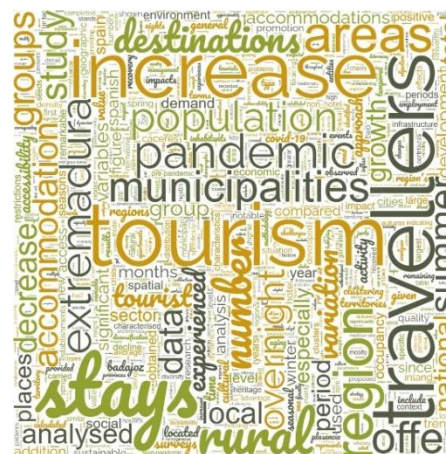


TOURISM REACTIVATION IN EXTREMADURA (SPAIN): POST-COVID ANALYSIS OF INLAND DESTINATIONS

Nerea Ríos Rodríguez,
Gema Cárdenas Alonso,
Ana Nieto Masot¹



¹ Nerea Ríos Rodríguez, PhD student, ORCID: 0000-0003-0307-5609, email: nerearios@unex.es; Gema Cárdenas Alonso, professor, ORCID: 0000-0002-4977-8599, email: gemacardenas@unex.es; Ana Nieto Masot professor ORCID: 0000-0001-9301-8637, email: ananieto@unex.es, University of Extremadura, Cáceres, Spain

Abstract: The research analyses the tourism situation in Extremadura (Spain) in recent years to assess whether the COVID-19 pandemic has been an opportunity to revitalise these destinations. An analysis was carried out at the municipal level using contextual variables and tourism indicators obtained from surveys of the National Institute of Statistics. The data were processed and compared using Geographic Information Systems, allowing for a spatial and temporal assessment. The results provide a detailed overview of the current state of tourism in the municipalities of Extremadura, determining whether pre-pandemic levels of activity have been recovered and identifying the municipalities with significant improvements in their tourism potential during the period studied.

Keywords: tourism evolution, travellers, overnight stays, seasonal variation, municipal data, Extremadura

Resumen: La investigación analiza la situación del turismo en Extremadura (España) en los últimos años para evaluar si la pandemia de COVID-19 ha sido una oportunidad para revitalizar estos destinos. Se realizó un análisis a nivel municipal utilizando variables contextuales e indicadores turísticos obtenidos de encuestas del Instituto Nacional de Estadística. Los datos se procesaron y compararon mediante Sistemas de Información Geográfica, permitiendo una evaluación espacial y temporal. Los resultados proporcionan una visión detallada del estado actual del turismo en los municipios de Extremadura, determinando si se han recuperado los niveles de actividad previos a la pandemia e identificando los municipios con mejoras significativas en su potencial turístico durante el periodo estudiado.

Palabras clave: evolución del turismo, viajeros, pernoctaciones, variación estacional, datos municipales, Extremadura

Highlights

- Extremadura showed resistance to the pandemic and recovered quickly.
 - Demand for rural lodging increased due to the pandemic.
 - Diversification of accommodations boosts local economy and employment.
 - Tourism in Extremadura is growing, especially in terms of overnight stays during the warm seasons.
-

1. Introduction

Tourism in Spain has experienced significant transformations over the decades, constantly adapting to the preferences and needs of travellers. This ability to adapt has been essential in maintaining Spain's position as one of the world's leading tourist destinations.

Throughout history, however, it has had to deal with the concentration of tourism in certain areas, leaving other ones less favoured and underutilised (Gómez & Martín, 2019). Oversaturation of tourist destinations can lead to a lower quality tourism experience, negatively impacting heritage and cultural authenticity (Blázquez-Salom et al., 2019). In addition, pressure on natural resources and local infrastructure can lead to environmental and urban management problems.

In recent decades, Spanish tourism, as in other countries, has undergone significant changes due to technological advances, a wide offer of accommodations and the discovery of new destinations. This phenomenon has particularly benefited its inland regions, especially those of a rural character (Solsona, 2006), far from the coasts and the sun and beach, with a proposal oriented towards the valorisation of

their heritage, cultural and natural resources (Moreno, 2022; Pillet, 2012). In this context, Extremadura stands out, a Spanish region that has experienced a significant tourism boost thanks to its historical, cultural and natural wealth. This growth has led to the emergence of new tourist destinations characterised by a minimal transformation of the territory, a varied gastronomic offer and a wide diversity of sites. This is why, since 2000, Extremadura has experienced a 35% increase in the number of travellers, surpassing other Spanish destinations such as the Canary Islands (24.97%), one of the main Spanish tourist destinations. This has been reflected in a 40% increase in overnight stays, well above the Spanish average increase of 25%, and a 54.9% increase in the number of establishments (Instituto Nacional de Estadística, 2024) in these more than 20 years. Despite significant growth, tourism in the region still contributes less to GDP compared to the national average of 12.4%, according to the Tourism Satellite Account of the National Institute of Statistics (NIS), although it stands out as the economic sector with the highest growth in the region, considering the initial underdeveloped situation of the tourism sector in the area.

The COVID-19 pandemic was a crucial moment for tourism worldwide (Deb & Nafi, 2021; Gössling et al., 2020), and Extremadura was no exception. Travel restrictions and social distancing measures significantly impacted the number of travellers (Díez-Pisonero & Gago-García, 2022; Ribes et al., 2020), but, at the same time, they provided an opportunity to rethink the approach to tourism, since it became clear that the country was vulnerable to relying largely on a single sector and the need to diversify the tourism offer (Gago-García et al., 2021), and promote national and local tourism due to the limitations imposed by COVID-19 on international and/or long-distance tourism.

In Spain, at the municipal level, few research has been carried out to determine the variation in tourism before and after the pandemic. Also, the vulnerability of tourism to COVID-19 has been analysed in the 50 Spanish provinces (Duro et al., 2021), based on the identification of factors related to the vulnerability of tourism. Other regions, such as Andalucía (Garzón et al., 2023) and Murcia (Agudo et al., 2022), have been analysed in greater detail as Island regions characterised by international tourism that have been the subject of studies related to post-pandemic tourism (Pou, 2023; Rodríguez-Darias & Rodríguez, 2023). It is noteworthy that in previous analyses, (Ríos et al., 2023; Ríos et al., 2022b) this information has been analysed at the regional level to determine which regions were most affected by covid and to what extent and focused on a more limited study area such as the Valle del Jerte- La Vera in Extremadura (Ríos et al., 2022a). As in Spain, some authors have analysed the effects in other countries (Curtale et al., 2023), such as France (Soria et al., 2023) and the Netherlands (Kuenen et al., 2023).

In this context, the present study proposed to go beyond a simple analysis of travellers and overnight stays in Extremadura, extending the study to seasonal data and considering key variables in tourism such as income, population growth and the minimum access time of municipalities to the main communication routes. In this way, we focused on analysing the data at the municipal level, allowing a detailed understanding of the interconnection between the proposed variables and their impact on tourism activity in the region of Extremadura. Therefore, the objective was to analyse the situation of tourism activity in the Extremadura region during the last years (2019–2022), to understand the distribution and variation of the tourism sector, especially in the post-pandemic period generated by the COVID-19 health crisis. To achieve this objective, a methodology based on the assignment of spatial clusters through Geographic Information Systems (GIS) was developed to form a model whose result would allow determining which municipalities have suffered the greatest impact of the pandemic and, consequently, which types of housing have been most affected. The research analysed geospatial and temporal data variation using graphical representation, particularly focusing on tourism demand at the municipal level, which is a novel approach in tourism research. New methodologies of analysis on a local scale were provided which could be implemented in other areas of study and the effects of the COVID-19 pandemic on the sector could also be studied in these territories and if some changes in trends are observed.

Next, taking into account the above considerations, the methodology of this work is presented, followed by section 3, where the results obtained, and their discussion are shown. Finally, section 4 presents the conclusions.

2. Theoretical framework

Tourism, as an economic and social activity of great relevance for territorial development, has undergone a remarkable evolution in recent decades, significantly marking the economic and cultural dynamics of various regions. This phenomenon has not only influenced the transformation of local economies but has also shaped the cultural, social and environmental dynamics of regions (Capdepón, 2023). Globally, tourism has established itself as one of the most dynamic and fast-growing sectors, representing an essential source of income, employment and development.

During the first two decades of the 21st century, the country has experienced vertiginous growth with positive economic consequences, generating direct impacts on employment and creating complementary activities that have energised various territories, including Extremadura. However, the traditional model of mass tourism has begun to decline, especially in coastal and island regions, as well as in large cities integrated into international circuits (Cánoves et al., 2020). This saturation has highlighted negative externalities on the environment, heritage and socio-labor conditions, giving rise to a critical approach known as "global touristification" (Cañada & Murray, 2021).

Many territories have suffered and continue to suffer from the saturation of their tourist destinations, which has generated a series of negative impacts on both the environment and society. At the social level, tourist saturation has contributed to the rising cost of housing, displacing residents and encouraging the gentrification of historic and cultural areas (Fletcher et al., 2019). This phenomenon has caused many communities to lose their identity and social cohesion, transforming traditional neighbourhoods into spaces geared primarily to tourist consumption (Vega Falcón et al., 2020). The proliferation of tourist accommodation, such as short-term rentals, has reduced the availability of affordable housing for permanent residents, intensifying social inequalities and changing the demographic structure of cities. The COVID-19 health crisis has exacerbated these issues, highlighting both the vulnerability and resilience of tourism destinations (Méndez, 2022). This situation underlined the need to diversify local economies and reduce over-reliance on the tourism sector as a major source of income (Rodríguez-Antón & Alonso-Almeida, 2020). However, the pandemic also acted as a catalyst for the revaluation of more sustainable and resilient tourism models. Some destinations have been able to take advantage of this situation to rethink their tourism development strategies, implementing more responsible practices aligned with the protection of the environment and the quality of life of residents. Examples include the promotion of local tourism, the implementation of policies to regulate tourist rentals and the promotion of experiences with a lower environmental impact.

After the pandemic, in numerous territories, an alternative approach has been proposed that seeks to promote a more sustainable and balanced development, with a greater diversification of the tourism offer (Bauza & Melgosa, 2020; Benítez-Aurióles, 2021) and reducing the overexploitation of certain resources and the offer of certain accommodation infrastructures (apartments in historical centres, large hotels in coastal areas...). The pandemic has revived the need to rethink the tourism model, highlighting the importance of the resilience of tourism destinations in the face of disruptive events (Andreu et al., 2020).

In recent years, Extremadura has experienced a variety of impacts on tourism activity. Although it has not traditionally been a top tourist destination in terms of number of travelers or contribution to GDP, the region has experienced remarkable growth based on the diversification of its tourism offer and the effective use of its cultural and natural heritage (Ríos et al., 2022b). Thus, while some areas focus on cultural tourism, with their historical and artistic heritage as the main attraction, others are committed to natural tourism, taking advantage of their protected areas and landscapes. This diversified strategy has contributed to the region's resilience to the impacts of the pandemic, enabling a faster recovery as vaccination progressed and restrictions were relaxed (Arold, 2021). The resilience of Extremadura tourism is due to several factors that have been decisive in counteracting the challenges caused by the health crisis. These factors include:

- The diversification of the tourism offer has allowed Extremadura, by not depending exclusively on a specific segment, not to have experienced such a sharp decline in its tourism activity during the pandemic.
- Extremadura has adapted to the new preferences of travellers by promoting rural tourism, outdoor activities, and experiential tourism. The development of thematic routes focused on heritage, culture and nature has been a key strategy to boost experiential tourism in the region.
- Investing in sustainable tourism infrastructure is crucial for maintaining the long-term competitiveness and sustainability of tourism destinations. This initiative has not only preserved the environment but also tailors the tourism offer to meet current needs and demands. It improves access to a place of interest and the tourist experience.
- The active participation of local stakeholders and inter-institutional collaboration has improved the management and promotion of tourism in Extremadura. This collaboration strengthens the link between tourists and the environment, promoting sustainable development. Collaboration between the public and private sectors ensures that decisions related to tourism respond to the specific needs of each area of Extremadura.
- Less overcrowding in accommodations, with smaller options such as rural houses and tourist apartments gaining preference over large hotels, especially during events such as the COVID-19 pandemic.

The combination of these and other factors positions Extremadura as a relevant case study to understand how regions can manage and strengthen their tourism industry in a changing and challenging environment.

3. Study area

The study area is the Autonomous Community of Extremadura, located in the southwestern part of the Península Ibérica. Bordered by Castilla y León to the north, Castilla La Mancha to the east, Andalucía to the south and Portugal to the west, this region is formed by the two largest provinces of Spain: Cáceres and Badajoz, covering an area of 41,635 km² with a perimeter of 1,184 km. According to data from the National Statistics Institute (NIS), as of January 1, 2023, the total population of Extremadura is 1,052,523 inhabitants, distributed among its 388 municipalities. The population distribution in Extremadura is characterised by its territorial dispersion, resulting in a low population density of 25.27 inhabitants/km², in contrast to the Spanish population density, which is over 93 inhabitants/km² (Instituto Nacional de Estadística, 2023).

In terms of tourism, Extremadura is organised into 15 tourist territories, according to the Tourism Observatory of Extremadura in 2023 (Figure 1). These territories are composed of four urban municipalities and 11 areas that include the remaining 384 municipalities.

The average number of municipalities per territory is 25 and the distribution is not uniform across regions. In the southeast, extensive territories host numerous municipalities with limited tourist tradition, whereas in the north of the province of Cáceres, they have a more developed tourist sector, linked to the mountain and water offer.

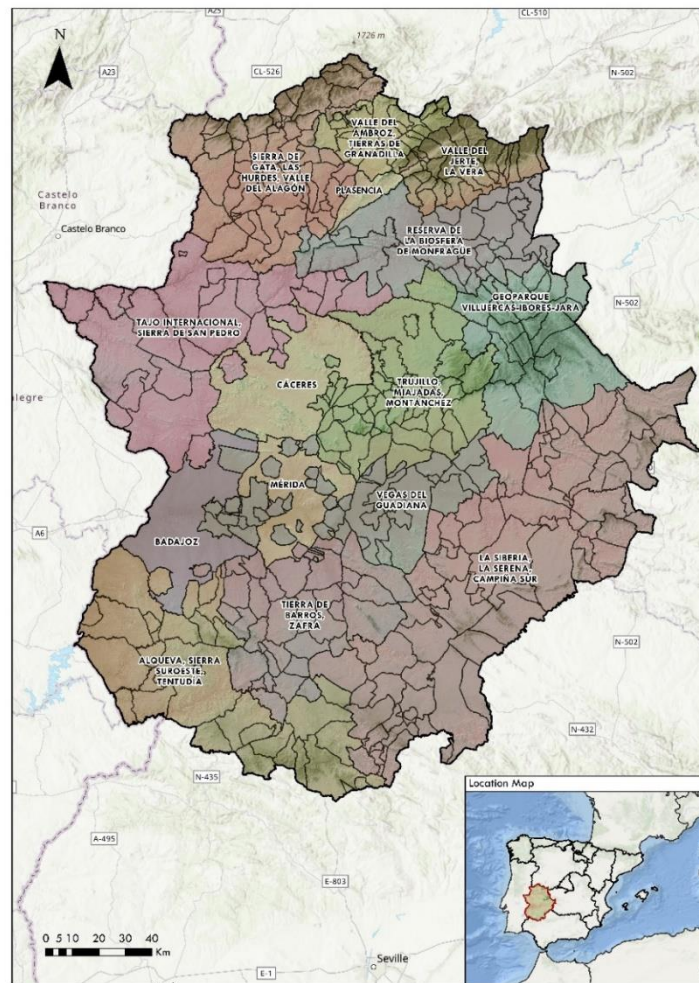


Fig 1. Tourist territories of Extremadura. Source: authors

In terms of geographic and, specifically, demographic characteristics, at the municipal level, the disparity in distribution is evident with a high concentration of population in seven municipalities with more than 20,000 inhabitants, totalling more than 442,000 inhabitants in 2023. Among these, the cities of Badajoz, Cáceres and Mérida concentrate almost 70% of the population. It is noteworthy that 91% of Extremadura's municipalities have less than 5,000 inhabitants and more than 56% have less than 1,000 inhabitants. Analysing the population distribution by tourist territories, the Vegas Altas del Guadiana and Tierra de Barros-Zafra stand out, characterised by a higher population density and more moderate population losses. These areas are dedicated to productive irrigated and dry farming, respectively. In addition, they have adequate territorial accessibility due to their proximity to the region's main highways (A-5 and A-66), as well as to important county capitals that facilitate connectivity. On the contrary, the tourist territories with a population of less than 50,000 inhabitants are located in mountainous areas and on the outer limits of the two provinces of the region. The geographic configuration of these territories contributes to their lower population density and demographic challenges, resulting in a reality characterised by an aging and declining population.

4. Materials and methods

From the methodological point of view, this study focuses on collecting information related to the tourism sector in each of the municipalities of Extremadura during the last few years. This data collection aids in identifying spatial and temporal patterns crucial for comprehending tourism evolution in Extremadura, offering a detailed insight into its tourism dynamics.

4.1 Data collection process

The analysis of tourism demand was carried out using data from the Occupancy Surveys corresponding to each type of accommodation, prepared by the National Institute of Statistics of Spain (NIS). The methodological process for obtaining the data corresponding to tourism demand is shown in Figure 2.

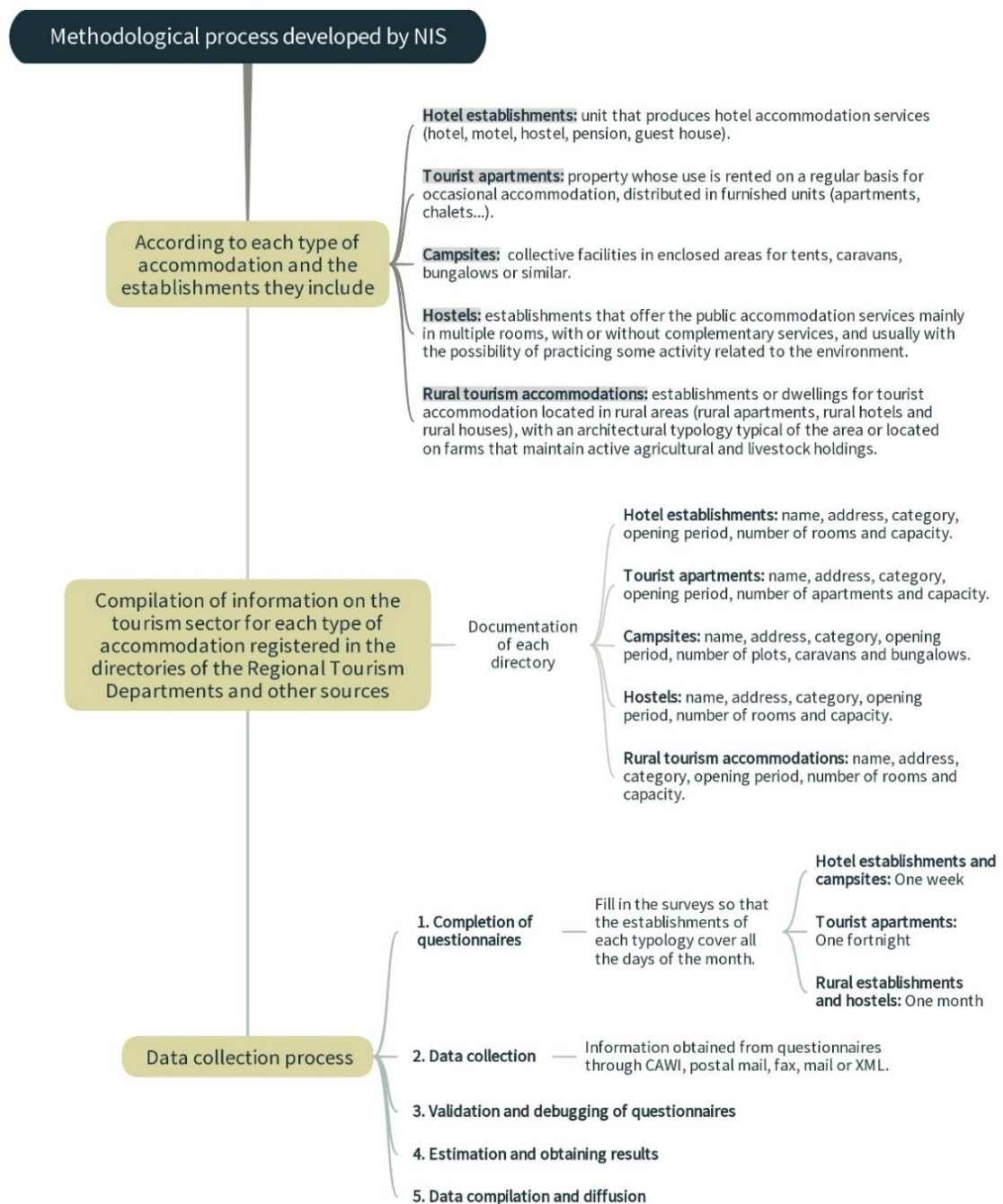


Fig 2. Methodological scheme for data collection and processing developed by NIS. Source: authors

The data were provided by the NIS through the Directorate General of Tourism of the Regional Government of Extremadura and the Tourism Observatory of Extremadura in microdata format. These data had to be subjected to a process of analysis, filtering and estimation to obtain the values at the municipal level (Figure 3).

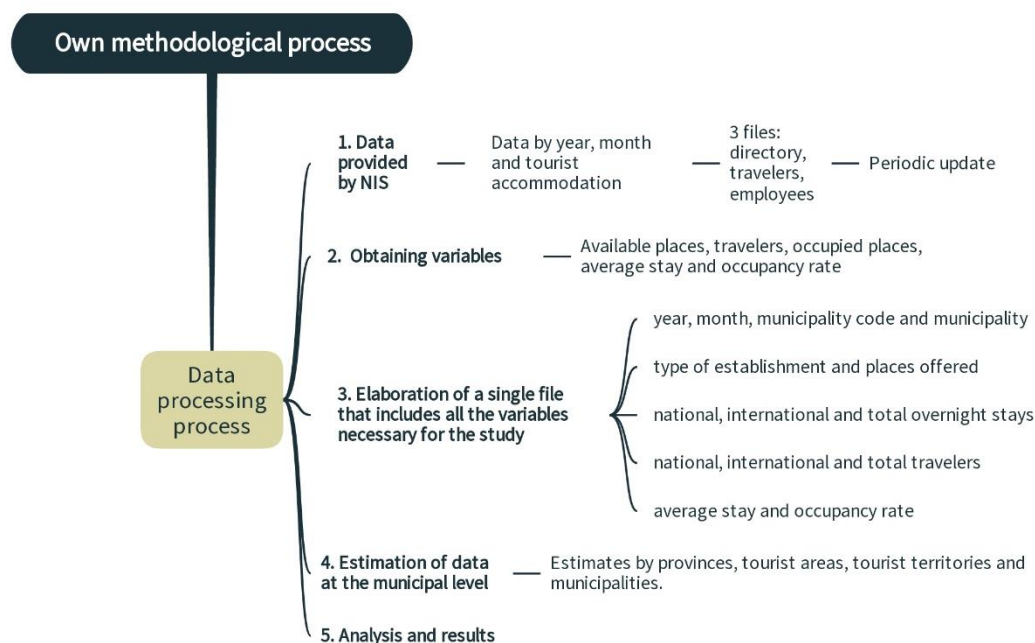


Fig 3. Methodological outline of the data processing itself. Source: authors

The research focused on the establishments that completed the occupancy surveys in 2019 and 2022 and were grouped into three categories of accommodation: hotel (hotels, hostels and pensions), non-hotel (tourist apartments, hostels and campsites) and rural (rural apartments, hotels and rural houses, as well as other buildings intended for agritourism in rural areas), to obtain a total count.

Among the 388 Extremadura municipalities, 126 were identified as not offering any accommodation during the study period. Of the 262 municipalities that did offer accommodations in at least one of the two years, 32 closed their accommodations in 2022, while 28 municipalities opened new ones. These groups were excluded from the analysis due to the inconsistency of the offer. Of the remaining 202 municipalities, 78% (157) not only offered accommodations but also completed occupancy surveys, providing essential data for the study. Variations in the number of travellers, overnight stays and bed capacity were calculated from 2019, the year of the historical record, to 2022, the latest year available.

The data obtained were interconnected and analysed to determine the variations in the offer of accommodation, number of travellers and overnight stays, both overall and by season and type of accommodation, in the Extremadura municipalities before and after the impact of the pandemic. This approach revealed spatial and temporal patterns that will help explain the dynamics of tourism activity in the region. In addition, the sociodemographic characteristics of the population of Extremadura were examined using data from the NIS (Instituto Nacional de Estadística, 2023).

On the other hand, the minimum access time was calculated to determine the accessibility from the municipalities to the nearest highway or national road. The accessibility study is based on graph theory, supported by geospatial analysis tools in ArcGIS Pro (Cardozo et al., 2009). A road network was generated using road data obtained from the National Download Centre of the National Geographic Institute. Municipalities were considered as nodes and road connections as edges. Access times from each node to each edge were calculated, taking into account the length and maximum speed allowed on the roads. An estimated speed of 120 km/h was used for highways and 90 km/h for national roads. The calculation was made according to the expression:

$$[\text{Length}]/([\text{Speed}]*1000)/60$$

The calculation of the minimum access time from each centroid to the nearest road will show an ideal model. The expression is as follows:

$$TA M i = \text{minimum} (I R i j) \forall j$$

where the minimum time from each node *i* (centroid of the municipality) to the nearest road (node *j*) is determined.

The following diagram shows the variables used in the research (Figure 4):

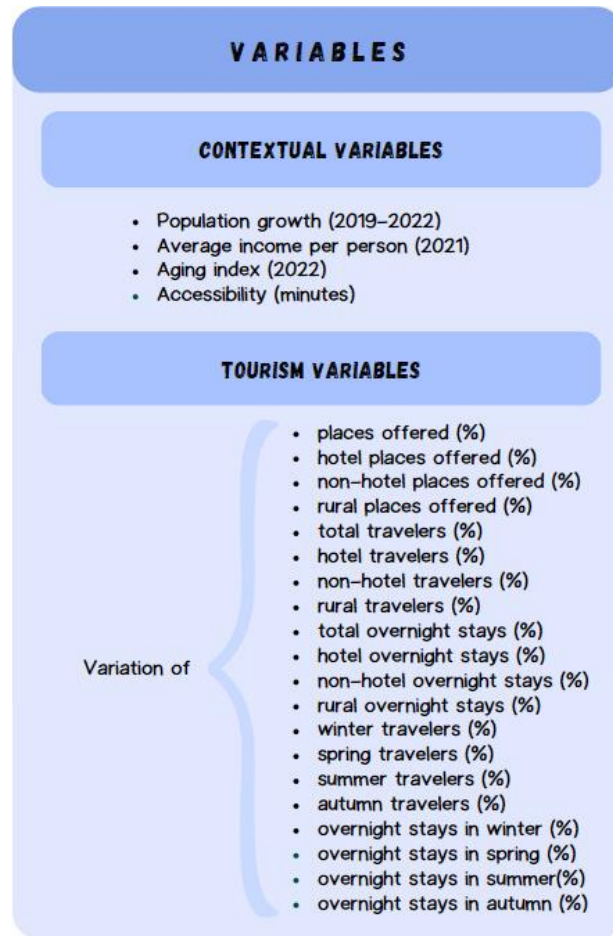


Fig 4. Variables used in the research. Source: authors

4.2 Spatial grouping allocation

To achieve the stated objectives, spatial statistical analysis techniques were employed, specifically by assigning spatial groupings or clusters, using the Multivariate Clustering method. This approach allows homogeneous groups to be identified by looking for similarities between the variables that characterise each group within the model.

The quality and efficiency of the clustering of the groups generated was assessed using the Calinski-Harabasz pseudo-F statistic (Caliński & Harabasz, 1974). This statistic quantifies the separation between groups and the internal cohesion within each group, providing a measure of the effectiveness of clustering as a function of the internal similarity of the data within clusters and the difference between different clusters. A higher pseudo-F value indicates greater homogeneity within clusters and greater heterogeneity between clusters, suggesting a better quality of the clustering obtained. This formula is expressed as:

$$\frac{(R^2/n_c - 1)}{(1 - R^2)/(n - n_c)}$$

where:

$$R^2 = \frac{SST - SSE}{SST}$$

SST is the total sum of the squares obtained for the variable considered, reflecting the differences between the groups, while SSE is the explained sum of the squares and shows the level of similarity within each group. Both parameters are calculated using the following formulas:

$$SST = \sum_{i=1}^{n_c} \sum_{j=1}^{n_i} \sum_{v=1}^{n_v} (V_{ij}^k - \bar{V}^k)^2$$

$$SSE = \sum_{i=1}^{n_c} \sum_{j=1}^{n_i} \sum_{v=1}^{n_v} (V_{ij}^k - \bar{V}_t^k)^2$$

where n is the number of characteristics; n_i the number of characteristics in the group i ; n_c the number of groups; n_v the number of variables used, V_{ij}^k the value acquired by the k -th variable in the j -th characteristic within the i -th group V^k , the average of the k -th variable and $\bar{V}_t^k$ the mean value of the k -th variable in group i .

Using ArcGIS Pro software, the cluster analysis was established following the assigned parameters of the K-means algorithm. In K-means clustering, a method without spatial assignment was used, that is, without spatial restrictions to ensure that the data were grouped according to variables and without the influence of neighbouring data, as would occur if clustering methods with space-time restrictions were selected. The objective of the K-means algorithm is to divide the entities into smaller groups, identifying for them entities called "seeds". While the selection of the first seed is random, the subsequent selection of seeds applies a weighting that favours the choice of seeds from the existing set of entities in the data space ($K++$ mean values). After establishing these seeds, those closest in data value are identified to establish to which group each entity belongs (Jain, 2010).

In this study, 5 groups of entities were established based on their characteristics and the number of municipalities analysed, considered optimal for the analysis. The results were obtained for the municipalities characterised by their central value, designated as reference (ss_seed) for each of the 5 groups. The previous standardization of the variables and the elaboration of the averages facilitated the study, since it allows us to determine which variables best describe each group, by identifying whether they are above or below the mean and the magnitude of their deviation.

5. Results

First, Figure 5 represents the annual evolution of total travellers in the Extremadura region during the period from 2019 to 2022, by month. The graph shows variability in the data over the years due to multiple factors, such as seasonal events, economic changes and, in this particular case, the COVID-19 pandemic.

Until 2019, Extremadura consolidated its position as an inland tourist destination, reaching record records with 1,938,240 travellers. However, tourism dynamics in Extremadura experienced a remarkable change with the onset of the pandemic, reflecting global trends in all tourism regions. In 2020, the tourism sector experienced a temporary halt, a direct consequence of the containment measures to curb the spread of the COVID-19 virus.

In April 2020, tourism experienced an unprecedented downturn, with some periods even registering zero activity due to travel restrictions and confinement measures amid the health crisis. The temporary break in the data highlighted the vulnerability of the tourism sector to unexpected events. In the months after April 2020, values declined compared to previous years, but as 2021 progressed, gradual recovery developed especially in the summer months, although it did not reach 2019 levels in several months. In the summer months, July and August, Extremadura reached higher values of influx of travellers compared to the rest of the months. Moreover, it is in the last year analysed when a positive trend is shown, showing a return to figures close to those reached in 2019, and even improving them in some

months (February, April, September and October). This progressive improvement indicates a continuous recovery of the situation, given that the region has received during 2022 more than 1,850,000 travellers.

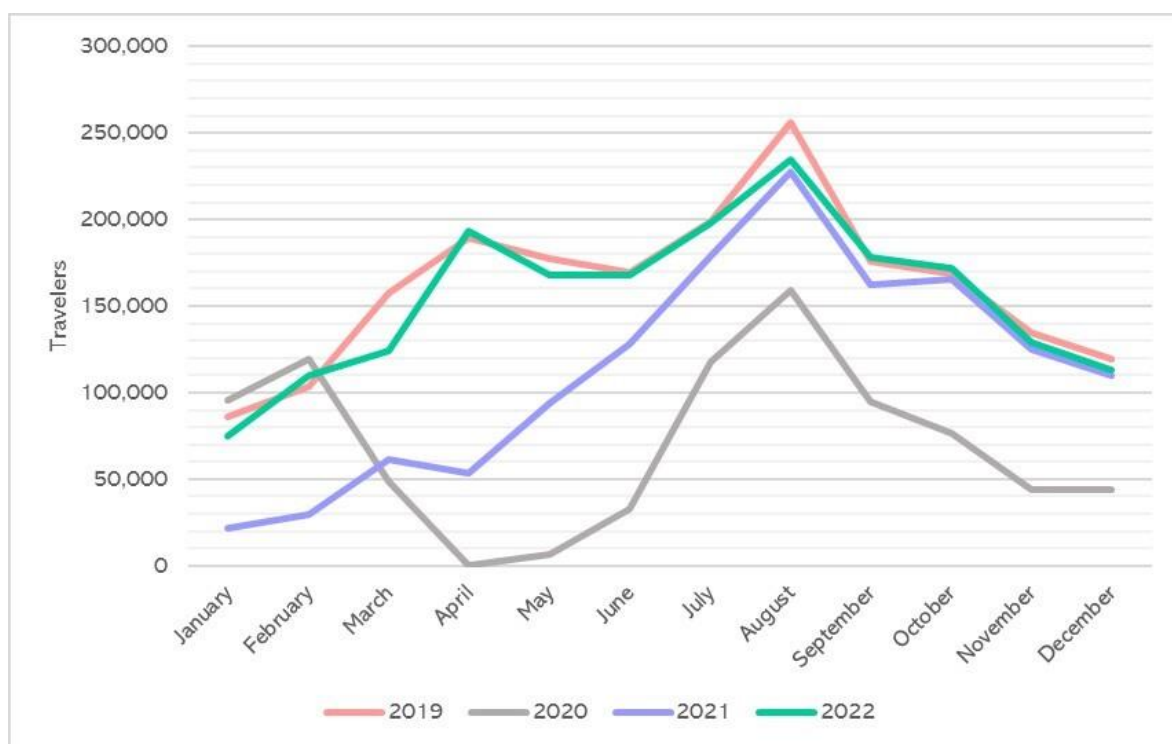


Fig 5. Evolution of total travellers received in Extremadura from 2019 to 2022. Source: authors

Analysing the variations of travellers by season in Extremadura municipalities between 2019 and 2022 (Figure 6) reveals several significant trends. In general, summer records the highest traveller numbers, doubling or tripling in many cases those of the winter months. Comparing 2022 data to pre-pandemic levels in 2019, no season exceeded pre-COVID-19 traveller numbers. Winter experienced the most significant decline, with a 10.8% drop, while spring experienced the least impact, with a 1.5% decline.

Thus, 157 municipalities in Extremadura count with accommodation establishments that offer places and that have answered the occupancy surveys between 2019 and 2022, 55.4% of these municipalities, representing 87 in total, have experienced an increase in the number of travellers during that period, with more than half of them exceeding 50% of the travellers received in 2019. In contrast, 70 (44.6%) have experienced a decrease in the number of travellers. These municipalities, mostly situated in mountainous areas in the northeast of the province of Cáceres or in penillanura areas, have seen 22 of them lose more than half of the travellers received compared to 2019, equivalent to 31.4% of the total.

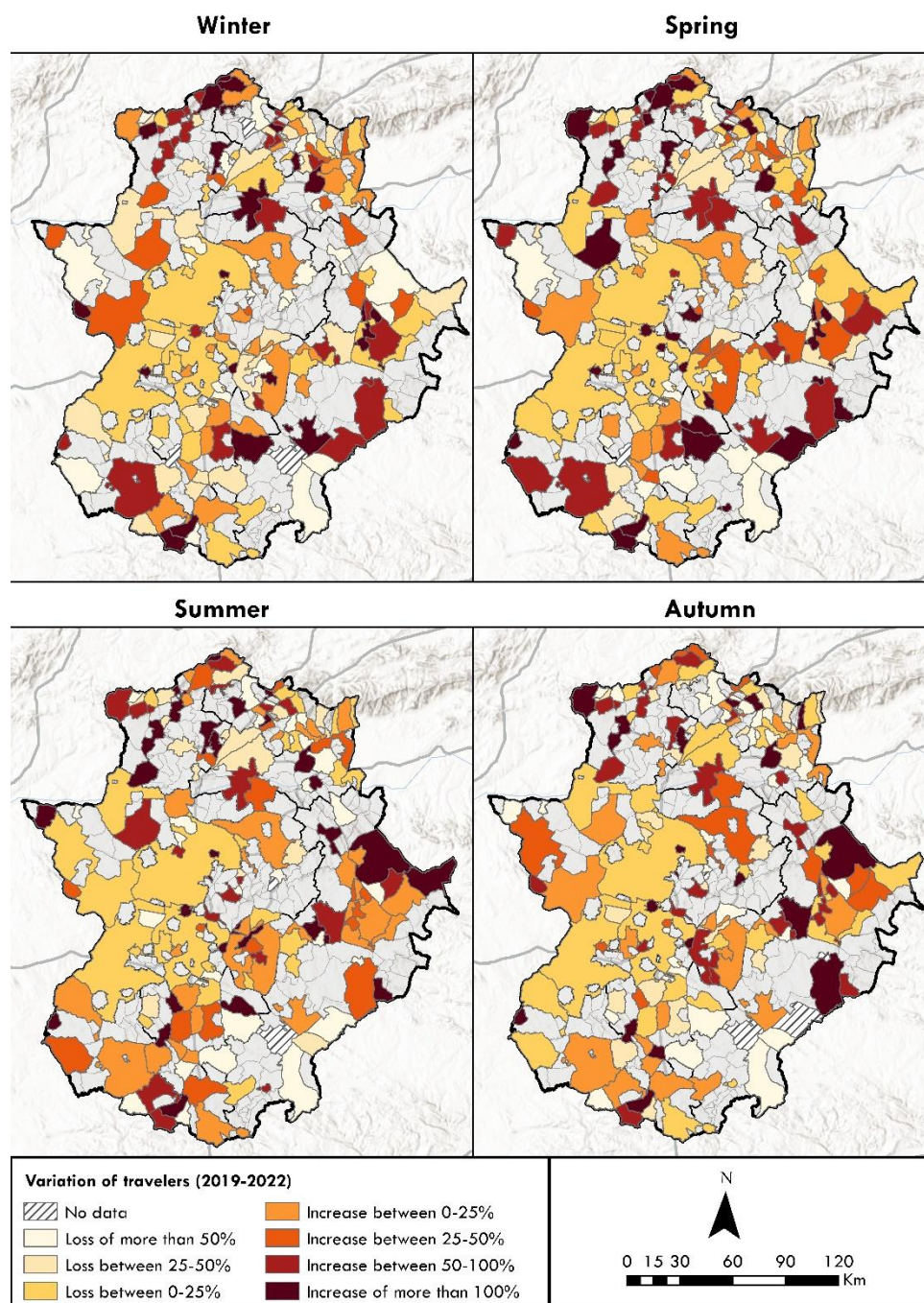


Fig 6. Seasonal variation of travellers (2019–2022) by municipality. Source: authors

By seasons, winter stands out when 78 municipalities received a lower number of travellers than in 2019, of which 35% reduce to 50% their travellers, located in areas of peneplain and irrigated land, areas not traditionally used as tourist destinations. On the other hand, during the spring months, there was a notable boom in the number of travellers arriving in Extremadura, attributed to favourable weather, natural attractions, and cultural events such as the Cherry Blossom Festival and Easter Week celebrations in cities such as Cáceres and Mérida. During the summer period, it is observed that 88 municipalities showed an increase in the number of travellers, of which more than half experienced an increase of more than 50% over previous years. Surprisingly, 66% of these municipalities experienced an increase of more than 100% in the number of travellers, mainly in the mountain, water and border areas of the region, which shows the consolidation of rural and nature tourism. Conversely, during autumn, over 50% of municipalities received fewer travellers compared to pre-pandemic levels, this decrease is especially noticeable in the mountain municipalities of northern Extremadura. Some historically touristic rural areas,

such as Aldeanueva de la Vera and Losar de la Vera, also experienced significant decreases in traveller numbers during the study period.

Regarding the four main cities of Extremadura, all experienced a reduction in the number of travellers during the last year compared to 2019. The most significant decreases were observed in Badajoz and Merida, ranging between 3% and 15%. This trend was especially noticeable in winter and less pronounced in summer. In contrast, Cáceres experienced milder losses, which ranged from 0% to 6%, with more notable declines in winter (-5.4%) and less pronounced in autumn (-0.6%). Plasencia suffered more significant losses, ranging from 9% to 36%, with the sharpest decline in winter (-35.6%). Despite these reductions in the last year, it is important to mention that these cities continue to be the main tourist destinations in the region, receiving the highest number of travellers in total terms since data collection began.

The variation of overnight stays in Extremadura municipalities during 2019 and 2022 is represented in Figure 7, categorised by seasons of the year. This variable is fundamental to understand the behaviour of tourism in the region, as it reflects the number of nights spent by travellers in the accommodations of each municipality and whether there has been an increase or a decrease with respect to the period before the health crisis. In the first year analysed, the average stay was around 1.85 nights per person, while in the last year analysed it increased to 1.93 nights per person, marking the highest value recorded to date.

In general, a positive trend was observed in the total number of overnight stays. The largest increase was recorded during spring, with a rise of 2.3%, followed by autumn with 1.5%. Summer recorded a more moderate increase of 0.2%. However, there was a notable decrease in overnight stays during the winter months, with a decrease of close to 5%. In general, the variation in the number of overnight stays in the municipalities' accommodations followed a similar pattern to that of the number of travellers. Approximately 57.3% of the municipalities experienced an increase in overnight stays, while around 43% experienced a decrease.

By seasons, during the winter, spring and summer, more municipalities have grown in their overnight stay numbers compared to those that have registered a decrease. Particularly noteworthy is the summer period, with 95 municipalities an increase in overnight stays, indicating the region's appeal and the preference of travellers to spend more nights in these destinations.

Analysing in more detail the main cities of Extremadura, the variations in overnight stays are less pronounced, remaining mostly below 10%, except in Plasencia, where the decreases are comparable to those recorded in the number of travellers. Particularly noteworthy is the behaviour of Cáceres, where an increase in overnight stays is observed during the winter and autumn seasons with respect to 2019. Specifically, there is an increase of 1.7% in winter and 7.5% in autumn. Despite the decline in the number of travellers during 2022, tourists to Cáceres are opting to extend their stay in the city. Similarly, in Badajoz, there is an almost 5% increase in overnight stays during the summer months compared to the year before the pandemic. These trends indicate that while the pandemic has significantly affected the tourism sector, some Extremadura cities have adapted and maintained their attractiveness to travellers, even encouraging longer stays. The pandemic has had a notable positive effect on tourism in Extremadura, despite the decline in the number of travellers. Overnight stays have increased significantly, resulting in higher occupancy rates and higher tourist spending, amplifying the region's economic impact. This trend follows that observed in other major tourist regions, highlighting the importance not only of the number of travellers, but also of the length of stay and spending. Extremadura is transitioning towards this model, in which quality and length of stay play a crucial role in improving tourism and its economic influence on the local economy.

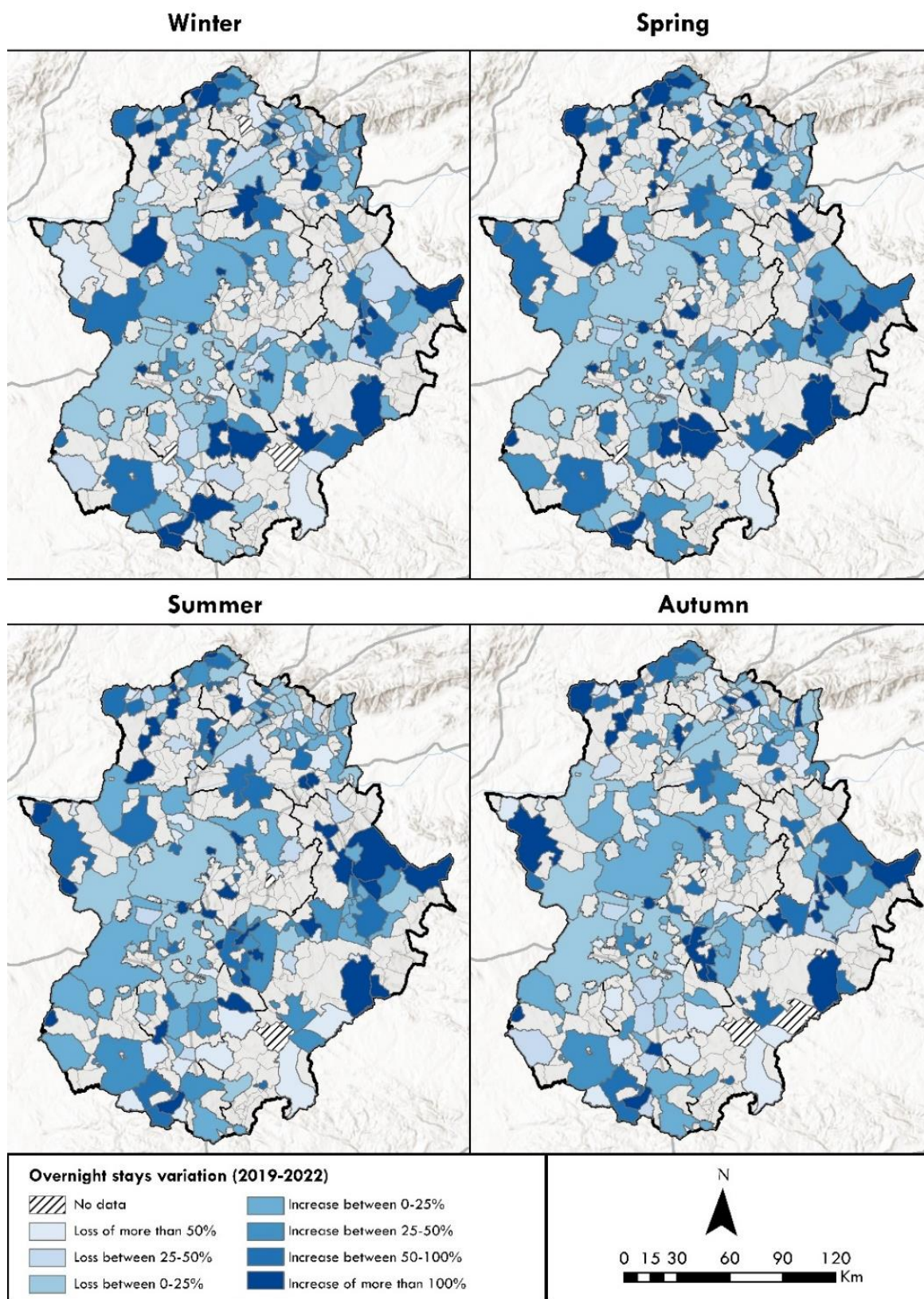


Fig 7. Seasonal variation of overnight stays (2019–2022) by municipalities. Source: authors

After examining the variation in tourism demand by municipality and its pandemic-related impact, the results of the multivariate clustering are presented below. Through the analysis, it was determined that obtaining five clusters was optimal due to the number of variables used. These clusters categorise 157 municipalities, each of which presents homogeneous characteristics in tourism, demographic,

socioeconomic and accessibility aspects. The subsequent table (Table 1) displays average values for different variables within each group.

Tab 1. Cluster analysis groups and mean variables. Source: authors

Variables	Group 1	Group 2	Group 3	Group 4	Group 5
Population growth (2019–2022)	-0.4	-1.6	-3.0	-1.9	-1.8
Average income per person (2021)	9.996	10.149	10.042	9.868	10.330
Aging index (2022)	553.1	217.4	445.8	407.0	216.7
Accessibility (minutes)	13.4	7.2	13.6	11.8	11.0
Variation of places offered (%)	13.2	0.0	24.4	248.0	6.5
Variation of hotel places offered (%)	-3.9	0.0	2.5	-	-0.8
Variation of non-hotel places offered (%)	24.2	-	-	55.0	14.6
Variation of rural places offered (%)	-	-	23.0	98.7	36.6
Variation of total travellers (%)	91.8	18.0	123.7	1.124.1	31.0
Variation of hotel travellers (%)	-30.5	18.0	24.1	-	8.0
Variation of non-hotel travellers (%)	128.6	-	-	60.2	102.8
Variation of rural travellers (%)	-	-	97.0	302.2	34.4
Variation of total overnight stays (%)	151.3	38.0	80.1	1.258.4	18.1
Variation of hotel overnight stays (%)	-27.8	38.0	62.8	-	11.1
Variation of non-hotel overnight stays (%)	118.3	-	-	70.3	190.4
Variation of rural overnight stays (%)	-	-	48.2	266.9	29.5
Variation of winter travellers (%)	-6.2	6.3	226.1	171.8	28.6
Variation of spring travellers (%)	66.4	40.4	28.4	74.3	117.2
Variation of summer travellers (%)	178.5	36.5	87.7	135.0	9.7
Variation of autumn travellers (%)	14.9	28.8	13.4	42.4	11.5
Variation of overnight stays in winter (%)	12.7	30.4	132.4	148.8	52.0
Variation of overnight stays in spring (%)	157.2	68.1	53.6	91.5	161.7
Variation of overnight stays in summer (%)	349.6	70.0	139.2	394.0	17.4
Variation of overnight stays in autumn (%)	159.3	41.8	14.9	55.4	18.3

The spatial distribution (Figure 8) of the groups is presented below:

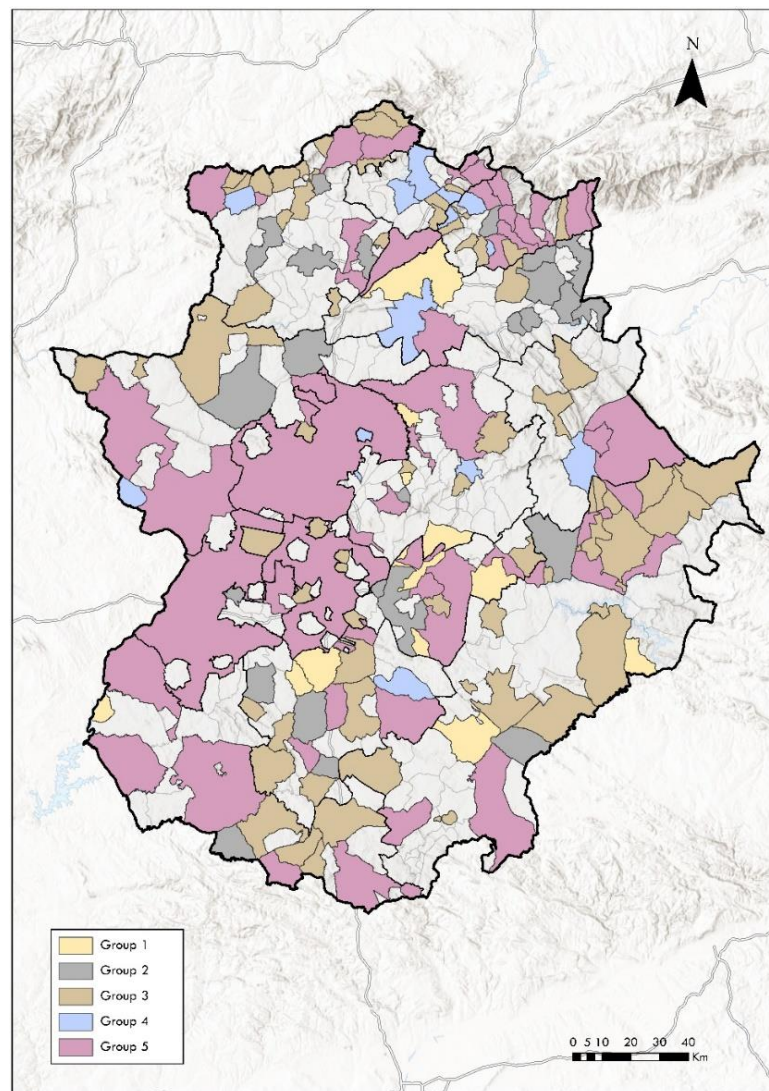


Fig 8. Groups obtained by multivariate clustering. Source: authors

As the map above shows, Group 1 is integrated by a small number of municipalities, specifically 12, of which 67% are located in the province of Badajoz. None of these municipalities offer accommodation in rural areas, despite being predominantly located in rural areas. Non-hotel accommodation has become the main option for travellers, evidenced by a significant 24.2% increase in available bed places from 2019 to 2022. This increase has led to a remarkable 129% increase in the number of travellers and, consequently, a 118% increase in overnight stays. In contrast, the preference for hotel accommodation has decreased by more than 30%, despite a slight decrease of only 4% in the number of available bed places. This decrease, especially evident during the winter months, is in contrast to the preference for the summer period, during which there is an increase of almost 180% in the number of travellers and an increase of almost 350% in overnight stays. This phenomenon is notable in municipalities with border location with Portugal and with blue flag inland beaches that have generated a positive impact in attracting travellers, exceeding by more than 500% their influx in 2019 and reaching an increase of more than 800% during the summer. As for the rest of the variables, we find a high rate of aging given that most of the municipalities are in predominantly rural areas (less than 500 inhabitants). This variable is closely linked to population variation, which has been slightly reduced.

Group 2 includes municipalities that not only have no rural accommodation offer, but also no places in non-hotel accommodation. Approximately 26% of these municipalities are in the bordering area of the region within the tourist territory of the Monfragüe Biosphere Reserve. This geographical particularity influences access to the region's main communication routes, such as the highway and the national road,

since, as a whole, access times exceed 20 minutes. The defining characteristic of this group is the absence of both rural and extra-hotel accommodation, with hotel capacity remaining practically unchanged with respect to pre-pandemic levels. Despite this, there has been an increase in the number of travellers, especially in terms of overnight stays, especially during the spring and summer months.

This is followed by Group 3, which includes the largest number of municipalities, specifically a total of 62 municipalities. These municipalities have no extra-hotel accommodation, and 34 of them also have no hotel accommodation, so data on demand variables for this category are not available. However, most of the municipalities in this group have experienced an increase in overnight stays (80%), driven by a 124% increase in the number of travellers, especially in rural category accommodation (97%). A remarkable aspect of this group is the significant increase of 226% in the number of travellers during the winter months, which differentiates it from other groups. Considering the demographic variables, these municipalities have experienced a slight decrease in population, from 80,746 inhabitants in 2019 to 78,495 in 2022, and only 10 municipalities have experienced population growth, which represents an overall reduction of 3%. Geographically, most of these municipalities are located in peripheral areas such as La Siberia, La Serena, Campiña Sur, Sierra de Gata, Las Hurdes and Valle del Alagón, where in terms of accessibility, the average distance to the nearest main road exceeds 13 minutes.

Group 4 includes only 13 municipalities and is characterised by the absence of hotel accommodation, an increase of more than 50% in extra-hotel accommodation and almost 100% availability of rural accommodation. This increase in accommodation corresponds to a significant increase in the number of travellers, exceeding 1,000% compared to 2019. The growth is also evident in overnight stays, especially pronounced in rural accommodation during the summer months, especially in municipalities with numerous bathing areas that are in great demand during this period.

Finally, Group 5 includes 47 municipalities, including important cities in Extremadura such as Badajoz, Cáceres, Mérida and Plasencia. These cities serve both as urban centres of economic activity and as tourist destinations due to their rich historical and cultural heritage. The tourism sector in these municipalities shows a diverse trend in the offer of accommodation places. In some of these municipalities with a higher population volume, such as Zafra, Plasencia and Trujillo, despite the loss of hotel places, there has been an increase in the number of travellers and overnight stays (increasing demand for other types of accommodation such as apartments or rural houses). However, what is most notable is the increase in tourism demand, with a 31% increase in the total number of travellers, especially 102.8% in non-hotel travellers compared to the year before the pandemic. This suggests a shift in the accommodation preferences of travellers, who may be increasingly opting for alternatives such as vacation rentals. During the spring months, there is an increase in the influx of travellers, specifically in municipalities in the Valle del Jerte, because during this time, this territory is characterised by becoming a sea of flowers due to the flowering of the cherry trees, thus generating a natural phenomenon that gives rise to the so-called Cherry Blossom Festival. This festivity is closely related to the development of traditional activities, cultural events and regional gastronomy that contributes significantly to tourism and the promotion of the natural and cultural heritage of the Valle del Jerte. In addition, it is worth mentioning that, although the growth of non-hotel accommodation places is 14.6%, in the city of Cáceres, there is a considerable offer in this typology during the last year analysed, with an offer of more than 1,250 places in tourist apartments. In terms of demographics, although these municipalities show an aging index of 216.7%, suggesting a relatively aged population, it is important to note that this value is less pronounced compared to other groups. This is due in part to the population dynamism generated by greater economic activity, cultural offerings and employment, especially in its four large cities.

6. Discussion

The analysis of the results obtained reveals the complex dynamics of the tourism sector in the region of Extremadura during the period analysed, especially in the context of the COVID-19 pandemic. Thus, a clear temporary interruption in tourism activity is observed during 2020, with a significant decrease in the number of travellers and overnight stays, which evidences the vulnerability of the tourism sector to unexpected events. From 2021 and especially in 2022, a gradual recovery in tourism activity can be seen,

however, the levels of activity recorded before the pandemic have not yet been reached. This gradual improvement indicates a continued recovery in the situation given that the region has managed to receive more than 1,850,000 travellers during this last year. Comparing the pre-pandemic and current tourism situation reveals a dichotomy of situations, with a 3.8% decrease in the number of travellers at the regional level. It is necessary to take into account that in the Extremadura region the decrease in the number of travellers after the crisis was less accentuated than in other Spanish regions (Ríos et al., 2023), given that the regions with more rural and inland areas receive mostly national tourism, so they lost fewer travellers, although they have not yet recovered their pre-pandemic levels. The decrease in the number of travellers has been offset by a notable increase in overnight stays, indicating that travellers visiting the region are opting for longer stays. This change in behaviour has driven higher spending, contributing positively to regional GDP and improving wealth in the region.

At the local level, 44.6% of the municipalities experienced a decrease in the number of travellers, and some experienced significant losses. However, it is important to note that the methodology developed by NIS is based on data obtained through occupancy surveys, which may not be completed by all establishments in each municipality. Because of this, the NIS estimates the rest of the accommodations, through its methodology, to be able to know each tourism variable. These limitations include problems of representativeness, not capturing all the particularities of specific tourism segments. This may result in a bias towards general trends and in the underestimation or overestimation of certain local data. In addition, the periodicity of updates of these data may generate time lags between the collection of the information and its availability, which may affect the accuracy of the analyses in dynamic contexts. Estimates made for unreported accommodation may also introduce a margin of error, affecting the completeness and accuracy of the overall data.

In previous studies (Ríos et al., 2023), data from occupancy surveys were analysed but at the regional level, using the same methodology as in this study (Multivariate Clustering), the results obtained are similar, since these regions were grouped according to their type of lodging and the number of travellers received mainly.

Other authors (Agudo et al., 2022; Garzón et al., 2023; Rodríguez-Darias & Rodríguez, 2023) have used different methodologies whose results have been similar to those obtained in this study, given that they have established that in the areas of Spain where rural tourism is developed, its dynamism and resistance to the pandemic was greater, since these areas do not depend to a large extent on international travellers. Also, numerous studies have also been carried out in various disciplines such as economics, sociology and tourism. These areas are dedicated to addressing, investigating and evaluating problems that present multiple variables, using multi-criteria analysis methods, such as Multivariate Clustering. This study used this methodology to examine tourism demand at the municipal level, highlighting the scarcity of studies that focus on this level of detail, which represents an innovative approach in the field of tourism research.

The main characteristics of Extremadura's tourism sector in recent years include the seasonality of the offer, with the greatest increases during the summer months, underscoring the need for management strategies to take advantage of these periods of high demand and mitigate the effects of seasonality. In addition, the increase in overnight stays across all groups indicates a general growth in tourism activity, indicating continued and growing interest in the region. However, the decline of hotel accommodation and the shift towards new types of accommodation pose challenges and opportunities to adapt to changing traveller preferences and diversify the offer of accommodation.

The study identifies significant seasonal variations in tourist arrivals and overnight stays, with the largest increase occurring during the summer, followed by the spring, and the most significant decrease during the winter. For example, there is a 10.8% decline in the number of travellers during the winter compared to pre-pandemic levels. These patterns suggest a considerable influence of climate on tourism demand, with warmer periods attracting more travellers to the region.

The spatial distribution of municipalities in the different cluster groups provides insight into the tourism and socio-economic trends of the region. These groups present diverse tourism characteristics and behaviour, ranging from those experiencing a significant increase in tourism demand to others showing

a lack of diversification in accommodation offer and consequently very limited demand, as these destinations have focused on a specific type of traveller. For example, Cluster 4, consisting of 13 municipalities, demonstrates a notable increase of more than 1,000% in the number of travellers compared to 2019, especially evident in rural accommodation during the summer months. The notable increase in demand for rural and extra-hotel accommodation in several clusters underlines the preference for authentic tourism experiences connected to nature, especially during the summer. However, some groups face challenges related to accessibility and lack of diversification of accommodation, which limits their ability to attract travellers.

7. Conclusions and future prospects

This research has provided insight into the dynamics of the tourism sector in Extremadura, especially in the challenging context of the COVID-19 pandemic. From the interaction between tourism variables to the adaptation of destinations to the changing preferences of travellers, a series of challenges and opportunities have developed that have shaped tourism activity in the region during the period analysed. Improving infrastructure and diversifying the accommodation offer could be key to unlocking the tourism potential of these areas and promoting a more diversified development of tourism in the region. As reflected in the data, local events with national and even international impact demonstrate the positive impact that tourism events can have on tourism growth, as these initiatives not only attract more tourists, but also promote regional culture and contribute to local economic development.

Finally, these results suggest that, despite the challenges presented by the health crisis, tourism in Extremadura has shown resilience and has managed to maintain growth in terms of overnight stays, especially during the warmer seasons of the year. Likewise, it has been observed that during festive periods such as weekends and holiday periods, such as Easter, there have been rises in the number of mainly national travellers, and even travellers from the region itself, given that international travellers generally have the flexibility to travel throughout the year. In addition, the spatial distribution of municipalities in cluster groups reveals the diversity of tourism characteristics and behaviours in the region. It is essential to implement tourism promotion strategies adapted to the post-pandemic reality, exploring opportunities to improve accessibility and tourism infrastructure in less developed municipalities and boosting the sustainable growth of the tourism sector in Extremadura.

It is worth noting that future research will incorporate qualitative methodology, such as conducting interviews with local tourism workers and visitors, with the aim of enriching the study by providing a more detailed and in-depth understanding of the impacts observed. This approach will capture individual experiences and perceptions, which will provide a more nuanced perspective on the social and economic effects of the crisis on the tourism sector, complementing the findings obtained through quantitative analysis.

Acknowledgment

This publication has been made possible thanks to funding from the Ministry of Universities of the Government of Spain with the aid for university teacher training (FPU), reference FPU20/03830.

Academic references

- [1] Agudo, L., Moreno, D. & García, R. (2022). Análisis de los cambios en el comportamiento de los consumidores turísticos en la Región de Murcia (España) tras la aparición de la COVID-19. *Revista de Ocio y Turismo*, 16(1). DOI: 10.17979/rotur.2022.16.1.8746.
- [2] Andreu, L., Palomo, J. & Stojanivoc, I. (2020). Recuperar la confianza de losturistas: medidas a implementar. In Bauza Martorell, F. J., Melgosa Arcos, F. J., Rondón García, L. M., Troitiño Torralba, L. & Mulet Forteza, eds., *El Turismo Después de La Pandemia Global. Análisis, Perspectivas y Vías*

de Recuperación (pp. 95–112). Universidad de Salamanca.

- [3] Arold, P. (2021). Apuntes para la gestión del turismo en España tras la crisis sanitaria de la Covid-19. *Pasos*, 19(1), 189–194. DOI: 10.25145/j.pasos.2021.19.012.
- [4] Bauza, F. J. & Melgosa, F. J. (2020). *El turismo despues de la pandemia global analisis, perspectiva y vias recuperación*. Salamanca: Ediciones Universidad de Salamanca.
- [5] Benítez-Aurioles, B. (2021). Turismo interior en España ante la crisis de la COVID-19. *Boletín Económico de ICE*, 3139. DOI: 10.32796/bice.2021.3139.7285.
- [6] Blázquez-Salom, M., Blanco-Romero, A., Vera-Rebollo, F. & Ivars-Baidal, J. (2019). Territorial tourism planning in Spain: from boosterism to tourism degrowth? *Journal of Sustainable Tourism*, 27(12), 1764–1785. DOI: 10.1080/09669582.2019.1675073.
- [7] Caliński, T. & Harabasz, J. (1974). A Dendrite Method For Cluster Analysis. *Communications in Statistics*, 3(1), 1–27. DOI: 10.1080/03610927408827101.
- [8] Cañada, E. & Murray, I., eds. (2021). *#TourismPostCOVID19. Turistificación confinada*. Barcelona: Alba Sud.
- [9] Cànoves, G., Blanco-Romero, A. & Díaz, I. (2020). Turismo de interior en España, del overtourism al undertourism. In M. Pons, G. X., Blanco-Romero, A., Navalón-García, C., Troitiño-Torralba, L. & Blázquez-Salom, eds., *Sostenibilidad Turística: overtourism vs undertourism*. Monografies de la Societat d'Història Natural de les Balears 31, 471.
- [10] Capdepón, M. (2023). El turismo de naturaleza en España: de las políticas de recuperación post-pandemia a la propuesta de alternativas. *Boletín de La Asociación de Geógrafos Españoles*, 99. DOI: 10.21138/bage.3444.
- [11] Cardozo, O. D., Gómez, E. L. & Parras, M. A. (2009). Teoría de Grafos y Sistemas de Información Geográfica aplicados al Transporte Público de Pasajeros en Resistencia (Argentina). *Revista Transporte y Territorio*, (1), 89–111. DOI: 10.34096/rtt.i1.223.
- [12] Curtale, R., de Silva, F. B., Proietti, P. & Barranco, R. (2023). Impact of COVID-19 on tourism demand in European regions – An analysis of the factors affecting loss in number of guest nights. *Annals of Tourism Research Empirical Insights*, 4(2), 100112. DOI: 10.1016/j.annale.2023.100112.
- [13] Deb, S. K. & Nafi, S. M. (2021). Impact of COVID-19 pandemic on tourism: Recovery proposal for future tourism. *Geojournal of Tourism and Geosites*, 33(4). DOI: 10.30892/gtg.334spl06-597.
- [14] Díez-Pisonero, R. & Gago-García, C. (2022). Transporte aéreo y pandemia de la COVID-19: ¿Hacia un cambio de trayectoria en la red aeroportuaria española? *Revista de Estudios Andaluces*, 43, 159–187. DOI: 10.12795/rea.2022.i43.09.
- [15] Duro, J. A., Perez-Laborda, A., Turrion-Prats, J. & Fernández-Fernández, M. (2021). Covid-19 and tourism vulnerability. *Tourism Management Perspectives*, 38, 100819. DOI: 10.1016/j.tmp.2021.100819.
- [16] Fletcher, R., Murray Mas, I., Blanco-Romero, A. & Blázquez-Salom, M. (2019). Tourism and degrowth: an emerging agenda for research and praxis. *Journal of Sustainable Tourism*, 27(12), 1745–1763. DOI: 10.1080/09669582.2019.1679822.
- [17] Gago-García, C., González-Relaño, R., Cambronero, M. S. & Babinger, F. (2021). Impact of the Covid-19 crisis on labor in the tourism sector in Spain: Territorial and gender perspectives. *Boletín de La Asociación de Geógrafos Españoles*, 91. DOI: 10.21138/bage.3162.
- [18] Garzón, R., Ramírez, M. L., Vega, R. & Florido, G. (2023). Turismo en Andalucía (España): una puesta al día desde el análisis geográfico. *Revista de Estudios Andaluces*, 46, 184–211. DOI: 10.12795/rea.2023.i46.09.
- [19] Gómez, D. & Martín, C. (2019). Los impactos del turismo en España: diferencias entre destinos de sol y playa y destinos de interior. *Cuadernos de Turismo*, 43, 325–347. DOI: 10.6018/turismo.43.13.

- [20] Gössling, S., Scott, D. & Hall, C. M. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of Sustainable Tourism*, 29(1), 1–20. DOI: 10.1080/09669582.2020.1758708.
- [21] Jain, A. K. (2010). Data clustering: 50 years beyond K-means. *Pattern Recognition Letters*, 31(8). DOI: 10.1016/j.patrec.2009.09.011.
- [22] Kuenen, L., Fletcher, R., Jakobs, T., Duineveld, M. & Koens, K. (2023). From overtourism to undertourism... and back? The struggle to manage tourism regrowth in post-pandemic Amsterdam. *Boletín de La Asociación de Geógrafos Españoles*, 99. DOI: 10.21138/bage.3482.
- [23] Méndez, R. (2022). Turismo, pandemia y nuevos contrastes territoriales en España. *Ikara. Revista de Geografías Iberoamericanas*, (1). DOI: 10.18239/ikara.3006.
- [24] Moreno, D. (2022). Turismo de naturaleza en España. Nuevas realidades, nuevos modelos de turismo sostenible. *Observatorio Medioambiental*, 25, 199–246. DOI: 10.5209/obmd.85276.
- [25] Pillet, F. (2012). El turismo de Interior en la España Peninsular: El Patrimonio Territorial como Destino Turístico. *Boletín de La Asociación de Geógrafos Españoles*, 59. DOI: 10.21138/bage.1461.
- [26] Pou, J. J. (2023). Efectos, evolución y tendencias del turismo en las Islas Baleares post-COVID-19. Trabajo Fin de Grado. Universitat de les Illes Balears. <http://hdl.handle.net/11201/163151>.
- [27] Ribes, P., Canós, L. & Santandreu, C. (2020). *Análisis del impacto de la COVID-19 en el turismo español*. Valencia: Universitat Politècnica de València.
- [28] Ríos, N., Cárdenas, G., Nieto, A. & Leco, F. (2022a). The Territory of Valle del Jerte-La Vera and Its Tourist Development (Extremadura, SW Spain). *Land*, 11(12). DOI: 10.3390/land11122171.
- [29] Ríos, N., Nieto, A. & Cárdenas, G. (2022b). Los efectos de la COVID-19 en el sector turístico de las Comunidades Autónomas españolas. *Boletín de La Asociación de Geógrafos Españoles*, 94. DOI: 10.21138/bage.3279.
- [30] Ríos, N., Nieto, A. & Cárdenas, G. (2023). Impact of the COVID-19 Pandemic on Tourism: A Clustering Approach for the Spanish Tourism Analysis. *Land*, 12(8). DOI: 10.3390/land12081494.
- [31] Rodríguez-Antón, J. M. & Alonso-Almeida, M. D. M. (2020). COVID-19 impacts and recovery strategies: The case of the hospitality industry in Spain. *Sustainability*, 12(20), 8599. DOI: 10.3390/su12208599.
- [32] Rodríguez-Darias, A. J. & Rodríguez, P. D. (2023). Percepciones de los residentes del turismo post-COVID. El caso de Tenerife (Islas Canarias, España). *PASOS*, 21(4), 699–711. DOI: 10.25145/j.pasos.2023.21.048.
- [33] Solsona, J. (2006). El Turismo Rural en Europa. *Aportes y Transferencias*, 10(2), 25–35.
- [34] Soria, I. D., Rayssac, S. & Blanco-Romero, A. (2023). Learning from crises: challenges and opportunities for rural inland territories in the south-west of France after COVID-19. *Boletín de La Asociación de Geógrafos Españoles*, 99. DOI: 10.21138/bage.3466.
- [35] Vega Falcón, V., Castro Sánchez, F. & Romero Fernández, A. J. (2020). Impact of covid-19 on world tourism | Impacto de la covid-19 en el turismo mundial. *Universidad y Sociedad*, 12(s1), 207–216.

Other sources

- [36] *Indicadores demográficos básicos 2000–2023*. Instituto Nacional de Estadística. <https://www.ine.es/>. Accessed: 17 January 2024.
- [37] *Cuenta Satélite del Turismo en España*. Instituto Nacional de Estadística. www.ine.es/prensa/cst_2020.pdf. Accessed: 17 January 2024.