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“Retos en la gestión post COVI-19”

EFFICIENCY ANALYSIS OF THE TOURIST ACCOMMODATION SECTOR IN SPAIN

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TEMÁTICA: Costos para la toma de decisiones

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Abstract

The tourism industry is one of the most important economic sectors, not only internationally but also for the specific case of Spain, which is one of the most important tourist destinations in the world. This sector is characterized by high competitiveness among companies because of globalisation. In order to understand better the performance of the enterprises, an efficiency analysis of the Spanish tourist accommodation sector is carried out, using a Data Envelopment Analysis (DEA). The aim of this analysis is to determine the technical efficiency, the pure efficiency and the scale efficiency for evaluating the situation of the sector. This study is completed with a regional analysis and others analysis considering the different existing sub-sectors and the firm size. This paper contributes to the previous literature as studying the efficiency of the whole accommodations sector, by contrast with the majority of existing works, which were focused on the hotel sector. The number of enterprises taken into account is considerably higher than the average size of the samples utilised in other studies, having achieved a broader vision. Findings show that analysed companies can improve their production processes by almost 75%, so it is suggested that a general improvement in the technical efficiency of the Spanish tourist accommodation sector should be necessary.

Key words: Efficiency, DEA, tourist accommodation sector, regional analysis, firm size

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1. INTRODUCTION

The increasing of competition in all the sectors of the economy, linked to the need to optimize the resources used to obtain results, make it extremely important for companies to evaluate their productivity and performance (Fuentes, 2011). Because of that, efficiency analysis is being very used for studying the different economy sectors, both at the regional and country level (Alberca & Parte, 2013).

Among these economy sectors, Tourism is considered one of the main pillars of economy in the world, because it supposes over 10.4% of the global GDP around the world (WTTC, 2019). In the Spanish case, Tourism is a key driver for economic development, because the country received 83.7 million of tourist at 2019, a figure 1.1% higher than the year before (Frontur, 2020). It supposed an income of 71 237 million of euros and a 3.1% of increase with respect to 2018. As stated by Tourist Accommodation Occupancy Survey (EOAT), there were 133 692 046 overnights in Spain in 2019, 81.20% of them at hotels, 9.34% in apartments, 6.15% at campsites and 3.3% at other rural accommodations (INE, 2019).

In this context, it is necessary to carry out an analysis in order to know the performance of the enterprises that define the touristic lodging sector. To this effect, the application of an efficiency analysis to this sector will allow to aim the enterprise policies in order to get a higher competition in the sector. Even if this sort of analysis has usually been used for different sectors of the economy, they have not been commonly used in the Spanish hotel sub-sector (Arbelo, 2016) and very limited for the others accommodation sub-sectors.

In a society in which resources are increasingly limited and competition stronger, companies are forced to act in the most efficient way as possible. It is therefore extremely important to know if the maximum performance is being obtained or, in other words, the relationship between production and productive factors. In this sense, for evaluating the efficiency of the tourist accommodation sector, a DEA is going to be carried out, to derive a measure which allows knowing the position of each of the companies analysed in the sector.

In the specific case of Tourist Accommodation, despite its importance within the world economy, the efficiency analysis carried out before are scarce (Arbelo, 2016), even its use is being increasing in this decade. Basically, these researches use Stochastic Frontier Analysis (SFA) and non-parametric models like DEA (Arbelo, 2016). The main difference in the utilisation of these two techniques is that for SFA it is necessary to have a function of production that relates inputs with outputs. Non-parametric models do not need this kind of functions to for being made. Generally, non-parametric models have an easier implementation and the sample does not need to follow a normal distribution of data. However, non-parametric techniques usually are less efficient than stochastic, because a loss of information can be produced.

Concerning to the international stage, the firsts analysis carried out for tourist accommodation sector were developed at the end of the twentieth century by Morey & Ditmann (1995) and Johns et al. (1997) (De Jorge & Suarez, 2014). Some of the subsequent studies and analysis about efficiency that have used SFA models or DEA models are Anderson et al. (2000), Brown & Ragsdale (2002), Hwang &Chang (2003), Assaf & Magnini (2012), Poldrugovac et al. (2016), Amado et al. (2017), Higuerey et al. (2020), Morales García (2019), Rey Vargas (2020) and Zhan et al. (2020).

On the national stage, efficiency analysis in the hotel sector had barely been developed till this decade (Alberca & Parte, 2013), in which this sort of analysis is increasingly used. The hotel efficiency analysis made by Rubio & Roman (2006) was one of the first ones for the country. In the case of including other tourist accommodation services, the bibliography is practically non-existent, except for some specific analysis, such as that applied to youth hostels by Agabo-Mateos et al. (2013). Relevant Spanish studies include the following, among others: Alonso et al. (2009), Alberca et al. (2011), Alberca et al. (2012), Such & Mendieta (2013), Alberca Oliver (2014), Parte-Esteban & Alberca-Oliver (2015), Mendieta-Peñalver et al. (2018), Arbelo et al. (2017), González-González (2017), Sellers-Rubio & Casado-Díaz (2018), Deng et al. (2019), Lado-Sestayo & Fernández-Castro (2019), Latorre-Bueno (2019), Rey-Romero (2019) and Sáez-Fernández et al. (2020).

With respect to sample size, generally, this sort of analysis has been conducted with small sizes, even if it is changing to bigger sizes in recent years, in order to achieve more representative results (Lado-Sestayo & Fernández-Castro, 2019). The most representatives have been the study of Oliver et al. (2012), with a sample of 1593 hotels, followed by the study carried out by De Jorge & Suarez (2014), who used a sample of 303 hotels and the study of Sellers-Rubio & Casado-Díaz (2018), with a sample of 1836 hotels, one of the largest samples of all times.

Considering the studies summarised, it does exist variability and different criteria for choosing the variables for the analysis. Even the selection of inputs and outputs is always conditioned by data availability (Alberca & Parte, 2013), the majority of them use the total income or total sales as output, while criteria are more different for inputs. Those inputs try, in most cases, to represent the production factors of materials, labour and capital (Deng et al., 2019). The most common are the value of fixed assets, number of employees, operating costs, number of full-time workers (FTEs) or number of rooms.

Concerning regional analysis, according to Such & Mendieta (2013), Murcia (87.57%), Valencian Community (77.40%) and Andalusia (75.04%) were the most efficient autonomic communities with respect to hotel chains on the year 2006, whereas those more inefficient were Madrid (54.23%), Canary Islands (56.44%) and Catalonia (59.26%). As stated Alberca & Parte (2013), for the year 2008, the most efficient regions were Madrid (65.08%), País Vasco (57.04%) and Catalonia (56.33%), whereas those with the lowest efficiency score were Galicia (43.86%), Castilla La Mancha (47.53%) and Murcia (47.84%). Jackute (2014) derived the mean efficiency for the 2007-2012 period. The most efficient autonomic communities obtained were Madrid (71.7%), Andalusia (67.1%) and Valencia (64.3%); Galicia (48.4%), Castilla & León (49.8%) and Castilla La Mancha (50.8%). The study carried out by Sellers-Rubio & Casado-Díaz (2018) use DEA with output orientation and DEA-BC (Bias Corrected), which differs with respect to the other mentioned analysis (input orientation). According to them, Galicia (1.944) was the most inefficient region for the year 2016, followed by Castilla & León (1.911) and Aragón. On the other hand, Balearic Islands (1.260), La Rioja (1.170) and Canary Islands (1.112) presented the best scores. These results are the inverse of those that can be obtain with an input orientation. The greater the score is, the higher the inefficiency is.

Other efficiency studies, like those conducted by González-González (2017) or Latorre-Bueno (2019), focus on using the results as a Benchmarking tool. They derive the most efficient companies of a small sample in a region, that are called “reference enterprises”, in order to help the other enterprises to make a comparison with them.

Furthermore, some effects produced by the location of the different enterprises and tourist destination have also been studied, for example for Lado-Sestayo & Fernández-Castro

(2019). They show that tourist destinations are the main cause of the differences of efficiency among different hotels.

In addition, seasonality is relevant too for the Spanish sector, because of the predominant “Sun & Beach” tourism of the country Sáez-Fernández et al. (2020) stated that accommodation establishments that operate continuously during all the year are more efficient that those which operate in concrete seasons. It is caused because the first group of enterprise reduce their pressure in high seasons, so they can do a better administration of their inputs.

Once the literature review is already made in this introduction, the efficiency analysis of the Tourist Accommodation Sector is presented. The purpose of this study is to contribute with a new efficiency analysis, in order to offer new information that could improve the knowledge of the company’s performance of the touristic accommodation sector of Spain. This work aims to broadly analyse a large number of companies, segmenting this sample according to different criteria, such as company size, types of accommodation and autonomous communities. This analysis could be used as a benchmarking tool by national and regional public institutions, in order to establish regulatory policies for achieving a higher efficiency for the operating enterprises, especially in the post-pandemic period.

The paper is structured as follows. In the next section, the research methodology is presented, then the variables and data utilised are shown. After that, the main results are derived and finally, the main conclusions of this paper are explained.

2. METHODOLOGY

In order to evaluate the relative efficiency of the companies that offer accommodation services, a Data Envelopment Analysis (DEA) will be used. DEA is a deterministic non-parametric technique based on non-linear programming models developed by Charnes et al. (1978) and which is increasingly applicable today.

DEA methodology analyses the relative efficiency of a set of DMU’s with similar characteristics. These DMU’s transform a set of input data into a series output data, determining the efficiency like as the quotient between the weighted sum of inputs and the weighted sum of outputs (Villarreal & Tohmé, 2017), assuming a series of hypotheses: convexity, free unavailability and returns to scale (Bogetoft & Otto, 2011).

There exist several models of DEA. For its classification, the typology of returns to scale (constant or variable) and the orientation of the model (input or output) are considered (Coll and Blasco, 2006). The selection of the orientation of the model is carried out based on those variables (input or output) that the DMU can better control. The model is oriented to input when the DMU seeks the maximum reduction of inputs to continue producing the same level of outputs, while it is oriented to output when, with a known level of inputs, it looks for the maximum proportional increase in outputs. In this study, the input-oriented DEA-CCR will be developed, because in the short term the companies in this sector have more control over their inputs than their outputs (Detotto et al., 2014).

Moreover, with the use of this type of analysis it is possible to determine the technical efficiency, the pure efficiency and the scale efficiency, according to the type of returns to scale. So, technical efficiency refers to the optimal use of productive factors and is obtained by comparing the value obtained for each unit with the optimal value defined by the efficiency frontier. It is determined with constant returns to scale (Färe & Lovell, 1978) in which the variation between inputs and outputs always occurs in the same proportion (Charnes et al., 1978). In order to determine technical efficiency, a DEA-CCR model can be used.

The algorithm to be solved for the DEA-CCR model with constant returns of scale and orientation to input ($E_I^{k,\ CRS}$) follows the following expression:

$$Min_{\theta,y}\,\theta$$

$$s.t$$

$$\sum_{k=1}^{K} \lambda^k * x_n^k \leq \theta * x_n^{k'}, \quad \forall\, n = 1,2, \dots N$$

$$\sum_{k=1}^{K} \lambda^k * y_m^k \geq y_{m'}^{k'}, \quad \forall\, m = 1,2, \dots M$$

$$\lambda \in \mathbb{R}_+^K$$

Where:

- θ: Efficiency of the unit.
- λ^k: Ponderation.
- x_n^k y y_m^k : Observed variables.
- K: Number of DMU's.
- N: Number of inputs.
- M: Number of outputs.

On the other hand, pure efficiency is determined with variable returns to scale; it measures the capacity of a unit to use the inputs in an efficient way but taking into account how the outputs change in relation to the variation of the inputs used (Latorre-Bueno, 2019). DEA-BCC model is an appropriate methodology for estimating this kind of efficiency.

This model is an extension of the previous one, although it differs from it by the inclusion of variable returns to scale (Banker et al. 1984). For considering the variable returns to scale, a restriction or variable must be introduced to the previous linearized model. This variable indicates that each DMU has to be compared with those of its size and not with all those present in the problem.

The algorithm to be solved for the input-oriented DEA-BCC model ($E_I^{k,\ VRS}$) follows the expression:

$$Min_{\theta,y}\,\theta$$

$$s.t:$$

$$\sum_{k=1}^{K} x_n * \lambda_n = \theta_n * x_n - h_n^- \qquad n = 1,2, \dots, N$$

$$\sum_{k=1}^{K} y_m * \lambda_m = y_m + h_m^+ \qquad m = 1,2,\dots,M$$

$$\sum_{k=1}^{K} \lambda_k = 1$$

$$\lambda_k, h_n^-, h_m^+ \geq 0$$

$$\theta_\lambda \ free$$

Where:

- θ: Efficiency.
- λ^k: Ponderation.
- x_n^k y y_m^k : Observed variables.
- K: Number of DMU's.
- N: Number of inputs.
- M: Number of outputs.
- h: inefficiency values.

Finally, scale efficiency is obtained as a quotient of technical efficiency and pure efficiency.

$$EE_I^k = \frac{E_I^{k,CRS}}{E_I^{k,VRS}}$$

It is defined as the distance between the technical efficiency frontier and the pure efficiency frontier (Coll & Blasco, 2006). This efficiency is a global indicator, since a company will be considered efficient if it manages to be technically and pure efficient at the same time (González-González, 2017). Scale efficiency measures the effect of scale size on the efficiency of a unit.

The database used has been the Iberian Balance Analysis System (SABI). Companies corresponding to the Activity Code 55 of the CNAE-2009 have been selected, which corresponds to "Accommodation Services". This activity code can be divided into Hotels and Similar Accommodation (Code 551), Tourist accommodation and other short-stay accommodation (Code 552), Campsites and caravan parks (Code 553) and Other accommodation (Code 559).

A sample of 8 397 companies has been obtained, providing information till December 2018. Of this total, 5 816 correspond to Hotels, 1 721 correspond to Tourist accommodation, 533 companies to Campsites and 327 to Other types of accommodation. The average efficiency of the whole sample will be obtained, in addition to the efficiency segmented in autonomous communities, by activity code and number of employees.

Regarding the variables used, there is no common criterion for selecting them in the studies previously carried out for this sector (Alberca & Parte, 2013), but the most commonly used are those that reflect the productive factors, such as labour, materials and capital factors, as well as the income received from the development of the accommodation services activity and those obtained from other complementary services to the activity.

For our study in particular, the input variables selected are: number of employees, operating costs and the value of fixed asset. The variable chosen as output is the net amount of the Business-Sales. These variables have been chosen according to some studies like those made by Rubio & Román (2006), Such & Mendieta (2013), Alberca & Parte (2013), Jackute (2014) and Pérez-López & Ibarrondo-Dávila (2018).

Table 1 shows the descriptive statistics of the input and output variables, for the total of the companies analysed in 2018. It can be observed that the average size of the companies that compose the sample is small, according to the number of workers. In concordance with the criteria established by the European Union, a micro-company is one that has fewer than 10 employees, a small company is one that has less than 50 workers, medium if it has less than 250 and large if the number of employees is greater than 250 (Comisión Europea, 2003). As the median value indicates, more than 50% of the sample is made up of microenterprises. The variable that shows the most dispersion, due to its standard deviation value, is the value of fixed assets, because the capital of large hotel companies is compared with that of small accommodation establishments.

Table 1: Global descriptive statistics for the whole sample

TOTAL	Variable	Mean	Median	Min	Max	Std.Dev.
n = 8 397	Number of Employees	26.73	8.00	1.00	4 569.00	106.12
	Value of fixed asset (€ thousand)	5 085.95	684.39	-0.25	1 176 534.00	27 963.81
	Operating Costs (€ thousand)	2 220.90	557.06	0.27	320 528.00	8 785.38
	Net Amount of the Business-Sales (€ thousand)	2 504.88	590.37	0.09	441 991.00	9 990.35

As can be seen below, Table 2 shows the descriptive statistics of the different CNAE activity codes. It can be seen that the companies with the largest number of workers are dedicated to the hotel sector (code 551), while the smaller ones are in the short-stay tourist accommodation sector (code 552). In addition, the hotel sector turns out to be the highest average values presented in the study variables. If the net amount of the Business-Sales is considered, Other Accommodations (code 559) is the one with a lower average than the others.

Table 2: Descriptive statistics segmented by CNAE's Codes

CODE	Variable	Mean	Median	Min	Max	Std.Dev.
551 n = 5 816	Number of Employees	34.33	11.00	1.00	4 569.00	125.32
	Value of fixed asset (€ thousand)	6568.03	885.78	-0.25	1 176 534.00	33 232.13
	Operating Costs (€ thousand)	2 852.79	794.74	0.34	320 528.00	10 369.96
	Net Amount of the Business-Sales (€ thousand)	3 229.79	849.33	0.09	441 991.00	11 809.76
552 n = 1 721	Number of Employees	8.99	3.00	1.00	623.00	27.59
	Value of fixed asset (€ thousand)	1 786.28	356.29	0.12	110 168.68	5968.31
	Operating Costs (€ thousand)	799.63	253.67	0.26	64 513.48	2 676.21
	Net Amount of the Business-Sales (€ thousand)	849.91	260.81	0.17	61 156.05	2 693.18
553 n = 533	Number of Employees	11.35	7.00	1.00	115.00	13.40
	Value of fixed asset (€ thousand)	1 543.64	502.75	0.23	47 983.30	3 753.66

CODE	Variable	Mean	Median	Min	Max	Std.Dev.
	Operating Costs (€ thousand)	875.66	466.06	0.31	14 280.94	1 427.45
	Net Amount of the Business-Sales (€ thousand)	1 019.92	498.49	0.95	16 976.79	1 708.61
559 n = 325	Number of Employees	9.98	4.00	1.00	605.00	47.72
	Value of fixed asset (€ thousand)	1 889.58	237.01	0.00	156 600.67	10 236.35
	Operating Costs (€ thousand)	665.46	232.76	0.29	37 108.06	2 366.88
	Net Amount of the Business-Sales (€ thousand)	754.55	225.29	0.63	51 188.07	3 078.86

Finally, accommodation companies are classified by autonomous communities, in order to carry out a national analysis by regions (Table 3). Regarding the number of workers, the Canary Islands, the Balearic Islands and Madrid are the communities that employ the highest number of workers, while Asturias, Castilla La Mancha and Galicia utilise fewer workers. Considering the value of fixed assets, the Balearic Islands, Madrid and Aragon have the highest average capital to the contrary of communities like Extremadura, La Rioja and the autonomous cities of Ceuta and Melilla. Regarding the value of the net amount of the Business-Sales, the companies of the Canary Islands, the Balearic Islands and Madrid stand out as those with a higher average. On the contrary, those autonomous communities with the lowest net amount of the Business-Sales are Galicia, Castilla La Mancha and Castilla y León.

Table 3: Descriptive statistics segmented by region

Region	Variable	Mean	Median	Min	Max	Std.Dev.
Andalusia n = 1 078	Number of Employees	20.39	7.00	1.00	2 126.00	76.11
	Value of fixed asset (€ thousand)	3 036.40	573.82	0.12	286 723.00	12 671.23
	Operating Costs (€ thousand)	1 524.09	449.28	0.25	134 082.00	5 366.38
	Net Amount of the Business-Sales (€ thousand)	1 689.70	468.07	0.40	139 053.00	5 722.95
Aragón n = 278	Number of Employees	12.21	5.00	1.00	241.00	22.09
	Value of fixed asset (€ thousand)	2 909.89	586.98	0.98	307 459.64	19 416.47
	Operating Costs (€ thousand)	1044.44	376.55	14.26	63 764.98	4 100.31
	Net Amount of the Business-Sales (€ thousand)	847.67	381.48	3.44	21 027.06	1 731.69
Asturias n = 271	Number of Employees	7.86	3.00	1.00	109.00	13.36
	Value of fixed asset (€ thousand)	1 222.25	442.62	0.61	41 366.71	3 101.47
	Operating Costs (€ thousand)	496.31	215.48	13.99	6 881.28	801.83
	Net Amount of the Business-Sales (€ thousand)	513.82	213.58	3.56	5 889.86	802.43
Balearic Islands n = 1056	Number of Employees	48.30	15.00	1.00	3 924.00	176.13
	Value of fixed asset (€ thousand)	10 830.95	1 761.27	0.97	1 176 534.00	63 738.89
	Operating Costs (€ thousand)	4 316.74	1 343.03	0.45	308 349.00	15 273.56
	Net Amount of the Business-Sales	4 987.71	1 474.71	0.27	441 991.00	18 802.00

Region	Variable	Mean	Median	Min	Max	Std.Dev.
	(€ thousand)					
Canary Islands n = 584	Number of Employees	66.70	18.00	1.00	1 778.00	140.03
	Value of fixed asset (€ thousand)	14 098.98	2 416.60	0.21	223 028.98	29 590.80
	Operating Costs (€ thousand)	5 149.76	1 304.81	0.65	121 078.85	10 744.04
	Net Amount of the Business-Sales (€ thousand)	6 254.07	1 515.16	1.51	119 042.09	12 631.73
Cantabria n = 174	Number of Employees	11.53	5.00	1.00	230.00	25.73
	Value of fixed asset (€ thousand)	1 740.52	358.01	0.00	50 232.25	5 458.22
	Operating Costs (€ thousand)	761.08	304.70	4.15	15 472.09	1 801.48
	Net Amount of the Business-Sales (€ thousand)	854.89	314.81	3.44	17 828.29	2 118.41
Castilla y León n = 476	Number of Employees	10.14	5.00	1.00	81.00	13.11
	Value of fixed asset (€ thousand)	1 130.90	377.72	0.19	19 076.04	2 205.40
	Operating Costs (€ thousand)	602.87	282.56	1.32	5 431.51	825.60
	Net Amount of the Business-Sales (€ thousand)	638.73	285.64	0.17	5 866.78	897.02
Castilla La Mancha n = 240	Number of Employees	9.33	5.00	1.00	2 126.00	76.11
	Value of fixed asset (€ thousand)	1 006.93	372.03	0.45	286 723.00	12 671.23
	Operating Costs (€ thousand)	567.51	265.16	1.01	134 082.00	5 366.38
	Net Amount of the Business-Sales (€ thousand)	572.27	272.81	0.40	139 053.00	5 722.95
Catalonia n = 1 756	Number of Employees	22.92	9.00	1.00	688.00	48.81
	Value of fixed asset (€ thousand)	4 316.33	775.22	-0.25	207 292.00	12 824.33
	Operating Costs (€ thousand)	2 143.17	798.94	4.36	64 513.48	4 544.96
	Net Amount of the Business-Sales (€ thousand)	2 356.64	844.78	0.09	61 156.05	4 951.69
Ceuta n = 2	Number of Employees	31.50	31.50	6.00	57.00	36.06
	Value of fixed asset (€ thousand)	2 941.40	2 941.40	123.98	5 758.82	3 984.43
	Operating Costs (€ thousand)	1 643.89	1 643.89	272.50	3 015.27	1 939.43
	Net Amount of the Business-Sales (€ thousand)	1 501.94	1 501.94	296.32	2 707.55	1 704.99
Valencian Community n = 632	Number of Employees	23.24	8.00	1.00	1 028.00	54.99
	Value of fixed asset (€ thousand)	3 662.00	542.26	0.76	203 796.00	11 524.42
	Operating Costs (€ thousand)	1 757.90	594.51	5.63	51 186.00	3 929.01
	Net Amount of the Business-Sales (€ thousand)	1 979.94	673.34	1.41	50 613.00	4 186.28
Extremadura n = 129	Number of Employees	12.51	5.00	1.00	169.00	20.19
	Value of fixed asset (€ thousand)	1 270.12	440.37	2.07	8 751.47	1 940.67
	Operating Costs (€ thousand)	675.98	329.63	19.89	7 499.43	996.26

Region	Variable	Mean	Median	Min	Max	Std.Dev.
	Net Amount of the Business-Sales (€ thousand)	686.15	345.86	3.20	5 829.21	951.49
Galicia n = 519	Number of Employees	8.98	4.00	1.00	140.00	14.02
	Value of fixed asset (€ thousand)	1 330.09	410.58	0.21	43 524.15	3627.95
	Operating Costs (€ thousand)	551.75	247.08	0.86	7 346.14	900.89
	Net Amount of the Business-Sales (€ thousand)	579.05	258.72	0.56	8 458.57	968.11
La Rioja n = 48	Number of Employees	12.60	5.00	1.00	140.00	21.54
	Value of fixed asset (€ thousand)	1 569.00	648.31	6.68	14 194.96	2 554.95
	Operating Costs (€ thousand)	809.51	286.68	26.99	8 339.07	1 363.95
	Net Amount of the Business-Sales (€ thousand)	837.90	322.27	1.34	8 465.62	1 388.35
Madrid n = 715	Number of Employees	41.77	10.00	1.00	4 569.00	221.17
	Value of fixed asset (€ thousand)	8 152.49	688.29	0.20	633 230.29	36 691.88
	Operating Costs (€ thousand)	3 737.57	910.86	0.33	320 528.00	18 017.44
	Net Amount of the Business-Sales (€ thousand)	4 139.95	929.81	0.29	331 700.00	18 791.44
Melilla n = 4	Number of Employees	33.00	29.00	6.00	68.00	25.94
	Value of fixed asset (€ thousand)	2 184.27	371.21	32.66	7 962.01	3 855.78
	Operating Costs (€ thousand)	1 742.49	1 232.65	310.09	4 194.57	1 721.75
	Net Amount of the Business-Sales (€ thousand)	1 828.92	1 348.06	257.49	4 362.06	1 824.28
Murcia n = 88	Number of Employees	17.23	7.00	1.00	262.00	32.47
	Value of fixed asset (€ thousand)	2 247.67	668.12	0.26	29 418.94	4 730.65
	Operating Costs (€ thousand)	1 158.81	412.53	31.62	13 439.63	2 033.12
	Net Amount of the Business-Sales (€ thousand)	1 205.85	456.70	18.50	15 210.23	2 137.97
Navarra n = 107	Number of Employees	12.54	8.00	1.00	132.00	16.27
	Value of fixed asset (€ thousand)	1 959.28	833.50	1.06	19 079.64	3233.93
	Operating Costs (€ thousand)	1 097.39	669.15	1.45	12 170.27	1502.71
	Net Amount of the Business-Sales (€ thousand)	1 187.08	684.13	5.00	12 694.46	1607.49
Basque Country n = 241	Number of Employees	13.16	6.00	1.00	179.00	20.31
	Value of fixed asset (€ thousand)	1 949.44	323.49	0.09	52 583.23	5 794.70
	Operating Costs (€ thousand)	1 132.58	466.09	63	12 361.13	1931.93
	Net Amount of the Business-Sales (€ thousand)	1 276.85	530.03	12.67	17 530.27	2 252.61

3. RESULTS

In this section there will be shown the results obtained from the efficiency calculations with constant returns to scale, also called technical efficiency, and variable returns to scale, known as pure efficiency too. In addition, scale efficiency is calculated as well, which is determined by the quotient of the two previous ones. The scale efficiency, as previously detailed in the methodology, is calculated by the quotient of the estimated efficiency with constant returns to scale and the estimated efficiency with variable returns to scale. This efficiency measures the distance between the technical efficiency frontier and the pure efficiency frontier. Therefore, when the efficiency is equal to 1, it is said that the unit operates with its optimal production size, while the smaller this ratio, the more inefficient it will be.

In order to get these results, software RStudio has been utilised to obtain technical and pure efficiencies. After that, scale efficiency has been derived using a spreadsheet in Excel.

A global analysis was carried out first, followed by an analysis by activity type (code). The codes represent the typology of tourist accommodations that make up the sample. Also, the analysis carried out for the autonomous communities is presented, for the purpose of knowing if there exist efficiency differences in function of the region. Next, efficiency will also be estimated through segmentation by the number of employees and, finally, a combined analysis will be carried out, segmenting by activity codes and number of employees simultaneously.

As Table 4 shows, the scale efficiency (EE_I^K) of the analysed tourist accommodation companies reaches an average value of 72.9%, obtaining an average technical efficiency ($E_I^{K,CRS}$) of 26.03% and an average pure efficiency ($E_I^{K,VRS}$) of 40.83%. This means that, in general, the companies of the sector could provide the same service reducing approximately 30% their inputs used. It is derived from these results that the studied tourist accommodation companies do not operate at their optimal production size, due to very low technical efficiencies.

Table 4: Technical efficiency, Pure Efficiency and Scale Efficiency obtained with Global DEA Analysis.

GLOBAL	Efficiency	Mean	Median	Min	Max	Std.Dev
n = 8 397	**E_I^K, CRS**	0.2603	0.2157	0.00003	1	0.1705
	E_I^K, VRS	0.4083	0.3224	0.00769	1	0.2801
	EE_I^K	0.7290	0.7957	0.00036	1	0.2419

However, this analysis has been done for a heterogeneous sample, because it encompasses different types of companies. In order to get more precise results, subsequent segmentations are carried out to clarify the results.

If the four different activity types of the CNAE are analysed separately (Hotels, Accommodation, Campsites and Others), which are represented by their CNAE code, it is obtained that there are significant differences for the technical efficiency, pure efficiency and scale efficiency as well, according to the Kruskal-Wallis test carried out (Table 5). This could be due to the fact that, as a general rule, the companies in each of the codes operate with very different volumes of inputs and outputs.

Table 5: Kruskal-Wallis test. CNAE codes.

	E_I^K, CRS	E_I^K, VRS	EE_I^K
chi-squared	197.12	564.91	200.2
df	3	3	3
p-value	2.20E-16	2.20E-16	2.20E-16

According to the Table 6, the highest scale efficiency (90.48%) corresponds to the group of Campsites (code 553), while the sub-sector of tourist accommodation, corresponding to code 552, shows a lower scale efficiency (39.29%). In between, the hotel sub-sector (78.05%) and other establishments (65.77%) can be observed.

Also noteworthy are the low values of technical efficiency (25.32%) and pure efficiency (36.94%) of the hotel subsector (code 551), as well as the values of technical efficiency of the tourist accommodation subsector (13.48%). This fact could be motivated because companies of different sizes are jointly analysed, that is, both micro and large companies are included in the whole sample.

Table 6: Technical efficiency, Pure Efficiency and Scale Efficiency obtained with DEA. CNAE codes.

CODE	Efficiency	Mean	Median	Min	Max	Std.Dev
551 (Hotels) n = 5 816	E_I^K, CRS	0.2532	0.2161	0.00002	1	0.1456
	E_I^K, VRS	0.3694	0.2797	0.0076	1	0.2417
	EE_I^K	0.7805	0.8751	0.0001	1	0.2453
552 (Accommodations) n = 1 721	E_I^K, CRS	0.1348	0.0905	0.0001	1	0.1403
	E_I^K, VRS	0.4981	0.3540	0.0208	1	0.3426
	EE_I^K	0.3929	0.3024	0.0001	1	0.3154
553 (Campsites) n = 533	E_I^K, CRS	0.5587	0.5470	0.0153	1	0.1842
	E_I^K, VRS	0.6287	0.5934	0.1111	1	0.2035
	EE_I^K	0.9048	0.9907	0.0264	1	0.1747
559 (Other) n = 325	E_I^K, CRS	0.3755	0.3476	0.0015	1	0.2141
	E_I^K, VRS	0.6230	0.5504	0.1124	1	0.2711
	EE_I^K	0.6577	0.7541	0.0015	1	0.2917

Analysing the companies by their size, which has been measured through the number of employees, it is obtained from the Kruskal-Wallis Test that it does exist as well significant difference in statistics, as it is shown on Table 7.

Table7: Kruskal-Wallis test. Size of enterprise.

	E_I^K, CRS	E_I^K, VRS	EE_I^K
chi-squared	1541.4	2490.3	695.35
df	3	3	3
p-value	2.20E-16	2.20E-16	2.20E-16

Considering the data collected in Table 8, it is observed that the biggest Spanish companies are those that present the highest efficiency rates, both in technical efficiency, (79.33%), pure efficiency (85.44%) and scale efficiency (93.18%). The most inefficient group corresponds to micro-enterprises, since they in turn present the lowest technical (30.49%), pure (51.37%) and scale (61.67%) efficiency of the analysis. These results show that the majority of microenterprises are far from their optimum production.

Small companies are in an intermediate position, with an average scale efficiency of 68.03%, as well as medium-sized companies, with an average efficiency of 65.87%. Both groups are conditioned by low values of technical efficiency.

Table 8: Technical efficiency, Pure Efficiency and Scale Efficiency obtained with DEA. Size

SIZE	Efficiency	Mean	Median	Min	Max	Std.Dev
Big n = 111	**E_I^K, CRS**	0.7933	0.7853	0.4379	1	0.1038
	E_I^K, VRS	0.8544	0.8475	0.6164	1	0.1045
	EE_I^K	0.9318	0.9726	0.5143	1	0.0847
Medium n = 720	**E_I^K, CRS**	0.4297	0.4025	0.00003	1	0.1590
	E_I^K, VRS	0.6841	0.6760	0.2415	1	0.1964
	EE_I^K	0.6587	0.6550	7.7383E-05	1	0.2217
Small n = 2 936	**E_I^K, CRS**	0.4045	0.3768	0.0005	1	0.1639
	E_I^K, VRS	0.6112	0.5852	0.2083	1	0.2138
	EE_I^K	0.6803	0.6892	0.0010	1	0.1873
Micro n = 4 631	**E_I^K, CRS**	0.3049	0.2572	0.00002	1	0.2159
	E_I^K, VRS	0.5137	0.4696	0.1111	1	0.3053
	EE_I^K	0.6167	0.6294	0.0001	1	0.2476

Next, a regional study of the country by autonomous communities is carried out. This analysis will derive the efficiencies these autonomic communities, in order to know which of them are the most efficient. Also, this analysis will allow knowing if those regions that have a greater economic dependence on tourism are the most efficient, comparing the results with the analysis effectuated in the background (section 2 of this paper).

For this segmentation, significant statistical differences are found too, as detailed by Kruskal-Wallis Test (Table 9).

Table 9: Kruskal Wallis test. Autonomic Communities.

	E_I^K, CRS	**E_I^K, VRS**	**EE_I^K**
chi-squared	83.132	93.719	179.77
df	18	18	18
p-value	2.41E-10	3.09E-12	2.20E-16

If the analysis by autonomous communities exposed in Table 10 is considered, the average scale efficiency range is between 61.42% and 93.74%. The highest average scale efficiency occurs in the autonomous cities of Ceuta and Melilla (93.74%), although this result could be due to a very small study sample (6 units) for those regions. Taking this into account, the communities with the highest average scale efficiency are Extremadura (91.99%), Aragón (90.02%) and Navarra (89.99%). These communities are not the ones which receive the greatest number of travellers nor the ones in which tourism is the most important pillar in their economy, as in the case of Catalonia (19.08% of total travellers), Andalusia (18.28%) and Madrid (11.62%), communities that present a considerably lower average scale efficiency. Nevertheless, for estimating the determinant factors of the scale efficiency, it would be necessary a second-stage analysis, which is beyond the scope of this work

Another relevant result of this analysis is that three of the autonomous communities in which tourism is the main economic driver of the region operate below the average global efficiency scale (72.90%), as is the case of Andalusia (71.89%), the Balearic Islands (64.76%) and the Canary Islands (61.42%). Canary Islands are the most inefficient region in the study.

One possible explanation is that the offer of accommodations is large in these regions, as indicated by the size of the sample, so there is more competition and companies are forced to use more resources as inputs. Another reason that could explain these results is that it is possible that these communities are affected by seasonality in their tourism.

In contrast, other regions that have obtained the highest average scale efficiency values have been Asturias (84.40%), Murcia (87.06%), Basque Country (84.33%), Castilla La

Mancha (79.54%), and Cantabria (76.09%). A possible explanation would be that most of these autonomous communities are characterized by having a more stable type of tourism, focused more on cultural tourism.

Table 10: Technical efficiency, Pure Efficiency and Scale Efficiency obtained with DEA. Autonomic communities

COMMUNITY	Efficiency	Mean	Median	Min	Max	Std.Dev
Andalusia n = 1 078	**E_I^K, CRS**	0.2901	0.2314	0.0011	1	0.1866
	E_I^K, VRS	0.4661	0.3606	0.0834	1	0.2837
	EE_I^K	0.7189	0.8725	0.0012	1	0.2966
Aragon n = 278	**E_I^K, CRS**	0.7093	0.7340	0.0322	1	0.1699
	E_I^K, VRS	0.7975	0.7991	0.0354	1	0.1647
	EE_I^K	0.9002	0.9580	0.0783	1	0.1617
Asturias n = 271	**E_I^K, CRS**	0.6739	0.6923	0.0464	1	0.1692
	E_I^K, VRS	0.8170	0.8028	0.3333	1	0.1612
	EE_I^K	0.8440	0.9411	0.0464	1	0.2024
Balearic Islands n =1 056	**E_I^K, CRS**	0.2090	0.1661	0.0001	1	0.1527
	E_I^K, VRS	0.3713	0.2743	0.046	1	0.2514
	EE_I^K	0.6476	0.6937	0.00044	1	0.2551
Canary Islands n = 584	**E_I^K, CRS**	0.2729	0.2380	0.00016	1	0.1583
	E_I^K, VRS	0.4926	0.4314	0.01136	1	0.2607
	EE_I^K	0.6142	0.5734	0.0032	1	0.2460
Cantabria n = 174	**E_I^K, CRS**	0.5283	0.5193	0.06577	1	0.1805
	E_I^K, VRS	0.7190	0.7026	0.19702	1	0.2120
	EE_I^K	0.7609	0.8141	0.06577	1	0.2040
Castilla La Mancha n = 240	**E_I^K, CRS**	0.5985	0.5868	0.02084	1	0.2019
	E_I^K, VRS	0.7658	0.7742	0.25	1	0.1944
	EE_I^K	0.7954	0.8416	0.04168	1	0.2038
Castilla y León n = 476	**E_I^K, CRS**	0.2846	0.2487	0.00056	1	0.1677
	E_I^K, VRS	0.5229	0.4815	0.094	1	0.2750
	EE_I^K	0.6301	0.6358	0.00056	1	0.2818
Catalonia n = 1 756	**E_I^K, CRS**	0.2073	0.1562	0.00002	1	0.1638
	E_I^K, VRS	0.3901	0.3000	0.02083	1	0.2783
	EE_I^K	0.6362	0.7173	0.00018	1	0.2791
Ceuta & Melilla n = 6	**E_I^K, CRS**	0.9075	0.9623	0.72563	1	0.1197
	E_I^K, VRS	0.9693	1	0.81585	1	0.0751
	EE_I^K	0.9374	0.9872	0.72563	1	0.1078
Com. Valencia n = 632	**E_I^K, CRS**	0.2703	0.2454	0.00241	1	0.1442
	E_I^K, VRS	0.4346	0.3528	0.09554	1	0.2408
	EE_I^K	0.6989	0.7653	0.00241	1	0.2477
Extremadura n = 129	**E_I^K, CRS**	0.7601	0.7791	0.04065	1	0.1786
	E_I^K, VRS	0.8383	0.8439	0.35425	1	0.1425
	EE_I^K	0.9199	0.9916	0.04065	1	0.1849
Galicia n = 519	**E_I^K, CRS**	0.4910	0.5040	0.01198	1	0.1734
	E_I^K, VRS	0.6872	0.6578	0.15006	1	0.2165
	EE_I^K	0.7606	0.8391	0.01198	1	0.2413
La Rioja n = 48	**E_I^K, CRS**	0.7261	0.7618	0.01563	1	0.1937
	E_I^K, VRS	0.8509	0.8779	0.49707	1	0.1533
	EE_I^K	0.8489	0.8805	0.0302	1	0.1820
Madrid n = 715	**E_I^K, CRS**	0.2439	0.2039	0.00001	1	0.1833
	E_I^K, VRS	0.4335	0.3669	0.0076	1	0.2757
	EE_I^K	0.6308	0.6730	0.0002	1	0.2792
Murcia n = 88	**E_I^K, CRS**	0.5654	0.5079	0.1145	1	0.1705
	E_I^K, VRS	0.6612	0.6169	0.3322	1	0.1847
	EE_I^K	0.8706	0.9420	0.1682	1	0.1736
Navarra n = 107	**E_I^K, CRS**	0.7382	0.7799	0.0219	1	0.1834
	E_I^K, VRS	0.8269	0.8580	0.4086	1	0.1607
	EE_I^K	0.8999	0.9703	0.0219	1	0.1606
Basque Country n = 241	**E_I^K, CRS**	0.5337	0.5303	0.0293	1	0.2294
	E_I^K, VRS	0.6488	0.6150	0.1345	1	0.2441
	EE_I^K	0.8433	0.9358	0.0605	1	0.2146

Finally, a segmentation by activity code and company size has been carried out, in order to achieve more precise results and for companies with similar characteristics.

It should be noted that there are not companies with more than 250 workers for the campsite sub-sector and no medium-sized companies for the other accommodations sub-sector. Furthermore, there are only 5 large companies for the tourist accommodation subsector and 12 medium-sized companies for the camping subsector available.

The analysis shows that for the specific case of the hotel subsector (code 551), companies are more efficient the greater the volume of labour they have. Average scale efficiencies of 93.92% have been obtained for large companies, 65.94% for medium-sized ones, 69.15% for small ones and 45.38% for micro companies (Table 11)

In the case of the tourist accommodation subsector (code 552), different results to the previous case are obtained. The most efficient companies turn out to be medium-sized companies (92.60%), followed by large (89.98%), small (69.59%) and lastly, micro-companies (31.23%). This last type of establishment turns out to be mostly small in size, hence its global average scale efficiency is 39.29% as indicated above.

If the study focusses at campsites (code 553) and other types of accommodations (code 559), we find a discrepancy in terms of the results. In the first place, the inexistence of large and medium-sized companies that operate in these activity codes is evident, reducing the sample to small and micro companies. Small companies are more efficient in "Other Accommodation" (89.84%) than in campsites (77.65%), while micro-companies are more efficient in campsites (91.06%) that in "Other Accommodation" (64.79%).

Table 11: Technical efficiency, Pure Efficiency and Scale Efficiency obtained with DEA. Code-Size Segmentation.

CODE & SIZE	Efficiency	Mean	Median	Min	Max	Std.Dev
Big	**E_I^K, CRS**	0.7948	0.7869	0.5605	1	0.0979
551 (Hotels)	**E_I^K, VRS**	0.8546	0.8506	0.6164	1	0.1045
n = 104	**EE_I^K**	0.9332	0.9657	0.7224	1	0.0731
Big	**E_I^K, CRS**	0.8896	1	0.4584	1	0.2410
552 (Accommodations)	**E_I^K, VRS**	0.9808	1	0.9097	1	0.0398
n = 5	**EE_I^K**	0.8998	1	0.5039	1	0.2213
Medium	**E_I^K, CRS**	0.4266	0.3998	0.00003	1	0.1583
551 (Hotels)	**E_I^K, VRS**	0.6796	0.6703	0.2415	1	0.1975
n = 673	**EE_I^K**	0.6594	0.6588	7.7383E-05	1	0.2237
Medium	**E_I^K, CRS**	0.8521	0.8432	0.6534	1	0.0996
552 (Accommodations)	**E_I^K, VRS**	0.9226	0.9540	0.6896	1	0.0890
n = 32	**EE_I^K**	0.9260	0.9664	0.6999	1	0.0854
Medium	**E_I^K, CRS**	0.9073	0.9148	0.7240	1	0.0981
553 (Campsites)	**E_I^K, VRS**	0.9384	1	0.7375	1	0.0931
n = 12	**EE_I^K**	0.9672	0.9906	0.8642	1	0.0464
Small	**E_I^K, CRS**	0.4038	0.3746	0.0005	1	0.1622
551(Hotels)	**E_I^K, VRS**	0.6007	0.5567	0.2117	1	0.2143
n = 2 364	**EE_I^K**	0.6915	0.7028	0.0010	1	0.1840
Small	**E_I^K, CRS**	0.4670	0.4370	0.0018	1	0.1976
552 (Accomodations)	**E_I^K, VRS**	0.6923	0.6830	0.2083	1	0.2044
n = 337	**EE_I^K**	0.6959	0.7443	0.0027	1	0.2410
Small	**E_I^K, CRS**	0.5793	0.5570	0.1717	1	0.1798
553 (Campsites)	**E_I^K, VRS**	0.7610	0.7692	0.4032	1	0.1695
n = 191	**EE_I^K**	0.7765	0.8283	0.2272	1	0.2062
Small	**E_I^K, CRS**	0.8152	0.8321	0.3288	1	0.1408
559 (Other)	**E_I^K, VRS**	0.9048	0.9441	0.5317	1	0.1075
n = 44	**EE_I^K**	0.8984	0.9145	0.4812	1	0.1001
Micro	**E_I^K, CRS**	0.1452	0.1010	0.00002	1	0.1425

CODE & SIZE	Efficiency	Mean	Median	Min	Max	Std.Dev
551(Hotels)	**E_I^K, VRS**	0.4105	0.3229	0.1111	1	0.2922
n = 2 675	**EE_I^K**	0.4538	0.4054	0.0001	1	0.3067
Micro	**E_I^K, CRS**	0.1342	0.0890	0.00008	1	0.1452
552 (Accomodations)	**E_I^K, VRS**	0.5719	0.5	0.1111	1	0.3345
n = 1 350	**EE_I^K**	0.3123	0.2147	0.0001	1	0.2838
Micro	**E_I^K, CRS**	0.6968	0.6950	0.0216	1	0.1527
553 (Campsites)	**E_I^K, VRS**	0.7735	0.7602	0.1111	1	0.1624
n = 330	**EE_I^K**	0.9106	0.9670	0.0650	1	0.1449
Micro	**E_I^K, CRS**	0.3730	0.3472	0.0015	1	0.2217
559 (Other)	**E_I^K, VRS**	0.6324	0.5355	0.1501	1	0.2798
n = 276	**EE_I^K**	0.6479	0.7541	0.0015	1	0.3045

Source: Author's elaboration

The present study is then compared with some of the previous analysis carried out for the hotel sector. Compared with the analysis by Such & Mendieta (2013), the community of Murcia has maintained a high level of scale efficiency since 2006, while the Valencian Community and Andalusia have lowered their levels of scale efficiency, that have been replaced nowadays by Extremadura, Aragón and Navarra. These differences may be motivated by the fact that those communities that have a more stable tourism could maintain higher levels of efficiency than those that are focused on the "Sun & Beach" tourism.

In comparison with the efficiency and productivity study by Alberca & Parte (2013), which used a sample of companies for 2008, it is observed how the most inefficient communities (Galicia, Castilla La Mancha and Murcia) present in this study high efficiency values above the mean of the overall sample. This result is remarkable because practically identical inputs and outputs for the DEA analysis have been chosen in both studies, although this disparity may be due to the difference in sample sizes considered, as well as to the fact that it was an exclusive study of the hotel sector, unlike of this work.

Finally, the results are compared with those obtained by Sellers-Rubio & Casado-Díaz (2018). It is noteworthy that two of the communities that show the highest medium-scale efficiency (Canary Islands and Balearic Islands) in this study are, in the present analysis, the most inefficient. This may be due to the fact that their study is output-oriented, that is, more focused on the final product, as opposite to the one carried out here, which focuses on the management of inputs.

CONCLUSIONS

The tourism industry is one of the most important economic sectors, not only internationally but also for the specific case of Spain, which is one of the most important tourist destinations in the world. Furthermore, this sector is characterized by high competitiveness among companies because of globalisation. In this context, the analysis of efficiency of the sector is very useful, in order to know the performance of the companies that operate on it. The results of this type of analysis will make it possible to orient corporate and institutional policies towards improving the efficiency of companies in the sector.

The efficiency analysis presented here has been carried out from a sample of 8397 companies which belong to the tourist accommodation sector in Spain. Compared to most of the works consulted, this work presents two relevant contributions. On the one hand, the number of companies considered in the sample, which is much higher, and on the other hand, the diversity of companies considered, including, along with the hotel sector, other types of tourist accommodation companies.

The results obtained in this work, which has been carried out through the DEA methodology; reveal that Spanish accommodation companies operate with a scale efficiency of 72.90%, which means that for the results they obtain, they could reduce their resources used by almost 30%, due to low values of technical efficiency (26.03%) and pure efficiency (40.83%). These results show that companies can improve their production processes by almost 75%, so it is suggested that a general improvement in the technical efficiency of the Spanish tourist accommodation sector should be necessary.

The study also reveals that the observed differences in technical efficiency, as well as in pure efficiency and scale efficiency, are significant if the different kinds of accommodations, regions or sizes are compared.

In this sense, it is obtained that the Campsites subsector presents a much higher efficiency than the other subsectors. On the other hand, the comparison between different sizes of DMU shows the difficulty of small and medium-sized companies for competing with large companies in terms of efficiency.

In addition, the analysis carried out by autonomous communities also reveals significant differences in the observed efficiency. Thus, autonomous communities such as the Canary Islands and the Balearic Islands have high inefficiency values, despite the fact that they are regions where their economy is strongly marked by tourism. This could be due to other factors such as seasonality suffered by these regions oriented to “Sun & Beach Tourism”, since they concentrate their highest turnover in the summer months. Because of that, most accommodations are over-dimensioned, in order to be able to face the high demand. At the other end, the communities that present the highest scale efficiency values are Extremadura, Navarra, Murcia, La Rioja and Asturias.

Finally, a segmentation by activity code and company size has been carried out, in order to achieve more precise results and for companies with similar characteristics. The analysis shows that for the specific case of the hotel subsector (code 551), companies are more efficient the greater the volume of labour they have. Average scale efficiencies of 93.92% have been obtained for large companies, 65.94% for medium-sized ones, 69.15% for small ones and 45.38% for micro companies. For the case of the tourist accommodation subsector (code 552), the most efficient companies turn out to be medium-sized companies (92.60%), whereas micro-companies (31.23%) are those with present more inefficiency. In addition, the most efficient micro-companies are found for the Campsites’ sector, whereas the most efficient small companies are related with “Other accommodation” establishments (Code 559).

For future research, it is proposed to extend this analysis with a greater number of segmentations such as comparing hotels with the same number of stars or depending on the sort of tourism in the area, in order to have the general information to compare it with groups of smaller size but with similar characteristics. It would be highly recommended to study the effect of seasonality and tourist destinations, as well as a second-stage analysis which identifies the determinant factors of the efficiency, such as the number of travellers received by the autonomic communities.

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