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SUMARIO

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Public expenditure and business effort in sports and their relation to the territorial development: The case of spanish autonomous communities

Gasto público y esfuerzo empresarial en deporte y su relación con el desarrollo territorial: El caso de las comunidades autónomas españolas

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ABSTRACT

The present work aims at identifying the role of public expenditure and private business effort in sports in Spain and its impact on the territorial development of its autonomous communities in 2011, 2015 and 2018. Basing on a cluster analysis and incorporating variables that relate the territory to sports, it is revealed that these two factors do not always achieve a correlated success and that different approaches and specificities should be considered to design and apply policies, strategic plans and private participation that would be more in line with the territory's realities, so to guarantee greater sports-related success in terms of efficiency and profitability.

RESUMEN

El presente trabajo tiene como objetivo identificar el papel del gasto público y el esfuerzo empresarial en el deporte en España y su impacto en el desarrollo territorial de

sus comunidades autónomas en 2011, 2015 y 2018. A partir de un análisis de clúster al que se le incorporan variables que relacionan el territorio con el deporte, se comprueba que estos dos factores no siempre logran un éxito correlacionado y que se deben considerar las especificaciones territoriales propias para diseñar y aplicar políticas públicas y planes privados que sean más acordes con la realidad de las regiones, para que, de esa manera, se garantice un mayor éxito relacionado con el deporte en términos de eficiencia y rentabilidad.

1. INTRODUCTION

Sports is related on intimate level to the population's healthy lifestyle both from physical perspective and mental (Schädlich et al., 2017). Practicing sports also helps in improvement of social skills and may as well influence expectations of promotion or social mobility of sportspeople (Riley et al., 2017). All these issues can generate subsequent economic relations that would boost the entrepreneurship of the territory (Coates & Humphreys, 2011), decrease in the number of hospitalizations (Barbosa & Urrea, 2018), growth of potential collaboration networks between citizens-athletes or increase in their sense of pride and belonging to the territory (Inoue & Havard, 2014), among other factors.

Being conscious of this relation between sports, population's wellbeing and territorial development, both governments and private sector have assumed the responsibility over its stimulus between citizens at professional and amateur levels. In this aspect, Spain, for example, has established a legal framework for regulation of state, regional and local competence (Law 7/1985), which determines their responsibilities in sports.

According to Figure 1, public investments of the General State Administration in sports in 2018 were the highest of the analyzed years (175 million euros, 0.01% of total GDP). Likewise, the expenditure of the Autonomous Administration had also a reasonable increase in recent years, but it is still far away from 2011 data (358 million in 2018 and 579 in 2011). As Figure 2 shows, the Local Administration make the main public expenditure on sport (0.19% of total GDP in 2018). This could be due to the large number of municipalities in the country.

FIGURE 1
EXPENDITURE ON SPORTS PAID BY THE A.A. AND G.S.A. (€ THOUSANDS)
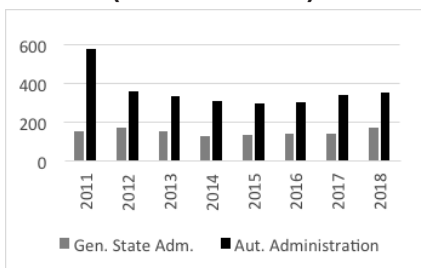
Source: Anuario de Estadísticas Deportivas 2020.

FIGURE 2
EXPENDITURE PAID BY THE LOCAL ADMINISTRATION ON SPORTS (€ THOUSANDS)
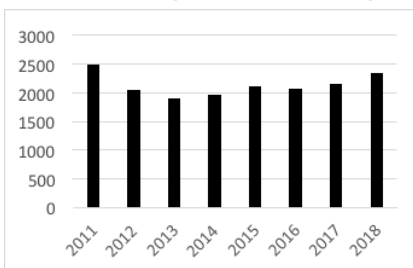
Source: Anuario de Estadísticas Deportivas 2020.

Spanish government and its private sector have also boosted hiring specialized staff for sports' promotion, as well as creating businesses related to it. In fact, in 2016, 194 thousand people worked in the sports sector (1.1% of active population), expanding to 219.9 thousand in 2019 (Figure 3), which made Spain the third European country by the number of sports-related employees (Barbero, 2017). In its turn, the number of companies whose main activity is sports rose to 36,793 at the beginning of 2019 (Figure 4), 83.5% of which corresponds to those who carry out facilities management and sports clubs' activities. 0.7% corresponds to sports items manufacturing and 15.7% – to their trade. These companies are mostly found in autonomous communities (ACs) such as Andalusia (14.7%), Catalonia (16.9%), Valencia (10.6%) and Madrid (14.8%) and export goods valued at 1,046.8 million euros.

Therefore, keeping in mind the important relationship between sports, personal wellbeing and territorial development, it is necessary to deepen in the analysis and knowledge of sports-territory relationship in Spain and the use of public and private resources, highlighting the importance of specificities of different ACs and considering that sports practice depends on personal, educational, cultural, political and economic aspects – i.e. capacities and potentialities of each territory. That is why, public and private sectors must take into account singularities of the territories to establish strategic plans in the encouragement of sports.

FIGURE 3
AVERAGE ANNUAL EMPLOYMENT RELATED TO SPORTS (THOUSANDS)
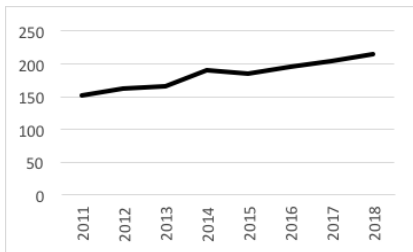
FIGURE 4
SPORTS-RELATED COMPANIES

Source: Anuario de Estadísticas Deportivas 2020.
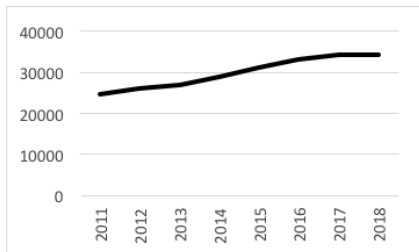
Source: Anuario de Estadísticas Deportivas 2020.

In this way, the aim of the present work is to identify which role public expenditure and business effort play in sports in Spain and their impact on territorial development of its ACs, keeping in mind possible territorial differences.

The scope of research are Spanish ACs in comparison between 2011, 2015 and 2018 (final year with available data) to analyze the evolution of the role of sports in the territorial development of its regions throughout that decade. The analysis is divided between different ACs to find common behavior patterns that would later allow to compare them. Likewise, since Spain has various territorial realities that affect the daily life of citizens, it is intended to determine the influence of territorial specificities on sports and, in turn, its impact on the development of the territories.

This work has the following structure: it begins with a theoretical framework that justifies the relationship between sport and territorial development. It continues with an exposition of the methodology used to achieve the established aims. Subsequently, the results achieved after carrying out a descriptive study of the situation and the cluster analysis are presented. It ends by highlighting the main conclusions reached in the research, in addition to the bibliography and the annexes used.

2. THEORETICAL FRAMEWORK

Sports is an activity that can contribute to the stimulation of territorial development of municipalities (Lera & Suárez, 2019) through of the organization of sporting events (Bosch et al., 2019), sports tourism (Mateos, 2016), sports infrastructure (Agha, 2013), professional sports (Coates & Depken, 2011) or lifestyle habits health of its citizens (Schädlich et al., 2017) among others.

In this sense, the public administration usually plays a leading role in the management of policies and strategic lines aimed at creating, improving and guaranteeing the sports habits of its citizens (Ruiz-Rico Ruiz & Ruiz-Rico Ruiz, 2019), the management and outsourcing of its sports resources (García & Barata, 2016) or the provision of infrastructure and professionals to guarantee physical preparation (Moreno Polo, 2014). Similarly, the private sector can support the promotion of sport through the marketing of more efficient sports equipment that allows the achievement of new accomplishments, licenses or clubs, in addition to supporting the sponsorship of teams (Davis, 2006).

All this encourages citizens to lead a more active life, which has a direct impact on their health and on the improvement of their social relationships (Riley et al., 2017), favouring subsequently the local economy through the creation of businesses and collaborative networks between individuals (Coates & Depken, 2011), increase in the sense of belonging to the territory and sports culture (Inoue & Havard, 2014) or hospital admissions (Barbosa & Urrea, 2018).

Getting deeper into the relation between municipalities and professional sports, there are a lot of examples of territories that invest efforts in their local teams' entering more powerful leagues as a means of achieving the development of the municipalities (Matheson & Baade, 2006). This type of investment, which will also benefit citizens and local clubs and can be an

opportunity for the promotion of sport (Medeiros, 2019), goes from building new sports infrastructure to tax exemptions (Lertwachara & Cochran, 2007). However, it does not always bring desired effects (Giraldo, 2019).

In fact, one must proceed with caution when implementing investments in sports infrastructure. Although they are positive for the increase in income of both athletes and clubs (Coates & Humphreys, 2011), these investments might bring a decrease in the income level of their citizens (Lertwachara & Cochran 2007). Here comes the importance of preparing a diagnosis that would reflect the municipality's sports and social realities and detect the territory's specificities, since making inconsistent investments could be detrimental to the public well-being (Santo, 2007).

Even so, major sports leagues enhance the promotion of professional sports in a territory through the attraction of potential economic opportunities (Coates & Humphreys, 2011). However, the municipalities with a higher population, per capita income and sports tradition have more opportunities to have an economically sustainable professional team (Agha, 2013). This is mainly due to the financing of their followers through subscriptions and advertisements (Davis, 2006). Besides, successful sports teams tend to raise the prestige of their cities (Baade et al., 2008), have an impact on the happiness and pride of their neighbors (Baade et al., 2011) and the generation of public goods (Lertwachara & Cochran, 2007).

The achievement of a sports title also has a statistically significant impact on the champion municipality's economy (Matheson, 2005). However, although winning a high-level championship is related to an increase in the local worker's productivity (Coates & Humphreys, 2002), the results obtained in other studies suggest that this only occurs in half of the cases (Matheson, 2005).

Likewise, the organization of big sports events also positively affects the host town's economy (Bosch et al., 2019). Nevertheless, it may also have negative effects like vandalism or doping (Barget & Gouguet, 2007). Despite that, citizen participation usually creates a cultural-festive atmosphere that increases the feeling of belonging to the territory and the promotion of the sport itself (Inoue & Havard, 2014).

In that sense, the impact of a major event like Super Bowl in the US is estimated at $300-400 million (Matheson & Baade, 2006), a claim used by the National Football League (NFL) as an incentive to convince potential host cities (Baade et al., 2008). However, the same event does not have

the same economic impact in one municipality as in another. In fact, the desired impact figures are often not achieved and only a quarter of what was expected might actually contribute to the cause (Matheson & Baade, 2006). Other macro sporting events have even caused losses, so that the holding of such a championship in the territories should be carefully considered (Baade et al., 2008).

FIGURE 5
TRINOMIAL PE AND BE, SPORTS ACTIVITIES AND TERRITORY
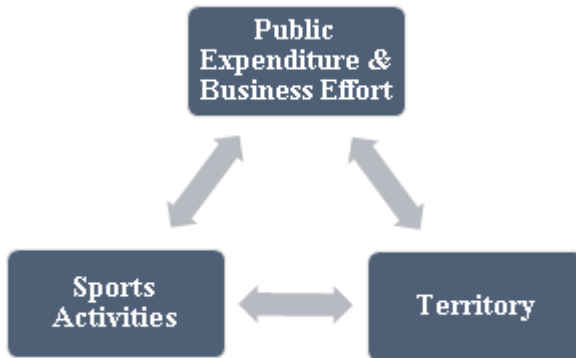
Source: Author elaboration.

As a result, a trinomial can be found with three main vertices: Public Expenditure and Business Effort (PE and BE), Sports Activities (SA) and Territory (T), where each of the elements influences the rest: a monetary injection in the form of public expenditure and private investment in the sports sector will promote sports activities among individuals. And it will influence the feeling of belonging and representation of their territory and this, in turn, will help the inclusion of new public policies, strategic plans or private measures in sports (Figure 5). Likewise, this feeling of belonging encourages sports practice, provokes and demands higher public expenditure and business effort. In their turn, federal clubs and licenses continue to grow – and this helps to achieve a greater volume of sports success (Mitchell et al., 2012).

Therefore, positive externalities promote sports practice among the inhabitants of different territories, i.e., a virtuous circle is created in which all agents (athletes, coaches, administrative personnel, companies and insti-

tutions, among others) must be interconnected through public policies or appropriate strategic plans, with the ultimate goal of meeting and achieving the proposed aims (Pulido Fernández, 2008).

3. METHODOLOGY

As described above, the present work aims to identify the role of public expenditure and private business effort in sports in Spain and its impact on the territorial development of its ACs, keeping in mind possible territorial differences. For that, a conglomerate analysis is developed as a methodological strategy, since it is appropriate for forming groups with homogeneous characteristics, allowing its classification into groups not previously defined (Faroughi & Javidan, 2018). The use of this exploratory analysis technique, based on interpretations of qualitative nature, is common for making comparisons between the resulting clusters and detecting common patterns of behavior (Kolveková et al. 2019).

Cluster studies have been used in a great number of different fields of research (Faroughi & Javidan, 2018). In this work such methodology is used to find out which ACs present similar behavior in sports, considering years 2011, 2015 and 2018, and analyzing how grouping of ACs occurs and what its evolution is throughout these three reference years.

There are several methods used in cluster analysis, including the farthest neighbor method (Camarero et al., 2019), the nearest neighbor method (Pérez & Valiente, 2015), the Centroid method (Ni et al., 2010), and Ward's method (Kolveková et al., 2019; Kukulska-Kozieł et al. 2019), among others. In this study, we opted for the farthest neighbor method, which allows association according to the maximum distance between groups (Castanho et al., 2019). In this way, clusters are made up according to the degree of similarity between regions (Faroughi & Javidan, 2018) and, in turn, can help to verify the existence of particularities associated with the territories.

Although this method usually yields large clusters (Faroughi & Javidan, 2018), it helps in the association of groups in which their members present important degrees of similarity between them. This, in turn, can help in the detection of territorial particularities (Kukulska-Kozieł et al., 2019), especially because this method is useful in the detection of outliers, since these will be the last to cluster (Camarero et al., 2019). However, it should be noted that

the presence of a large number of this type of values, can produce biased results (Irizarry & Love, 2015), so they should be treated with special care.

Table 1 shows the most frequent techniques applied to cluster analysis of territorial development next together with their main characteristics and outstanding articles.

TABLE 1

THE MOST FREQUENT TECHNIQUES APPLIED TO CLUSTER ANALYSIS OF TERRITORIAL DEVELOPMENT

Cluster method	Characteristics and uses	Featured articles
Farthest neighbor	It considers the farthest distance between individuals.	Camarero et al. (2019) Castanho et al. (2019)
Nearest neighbor	It considers the minimum distance between individuals.	García Márquez (2018) Pérez & Valiente (2015)
Centroid	It uses the distance between centroids as a function of the number of individuals in each group.	Ni et al. (2010) Naranjo & Prieto (2018)
Ward	Their distance is marked by the union of groups that least increase the sum of the squares of the deviations when joined.	Kolveková et al. (2019) Kukulska-Kozieł et al. (2019)

Source: Author elaboration.

The distance metric used is the squared Euclidean, one of the commonly used in this type of works (Pérez & Valiente, 2015), and, to complete the analysis, the Statgraphics software version 19 has been used. In this research, as in other cluster studies of Spanish ACs, the autonomous cities of Ceuta and Melilla will not be considered, given their particular situation (García Márquez, 2018).

Nevertheless, before carrying out the cluster analysis and in order to check for the possible presence of outliers that could influence the final grouping, it was decided to include a box-and-whisker plot for each of the variables analyzed (Garcia & Gosling, 2021). This previous study is particularly useful because the clustering method used in these cluster analyses, *the farthest neighbor*, is sensitive to this type of values (Picón et al, 2013). In this way, it is possible to corroborate which variables are particularly significant in the final grouping of the clusters (Castanho et al., 2019), which may be decisive when verifying the existence of particularities and specificities specific in the Spanish ACs.

Likewise, given that the variables analyzed have different units of measurement, it was decided to use standardized data (Appendices 5, 6 and 7) instead of the original data to carry out the analysis (Kaufman and Rousseeuw, 2009). This standardization process makes it possible to change the scale of the values of the variables so that they share a common scale. In this way, a variable with a higher value range than the rest of the variables is prevented from distorting the results, since standardization helps to equalize the relative weight of each variable by converting all of them into a measure without units or relative distance (Kaufman and Rousseeuw, 2009).

The chosen methodology is based on the following variables, whose geographical scope is the entire Spanish territory, separated by ACs. These variables have already been used (or other very similar ones) in some of the previous research included in the theoretical framework (Agha, 2013; García Márquez, 2018; Matheson & Baade, 2006; Mitchell et al., 2012; Pérez & Valiente, 2015), this being the first time that they have been analyzed as a whole (Table 2):

TABLE 2
VARIABLES CONSIDERED FOR THE ANALYSIS

VARIABLE	DESCRIPTION
Per capita expenditure on sports paid by the local Administration per ACs (PE).	- It measures the local Administration's spending on sports, and it is considered as an approximation to public expenditure linked to the sector on the territory. - Sports expenses include personnel expenses, current goods and services expenses, financial expenses, current transfers, real and capital investments and financial assets and liabilities. - Sources: Budget Settlement Statistics available at the Spanish Ministry of Finance and Civil Service.
Sports-related companies per ACs per hundred thousand inhabitants (Companies).	- It is considered as an approximation to the sports business network's effort on the territory. - It is composed of companies whose main economic activity is sports according to Spanish National Classification of Economic Activities 2009, of sports goods' manufacturers (except clothing and footwear), of sports retail stores in specialized establishments and of those who offer sports activities. - Sources: the Central Business Directory – for data related to the number of companies; the Industrial Companies Survey, the Annual Trade Survey and the Annual Services Survey – for data related to economic magnitudes.

continúa...

TABLE 2
VARIABLES CONSIDERED FOR THE ANALYSIS (CONCLUSIÓN)

VARIABLE	DESCRIPTION
Federal sports clubs per ACs per hundred thousand inhabitants (Clubs).	- Sports clubs are private associations, whose aim is the promotion and practice of one or more sports modalities or participation in competitions, which has a direct relation to sports practice by the inhabitants of the territory. That is why it is chosen as a drive of the promotion of sports. - They must be enrolled in the Sports Associations Registry. - Sources: Federal Sports Statistics prepared by the Higher Sports Council.
Federal licenses per ACs per hundred thousand inhabitants (Licenses).	- Athletes who have a federal license to practise a specific type of sports, which again is directly linked to the number of citizens who do sports and to its promotion. - Sources: Federal Sports Statistics.
Medals obtained in Spanish School Championships per ACs per hundred participants (MSC).	- These competitions are organized annually by the Presidency's resolution of the Higher Sports Council. - Those who represent the ACs where their educational center is located and those who have a sports license in the corresponding season and meet the necessary requirements can participate. - Sources: State Administration's Statistical Operations Inventory.
Medals obtained in Spanish University Championships per ACs per hundred participants (MUC).	- These competitions are organized annually by the Presidency's resolution of the Higher Sports Council. - Those who carry out their sporting activity in a recognized university and represented in the Spanish University Sports Committee can participate, in which they are enrolled during the course in which the championships are held and prove that they are studying for any official degree. - Both this variable and the previous one are taken as an approximation to the success of strictly measurable sports results. - Sources: State Administration's Statistical Operations Inventory.

Source: Own elaboration based on the *Anuario de Estadísticas Deportivas 2020*.

All the variables used in this work are minimized depending on the inhabitants of each year (Spanish National Statistics Institute (commonly known as INE), 2020) or participants of each edition (Anuario de Estadísticas Deportivas, 2020), with the intention of analyzing and comparing their impact in a homogeneous way (Naranjo & Prieto, 2018). In this way, it is possible to lay out an approach to the economic situations and the level of development of the ACs, benefiting comparative analyzes between clusters (Ni et al., 2010). The intervals created for the classification of these values in the resulting clusters are detailed in Appendix 1.

4. RESULTS

In this section the main results are presented, which have been obtained after the descriptive analysis of the datum used in the elaboration of this research and the cluster methodology previously laid out.

4.1 Descriptive analysis

Next step is to carry out a descriptive analysis of the variables used for the cluster analysis in reference to the territories under study. Firstly, public investment in sports has experienced an overall decrease in the ACs between 2011 and 2015, except for the Canary Islands, Extremadura and the Basque Country, with significant inequalities between them (the Basque Country triples its PE in relation to Extremadura). The opposite occurs when comparing 2015 and 2018, given that investments in sports increase in 15 out of 17 ACs (all except Asturias and the Basque Country), which indicates a financial and economic improvement in the country. However, it must be pointed out that, except for very specific cases (such as Castilla-La Mancha, Navarre, Extremadura and La Rioja), in the three years analyzed, the ACs tend to maintain their PE in sports (Table 3; amounts in brackets show the % of change compared to the previous year).

Secondly, all the ACs have experienced a surge in the number of sports companies between 2011 and 2018. As it can be seen in Table 3, they keep on having similar values between them except for the Canary and Balearic Islands, whose number of companies per hundred thousand inhabitants is higher than other regions.

Regarding the number of clubs, the same trend has been maintained in each AC in the years analyzed, except for the Canary Islands, Castilla-La Mancha, Catalonia and La Rioja, which follow a pattern different from the other ACs. In general, there has been a progressive increase, which may be correlated with the aforementioned increase in companies linked to sports. This may encourage a popular enthusiasm for sports or the creation of new clubs. However, Catalonia lost many of its clubs year after year in the period analyzed. The number of licenses, though, remains stable in the chosen cycle with slight ups and downs between 2015 and 2018 in a few ACs such as Galicia or the Basque Country (Table 4).

TABLE 3
**SPORTS COMPANIES PER 100 THOUSAND INHABITANTS AND
PUBLIC EXPENDITURE (PE) IN SPORTS PER 100 THOUSAND
INHABITANTS PER ACS. YEARS 2011, 2015 AND 2018**

ACs	PE			Companies		
	2011	2015	2018	2011	2015	2018
Andalusia	49.83	36.51 (-26.73%)	40.89 (12.00%)	44.87	56.27 (25.41%)	60.55 (7.61%)
Aragon	58.69	55.64 (-5.20%)	68.32 (22.79%)	42.56	61.01 (43.35%)	71.52 (17.23%)
Asturias	54.19	47.09 (-13.10%)	45.32 (-3.76)	53.26	64.31 (20.75%)	73.52 (14.32%)
Balearic Islands	66.08	55.70 (-15.71%)	64.73 (16.21%)	90.92	109.46 (20.39%)	117.28 (7.14%)
Canary Islands	57.40	59.00 (2.79%)	59.82 (1.39%)	62.49	84.99 (36.01%)	94.23 (10.87%)
Cantabria	59.41	49.03 (-17.47%)	56.01 (14.24%)	49.57	68.18 (37.54%)	78.59 (15.27%)
Castilla and Leon	53.46	52.36 (-2.06%)	52.74 (0.73%)	51.05	71.03 (39.14%)	82.44 (16.06%)
Castilla-La Mancha	62.39	46.22 (-25.92%)	53.94 (16.70%)	37.77	55.85 (47.87%)	63.01 (12.82%)
Catalonia	46.17	41.94 (-9,16%)	51.46 (22.70%)	58.07	71.36 (22.89%)	78.46 (9.95%)
Valencia	48.83	37.64 (-22.92%)	40.19 (6.77%)	47.60	63.24 (32.86%)	72.37 (14.44%)
Extremadura	31.86	35.50 (11.42%)	47.62 (34.14%)	42.55	53.61 (25.99%)	61.89 (15.44%)
Galicia	48.42	41.20 (-14.91%)	45.11 (9.49%)	55.23	71.40 (29.28%)	80.17 (12.28%)
Madrid	53.02	46.44 (-12.41%)	50.36 (8.44%)	57.94	74.40 (28.41%)	78.55 (5.58%)
Murcia	48.22	34.94 (-27.54%)	36.02 (3.09%)	45.71	59.09 (29.27%)	67.30 (13.89%)
Navarre	80.06	53.51 (-33.16%)	68.51 (28.03%)	47.35	61.20 (29.25%)	73.51 (20.11%)
Basque Country	85.48	87.23 (2.05%)	82.35 (-5.59%)	53.88	56.00 (3.93%)	60.80 (8.57%)
La Rioja	70.21	56.34 (-19.76%)	58.18 (3.27%)	51.09	66.55 (30.26%)	75.08 (12.82%)
AVERAGE	57.28	49.19 (-14.12%)	54.21 (10.21%)	52.47	67.53 (29.70%)	75.84 (12.31%)

Source: Author elaboration based on the Anuario de Estadísticas Deportivas 2020.

TABLE 4
CLUBS AND SPORT LICENSES PER 100 THOUSAND
INHABITANTS PER AC. YEARS 2011, 2015 AND 2018

ACs	Clubs			Licenses		
	2011	2015	2018	2011	2015	2018
Andalusia	127.10	135.50 (6.61%)	140.86 (3.96%)	6,773.09	6,146.63 (-9.25%)	6,183.42 (0.60%)
Aragon	365.08	414.84 (13.63%)	426.22 (2.74%)	10,710.70	10,742.07 (0.29%)	10,752.96 (0.10%)
Asturias	140.18	168.56 (20.25%)	186.43 (10.60%)	8,090.34	8,904.91 (10.07%)	9,824.91 (10.33%)
Balearic Islands	125.41	133.64 (6.56%)	142.79 (6.85%)	8,102.58	7,994.27 (-1.34%)	8,937.40 (11.80%)
Canary Islands	106.55	131.98 (23.87%)	118.63 (-10.12%)	6,898.92	7,251.04 (5.10%)	7,810.70 (7.72%)
Cantabria	157.81	204.72 (29.73%)	216.64 (5.82%)	10,366.40	11,609.44 (11.99%)	12,838.03 (10.58%)
Castilla and Leon	185.50	168.12 (-9.37%)	169.48 (0.81%)	7,086.40	7,100.54 (0.20%)	7,633.98 (7.51%)
Castilla-La Mancha	199.54	213.58 (7.04%)	178.70 (-16.33%)	6,790.23	6,258.96 (-7.82%)	6,514.34 (4.08%)
Catalonia	108.23	107.23 (-0.92%)	102.47 (-4.44%)	8,041.52	7,964.37 (-0.96%)	8,466.51 (6.30%)
Valencia	104.39	121.55 (16.44%)	129.6 (6.72%)	6,895.15	7,291.24 (5.74%)	8,082.86 (10.86%)
Extremadura	140.17	222.96 (59.06%)	254.46 (14.13%)	7,441.72	7,427.93 (-0.19%)	8,680.42 (16.86%)
Galicia	151.53	169.20 (11.66%)	196.28 (16.00%)	7,804.01	7,877.33 (0.94%)	10,597.01 (34.53%)
Madrid	58.25	62.13 (6.66%)	69.28 (11.51%)	6,629.39	6,927.63 (4.50%)	7,737.41 (11.69%)
Murcia	107.34	168.54 (57.02%)	185.25 (9.91%)	6,209.78	6,391.93 (2.93%)	8,273.33 (29.43%)
Navarre	170.39	187.20 (9.87%)	204.15 (9.05%)	11,340.50	11,763.59 (3.73%)	12,203.77 (3.74%)
Basque Country	124.37	139.04 (11.80%)	145.83 (4.88%)	9,790.00	9,775.55 (-0.15%)	11,998.06 (22.74%)
La Rioja	213.03	241.92 (13.56%)	234.10 (-3.23%)	10,826.30	10,123.23 (-6.49%)	10,745.86 (6.15%)
AVERAGE	152.05	175.92 (3.70%)	182.43 (3.70%)	8,223.35	8,326.51 (1.25%)	9,251.82 (11.11%)

Source: Author elaboration based on the Anuario de Estadísticas Deportivas 2020.

Both in the number of medals obtained in the Spanish School Championships (MSC) and in the University Championships (MUC), the data shows that the trend is maintained in each AC, i.e., those that won a large number in 2011 continue to win in 2015 and 2018. In this case, the quality sports infrastructure and the coaches' proficiency help the athletes to work efficiently over the years. More than 10 points Catalonia's fall in the Spanish School Championships in 2011-2015 and the enormous increase in the same period in the University Championships of the Canary Islands, Galicia and Murcia, should be stressed. These three ACs have prestigious university centers in the field of sports, such as Murcia's Saint Anthony Catholic University (UCAM) or University of La Laguna (ULL). While achieving these trophies, it is important to take into account talent drains from some ACs to others with universities and prestigious and traditional clubs, the proliferation of generations of athletes of unequal quality or coaches' replacement (Table 5).

In addition to the aforementioned results, some other aspects worth highlighting are pointed out below:

– The occasional variation in the medals winning in some ACs may be linked to sports talent drains (both coaches and competitors) to other regions, allured by more comprehensive sports or educational programs or by the existence of better infrastructure or competitions (cases of the Canary Islands, Murcia and Galicia). It is also worth adding the appearance, mostly almost spontaneous, of a generation of unique athletes who leave their mark on a specific championship.
– The continuing extensive medal table in each of the years analyzed is explained by the tremendous job done by coaches and trainers in one region or the talent recruitment from other ACs (Asturias).
– Having a great public and business effort in sports is usually more linked to the leisure and tourism offer than to the commitment to obtaining medals (Balearic and Canary Islands).
– An increase in clubs and licenses may be caused by the inclusion of new sports public policies, investments or strategic plans in previous years.
– The drop in clubs level experienced by Castilla and León may be due to the closure of municipal teams in towns or cities that have lost population (lower population density in Spain) (INE, 2022).

TABLE 5
MSC AND MUC VARIABLES DATA PER 100 PARTICIPANTS PER AC. YEARS 2011, 2015 AND 2018

ACs	MSC			MUC		
	2011	2015	2018	2011	2015	2018
Andalusia	17.39	18.11 (4.14%)	15.28 (-15.63%)	10.23	16.80 (64.22%)	14.06 (-16.31%)
Aragon	4.40	2.77 (-37.05%)	4.13 (49.10%)	20.51	12.24 (-40.32%)	14.93 (21.98%)
Asturias	7.90	5.40 (-31.65%)	6.36 (17.78%)	14.81	50.00 (237.61%)	22.41 (-55.18%)
Balearic Islands	4.65	5.00 (7.53%)	5.26 (5.20%)	5.56	12.50 (124.82%)	26.67 (113.36%)
Canary Islands	6.44	4.91 (-23.71%)	6.07 (23.63%)	22.35	57.89 (159.02%)	41.18 (-28.87%)
Cantabria	2.04	3.83 (87.75%)	4.87 (27.15%)	3.38	5.56 (64.50%)	11.76 (111.51%)
Castilla and Leon	15.94	12.63 (-20.77%)	9.65 (-23.59%)	5.39	9.68 (79.59%)	12.54 (29.55%)
Castilla-La Mancha	13.17	7.02 (-46.70%)	3.32 (-52.71%)	6.25	15.38 (146.08%)	9.59 (-37.65%)
Catalonia	30.23	19.90 (-34.17%)	20.94 (5.23%)	11.42	15.17 (32.84%)	20.36 (38.21%)
Valencia	24.33	20.21 (-16.93%)	14.45 (-28.50%)	12.90	16.34 (26.67%)	17.85 (9.24%)
Extremadura	6.30	2.02 (-67.94%)	2.25 (11.39%)	8.18	10.23 (25.06%)	2.04 (-80.06%)
Galicia	9.09	7.85 (-13.64%)	10.67 (35.92%)	13.11	38.64 (194.74%)	23.20 (-39.96%)
Madrid	19.21	18.91 (-1.56%)	19.97 (5.61%)	16.81	20.17 (19.99%)	19.18 (-4.91%)
Murcia	5.57	3.42 (-38.60%)	3.9 (14.04%)	22.82	42.20 (84.93%)	49.54 (17.39%)
Navarre	5.65	4.14 (-26.73%)	4.38 (5.80%)	3.64	0.00 (-100.00%)	21.74
Basque Country	10.85	10.53 (-2.95%)	9.67 (-8.17%)	7.01	10.28 (46.65%)	15.60 (51.75%)
La Rioja	1.91	3.16 (65.45%)	1.20 (-62.03%)	5.56	0.00 (-100.00%)	13.64
AVERAGE	10.89	8.81 (-19.10%)	8.37 (-4.99%)	11.17	19.59 (75.38%)	19.78 (0.97%)

Source: Author elaboration based on the Anuario de Estadísticas Deportivas 2020.

4.2 Cluster analysis

The results obtained after carrying out the methodological steps are shown below. They reveal significant territorial differences in the management of public resources and entrepreneurial effort in sports in the Spanish ACs, for the years analyzed 2011,2015 and 2018.

To begin with, the results are presented regarding the presence of outliers found after the elaboration of the box-and-whisker plots carried out for each of the variables, which were taken into consideration in this study. They demonstrate the existence of territorial particularities in some of the regions analyzed.

The first of these refers to the high public expenditure on sports in the Basque Country (Appendix 8). This territory has strong levels of public investment in each of the three years analyzed, which can be understood as a particularity of its territory. In fact, this influences, as shown below, the fact that the region forms a single cluster in 2015 and that in the rest of the years it has its neighbors at a significant distance.

Similarly, Aragon has a higher number of sports clubs than the rest of the regions in 2011, 2015 and 2018, year in which this AC became an individual conglomerate (Appendix 9). This can also be considered as a distinctive argument of its territorial diversity, given the large number of existing municipalities in the community and of a likely outstanding number of municipal clubs. This has an impact on Aragon forming individual clusters in 2011 and 2018.

The anomalous data detected in the island region of the Balearic Islands is also of interest (Appendix 10). In this case, its commitment to leisure sport rather than competitive sport leads to the existence of a much higher number of linked companies than in the rest of the ACs in each of the years analyzed. This territorial casuistry makes it form a unique conglomerate in 2011.

The rest of the anomalous data that emerged after the analysis do not seem to be related to the existence of territorial particularities, since they occur exclusively in only one of the years of analysis, which is why it is considered that they are not a reflection of factors rooted in the territory (Appendices 11 and 12). These are the cases of the medals obtained, whose most representative data is reached by Murcia in the university tournaments of 2018, which has repercussions in forming individual conglomerates in that same year.

Once this has been clarified, we will now comment on the results obtained after the cluster analysis, by means of which it has been verified that there's an existence of a diversity of behavior among the ACs in relation to the sports variables considered, as a response to territorial particularities (Table 6). In this regard, the PE variable has notable effects on some of the resulting conglomerates: the ACs belonging to Cluster 1 of 2011 (Andalusia, Valencia, Madrid and Catalonia) achieve big sports results, recorded in medals, despite having relative medium-low levels of public expenditure. A similar case also occurs for this conglomerate in 2015 (same ACs plus Castilla and León) and in Clusters 1 and 6 of 2018, as it can be seen later. Such success is more likely to have been achieved by sports criteria, rather than by economic criteria. However, the demographic peculiarities of these regions (among the six most populated ACs) (INE, 2022) may justify the low level of public expenditure. In any case, applying sports-promoting policies may be considered to increase the number of inhabitants who practice federal sports.

On the other hand, the ACs of the Canary and Balearic Islands, located in Cluster 4 of 2011 and 2015 and Cluster 3 of 2018, are defined as having relative high levels of public expenditure, despite the fact that the rest of the values are low or very low. Again, the specificities of these territories must be taken into account. In this case, they are islands. And since they are highly tourist regions, sports are mainly practiced as leisure and not as a competition. In any case, these regions should encourage sports participation by their inhabitants to achieve greater efficiency based on the resources used. In connection with this, it is pertinent to comment on Cluster 2 of 2015 made up of Aragon, Cantabria, Navarre and La Rioja (Table 6) and Cluster 2 of 2018 (Aragon) since, despite the small number of sports companies, they have a large variety of clubs and federal licenses. It is possible that online and distance shopping is used more in these regions than in others.

Moreover, the ACs belonging to Cluster 3 of 2015 (Asturias, Galicia, Murcia, Castilla-La Mancha and Extremadura) should be highlighted, since their number of federal clubs is high, even compared to that of licenses, perhaps caused by a very high number of small municipalities with their own teams, influencing the feeling of belonging to their territory and the expansion and structuring of territorial development. The opposite occurs in the regions of Cluster 5 of 2011 (Cantabria, Navarre, La Rioja and the Basque Country), while having very few federal teams, the number of licenses is

high and very high. The reason for this may be attributed to the existence of municipal clubs that manage various sports with headquarters in different territories. Cluster 2 of 2011 and 2018 (Aragon) is the only one that presents very high levels in the number of clubs and high in the number of licenses, which indicates a wide sports tradition, a strong feeling of belonging rooted in the region and that aforementioned existence of municipal clubs in its numerous municipalities.

In light of the above, it is also interesting to analyze Cluster 3 of 2011 (Asturias, Galicia, Canary Islands and Murcia), whose ACs have a low number of athletes, but achieve a high number of medals in the University Championships. The opposite happens in Cluster 5 of 2015 (the Basque Country), in which, despite having a large number of sports licenses, its medal count is scarce – a situation that would be the subject of a specific study. As for Cluster 6 of 2011 (Castilla and León, Castilla-La Mancha and Extremadura), it is the most heterogeneous group of all, where there is no common relationship beyond the relative medium-low levels in clubs and federal licenses or the low number of medals obtained in the University Championships. Even so, there is one common territorial characteristic: they are the ACs with the lowest population density (INE, 2022).

As a general rule, the results obtained in the period studied show that investments in sports and the medals obtained fell, although sports-related companies and federal clubs increased. In any case, it can be specified that this factor has had negative effects on public investments in sports, but it is also true to point out that in those years of instability, companies and clubs have found opportunities to grow, as can be seen in the data that is handled. Likewise, the cluster analysis carried out for 2018 offers results that certify in particular a great territorial diversity in the country, as it is more difficult to find common values in the ACs of each cluster.

In any case, the results obtained are in line with other previous studies, since the intense influence of sports in Spain (Lera & Suárez, 2019) and its territorial diversity (García Márquez, 2018; Pérez & Valiente, 2015).

TABLE 6
RESULTS PER CLUSTER. YEARS 2011, 2015 AND 2018

CLUSTER	ACs	RELATIVE LEVELS OF VARIABLES (2011)	ACs	RELATIVE LEVELS OF VARIABLES (2015)	ACs	RELATIVE LEVELS OF VARIABLES (2018)
1	Andalusia Catalonia Valencia Madrid	PE: médium-low Companies: high or low Clubs: medium-very low Licenses: medium-low MSC: very high Muc: medium-high	Andalusia Castilla and Leon Catalonia Valencia Madrid	PE: medium-low. Companies: low-very low or high. Clubs: medium-very low. Licenses: medium-low. MSC: high-very high. MUC: medium-high. PE: medium-high.	Andalusia Valencia Catalonia Madrid Asturias Galicia Castilla and Leon	PE: medium-low Companies: no relation Clubs: very low to medium Licenses: from very low a high MSC: high-very high MUC: from very low to high PE: high
2	Aragon	PE: medium Companies: very low Clubs: very high Licenses: high MSC: very low MUC: very high	Aragon Cantabria Navarre La Rioja	Companies: medium-low. Clubs: medium-very high. Licenses: hugh-very high. MSC: low-very low. MUC: low-very low. PE: medium-low.	Aragon	Companies: low Clubs: very high Licenses: high MSC: medium-high-very high MUC: low
3	Asturias Galicia Canarias Murcia	PE: medium-low Companies: no apparent relation Clubs: medium-low Licenses: medium-low MSC: medium-low MUC: medium-very high	Asturias Galicia Murcia Castilla-La Mancha Extremadura	Companies: low-very low or high. Clubs: medium-high. Licenses: medium-loq. MSC: medium-very low. MUC: medium-low or very high.	Balearic Islands Canary Islands	PE: high Companies: very high Clubs: low Licenses: medium-low MSC: low MUC: very high

continúa…

TABLE 6

RESULTS PER CLUSTER. YEARS 2011, 2015 AND 2018 (CONCLUSIONS)

CLUSTER	2011 ACs	2011 RELATIVE LEVELS OF VARIABLES	2015 ACs	2015 RELATIVE LEVELS OF VARIABLES	2018 ACs	2018 RELATIVE LEVELS OF VARIABLES
4	Balearic Islands	PE: high / Companies: very high / Clubs: low / Licenses: medium / MSC: very low / MUC: low	Balearic Islands, Canary Islands	PE: high. / Companies: very high. / Clubs: low. / Licenses: medium-low. / MCE: low. / MCU: low or very high.	Cantabria, La Rioja, Navarre, Basque Country	PE: medium-high-very high / Companies: medium-very low / Clubs: low-medium-high / Licenses: high-very high / MSC: medium-low-very low / MUC: very low to medium
5	Cantabria, Navarre, La Rioja, Basque Country	PE: medium-very high / Companies: medium-low / Clubs: low-high / Licenses: high-very high / MSC: very low-medium / MUC: low-very low	Basque Country	PE: very high. / Companies: very low. / Clubs: low. / Licenses: high. / MSC: medium. / MUC: low.	Extremadura, Castilla-La Mancha	PE: medium-low / Companies: very low / Clubs: medium-high / Licenses: medium-low / MSC: low-very low / MUC: very low
6	Castilla and Leon, Castilla-La Mancha Extremadura	PE: very low or medium-high / Companies: medium or very low / Clubs: medium-low / Licenses: medium-low / MSC: low or high / MUC: low			Murcia	PE: very low / Companies: low / Clubs: medium / Licenses: medium / MSC: low / MUC: very high

Source: Author elaboration based on the obtained results.

5. CONCLUSIONS

The aim of this work is to identify the role of public expenditure and private business effort in sports in Spain and its impact on the territorial development of its autonomous communities, taking into account the possible territorial differences in this regard and for this, and as a novel aspect, a conglomerate analysis was followed as a methodological strategy for the Spanish ACs in 2011, 2015 and 2018. One of the main contributions of this work is the enhancement of the need to incorporate and consider territorial variables in decision-making and in the implementation of policies and measures of both the public and private sectors related to sports activity and its development in the territories. This has been demonstrated with the analysis of the public sector and the private effort in relation to the dynamics followed by the different ACs in terms of the sports variables considered.

On the basis of the results obtained, a division into groups of highly heterogeneous regions with unique characteristics is verified, which suggests a remarkable territorial diversity. This approach serves to verify that in Spain there is an important territorial difference both in the public and private investments in sports, and in the achievements.

In this sense, among other aspects, one in particular should be stressed. Larger public or private investment in sports does not always guarantee sports success: Cluster 4 of 2011 has got regions whose levels of medals or federal clubs are low or very low, despite having high public expenditure on sports and a large number of related companies. A similar case occurs with Cluster 1 and Cluster 5 of 2015 with extensive public resources aimed at sports but low levels of clubs and medal tables. In other cases, public expenditure and the number of sports-related companies do ensure this sports success, as in the ACs belonging to Cluster 1 of 2011, where relative medium-low levels of public expenditure bring a very high number of medals in the Spanish Championships and medium-high in the University ones. The same occurs in the regions of Cluster 2 of 2015, in which relative medium-low levels of sports companies guarantee, however, that the levels of federal licenses are high or very high.

These results also make it possible to show that territorial particularities must be significantly considered in terms of the measures adopted by both public and private sectors to improve sports results. Therefore, they do not depend exclusively on purely economic aspects, but also on education,

culture, tradition, social character, besides the number of hours dedicated to sports, the quality of the facilities or the sports tradition. All of this opens up a new field of research.

Likewise, this heterogeneity of results confirms the need to know the characteristics and singularities of each territory and the degree of participation and involvement of the territorial actors before designing and applying public or private measures in the sports sector of a specific AC. This prior diagnosis will affect the knowledge of the potential of the territory and will also influence the achievement of better and more efficient sports results.

Likewise, this knowledge of the territories' endogenous resources in sports may help to establish common development processes in the ACs that can be found within the resulting clusters, always led by the regional entities that are most knowledgeable of their territories' resources and needs.

Therefore, this work has achieved the initially established aim and, from here, future lines of research are now open to deepen the knowledge of the relationship between sports and territorial development, basing on the introduction of new explanatory variables that could help to understand the different regions' behaviors and that could also contribute to a better understanding of the sector and to the design and implementation of new policies. The same model could also be applied to specific territories, specific sports or very specific aspects such as their development from a gender perspective.

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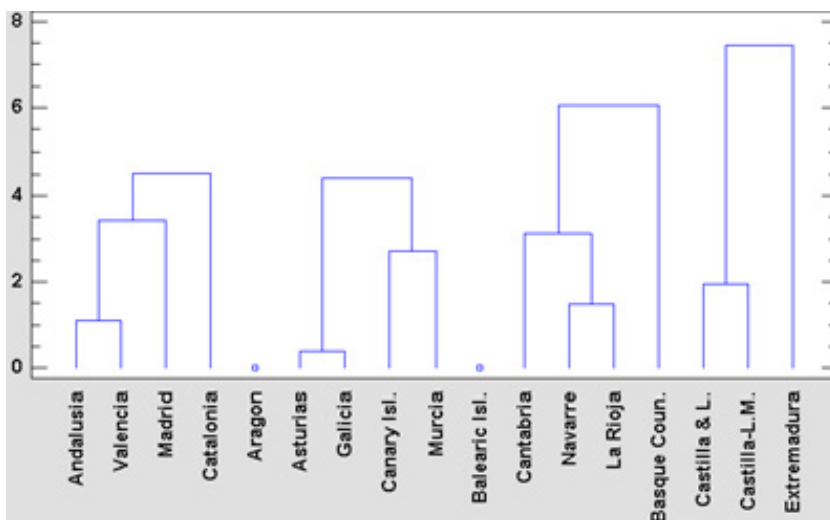
8. APPENDIXES

APPENDIX 1
INTERVALS EVALUATION OF AVERAGE NUMBERS FOR 2011, 2015 AND 2018

|	PE	Companies	Clubs	Licenses	MSC	MUC
Very high	v>x̄+15	v>x̄+9	v>x̄+75	v>x̄+3,000	v>x̄+6	v>x̄+6
High	v [x̄+5, x̄+15]	v [x̄+3, x̄+9]	v [x̄+25, x̄+75]	v [x̄+1,000, x̄+3,000]	v [x̄+2, x̄+6]	v [x̄+2, x̄+6]
Medium	v [x̄-5, x̄+5]	v [x̄-3, x̄+3]	v [x̄-25, x̄+25]	v [x̄-1,000, x̄+1,000]	v [x̄-2, x̄+2]	v [x̄-2, x̄+2]
Low	v [x̄-15, x̄-5]	v [x̄-9, x̄-3]	v [x̄-25, x̄-75]	v [x̄-1,000, x̄-3,000]	v [x̄-2, x̄-6]	v [x̄-2, x̄-6]
Very low	v<x̄-15	v<x̄-9	v<x̄-75	v<x̄-3,000	v<x̄-6	v<x̄-6

Source: Author elaboration based on the data used under his own criteria. "v" corresponds to the value that this variable takes for an AC in a specific period and "x̄" to the average of the ACs of that variable in that period. Thus, for example, the AC with a very high value in PE (v> x̄ + 15) would be considered the one that was 15 points above the average in the year analyzed.

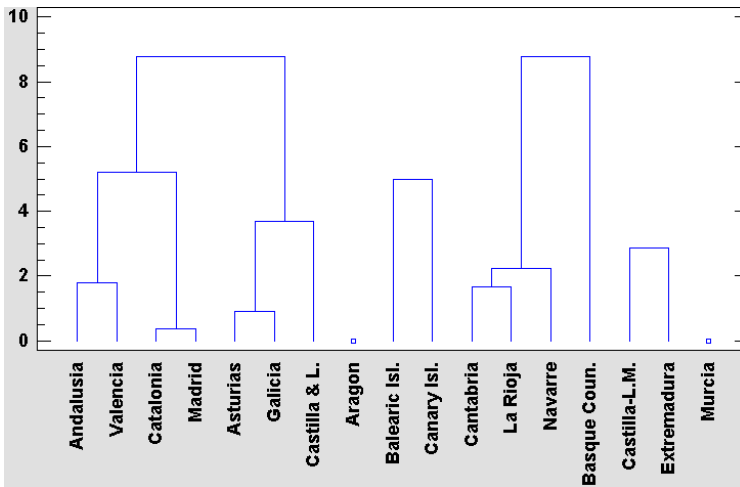### APPENDIX 2
2011 ACS DENDROGRAM

Source: Author elaboration with the use of Statgraphics 19 software under his own criteria.

APPENDIX 3
2015 ACS DENDROGRAM
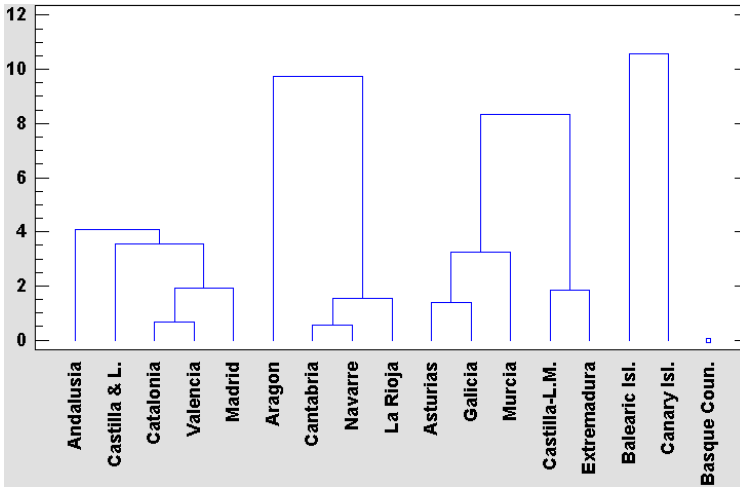
Source: Author elaboration with the use of Statgraphics 19 software under his own criteria.

APPENDIX 4
2018 ACS DENDROGRAM

Source: Author elaboration with the use of Statgraphics 19 software under his own criteria. To establish the limit of the resulting clusters, the distance of 11 points is taken as a reference.

APPENDIX 5
STANDARDIZED VARIABLES DATA. YEAR 2011

ACs	PE	Companies	Clubs	Licenses	MSC	MUC
Andalusia	-0,57	-0,64	-0,37	-0,85	0,80	-0,15
Aragon	0,11	-0,84	3,17	1,46	-0,80	1,45
Asturias	-0,24	0,07	-0,18	-0,08	-0,37	0,56
Balearic Islands	0,68	3,26	-0,40	-0,07	-0,77	-0,87
Canary Islands	0,01	0,85	-0,68	-0,78	-0,55	1,73
Cantabria	0,16	-0,25	0,09	1,26	-1,09	-1,21
Castilla and Leon	-0,29	-0,12	0,50	-0,67	0,63	-0,90
Castilla-La Mancha	0,39	-1,25	0,71	-0,84	0,28	-0,76
Catalonia	-0,86	0,47	-0,65	-0,11	2,39	0,04
Valencia	-0,65	-0,41	-0,71	-0,78	1,66	0,27
Extremadura	-1,96	-0,84	-0,18	-0,46	-0,57	-0,46
Galicia	-0,68	0,23	-0,01	-0,25	-0,22	0,30
Madrid	-0,33	0,46	-1,40	-0,94	1,03	0,87
Murcia	-0,70	-0,57	-0,67	-1,19	-0,66	1,81
Navarre	1,76	-0,43	0,27	1,84	-0,65	-1,17
Basque Country	2,17	0,12	-0,41	0,92	0,00	-0,65
La Rioja	1,00	-0,12	0,91	1,53	-1,11	-0,87

Source: Author elaboration with the use of Statgraphics 19 software.

APPENDIX 6
STANDARDIZED VARIABLES DATA. YEAR 2015

| ACs	PE	Companies	Clubs	Licenses	MSC	MUC
Andalusia	-1,01	-0,83	-0,53	-1,19	1,41	-0,16
Aragon	0,51	-0,48	3,12	1,32	-0,92	-0,43
Asturias	-0,17	-0,24	-0,10	0,32	-0,52	1,78
Balearic Islands	0,52	3,10	-0,55	-0,18	-0,58	-0,42
Canary Islands	0,78	1,29	-0,57	-0,59	-0,59	2,24
Cantabria	-0,01	0,05	0,38	1,79	-0,76	-0,82
Castilla and Leon	0,25	0,26	-0,10	-0,67	0,58	-0,58
Castilla-La Mancha	-0,24	-0,86	0,49	-1,13	-0,27	-0,25
Catalonia	-0,58	0,28	-0,90	-0,20	1,68	-0,26
Valencia	-0,92	-0,32	-0,71	-0,56	1,73	-0,19
Extremadura	-1,09	-1,03	0,62	-0,49	-1,03	-0,55
Galicia	-0,64	0,29	-0,09	-0,24	-0,15	1,12
Madrid	-0,22	0,51	-1,49	-0,76	1,53	0,03
Murcia	-1,13	-0,62	-0,10	-1,06	-0,82	1,32
Navarre	0,34	-0,47	0,15	1,87	-0,71	-1,15
Basque Country	3,03	-0,85	-0,48	0,79	0,26	-0,55
La Rioja	0,57	-0,07	0,86	0,98	-0,86	-1,15

Source: Author elaboration with the use of Statgraphics 19 software.

APPENDIX 7
STANDARDIZED VARIABLES DATA. YEAR 2018

| ACs	PE	Companies	Clubs	Licenses	MSC	MUC
Andalusia	-1,11	-1,10	-0,53	-1,55	1,14	-0,50
Aragon	1,18	-0,31	3,08	0,76	-0,70	-0,43
Asturias	-0,74	-0,17	0,05	0,29	-0,33	0,23
Balearic Islands	0,88	2,99	-0,50	-0,16	-0,51	0,61
Canary Islands	0,47	1,33	-0,81	-0,73	-0,38	1,88
Cantabria	0,15	0,20	0,43	1,81	-0,58	-0,71
Castilla and Leon	-0,12	0,48	-0,16	-0,82	0,21	-0,64
Castilla-La Mancha	-0,02	-0,93	-0,05	-1,38	-0,84	-0,90
Catalonia	-0,23	0,19	-1,01	-0,40	2,08	0,05
Valencia	-1,17	-0,25	-0,67	-0,59	1,00	-0,17
Extremadura	-0,55	-1,01	0,91	-0,29	-1,01	-1,56
Galicia	-0,76	0,31	0,18	0,68	0,38	0,30
Madrid	-0,32	0,20	-1,43	-0,76	1,92	-0,05
Murcia	-1,52	-0,62	0,04	-0,49	-0,74	2,62
Navarre	1,19	-0,17	0,27	1,49	-0,66	0,17
Basque Country	2,35	-1,09	-0,46	1,38	0,21	-0,37
La Rioja	0,33	-0,05	0,65	0,75	-1,19	-0,54

Source: Author elaboration with the use of Statgraphics 19 software.

APPENDIX 8
BOX-AND-WHISKER PLOT FOR PUBLIC EXPENDITURE IN SPORTS VARIABLE PER AC. YEARS 2011, 2015 AND 2018. OUTLIER: BASQUE COUNTRY
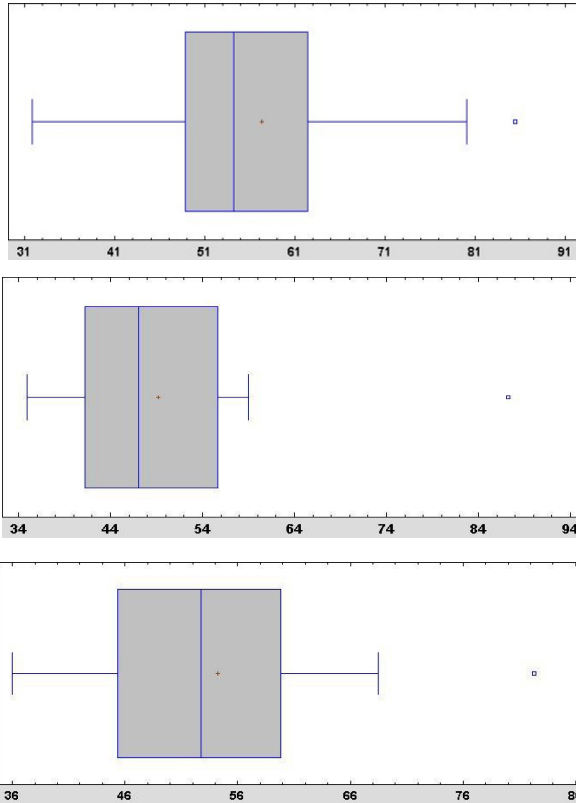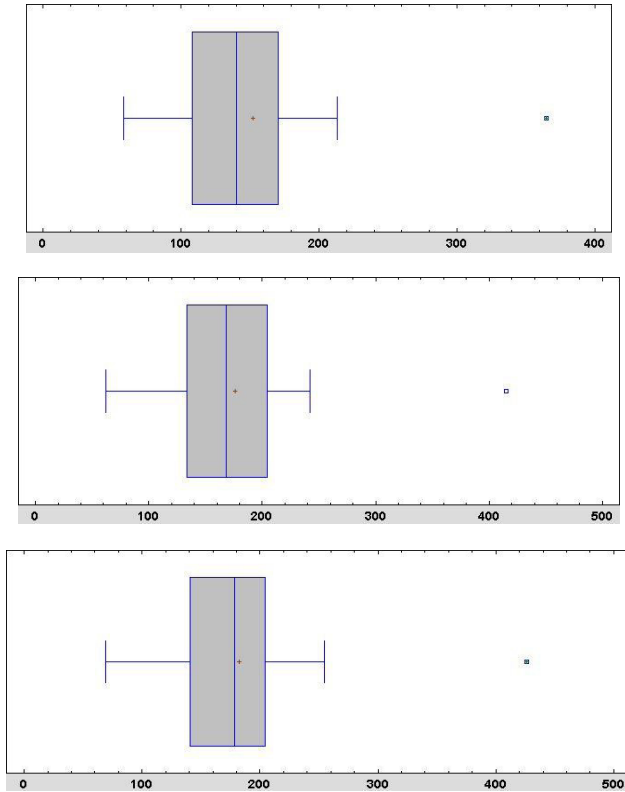

Source: Author elaboration with the use of Statgraphics 19 software.

APPENDIX 9
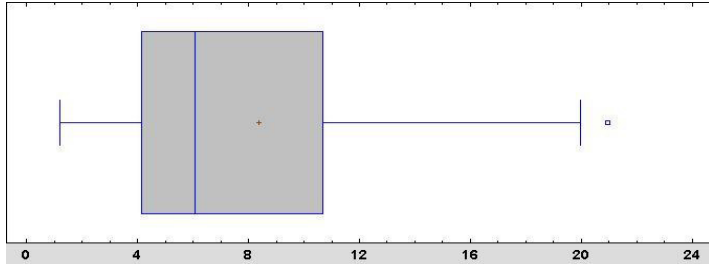# BOX-AND-WHISKER PLOT FOR SPORTS COMPANIES VARIABLE PER AC. YEARS 2011, 2015 AND 2018. OUTLIER: BALEARIC ISLANDS
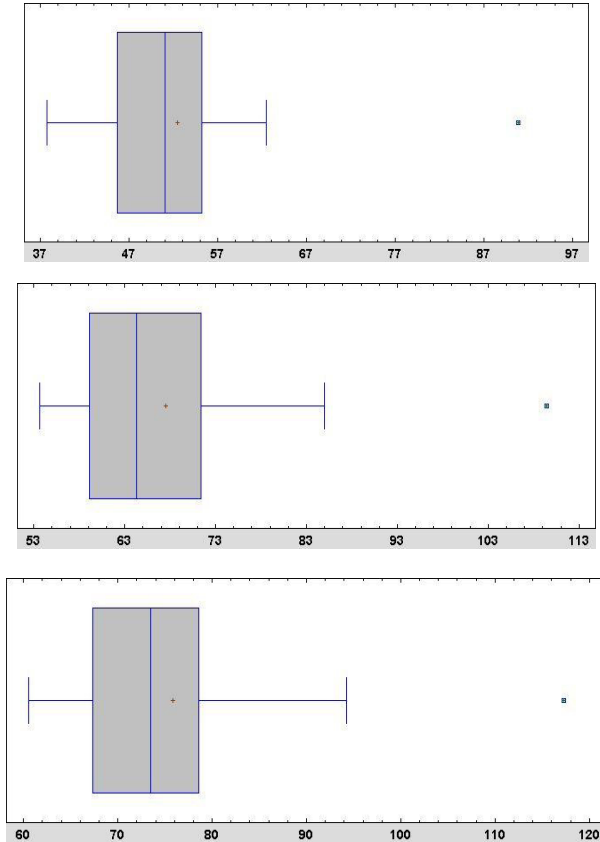
Source: Author elaboration with the use of Statgraphics 19 software.

APPENDIX 10
BOX-AND-WHISKER PLOT FOR CLUBS VARIABLE PER AC.
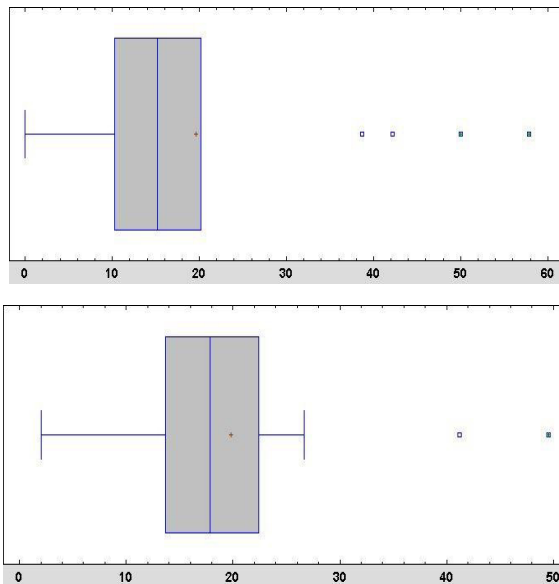## YEARS 2011, 2015 AND 2018. OUTLIER: ARAGON

Source: Author elaboration with the use of Statgraphics 19 software.

APPENDIX 11
BOX-AND-WHISKER PLOT FOR MSC VARIABLE PER AC. YEAR 2018. OUTLIER: CATALONIA

Source: Author elaboration with the use of Statgraphics 19 software.

APPENDIX 12
BOX-AND-WHISKER PLOT FOR MUC VARIABLE PER AC. YEARS 2015 AND 2018. OUTLIER: ASTURIAS, CANARY ISLANDS, GALICIA AND MURCIA IN 2015 AND CANARY ISLANDS AND MURCIA IN 2018

Source: Author elaboration with the use of Statgraphics 19 software.