

## Papers

### Tactics for the tourism game in groups of municipalities from Buenos Aires Province: a classification for the development of sports tourism

Tácticas para el juego turístico en grupos de municipios de la Provincia de Buenos Aires: una clasificación para el desarrollo del turismo de deportes

Táticas para o jogo turístico em grupos de municípios da Província de Buenos Aires: uma classificação para o desenvolvimento do turismo de esportes

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#### Keywords:

Tourism.  
Municipalities.  
Cluster Analysis.  
Sports Tourism.

#### Abstract

This paper aims to analyze the distribution of tourist resources and tourist amenities, jointly with other relevant variables, in the municipalities in the Province of Buenos Aires, in order to propose a regional tourism classification that considers the potential of specific resources in their tourism development. Using principal component and cluster analysis, we obtain eight groups of municipalities. These show a gradual transition from municipalities where the tourism activity is relatively more important to those that are more urbanized and industrially developed. Three groups stand out regarding tourism. One of these is mainly composed of municipalities from the Atlantic Coast, with a majority of natural resources and a high share of Hotel and Restaurant activities in the local economy. The other two groups are mainly composed of municipalities with a relatively high endowment of sports tourism resources: one of them being more urban, with resources linked to football and rugby. In contrast, the other one is more rural and has other types of sports resources, such as polo, golf, basketball, or fishing, and includes clubs and associations. This finding shows that there is a great opportunity for the development of a sports tourism strategy. The present work contributes to the understanding of the diversity of the municipalities in the Province of Buenos Aires, encouraging the use of multivariate statistical methods in this area of research. At the same time, it proposes that alternative resources are considered, such as those linked to sports, for local development through tourism.

#### Palavras-chave:

Turismo.  
Municípios.

#### Resumo

O objetivo deste trabalho é analisar a distribuição de recursos e comodidades turísticas, juntamente com outras variáveis relevantes nos municípios da Província de Buenos Aires, a fim de propor uma classificação que considere a potencialidade de determinados recursos

Análise de cluster.  
Turismo de esportes.

#### Palabras clave:

Turismo.  
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no seu desenvolvimento turístico. Emprega-se uma metodologia de classificação estatística multivariada e, como resultado, obtêm-se oito grupos de municípios. Eles apresentam uma transição gradual de municípios onde a atividade turística é relativamente mais importante a outros mais urbanizados e industrialmente desenvolvidos. Três grupos destacam-se do ponto de vista da atividade turística: um deles está principalmente composto por municípios da Costa Atlântica, com uma maioria de recursos naturais e uma alta participação da Atividade de Alojamento e Restaurantes na economia local. Os outros dois grupos estão maiormente compostos por municípios com uma dotação relativamente alta de recursos turísticos esportivos: um deles é mais urbano, com recursos vinculados ao futebol e ao rugby, enquanto o outro é mais rural e tem um outro tipo de recursos esportivos, como pólo, golfe, basquetebol ou pesca, incluindo clubes e associações. Estes descobrimentos mostram que existe uma grande oportunidade para o desenvolvimento de uma estratégia de turismo de esportes. Espera-se que o presente trabalho contribua para a compreensão da diversidade dos municípios da Província de Buenos Aires, estimule o uso de métodos estatísticos multivariados nesta área de pesquisa, e proponha a consideração de recursos alternativos, como aqueles vinculados aos esportes, para o desenvolvimento local por meio do turismo.

#### Resumen

El objetivo de este trabajo es analizar la distribución de recursos y amenidades turísticas, junto con otras variables relevantes, en los municipios de la Provincia de Buenos Aires, con el fin de proponer una clasificación que considere la potencialidad de determinados recursos en su desarrollo turístico. Utilizando una metodología de análisis de componentes principales y análisis de cluster, se obtienen ocho grupos de municipios. Los mismos presentan una transición gradual de municipios donde la actividad turística es relativamente más importante, a aquellos que son más urbanizados e industrialmente desarrollados. Tres grupos se destacan desde el punto de vista de la actividad turística: uno de ellos está principalmente compuesto por municipios de la Costa Atlántica, con una mayoría de recursos naturales y una alta participación de la Actividad de Alojamiento y Restaurantes en la economía local. Los otros dos grupos están mayormente compuestos por municipios con una dotación relativamente alta de recursos turísticos deportivos: uno de ellos es más urbano, con recursos vinculados al fútbol y al rugby, mientras que el otro es más rural y tiene otro tipo de recursos deportivos, como polo, golf, básquet o pesca, e incluyendo clubes y asociaciones. Estos hallazgos muestran que existe una gran oportunidad para el desarrollo de una estrategia de turismo de deportes. Se espera que el presente trabajo contribuya a comprender la diversidad de los municipios de la Provincia de Buenos Aires, estimule el uso de métodos estadísticos multivariados en esta área de investigación, y proponga la consideración de recursos alternativos, como aquellos vinculados a los deportes, para el desarrollo local a través del turismo.

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## 1 INTRODUCTION

The Province of Buenos Aires in Argentina has a varied offer of tourism resources along with its territory that has consolidated numerous tourism destinations: be those kilometers of wide beaches that characterize the Atlantic Coast with established destinations such as Mar del Plata, Villa Gesell or Pinamar, going through ranges of hills in Tandil, Tornquist, Sierra de la Ventana, to the strengthening of local traditions, legacies and pampa and local town's stories in San Antonio de Areco or Lobos. The tourism activity has been strengthened, taking natural and cultural resources as a source of comparative advantage, both at national and international levels, but with an opportunity to foster its potentialities. For some time, in a world of tourists increasingly eager to have experiences, different non-traditional tourism products have been able to emerge and become potential successful drivers of local and regional development. Sports tourism is one of these products. In particular, we consider sports tourism as all forms of involvement, active or passive, in sports activities, be it the participation of an individual or organized group for commercial or non-commercial reasons, and that require the departure from a place of residence or a place of work (Standeven & de Knop, 1999, cited in United Nations World Tourism Organization, 2016). We consider it is also the one that involves visitors' attendance, either as spectators or participants, in sports events that take place away from their usual place of residence (Tajzadeh-Namin & Niknam, 2012).

According to the UNWTO (2016), in the 1990s, sports tourism was referred to as "the sleeping giant of tourism." Even though its important impact mainly lies in international-scale sports events, interest in sports, and its different forms using tourism have positioned it as a development opportunity. According to EUROSPO (n.d., cited in UNWTO, 2016), sports tourism generated in the last years around 800 million dollars, accounting for more than 10% of international tourism receipts. Data from SportsTravel (Delpy Neirotti & Gordon, 2016) indicates that more than 90% of leisure trips involve a sports event or taking part in a sports activity (such as fishing, sailing, mountain biking, or skiing).

In Argentina, tourists from the rest of the American continent are those that are most interested in practicing sports activities: according to 2015 data, more than 10% of international tourists participated in sports or cultural events during their trip to the country (Ministerio de Turismo de la Nación, 2016). As far as tourism in the Province of Buenos Aires is concerned, this province is both one of the leading destinations for domestic tourism and a significant source market for tourism in the same province and other spots in the country. More than 35% of domestic tourists choose the province as a vacation destination with a similar share in overnight stays (Ministerio de Turismo de la Nación, 2016). As such, the provincial tourism administration has strengthened the promotion of sports activities in sea and river shores (sailing tours, kitesurfing), in the hills (trekking, parachuting), and in the plains (horse-riding).

In this way, taking into account the variety of traditional tourism resources and the potential of sports tourism resources, together with the heterogeneity, in terms of landscapes, population, urban development, among other characteristics of the 135 municipalities that conform the Province of Buenos Aires, this paper aims to propose a multivariate methodology that considers a group of variables simultaneously in order to study and characterize each of these. In particular, we classify the municipalities in the Province of Buenos Aires by using a database with a high number of variables and cases that include the most recent data for each of the possible indicators. An innovative element in this analysis is the variable related to the endowment of tourism resources that we obtain from an unprecedented inventory of tourism resources developed by a research team at the Faculty of Economic Sciences from Universidad Nacional de La Plata (Porto, Garcia, Romero, Petrolli & Renzella, 2020), which gathers and classifies more than 5,000 resources, including sports resources.

Analyzing such disparate and numerous municipalities is a complicated task. In this sense, the idea of grouping municipalities is useful to take advantage of a heterogeneous bulk of data and summarize it without missing relevant information. In this sense, we apply multivariate statistical methods to contribute to the understanding of the variety of municipalities in the Province of Buenos Aires, mainly considering tourism as a local activity to be developed. At the same time, we also provide a specific strategy for tourism development by identifying potential tourism corridors based on sports tourism, both in urban and rural settings.

The paper is structured as follows. In Section 2 we present a brief literature review on competitiveness, tourism specialization, tourism resources, and sports tourism. In Section 3 we analyze the statistical information available at the municipal level, and the methodology used for the group classification. In Section 4 we show the results and in Section 5 we offer some concluding remarks.

## 2 LITERATURE REVIEW

### 2.1 Tourism competitiveness and specialization based on resources in emerging sustainable cities. Approaches for its classification

Tourism competitiveness and tourism specialization in different geographical units are topics under ongoing research and analysis in the specialized literature. In particular, the concept of competitiveness implies the apprehension of a set of dimensions into the analysis that, in broad terms, define, characterize, and position a destination vis-a-vis its competitors.

From a traditional view, we seek to reach more complex concepts. In this work we emphasize the relationship between competitiveness and specialization in tourism. As mentioned, the tourism resources inventory is a key tool for this analysis, since these resources determine the tourism specialization of the destination and, at the same time, the enhancement of these resources can be crucial for competitiveness.

An approach we found interesting involves the study of competitiveness and specialization in midsize emerging sustainable cities, following the methodology proposed by the Inter-American Development Bank (IDB, 2016) with the Emerging and Sustainable Cities Initiative (ESCI). This initiative supports cities in identifying priority interventions in three dimensions of sustainability: environmental and climate change, urban and fiscal development, and governance. Even though there are initiatives linked to tourism in the ESCI, this paper may contribute to deepening strategies at the local level integrated into the ESCI point of view for the specific case of the Province of Buenos Aires.

Within the framework of this multidimensional approach, the IDB (2016) proposes 127 indicators arranged in 30 topics related to the three dimensions of sustainability. These topics refer to environmental sustainability and climate change, urban and fiscal sustainability, and governance. The indicators constitute a tool to identify the critical problems of cities based on objective technical criteria. Although the methodology was developed considering cities as the geographic reference unit, in this work we are interested in considering the same analysis dimensions and associated indicators to classify the municipalities in the Province of Buenos Aires. This raises difficulties that we explain with more detail in the next section, since the availability of information varies for each group of indicators.

Likewise, the ESCI methodology can be complemented by considering the degree of tourism specialization and the importance given to the sector in each municipality. There are usual indicators of this dimension, such as the share of the tourism sector in the municipal Geographic Gross Product (GGP) and the Shannon index, a measure of economic diversification (Peña, 2002). Another indicator could be the distance from the municipality considered to non-tourist urban centers. These indicators could be associated with the urban development dimension in the ESCI approach.

When considering distance as a qualifying variable, a conceptual distinction between classification and regionalization should be made. The classification of municipalities seeks to obtain homogeneous groups of municipalities that may or may not be contiguous to one another in geographical terms. In regionalization, the distance variable prevails over the other ones to group municipalities. The criterion of regionalization is based on operational issues related to working in the territory around a theme. This defines health, education, or electoral regions, to mention some examples. Each region contains a set of contiguous municipalities, and regionalization aims to make some operational aspects more efficient. When talking about tourism, regionalization is an issue to deal with specific problems (mainly related to infrastructure), but a classification approach could be essential to policy-makers.

There are some previous works related to classifications of municipalities in the Province of Buenos Aires using multivariate analysis (Sotelo & Lázaro, 2015). This paper determines estimation domains, defined as any subdivision of the population about which quantitative information of known precision can be given (UN, 1950, cited in Sotelo & Lázaro, 2015). In all municipalities – except for those from the Greater Buenos Aires (right next to the capital of the country, the Autonomous City of Buenos Aires) – seven indicators were considered referring to socioeconomic and demographic dimensions of analysis: inter-census population growth rate 2010/2001; population density; concentration of the Gross Product of agricultural activities, hunting, and silviculture (2003);<sup>1</sup> concentration of the Gross Product of manufacturing activities; and total tax collection per capita (2010). For the municipalities of Greater Buenos Aires (GBA), three indicators were considered: concentration of Gross Product of manufacturing activities (2003), population density per square kilometer (2010), and the share of young people aged 20 to 24 years with completed high school education. The methodology used is principal component and cluster analysis, with the inclusion of the distance variable to the chosen solution in order to force the generation of compact estimation domains (regions), where the municipalities of the same domain are geographically contiguous.

In a paper more directly linked to classification schemes or municipalities grouping in the field of tourism, Porto (2016) quantifies the characteristics of the production function for the tourism sector in the Province of Buenos Aires. A significant correlation between different measures of GDP and the characterization of tourism is found. This classification grouped municipalities into the categories of Atlantic Coast; Ranges; Rivers and lagoons; Tourist towns; Great Buenos Aires; and Others. In previous work, Porto (2008) applies

<sup>1</sup> The concentration coefficients of a sector have been computed as:  $(X_{is} // X_i) / (X_s / X)$  where  $X_{is}$  is GGP in municipality  $i$ , sector  $s$ ,  $X_i$  is the total GGP of the municipality,  $X_s$  is the GGP of sector  $s$  in the Province without Great Buenos Aires area and  $X$  the overall total in the province without Great Buenos Aires.

cluster analysis for these municipalities distinguishing between green and cultural localities. In another line of research, Dosso (2005) studies cities that form territorial and tourist centers in terms of attraction and/or emission, in the case of the Province of Buenos Aires.

Another relevant piece of work is the categorization of the 3,285 municipalities from the 328 tourism regions held by the Ministry of Tourism of Brazil (2018). This initiative nurtures the Brazilian tourism map and groups municipalities according to the performance of their tourism economies. The variables considered for the classification are: number of accommodation establishments, number of employments in accommodation establishments, the estimated number of domestic visitors, and the estimated number of international visitors. The classification results in 5 categories, the first of which includes municipalities with the most significant tourism flows and the highest number of employment and establishments in the accommodation sector. At the same time, the latter has neither tourism flows, nor employment or establishments in the accommodation sector. According to the Ministry, the initiative can be useful for optimizing the distribution of public resources, guiding policy-making in each category of municipalities, improving public management, and helping to understand the role of each municipality in tourism development.

Rodrigues dos Santos, de Santana Ribeiro and Gomes da Silveira (2018) carry out a cluster analysis for Brazilian municipalities taking into account the variables number of jobs, number of establishments per 100,000 inhabitants, average income, the share of workers with complete higher education and specialization in tourism. They define six clusters, three of which are cataloged as touristic.

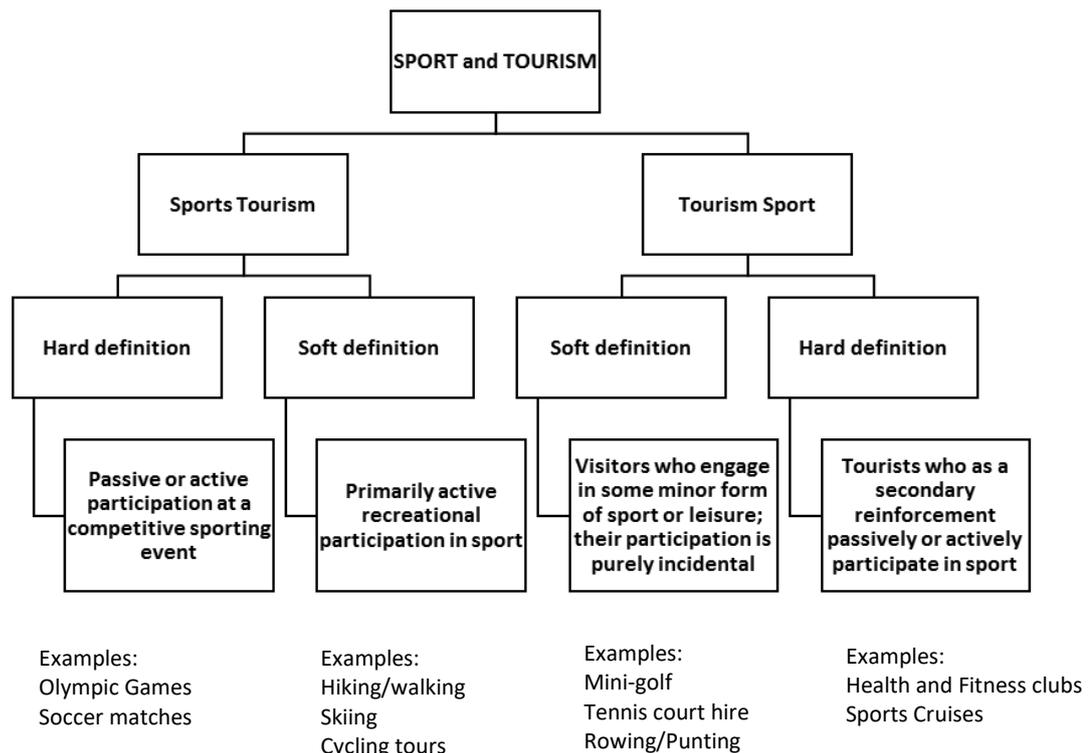
Another study in the same line for Latin America is the one by Frejomil and Crispín (2002), who make a regionalization of 37 touristic localities in Mexico. First, they classify municipalities into eight types considering different indicators (tourism intensity, penetration, and density rates, and degree of tourism internationalization). Then, they hold a probabilistic regionalization considering spatial proximity, thus establishing macro, meso, and micro tourism regions.

## 2.2 Sports tourism as a tourism competitiveness and specialization factor

We consider sports tourism as all forms of involvement, active or passive, in sports activities, be it the participation of an individual or organized group for commercial or non-commercial reasons, and that require the departure from a place of residence or a place of work (Standeven & De Knop, 1999, cited in UNWTO, 2016). Also, sports tourism is the one that involves visitors' attendance, either as spectators or participants, in sports events that take place away from their usual place of residence (Tajzadeh-Namin & Niknam, 2012). It is worth noting that either tourism or sports can represent the dominant reason for travel (Ritchie & Adair, 2004). Linked to this conceptualization, Gammon and Robinson (2003) refer to tourism and sports' consumer, distinguishing between those that participate in sports activities as the main reason for departure from the usual place of residence, and those that accidentally join sports activities as part of their trip (Figure 1). With the emphasis on market attraction, Pouder, Clarka and Fenichc (2018) determine three categories in sports: traditional, niche, and emerging.

Not only is sports tourism one of the fastest growing tourism sectors worldwide (UNWTO, 2020), but it also has several effects: economic impacts (increasing the number of visitors, their expenditure and length of stay; and off-peak demand); potentiation of tourism brand; development of infrastructure; diplomacy strategies; and benefits for the community (Delpy Neirotti & Gordon, 2016). As such, sports tourism can be part of and encourage regional development; in fact, sports have been studied within the framework of subnational development in Europe (European Commission, 2016) where its positive impacts in terms of employment (in Bulgaria and Finland), innovation (France and Italy), among other fields, have been evidenced. UNWTO (2019) indicates the advantages of this specialty: the physical activity it involves; the interaction opportunities that are generated; and its high potential of development virtually anywhere.

Figure 1 - Classification of sports and tourism consumer



Source: Gammon and Robinson (2003).

Within this framework, governments have a key role in the integration between sports and tourism, as well as in the design and planning of the sustainable development of this tourism (Zhang, Qin, Yang & Liu, 2017). Furthermore, destination marketing organizations are the ones seeking to conquer the sports tourism market (Pouder, Clarka & Fenichc, 2018). Hinch, Higham and Moyle (2016) highlight the relevance of sports tourism for destination sustainability, emphasizing the fields where more research is needed: differing scales in terms of activity and destination; single versus multi-sports destinations; resources and civic investment in sports destinations; the interplay of destination lifecycles and sports; sport tourism's contribution to and impacts of climate change; and more theorizing.

In this line and focusing on specific study cases, Tajzadeh-Namin and Niknam (2012) directly point out the role of sports tourism in economic development for the province of Ardebil in Iran. Meanwhile, Carneiro, Breda and Cordeiro (2016) do the same thing for the region of Aveiro, in Portugal. Medina and Sanchez (2004 and 2005) emphasize the possibilities of this type of tourism for Spain, although a more recent study (Lisbona, Medina & Sanchez, 2008) also highlights its limits and risks, focusing on Spain and Mexico.

Against this background, we consider that sports tourism can be a factor of tourism competitiveness and specialization.

### 3 METHODOLOGY

The methodology used in this study consisted of three stages. In stage 1, we prepared the database and processed the information collected in order to obtain indicators. In stage 2, we carried out a principal component analysis (PCA) for mixed variables and then applied a non-hierarchical k-means classification algorithm (cluster analysis, CA). Finally, in stage 3, we validated the groups obtained.

#### 3.1 Data sources

We collected economic, structural, social, and demographic variables from different sources: Direccion Provincial de Estadística (2018), Honorable Tribunal de Cuentas (2018) and an inventory of tourism resources

from the Province of Buenos Aires (Porto, Garcia, Romero, Petrolli & Renzella, 2020). The statistical information available at the municipal level for the three dimensions of analysis is limited if compared with the ESCI<sup>2</sup> Set of indicators: out of the 127 indicators considered by ESCI, only 13 were available for Buenos Aires Province's municipalities (Table 1).

**Table 1** - Indicators of the ESCI methodology and its proxy available at the municipal level in the Province of Buenos Aires

Dimension	Indicator according to ESCI methodology	Available indicator in PBA
Environmental and climate change sustainability	Share of households with household connections to the city's water network.	Share of households with running water. 2010.
	Share of households with a household connection to the sewage system.	Share of households with sewer coverage. 2010.
	Annual residential electricity consumption per household.	Annual residential electricity consumption per household. 2014.
Urban development sustainability	Urban population density.	Population density. 2017.
	Share of dwellings that do not meet the habitability standards defined by the country.	Share of urban housing. 2010.
	Quantitative housing deficit. <sup>3</sup>	Share of dwellings with constructive quality of insufficient housing. 2010.
	GDP per capita of the city.	Quantitative housing deficit. 2017.
	Adult literacy rate.	GGP per capita of the municipality. 2003.
	Mortality rate of children under five years of age per 1,000 live births.	Literacy rate in the population of 10 years or more. 2010.
Fiscal and governance sustainability	Hospital beds per 100,000 inhabitants.	Mortality rate of children under five years of age per 1,000 live births. 2014.
	Relevance of own income index. <sup>4</sup>	Hospital beds per 100,000 inhabitants. 2014.
	Indebtedness index. <sup>5</sup>	Relevance index of own revenues. 2016.
		Indebtedness index. 2016.

**Source:** The authors based on Direccion Provincial de Estadística (2018), Honorable Tribunal de Cuentas (2018) and IDB (2016).

With the available information, we built indicators that consider the importance of the tourism sector in the municipality and the productive diversity associated with the urban dimension:

- Share of Hotel and Restaurant activities in the municipal Geographical Gross Product (GGP) (2003).<sup>6</sup>
- Share of the municipality in the provincial Hotel and Restaurant activities (2003).<sup>7</sup>
- Shannon index at the municipal level to measure the productive diversity of the municipality (2003).<sup>8</sup>
- Share of the population with Unsatisfied Basic Needs (UBN) (2010).
- Share of households with Unsatisfied Basic Needs (UBN) (2010).
- Number of natural, sports and cultural resources; cultural manifestations; and other resources linked to tourism.

<sup>2</sup> The 127 IDB's indicators are distributed in 30 topics related to the three dimensions of sustainability. These are the following:

Environmental and climate change dimensions: water, sanitation, solid waste management, energy, air quality, climate change mitigation, noise, and vulnerability towards natural hazards with climate change.

Urban development dimension: land use/planning, urban inequality, mobility/transport, human capital, internationalization, productive matrix, business matrix, research, development and innovation, labor market, financial sector, fiscal environment, business environment, connectivity, education, security, and health.

Fiscal and governance sustainability dimension. Modern public management, participative public management, transparency, taxes and financial autonomy, public expenditure management, and fiscal sustainability.

<sup>3</sup> It is defined as (number of family groups - number of dwellings) / number of family groups. It is expressed in percentage.

<sup>4</sup> Municipal own income as a percentage of its overall income.

<sup>5</sup> The ESCI methodology defines it as the stock of debt of the municipal government as a percentage of its free disposal income average of the last four years. For the Province of Buenos Aires, the indicator available is the percentage of municipal debt in relation to its own resources.

<sup>6</sup> It is the most recent year available.

<sup>7</sup> *Ibidem*.

<sup>8</sup> *Ibidem*.

One of the limitations of the information is that not all the indicators are available for the 135 municipalities. Lezama separated from the municipality of Chascomús in 2009, and, as a result, there is no available data for the new municipality since many indicators cannot be proportionally distributed (especially economic indicators such as municipal GGB). In contrast, data for Chascomús is distorted because it includes Lezama. This limitation means that we had to decide how to treat the municipalities of Chascomús and Lezama. The literature (Hair et al., 1999, Everitt et al., 2001, Peña, 2002) suggests that in situations where information is not available for one of the cases or is inconsistent, the case should be eliminated or the variable with the missing or inconsistent data should be deleted instead. In this paper, we decided to consider Chascomús and Lezama altogether instead of setting aside half of the variables available for the analysis.

Another limitation of the database is the difference in time references. This temporal shift presents limitations in the usefulness of the information due to its lack of opportunity and comparability.

Additionally, we used as a source of data an unprecedented inventory of tourism resources developed by a research team at the Faculty of Economic Sciences from Universidad Nacional de La Plata (Porto, Garcia, Romero, Petrolli & Renzella, 2020). This database gathers and classifies more than 5,000 resources into the categories of natural, cultural, historical, sports, and other resources. It also identifies the main tourism resources in each municipality.

### 3.2 Database preparation

In light of the theoretical framework and the objective of classification, we processed the information collected. From a statistical point of view, we sought to eliminate redundant information to simplify the calculations and facilitate the identification of groups (Berdegué & Escobar, 1990; Everitt et al., 2001; Chian et al., 2007; Ahmad & Dey, 2011; Chatzis, 2011). In order to accomplish this, we carried out the following steps:

- a) We searched for the available indicators and variables that most closely approximated those proposed by the ESCI methodology.
- b) We computed new variables and indicators based on the available information: proportions of different variables, the Shannon coefficient, the distance by route of each municipality to the capital city of Argentina (Ciudad Autónoma de Buenos Aires), the number of tourism resources by category, the number of overall main tourism resources.
- c) We detected atypical cases (Chascomús, Lezama) due to inconsistencies in the available information (Hair et al., 1999; Peña, 2002).
- d) Given that some of the original quantitative variables have a markedly asymmetric distribution and this hinders the good performance of the PCA (Hair et al., 1999, Peña, 2002), we decided to transform the variables by adding one and applying logarithm before standardizing them:

$$\text{new variable} = \ln(\text{original variable} + 1)$$

The transformed variables were: population density; available beds; annual consumption of commercial, industrial and household energy use; and share of Hotel and Restaurant activities in the local economy.

- e) We analyzed the variability of the numerical variables. The literature indicates that variables with low discriminatory power in the construction of the groups should be discarded. For this reason, we calculated the coefficient of variation of each of the numerical variables. Although the literature recommends discarding variables that have a coefficient of variation of less than 50% (Berdegué & Escobar, 1990; Köbrich et al., 2003), in the case of variables measured at the municipal level this threshold is too high since many of the indicators are structural and do not present this variability.<sup>9</sup>
- f) We analyzed the correlation between the numerical variables. The literature states that pairs of highly correlated variables must be identified, and one of the variables of each pair discarded. The

<sup>9</sup> A coefficient of variation of 30% was considered as a reference. In this stage, we discarded the following variables: percentage of urban dwellings in the municipality; percentage of the population without sewers in the municipality; percentage of the population with UBN in the municipality; percentage of illiterates in the municipality; Shannon index; GDP per capita; participation of the municipality in the provincial Hotel and Restaurant activities; participation of the economic resources in the total of the resources of the municipality; and percentage of natural resources concerning the total resources of the municipality.

choice of the variable to be discarded depends on the criteria adopted. In this case, we did not eliminate variables since no pair of correlations reached numbers higher than 0.90 (Berdegué & Escobar, 1990; Köbrich et al., 2003).

- g) We standardized the numerical variables to eliminate both scale and unit of measurement effects (Berdegué & Escobar, 1990; Köbrich et al., 2003). Therefore, its value is interpreted as the number of standard deviations between any value of a numeric variable and its average.

Thus, at the end of stage 1, the database was made up of 134 cases and 17 variables (Table 2). Some of them are indicators we could build following the ESCI methodology, while others are additional ones we included specifically related to tourism. These 17 variables are the ones that remained after all the considerations explained above.

**Table 2** - Summary statistics of variables considered at the end of stage 1 of analysis

Variable number	Name of the variable	Mean	Std. Dev.	Min	Max
1	Share of commercial energy consumption in the total energy consumed in the municipality	0.22	0.12	0.03	0.66
2	Share of industrial energy consumption in the total energy consumed in the municipality	0.33	0.24	0.00	0.92
3	Share of residential energy consumption in the total energy consumed in the municipality	0.44	0.16	0.04	0.89
4	Population density	940.26	2137.83	1.12	9576.71
5	Share of households with UBN	6.07	3.47	1.06	19.20
6	Infant mortality rate	9.27	5.15	0.00	37.04
7	Share of the population without access to running water	24.35	21.00	0.27	89.23
8	Share of loss-making dwellings	2.86	2.08	0.41	10.34
9	Share of homes with Insufficient Constructive Quality Indicator	11.56	7.25	1.77	38.89
10	Distance to the Autonomous City of Buenos Aires (the capital city)	248.46	195.62	8.10	942.21
11	Number of available beds at hospitals	208.11	305.36	0.00	2440.00
12	Share of Natural Resources on the total resources of the municipality	17.22	10.28	0.00	58.33
13	Share of Sports Resources over the total resources of the municipality	14.61	10.22	0.00	50.00
14	Share of Cultural Manifestations on the total resources of the municipality	16.53	10.02	2.38	56.00
15	Share of Other Tourist Resources on the total resources of the municipality	6.71	6.76	0.00	36.00
16	Share of Hotel and Restaurant activities in the local economy	0.02	0.02	0.00	0.14
17	Number of main tourism resources	2.49	1.88	0.00	9.00

**Source:** The authors based on Dirección Provincial de Estadística (2018), Honorable Tribunal de Cuentas (2018) and IDB (2016).

### 3.3 Principal component analysis

Following the criteria suggested by Lebart et al. (1995), we performed a PCA and, afterward, we applied the k-means algorithm. It should be remembered that the components are orthogonal and that a small number of them usually explain a high percentage of the information contained in the original data matrix. Considering that each principal component is a synthetic variable resulting from the original variables, each case (municipality) can be identified by its coordinates for each of the components. Therefore, these components can be used as classification variables in CA. In this way, a weight relative to the original variables that naturally arises from the data is assigned in the classification. The aim of this is to reduce the dimensions of the space while preserving the mentioned variables. In turn, the components are numerical variables, so they allow the application of the k-means algorithm.

The PCA was performed with the `dudi.mix` command of the `ade4` package (Dray & Dufour, 2007) of the R software on the 17 variables resulting from stage 1 and shown in Table 2. The percentages of the variance of the data explained by the resulting components are presented in Table 3.

**Table 3** - Percentage of the variance explained by the main components of the PCA

Component	Eigenvalue	Percentage of variance explained	Accumulated percentage of variance explained
1	4.26	25.04	25.04
2	2.77	16.31	41.35
3	1.51	8.89	50.24
4	1.37	8.03	58.27
5	1.27	7.46	65.73
6	1.13	6.62	72.36
7	0.90	5.29	77.64
8	0.87	5.10	82.75
9	0.67	3.95	86.70
10	0.63	3.71	90.41
11	0.54	3.18	93.58
12	0.43	2.55	96.13
13	0.36	2.13	98.26
14	0.17	1.02	99.28
15	0.09	0.53	99.81
16	0.03	0.19	100.00

**Source:** The authors.

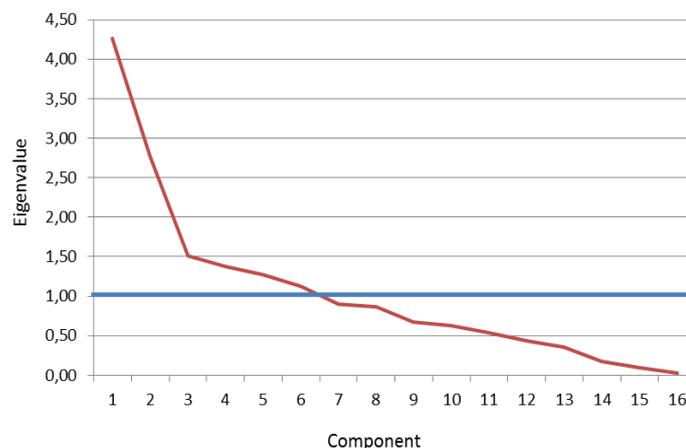
The number of components to be retained (on which the k-means algorithm will be applied) can be based on different criteria. We discuss three of them, as exposed by Hair et al. (1999) and Peña (2002):

1) To establish an acceptable percentage of the cumulative explained variance: in the literature, there is consensus in setting that this percentage is above 50% for the social sciences. According to this criterion, the first four components could be retained, explaining 58.2% of the variance of the data.

2) To apply the criteria of abrupt change. In the sedimentation graph (Graph 1), an abrupt slope is observed between the first component, the second and the third. Then the slope becomes smoother. Following this, the first three components could be selected, and 50.23% of the explained variance preserved.

3) To conserve those components that have eigenvalues equal to or greater than 1. Following this, the first six components should be retained, and 72.36% of the variance explained should be preserved. However, given that there are only 134 municipalities to classify, conserving six components would negatively affect the performance of the CA.

**Graph 1** - Sedimentation graph corresponding to the PCA eigenvalues



**Source:** The authors.

It is important to note that, as dimensions are added to the CA, the resulting groups have higher intra-group variance; that is, they present great heterogeneity. For this reason, the decision to retain one more component should be made by considering the contribution made by that component to the conformation and interpretation of the resulting groups as opposed to the higher intra-group variance that it generates.

Therefore, we decided to keep the four initial components as the first criteria suggest. Factorial loads (linear correlation coefficients between each of them and the components) and the components are presented in Table 4.

**Table 4** - Factor loads of the first four orthogonal components

Variable	Components			
	1	2	3	4
Share of commercial energy consumption in the total energy consumed in the municipality	-0.199	-0.808	0.130	0.039
Share of industrial energy consumption in the total energy consumed in the municipality	-0.108	0.927	-0.312	0.025
Share of residential energy consumption in the total energy consumed in the municipality	0.304	-0.756	0.358	-0.065
Population density	0.736	0.181	0.370	0.157
Percentage of households with UBN	0.916	-0.013	-0.182	0.133
Infant mortality rate	0.338	0.165	-0.225	0.107
Share of the population without access to running water	0.561	-0.274	-0.281	-0.339
Share of loss-making dwellings	0.872	-0.031	-0.203	0.138
Share of homes with Insufficient Constructive Quality Indicator	0.884	-0.087	-0.231	-0.118
Distance to the Autonomous City of Buenos Aires	-0.658	-0.287	-0.067	0.251
Number of available beds at hospitals	0.233	0.364	0.553	0.266
Share of Natural Resources on the total resources of the municipality	-0.326	-0.253	-0.469	0.385
Share of Sports Resources over the total resources of the municipality	0.009	0.212	0.429	-0.292
Share of Cultural Manifestations on the total resources of the municipality	-0.215	-0.182	-0.361	-0.420
Share of Hotel and Restaurant activities in the municipal GGP	0.331	-0.408	-0.042	0.426
Share of Other Tourist Resources on the total resources of the municipality	-0.041	-0.043	-0.157	0.442
Number of main tourism resources	-0.104	0.138	0.069	0.487

**Source:** The authors.

The first component correlates positively and strongly with the infrastructure variables (percentage of the population without running water, percentage of dwellings with a deficit, percentage of dwellings with an insufficient indicator of the constructive quality of the dwellings). It also correlates positively with the population density, with the percentage of households with unsatisfied basic needs and, more weakly, with the infant mortality rate. The distance to the capital city of the country correlates negatively with this component.

The second component correlates positively with the share of industrial energy consumption in the total energy consumed. The consumption of commercial and residential energy is negatively correlated.

The third component correlates positively with available beds in public hospitals and with sports resources of the municipalities. It correlates negatively with natural resources.

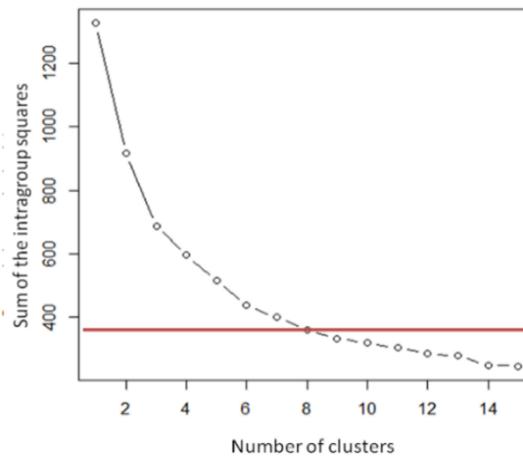
Finally, the fourth component correlates positively with the share of Hotel and Restaurant activities in the municipal GGP, with the number of main resources and with the share of other resources in the total resources of the municipality. At the same time, it is negatively correlated with the share of cultural manifestations on the total resources of the municipality.

### 3.4 Cluster analysis: the appliance of the classification algorithm

It should be noted that there are many algorithms of the k-means type depending on the measure of dissimilarity used, the selection of the k initial centers, and the strategies to calculate the mean of the groups. In particular, in this study, the k-means algorithm is applied using the Euclidean distance with the selected components from the PCA. The k initial centers are chosen randomly, and the mean of the groups are calculated in each reassignment of elements.

To perform the CA, the four retained components, the number of desired groups had to be determined beforehand, since it is a requirement of the k-means algorithm. To this end, the algorithm was applied for different numbers of groups, and the sum of the intragroup squares for the retained components was calculated in each case. Graph 2 shows the results obtained for the case of retaining the first four components.

**Graph 2** - Sum of the intragroup squares according to the number of groups applying the k-means algorithm to the first four components of the PCA



Source: The authors.

The abrupt change in the sum of intragroup squares should be considered to define the number of groups for the k-means algorithm (Hair, 1999). When no significant reduction is made by adding a new group, the number of desired groups is determined. Based on Graph 2, it was decided to cluster the municipalities into eight groups.

### 3.5 Statistical validation of obtained groups

Statistical validation involves testing the consistency of the logic and the results. That is, the classification exercise of stage 2 should be repeated using different initial centers and comparing the final results. The assumption is that the classification must be stable in the sense that the results (the groups obtained) must be similar regardless of the initial centers chosen.

For this reason, we repeated the procedure four times, starting with different randomized centers each time. Then, we verified if municipalities were grouped in approximately the same way, and an error rate was obtained (defined as the percentage of municipalities that remained in different groups concerning the total of municipalities) for all possible comparisons among the four groupings obtained. These error rates were between 5.2% and 33.5%. These percentages are considered low, and therefore the solution with eight groups is stable.

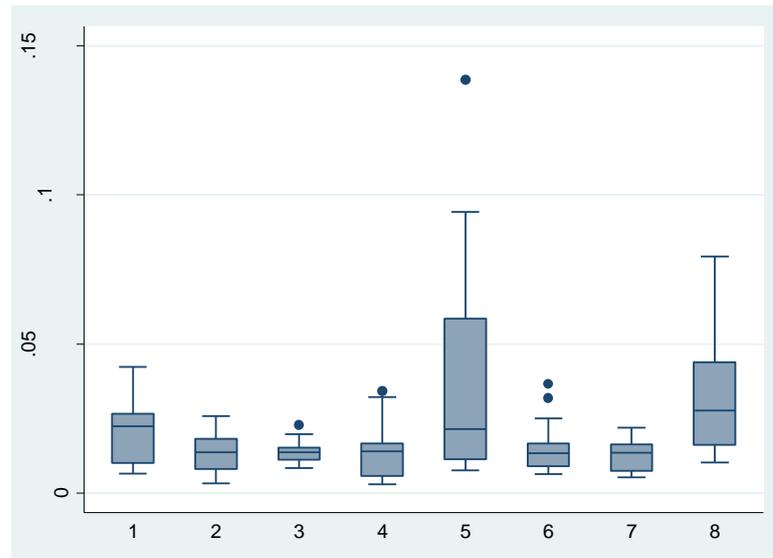
## 4 RESULTS

### 4.1 Composition of groups of municipalities

Table 5 presents the composition of groups for the solution of 134 municipalities in eight groups. Graph 3 shows the map colored with the specification of the municipalities that belong to each of the groups.

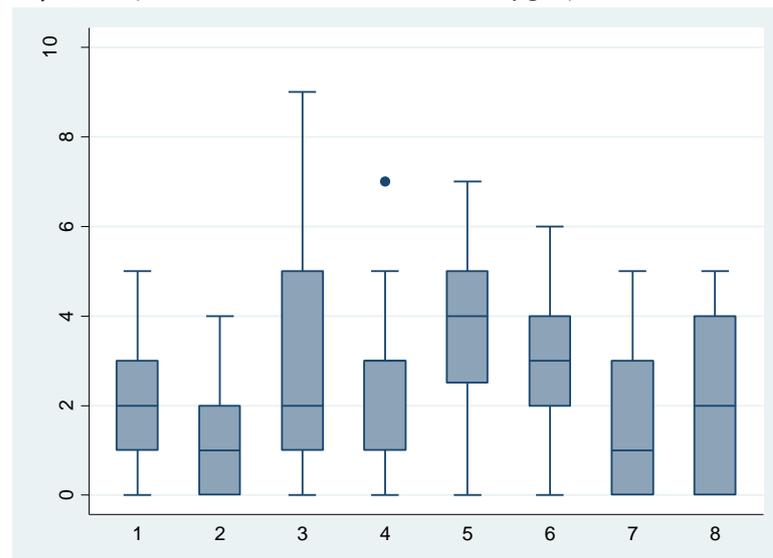


**Graph 4** - Box plot. Share of Hotel and Restaurant activities in local GGP

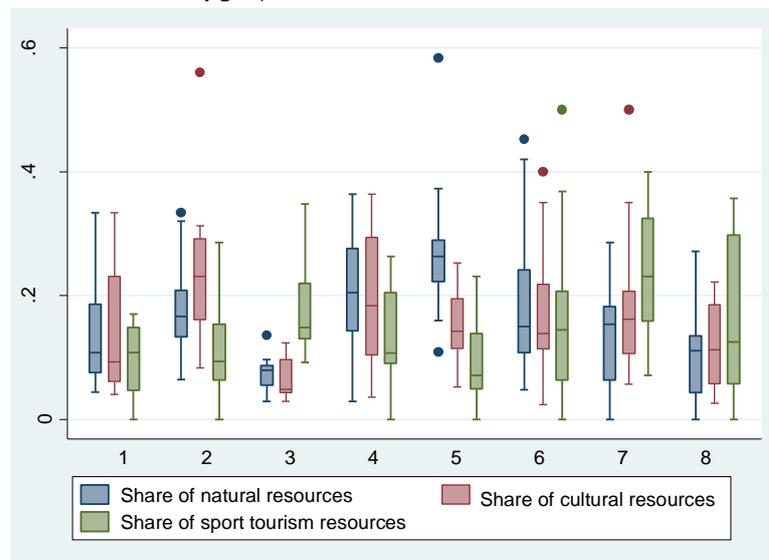


Source: The authors.

**Graph 5** - Box plot. Number of main tourism resources by group



Source: The authors.

**Graph 6** - Box plot. Share of natural resources, cultural resources and Sport tourism resources by group

Source: The authors.

#### 4.2 Characterization of groups of municipalities

- Group 1. 11 municipalities: Berazategui, Berisso, Cañuelas, Exaltación de la Cruz, General San Martín, Hurlingham, Luján, Marcos Paz, San Fernando, San Miguel, and Tigre.

Characteristics: The municipalities in this group are close to the capital city (distance ranging from 23 to 87 kilometers) and mostly very densely populated (50% of them with more than 686 inhabitants per square kilometer). The share of natural, sports, and cultural resources are similar. This group is among the three groups in worse conditions regarding the proportion of population without access to running water (going up to 66.4%) and low-quality housing (between 8.8% and 22%). Regarding the share of Hotel and Restaurant activities in the local economy, 25% of the municipalities exceed 2.7%. This group presents the third highest share in consumption of industrial energy (50% of the municipalities have a share of industrial energy greater than 38%).

- Group 2. 17 municipalities: Castelli, Dolores, General Alvear, General Belgrano, General Guido, General Juan Madariaga, General Las Heras, General Lavalle, General Viamonte, General Villegas, Itzaingó, Leandro N. Alem, Lobos, Magdalena, Mar Chiquita, Pila, and Tordillo.

Characteristics: This group is characterized by having municipalities with high share of cultural manifestation resources in total resources: from 8.3% to 56%. On the other hand, it is integrated with municipalities that are relatively more distant from the capital city: between 32 and 466 kilometers away, where 25% of the municipalities are more than 311 kilometers from the capital city. In turn, this group is composed of municipalities with very low population density (75% have less than 12 inhabitants per square kilometer, and 5% exceed 4,642). This group is among the three groups with worse conditions regarding the proportion of the population without access to running water (between 15.9% and 86.2%) and the proportion of low-quality housing (between 6.5% and 28%). Regarding the participation of Hotel and Restaurant activities in the local economy, this group does not exceed 2.6%.

- Group 3. 9 municipalities: Avellaneda, La Plata, Lanús, Lomas de Zamora, Morón, Quilmes, San Isidro, Tres de Febrero, and Vicente López

Characteristics: This group ranks second in terms of participation rates of sports resources (from 9.2% to 34.8%). The density of its municipalities is high and ranges from 7,040 to 9,576 inhabitants per square kilometer. These municipalities are very close to the capital city (between 8.1 and 58.5 kilometers). This group presents the lowest proportions of the population without access to running

water (between 0.27% and 18.7%), and the lowest proportion of low-quality housing (between 2.1% and 17%).

Regarding the participation of Hotel and Restaurant activities in the local economy, 25% of the municipalities exceed 1.5%. It is highlighted that 25% of the municipalities have five or more main tourism resources. The municipalities of this group have high and similar residential energy consumption rates (95% of the municipalities have a share of household energy consumption greater than 38%).

- Group 4. 21 municipalities: Baradero, Benito Juárez, Bragado, Brandsen, Campana, Capitán Sarmiento, Chascomús, Daireaux, Ensenada, General Paz, Monte, Navarro, Olavarría, Punta Indio, Ramallo, Roque Pérez, San Andrés de Giles, San Nicolás, San Pedro, Suipacha, and Zárate.

Characteristics: The critical presence of industrial activity characterizes this group: the share of industrial energy in the total energy consumed ranges from 44.6% to 92.4%. At the same time, it is observed that there are two subgroups of municipalities: some closer to the capital city and more densely populated, although this density does not exceed 605 inhabitants per square kilometer. The distance to the capital ranges between 60 and 423 km. This is the second group with the highest infant mortality rates (75% of the municipalities has a rate higher than 8.32‰). Regarding the participation of Hotel and Restaurant activities in the local economy, 25% of the municipalities exceed 1.7%. It is worth noting that 25% of the municipalities have three or more main tourism resources.

- Group 5. 16 municipalities: 25 de Mayo, Coronel Dorrego, Coronel Suárez, General Alvarado, General La Madrid, General Pueyrredón, Guaminí, La Costa, Monte Hermoso, Patagones, Pinamar, Rivadavia, Tornquist, Trenque Lauquen, Villa Gesell, and Villarino.

Characteristics: This group is characterized by containing six of the nine municipalities that make up the Atlantic Coast. The municipalities in this group have the largest share of natural resources in total tourism resources compared to the other groups. Thus, in 75% of the municipalities in this group, the share of natural resources exceeds 22.2%, reaching 58%. Also, the share of Hotel and Restaurant activities in the local economy is mostly higher than those of other groups: 50% exceeds 2.1% and reaches 13.9%. There is a low population density: 50% of the municipalities do not exceed eight inhabitants per square kilometer, and the maximum density is 447.47. Regarding the number of main tourism resources, 75% have three or more.

- Group 6. 30 municipalities: Adolfo Alsina, Alberti, Arrecifes, Azul, Bahía Blanca, Balcarce, Bolívar, Carlos Casares, Carmen de Areco, Chacabuco, Chivilcoy, Colón, Coronel de Marina L. Rosales, Coronel Pringles, Junín, Las Flores, Lobería, Mercedes, Necochea, Pehuajó, Pergamino, Puán, Rojas, Saavedra, Saladillo, Salto, San Antonio de Areco, San Cayetano, Tandil, and Tres Arroyos.

Characteristics: This group is characterized by having the highest dispersion in the shares of tourism resources. These municipalities have low population density (between 2.4 and 137.2 inhabitants per square kilometer) and are mostly located more than 194 kilometers away from the capital city. In turn, they have the lowest percentages of households with unsatisfied basic needs (less than 6.6%). It is the second group with the highest share of industrial energy in the total energy consumed (ranging from 28.3% to 71.5%). Regarding the participation of Hotel and Restaurant activities in the local economy, 25% of the municipalities exceed 1.7%. It is worth noting that 25% of the municipalities have four or more main tourism resources.

- Group 7. 16 municipalities: 9 de Julio, Adolfo González Chavez, Ayacucho, Carlos Tejedor, Florentino Ameghino, General Arenales, General Pinto, Hipólito Yrigoyen, Laprida, Lincoln, Maipú, Pellegrini, Rauch, Salliqueló, Tapalqué, and Tres Lomas

Characteristics: This group is characterized by having municipalities with high participation of sports resources in their total resources: between 7.1% and 40%, with 50% of the municipalities exceeding 23%. On the other hand, 75% of the municipalities are more than 271 kilometers away from the capital city and have a low density compared to the other groups: between 2.4 and 11.4 inhabitants per square kilometer. This group is one of the three groups with the best indicators of infrastructure: the proportion of the population without access to running water does not exceed 38%, and the

proportion of households with deficits does not exceed 2.5%. Regarding the participation of Hotel and Restaurant activities in the local economy, these do not exceed 2.2%.

- Group 8. 14 municipalities: Almirante Brown, Escobar, Esteban Echeverría, Ezeiza, Florencio Varela, General Rodríguez, José C. Paz, La Matanza, Malvinas Argentinas, Merlo, Moreno, Pilar, Presidente Perón, and San Vicente.

Characteristics: This group encompasses the municipalities in the suburbs of the capital city. The distance to the capital city ranges from 25 to 60 kilometers. The municipalities in this group present the worst infrastructure indicators. In 75% of the municipalities of this group, the percentage of the population without running water exceeds 48%. Also, between 20.5% and 38.4% of their populations live in poor-quality dwellings, and the percentage of households with unsatisfied basic needs exceeds 10.5%. Also, this group presents higher infant mortality rates (between 9.62 and 14.88). This group has municipalities with high population density: 50% of them exceed 2,680 inhabitants per square kilometer, and the maximum density reaches 6,490. Regarding tourism indicators, the participation of Hotel and Restaurant activities do not exceed 2.2%.

### 4.3 Groups of municipalities that stand out in their consolidated/potential development opportunities for tourism

#### 4.3.1 Traditional tourism and sports tourism

Table 6 presents the characteristics of the three groups that stand out from the point of view of tourism development opportunities. Even though the CA methodology indicates that groups should only be named with a number, we decide to propose a name linked to the variables that are of interest to the type of tourism in the already specialized destinations. In this sense, it is important to highlight Group 5, of consolidated beach traditional tourism, and Groups 3 and 7, where we find municipalities that should consider in their tourism policy “tactics” a local development based on sports tourism.

**Table 6** - Summary of characteristics of the main groups

Group	Main characteristics	Proposed denomination
5 (16 municipalities)	Greatest participation of natural resources in total tourism resources. 6 out of the 9 municipalities that belong to the Atlantic Coast. Greatest participation of hotel and restaurant services in the local economy (13.9%).	Traditional tourism
3 (9 municipalities)	Second group with the greatest participation of sports tourism resources in the total of tourism resources (from 9.2% to 34.8%). Municipalities are close to CABA (between 8.1 and 58.5 kilometers) and have a high population density (between 7,040 and 9,576 inhabitants per square kilometer).	Urban sports tourism
7 (16 municipalities)	High participation of sports resources in the total of tourism resources (between 7.1% and 40%, with 50% of municipalities surpassing the 23% of participation). Municipalities are far from CABA (75% of municipalities are farther than 271 kilometers) and have a low population density (between 2.4 and 11.4 inhabitants per square kilometers).	Rural sports tourism

**Source:** The authors.

#### 4.3.2 What kind of sports tourism should be enhanced in the Province of Buenos Aires?

We verify, through the analysis developed in this paper, the potential of sports tourism in the Province of Buenos Aires. This paper is a starting point to consolidate tourism promotion and development strategies based on new sectors adapted to changes in market demand and more demanding tourist typologies that

characterize the modern society, taking into account not only innovative management ideas but also making the most of the existing resources from a new perspective.

Sports tourism resources related to soccer and rugby stand out in Group 3, while in Group 7 there is a greater presence of clubs or associations linked to other sports (polo, golf, basketball, fishing, motor racing, etc.)

Tables 7 and 8 present the sports resources that characterize the two groups mentioned before.

**Table 7** - Sports tourism resources of municipalities in Group 3

Racing Club	Club Atenas	Club Lomas Athletic Club	Club Haedo Juniors	Club 10 de Octubre
Club Atlético Independiente	Club de Rugby Albatros	Club Atlético Banfield	Club Brisas del Plata	Club Ajedrez de Quilmes
Clubes de fútbol Arsenal	Club de Rugby Los Tilos	Club Gazcón Lawn Tennis Club	Sociedad de Fomento La Rural	Club Alemán
Club de fútbol El Porvenir	Club San Luis	Club Social Buchardo	Sociedad de Fomento Haedo Sur	Club Argentino de Quilmes
Club de fútbol Dock Sud	Club Universitario	Club Cludias	Sociedad de Fomento 13 de abril	Club Atlético Sarmiento
Club de fútbol San Telmo	Club Estudiantes de La Plata	Club Infantil de Banfield	Club Social y Deportivo Bernardino Rivadavia	Club Deportivo Bernal
Campo Hípico	Club Gimnasia y Esgrima de La Plata	Club Defensores de Banfield	Club Ateneo Sagrada Familia	Club Don Bosco
Campo de Pato	Club La Plata Rugby Club	Centro Recreativo y Deportivo Municipal Gorki Grana	Centro Social y Recreativo Español	Club Leones de Bernal Oeste
Club Argentino de Rugby	Club Santa Bárbara Hockey	Estadio Nuevo Francisco Urbano	Social Club Villa Sarmiento	Club Mariano Moreno
Estadio Ciudad de La Plata	Club Atlético Talleres (Remedios de Escalada)	Polideportivo de la Asociación de Fomento de los Amigos de Lomas del Palomar	Ramos Mejía Lawn Tennis Club	Club Moreno
Hipódromo de La Plata	Club Atlético Lanús	Sociedad Italiana de Tiro al Seguro	Unión General Armenia de Cultura Física	Club Quilmes Motors
Club Hípico y de Golf	Club El Porvenir	Club Atlético El Palomar	Club 25 de Mayo	Club Social de Quilmes
Autódromo Roberto Mouras	Club Atlético Victoriano Arenas	Club Atlético Sportivo Haedo	Estadio Centenario	Club Quilmes Atlético Club
Club Estudiantes de La Plata	Club Atlético Temperley	Club Atlético El Trébol	Polideportivo Reinaldo Gorno	Avenida de la Unidad Nacional
Club Gimnasia y Esgrima de La Plata	Club Atlético Los Andes	Club El Discóbolo	Club Asociación de Tiro y Gimnasia de Quilmes	Campo Municipal de Deportes
Club Municipal de la ciudad de Vicente López	Club Deportivo Italiano	Club Minicipal de Vicente López	Boulogne Golf Club	Club Hípico La Horqueta
Club Atlético Colegiales	Club Centro Asturiano de Buenos Aires	Club Centro Galicia de Buenos Aires	Hipódromo de San Isidro	Club Atlético San Isidro
Club Atlético Platense	Club Círculo Trovador	San Isidro Club Rugby	Club Social Beccar	Golf de Villa Adelina
Olivos Rugby Club	Club Almagro	Club Atlético Estudiantes	Club Arrows	Club 10 de Octubre
Club de Rugby Banco Nación	Club Urquiza	Club Hípico del Norte	Club de Fútbol Atlético Acassuso	
Racing Club	Club Atenas	Club Lomas Athletic Club	Club Haedo Juniors	

**Source:** The authors based on Porto, Garcia, Romero, Petrolli and Renzella (2020).

**Table 8 - Sports tourism resources of municipalities in Group 7**

Aero Club Gonzales Cháves	Club Atlético Amigos Gorra de Cuero	Aeroclub Laprida	Complejo Deportivo Club Atlético 9 de Julio	Aeródromo y AeroClub Salliqueló
Club de Pelota	Huracán Fútbol Club	Laprida Golf Club	Complejo Deportivo San Agustín	Autódromo
Club Deportivo Independencia	Club Atlético Argentino	Competencias de Rural Bike	Cancha de Golf del Club Atlético 9 de Julio	Club Alumni
Club Huracán Ciclista	Media Luna Polo Club	Club Atlético El Linqueño	Velódromo Club Ciclistas Unidos	Club Atlético Quenumá
Club Atlético San Martín	Pesca Deportiva	Club Rivadavia	Complejo Deportivo del Club Agustín Álvarez	Golf Club Tapalque
Club de Pesca y Caza	Club Arenales	Club Juventud Unida	Complejo Deportivo Club San Martín	Pesca
Club de Planeadores Otto Ballod	Club Social y Deportivo Ascensión	Club Atlético Argentino	Autódromo Municipal	Caminatas
Centro Recreativo Comunal Club Atlético Independiente	Singlar Club de Ascensión	Club Atlético Vagos Unidos de Lincoln	Circuito de Moto Cross	Paseos en bicicleta
Complejo Recreativo Comunal	Pesca Deportiva	Natatorio	Aeroclub 9 de Julio	Kayakismo
Club de Polo	Club Social y Deportivo	Hipódromo	Nueve de Julio Automóvil Club	Club Atlético Argentino
Club de Pesca	Club Atlético Pintense	Campo de Golf Lincoln Golf Club Doctor Ernesto González	Complejo Polideportivo	Club Unión Deportiva
Instituto deportivo CEF N° 32	Campo de Pato La Tribu	Canchas de tenis Club Tenis Parque General San Martín	Club Atlético Botafogo de Rauch	Club Ferrocarril Oeste
Tiro Federal	Ciclo vía	Aeroclub Lincoln	Club Atlético y Social de San Lorenzo de Rauch	Polideportivo Municipal
Estadio Municipal José Antonio Barbieri	Club Atlético San Jorge en San Jorge	Pesca deportiva	Club Atlético Agraria	Campo de jineteada
Cancha de básquet Ateneo Estrada	Club Atlético Jorge Newbery	Automoto Club Lincoln	Club Atlético Boca Juniors de Rauch	Autódromo Las Charas
Cancha de Básquet club Atlético	Club Social y Deportivo Juventud	Club Atlético	Club Atlético Juventud Agraria y Social Estudiantes de Rauch	
Cancha de básquet Defensores, Sarmiento y Ferroviario	Centro Recreativo y Deportivo Empleados de Comercio	Club Social	Club de Polo	
Cancha de básquet Sarmiento	Club Social y Deportivo Laprida	Club Independiente	Complejo Polideportivo Balneario	
Cancha de básquet Ferroviario	Club Atlético Platense	Club Ferroviario	Club Atlético Cecil Roberts	
Muelle Complejo Recreativo Municipal Club Independiente	Pista de bicicross	Campo de Pato La Guarida	Club Atlético Jorge Newbery	

**Source:** The authors based based on Porto, Garcia, Romero, Petrolli and Renzella (2020).

## 5 CONCLUDING REMARKS

For some time, sports tourism, considered as the one that involves visitors' attendance as a spectator or participant in sports events that take place out of their place of usual residence (Tajzadeh-Namin y Niknam, 2012), has consolidated as a strategy for the promotion, management, and destination of tourism resources. In the Province of Buenos Aires, for example, the provincial tourism area has strengthened the promotion of sports activities in its sea and river shores (sailing tours, kitesurf), hills (trekking, parachuting) and plains (horse-riding). A long term and strategic vision for growth could give a prevailing role to this type of product.

As such, this study proposes a multivariate methodology that considers a group of variables simultaneously in order to study and characterize each of the municipalities in the Province of Buenos Aires in Argentina, to reach a specification and classification based on their tourism resources. The innovative element of this analysis is the variable referred to tourism resources, which comes from an unprecedented tourism resources inventory developed by a research team from the School of Economic Sciences of Universidad Nacional de La Plata (Porto, Garcia, Romero, Petrolli & Renzella, 2020) and the application of a rigorous methodology of classification, in which we trust to develop the potentialities of tourism. Sports tourism is a classification itself inside this inventory.

We conclude that three groups stand out for some characteristics. Group 5 hosts most traditional tourist municipalities from the Atlantic Coast. Groups 3 and 7 include municipalities with high participation of sports resources, one of them with urban localities and the other one with more rural characteristics. These are cases where tourism, as a local economic activity, has excellent potential. Thus, this research contributes with a specific strategy for tourism development of the Province of Buenos Aires using the identification of potential tourism corridors, based on sports tourism, in both urban and rural settings. Specific sports tourism resources particularly stand out: soccer and rugby clubs in Group 3 and clubs and associations linked to other sports (polo, fishing, golf, basketball, among others) in Group 7.

This research makes a significant contribution at the local level in the field of tourism: it provides tools to understand the diversity of municipalities for the case of the Province of Buenos Aires through the appliance of multivariate statistical methods. This, together with the classification and grouping of municipalities, can be crucial for the formulation of tourism policies and, at the same time, it encourages the usage of statistical methods in the fields of sustainable development in general and tourism development, specifically. Sports tourism potential seems to be the development tactic in the path towards development and provincial growth.

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