of students per program per year.

The fourth group is made up of 59 PHEIs. These are all small UIs. Most of them are new (post-1991) and are located in large cities. They have less and not very diverse academic production. *The strategic aim of this group is remote education*. The increased number of both undergraduate and university major programs taught via remote learning has supported the growth of enrollment in this group's PHEIs. The growth in the number of medical majors is also noteworthy, but its relationship with the increased number of graduate students is weak. Graduate training is emerging, especially that which requires high levels of research (not including doctoral programs).

Group 5 includes 33 PHEIs. They are UIs and some small universities with a specific trajectory (pre-1991), and are mostly regional. *This group is identified by their emerging educational offerings in health fields.* While levels of graduate academic production are low, the growth strategy is driven by increased offerings of university majors and master's degrees. In the period analyzed, the number of undergraduate students decreased despite efforts to increase remote education offerings. For this reason, this relationship was not considered a strategy to attract students.

Adopting the concept of strategic groups to manage the private sector in higher education can be very useful. In particular, it is useful to improve policies and coordination tools applicable to the higher education system because it helps to identify each group's role in its sustainability or competitiveness, allowing differentiated and focused policy objectives to be defined. As shown in Figure 4, the distribution and characteristics of the groups identified in Colombia lead education and science policymakers to consider different growth routes or alternatives for each group. For example, group C4 (Group 4), primarily made up of the newest UIs, has at least three alternatives to grow and develop. Similarly, the traditional C3 universities (Group 3), which appear to be stalled in their growth, or C1

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universities (Group 1), which appear to be limited to serving the domestic market, could take different paths. From this illustration, strategic groups such as those obtained in this study can be identified to provide valuable information to generate growth and competitive scenarios in the higher education system.
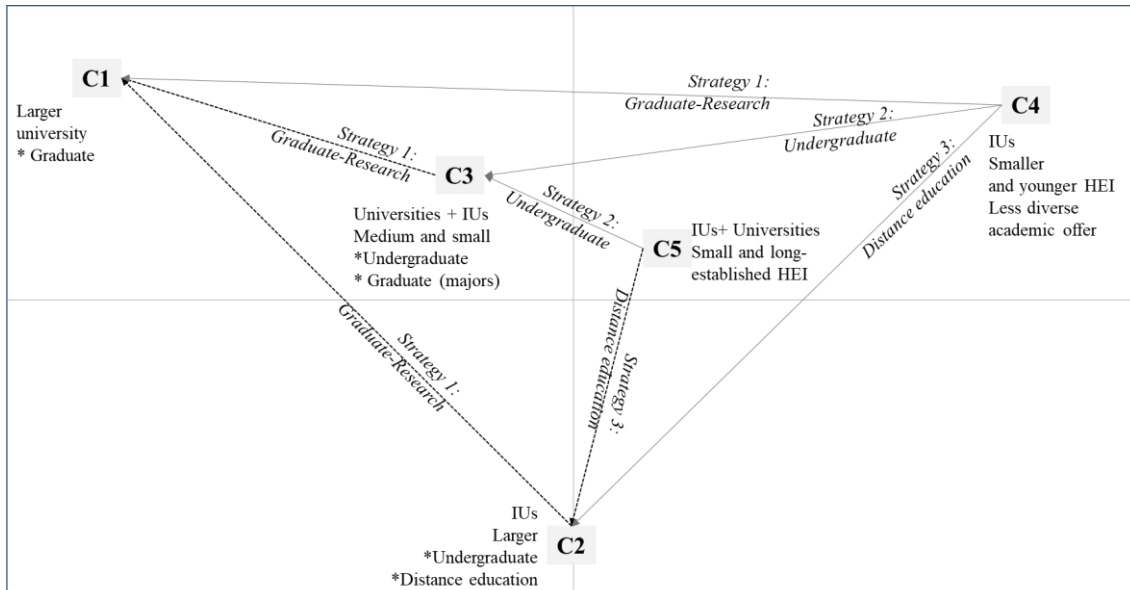

Figure 4. Potential paths for the identified private higher education institutions groups to progress and grow

CONCLUSIONS

This article presents five types of PHEIs that are considered "strategic groups" because they combine the institutions that tend to structure their educational offerings in a similar way from a strategic point of view (Meilich, 2019). The results show that remote education and technical and technological training are relevant differentiating factors in the private sector even in places like Colombia, where development in these markets is quite marginal (OECD, 2016). In this sense, despite the existence of a common regulatory framework, Colombian PHEIs are not only diverse in terms of their institutional profile but also have heterogeneous market interests. This likely leads to the existence of different structures to develop academic offerings (as demonstrated by Duan, 2019). This makes it necessary to pay greater attention to performance evaluations in the private sector, which could represent an interesting field for future research.

Other determining factors of diversity in the private sector are PHEI size and whether programs offered have greater research requirements (doctoral training). In the typology

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constructed in this article, only groups 1 and 2, primarily comprised of large universities, have significant doctoral offerings. This may suggest that the institutional differentiation of PHEIs could signify economies of scope in teaching and, in turn, in the development of research missions and their third mission (De Witte and Hudrlikova, 2013), which also merits attention in private sector performance evaluations.

Territorial scope plays a key role in defining strategic groups in the Colombian private sector. Clearly, the leading strategic groups in the private higher education sector in Colombia (groups 1 and 2) are found in the capital city (larger size and more urban development) and have spread to the rest of the country through multi-campus locations. In contrast, the regions include universities and UIs that maintain their strategic focus on undergraduate studies over the years (groups 3 and 5). Thus, territorial scope is a relevant source of differentiation. Not considering this when analyzing the performance of PHEIs could have undesirable consequences for the higher education system. In addition, not knowing the territorial scope would imply ignoring part of the contribution by these institutions to regional development (not reflected in current university classifications) and could lead to penalizing them. This could particularly affect PHEIs that focus on the third mission of this goal (Benneworth *et al.*, 2016). It could also be an interesting field for future research.

Even though Navas *et al.* (2020) use the same information as our study, the five groups they identified include public and private HEIs, and private HEIs do not constitute a separate strategic group, as is the case in similar studies (e.g., Aldas *et al.*, 2016; Sagarra *et al.*, 2015). In this sense, our study provides results that are focused on managing the private sector because of the strength of the MDS technique and the detailed characterization of the sources of diversity in this sector.

NOTAS

[1] The main market segments are undergraduate, professional graduate, advanced research degrees (doctorate), continuing education, remote education, business training, and research training (Brunner, 2009).

[1] Colombian regulations classify PHEIs into four types based on their academic nature. Technical professional and technological institutions are excluded from this research because their educational offerings focus on technical/technological and short-term programs. In addition, their role in conducting research and service missions is markedly lower compared to UIs and universities.

[1] The levels of training correspond to technological and professional technical education (level 5); university undergraduate degrees consisting of at least 4 years (level 6); university majors and master's degrees (level 7) and doctoral degrees (level 8) (DANE, 2011).

[1] The academic programs were classified based on training level and field of study using the nomenclature described (DANE, 2011).

[1] An academic credit refers to the unit of measurement of an academic program's academic load (Sav, 2016).

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