

# The Presence of Rural Accommodation in Extremadura on Facebook: An Approach to Its Intensity of Use Through a Grouping Analysis



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**Abstract** Facebook has acquired a notable presence in many business activities as a social medium and networking service. Tourism has not been oblivious to this trend and consequently numerous accommodation establishments have joined this network. However, when analysing a particular type of accommodation, i.e. rural accommodation, certain deficiencies can be observed at least in the context analysed. For this reason, this article aims to ascertain the activity of rural accommodation in Extremadura based on the hypothesis that the potential of this network to promote the visibility of its establishments is not always exploited. At the same time we investigate the possible existence of a territorial pattern in certain characteristics of the social network that could lead to an improvement in the visibility of the accommodation establishments. To corroborate this assumption, a Grouping Analysis is applied both with and without spatial restriction in order to determine the presence of spatial clusters. The results clearly show that a higher performance is achieved when this technique is applied based on spatial relationships than without them. At the same time, it can be observed that most of the rural accommodation establishments do not stand out in the use of the social network analysed and very few of them play a prominent role, both positively and negatively, with respect to the average situation of the accommodation establishments. In the first case, they should act as models when their behaviour can be replicated by other establishments, and in the second case they should serve as a basis for the implementation of corrective measures to involve the establishments in the management and control of this widely distributed social network. Among the conclusions drawn from this study is the need to actively incorporate Facebook as a basic tool for the positioning of accommodation.

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## 1 Introduction

The traditional role of tourism destination management, consisting of disseminating information sources for tourists, has been changing in recent years owing to the emergence of online communication tools such as Facebook (Hays et al., 2013; Li et al., 2017). These platforms have therefore become essential tools for positioning brands of tourism (Li et al., 2017), for attracting potential tourists (Schroeder & Pennington-Gray, 2015) and for adapting the offer to tourists' needs and being more competitive (Mariani et al., 2016), among other matters.

Facebook is currently the social network with the largest number of users in the world. According to the WeAreSocial and Hootsuite reports (2021), Facebook had 2.74 billion users in January 2021, which exceeded the figures for YouTube by more than 400 million users and for WhatsApp by more than 700 million.

Social media have now become perhaps the main source of information about destinations for tourists (Zeng & Gerritsen, 2014) and their role is likely to continue to grow in the future (Phillips et al., 2010). However, social networks are not merely a source of information but also a powerful tool for tourism business management. They help tourists make the decision to visit the destination (Phillips et al., 2010; Marchiori & Onder, 2015; Önder & Marchiori, 2017; Marder et al., 2019), promote tourism establishments much more effectively than websites or paid media advertisements (Lee et al., 2012; Moise & Cruceru, 2014), develop a destination brand image (Kim et al., 2016; Marine-Roig & Clavé, 2015), and help clarify misperceptions of the destination (Joyner et al., 2018; Kotsi et al., 2018).

Despite the abundance of studies analysing the importance of social networks in the management and marketing of hotels and tourist destinations, there is a clear lack of applied research on social networks (social media) referring to rural tourism and agritourism (Bowman et al., 2020; Cho et al., 2014; Zeng & Gerritsen, 2014). For this reason, this paper aims to fill this gap by determining the degree of use of Facebook profiles by rural accommodation establishments in one of the Spanish regions with the greatest development of this segment.

The aim of this chapter is to demonstrate that in the case of rural accommodation establishments in the region of Extremadura, Spain, the potential of Facebook to promote their visibility has not yet been sufficiently exploited. Likewise this research aims to determine whether those establishments that are more aware of the importance of being present and active on this social network are grouped in certain areas of Extremadura, i.e. whether there are spatial patterns justifying the existence of groups of establishments according to their greater or lesser presence and activity on Facebook.

To this end, the second section of this paper gives a brief overview of the uses of the social network Facebook as a marketing and promotion tool for any type of economic activity, paying special attention to the interaction established between the company and its customers (real or potential) through the messages published by both parties. Subsequently the third section establishes the relationship between social networks and tourism, highlighting the positive and negative impacts of the

use of social networks by any tourist company in general and rural and agritourism accommodation establishments in particular. The case study to be analysed, the data to be processed and the methodology used in this work are presented below. The most relevant results of the application of this spatial statistical technique are mentioned and discussed in the fifth section of the paper, which ends with a presentation of the main conclusions and their implications for the management of the presence of rural accommodation establishments in the region on social networks and more specifically on Facebook.

## 2 Facebook as a Tool for Marketing and Promotion

Social media is currently a unique marketing communication channel (Eagleman, 2013) which enables the mass dissemination of information about products, goods and services (Dahnil et al., 2014) and the building of brand loyalty among customers (Castronovo & Huang, 2012). Moreover, from the point of view of consumers social networks allow the latter to have more control over what they are willing to buy or reject (Tynan et al., 2010).

One of the greatest potentialities of social networks is the possibility of interaction with profile followers. The content of the publications (posts) on social networks determines the greater or lesser degree of interaction of the followers (Kim, 2018; Kim & Yang, 2017; Saxton & Waters, 2014). In addition, the length of the posts (in number of words) and the number of images, videos and links included in the posts also determine the interaction of profile followers (Pino et al., 2018; Sabate et al., 2014). Other factors which also condition the interaction between the profile and the followers are the use of hashtags (Sevin, 2013; Usakli et al., 2017) and the tagging of friends (Oeldorf-Hirsch & Sundar, 2015).

As established by Muntinga et al. (2011), forms of social media behaviour can be divided into three categories: consuming, contributing and creating. Consuming is the lowest level of participation in social networks, as it does not involve contributing or creating content. The intermediate level is contributing, which involves interaction between users and content or between users and users. Finally, the highest level is creating, which involves producing and publishing content.

In the specific case of the Facebook social network, the lowest level (consuming) represents liking, the intermediate level (contributing) represents commenting and the highest level (creating) represents sharing (Kim & Yang, 2017). This gradation of forms of behaviour on Facebook is organised around the basic unit of communication on this social network, which is the publication of messages (posts). However, not all Facebook posts generate the same amount of attention among Facebook users (Brafton, 2014). Therefore, certain aspects of the publication must be taken into account so that it generates as much interest and attention as possible. According to Kim and Yang (2017), the aspects to consider are the strategy of the message, the form of the message, the posting type and the interactivity of the message.

Every message on Facebook must correspond to a certain strategy, which takes into account aspects such as the type of product, the target audience, etc., since the response of users of this social network will be highly conditioned by the strategy chosen. Several studies have demonstrated the relationship between message strategy and user response (Ashley & Tuten, 2015; Chauhan & Pillai, 2013; Saxton & Waters, 2014; Swani et al., 2013).

On the other hand, the form of the message (text, photo, audio, video, etc.) is an element which may increase its usefulness (Kent et al., 2003), with the most common being the combination of different message forms to reach a greater number of users (Men & Tsai, 2012; Waters et al., 2009). Images (photos and videos) thus generate more emotions than text (Brantner et al., 2011). Furthermore, Kim and Yang (2017) show that photos contribute towards an increase in the number of likes but a decrease in the number of comments. These authors also show that visual elements (photos and videos) are positive predictors of the number of shares.

Type posting can be classified into two main groups: created posting and shared posting (Kim & Yang, 2017). According to these authors, in the same way that a shared post can save time and money for the organisation owning the Facebook profile, its usefulness may be less than that of a created post. In fact these authors show that a created post generates a higher number of likes, comments and shares than a shared post.

Finally, given that Facebook attributes to each profile the same level of structural interactivity (Lovejoy & Saxton, 2012), the perceived interactivity of the posts of an organisation will depend on the extent to which it wishes to use that interactive structure (Saffer et al., 2013) and the degree to which it initiates two-way communications (Lee & Park, 2013). Kim and Yang (2017) show that posts soliciting responses encourage users to comment on the post, although they do not increase the number of likes or shares.

### 3 Social Media and Tourism

The current impacts of social media on tourism are beyond doubt and this is so to such an extent that they are changing tourism information search habits (Roth-Cohen & Lahav, 2019) and modifying existing promotion and communication structures (Zeng & Gerritsen, 2014). Although these impacts are usually positive, some negative impacts have also been identified in the literature, although these are smaller than the positive impacts.

The positive impacts of social media include their usefulness to tourists in evaluating tourist destinations in real time, providing data to managers for decision-making (McCreary et al., 2019) and generating expectations (Narangajavana et al., 2017). In the specific case of the social network Facebook, it is being used to recommend a tourism brand or destination (Ben-Shaul & Reichel, 2018), to post complaints about tourism products or services (Pantano & Di Pietro, 2013), to provide real-time information which is not available in the media (Ketter,

2016), to enhance destination reputation (De Moya & Jain, 2013), to promote hotel brands or make bookings (Mariani et al., 2016), to model tourism demand (Önder et al., 2020) and so on.

However, despite the above some studies have revealed the existence of some negative impacts of social networks on tourism, although they are scarce. Zhang et al. (2016) therefore show that tourists' excessive exposure to social media can affect their decision-making process due to information overload. De Lencastre and Corte-Real (2013) show that the social exchange of information resources between residents and tourists on social networks can generate a reputation in the management of the destination's brand image.

The publication of photographs on the profile of tourism companies on social networks has become an essential element of their online marketing strategies. This is so much so that several studies (Choi et al., 2007; Dwivedi, 2009; Govers & Go, 2005; Stepchenkova & Morrison, 2008) have shown that online images of tourist destinations are a powerful tool for their management and marketing. The emotional response which certain photographs inspire in tourists can help or hinder their willingness to visit certain areas or book certain accommodation establishments. For example, in a study of agritourism businesses Joyner et al. (2018) show that tourists prefer photographs showing the farmer and animals together, or photographs showing farmers interacting with tourists, or photographs showing children with animals. Conversely, photographs showing fences or animals with ear tags generate negative emotions among tourists.

Social networks have also become a selection tool for tourists in view of the large number and variety of destinations from which they can choose (Roth-Cohen & Lahav, 2019), which is due among other reasons to the confidence they have in the comments made by other tourists (Casalo et al., 2010).

To turn to the specific case of rural tourism, despite the fact that well-planned commercial communication is a fundamental issue for companies operating in this segment (Simková, 2007), the truth is that the vast majority of establishments lack the means of carrying out major marketing campaigns (Lane, 2009). However, these small establishments always have the possibility of promoting themselves through social networks and also of providing customers with information about the establishment and the environment in which it is located, and of commenting on their experience during the trip (Joo et al., 2020). Moreover, the importance that customer satisfaction and behaviour is acquiring on social networks is causing tourism establishments in general and rural accommodation establishments in particular to give increasing prominence to new issues such as big data, online comments, eWom and digital marketing (Nusair, 2020; Nusair et al., 2019).

In addition, social media also represent an opportunity for rural residents to participate in the rural tourism development process (Lundgren & Johansson, 2017; Ryu et al., 2020; Senyao & Ha, 2020) and to define the image of the rural destination through their online behaviour on these social networks (Uchinaka et al., 2019).

However, despite the current importance of Facebook as an online marketing tool, this social network is little used by rural accommodation establishments. A

study by Pesonen (2011) analyses the Facebook tools used by rural accommodation establishments in Finland. The author concludes that most of the establishments analysed do not update their Facebook page on a weekly basis, with an average number of posts per week of only 0.62. In contrast to the more intense Facebook activity of other larger tourism businesses, Pesonen (2011) found that small rural tourism businesses do not devote much effort to their Facebook presence, which leads him to question whether they should even have Facebook pages if they do not plan to update their content on a regular basis.

## 4 Materials and Method

### 4.1 The Case Study

The study area chosen to carry out the research is the autonomous region of Extremadura. This region is located on the periphery of peninsular Spain and also shares a border with Portugal. It is an eminently rural territory as can be seen from the articles of Law 45/2007 of 13th December on the sustainable development of the rural milieu. This Law includes in its Article 3 different definitions of the concept of rural areas. In this sense, section a of the same law classes as rural the geographical area formed by the sum of municipalities or smaller local entities with a population of less than 30,000 inhabitants and a population density of less than 100 inhabitants per km<sup>2</sup>. Paragraph c specifies that a small rural municipality is one with a resident population of less than 5000 inhabitants and which is an integral part of the rural environment (Law 45/2007 of 13th December on the sustainable development of the rural milieu). Based on the articles of this Law, most of the 388 municipalities in Extremadura are rural, as only Badajoz, Plasencia and Almendralejo meet both requirements.

A large part of the surface area of Extremadura is dotted with numerous tourist attractions that are of interest to the demand for rural tourism in its broadest conception (Sánchez-Martín et al., 2020a) (Fig. 1). Natural landscapes of great richness and with an exceptional state of conservation stand out, which allows them to be included among protected natural areas (Sánchez-Martín et al., 2018).

There are also numerous bathing areas in the form of natural pools and a smaller number of river beaches located in the vicinity of the areas of upland relief (Sánchez-Martín et al., 2020a) or on large reservoirs, which are ideal for practising water sports. On the other hand, historical-artistic sites or assets of cultural interest constitute an important historical legacy (Sánchez-Martín et al., 2020c) and are accompanied by attractive gastronomy based on high quality products produced in the region itself, at times under the protection of a Protected Designation of Origin or Geographical Indication (Ortega-Rosell et al., 2012).

The great wealth of heritage present in Extremadura, whether natural or cultural, has been transformed into a resource and integrated into tourism products in certain areas, but not in all. It can be observed that there are areas in which the tourism

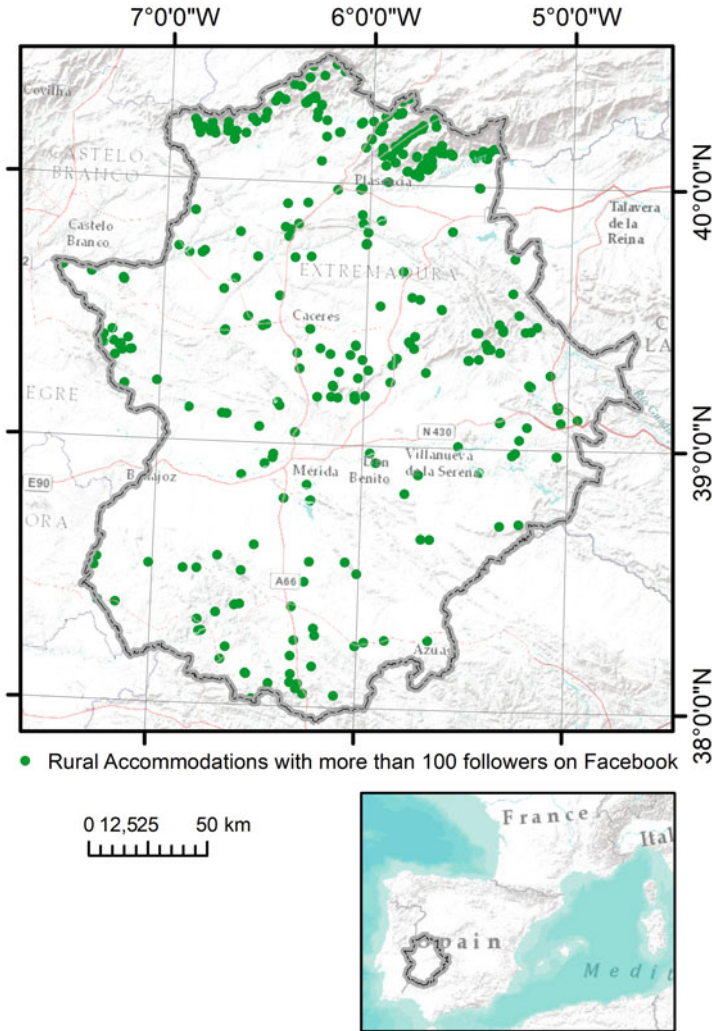


Fig. 1 Location. Source: Own material

potential of their main attractions is not exploited, as is the case, for example, with large reservoirs of water or emblematic cultural landscapes, such as the *dehesas*. This is despite the fact that they should serve as a basis for promoting an increase in rural tourism in the area analysed and contributing to the socio-economic development of the territory.

The reasons which may explain this differentiated behaviour are varied, one of the most common being the absence of the main attractions sought by the demand (Sánchez-Martín et al., 2020b). However, when analysing the supply of rural



accommodation establishments in the territory, numerous studies agree on their good online reputation (Martín-Delgado et al., 2020; Sánchez-Martín et al., 2019a).

Despite the significant number of attractions and the good reputation of the rural accommodation offered on different social networks, Extremadura has a demographic dynamic which shows a secular trend in decline, especially in rural areas which make up most of the territory. In addition, we find processes of the masculinisation of the population, ageing and a lack of generational replacement. This peculiar demographic situation is both a cause and a consequence of its clear economic backwardness, as it is one of the regions making the lowest contribution to the country's GDP, which was estimated according to 2019 data at 20,677 million euros (Datos Macro, <https://datosmacro.expansion.com>). In addition, communication routes which up until a few decades ago were in very poor condition conditioned limited accessibility to the main economic centres of the Iberian Peninsula, which contributed to its isolation. This is still the case even today for rail or air transport (Sánchez-Martín et al., 2019b).

However, these limitations have led to a population of only 1,063,987 inhabitants in 2020 according to official figures obtained from municipal registers on 1st January (<https://www.ine.es/jaxiT3/Datos.htm?t=2853>); the environment is well preserved and its amalgam of landscapes can be considered a tourist attraction of great interest to those making up the demand, who are eager for knowledge and new experiences. From this we can infer the great potential for the development of activities such as rural tourism, especially if they are accompanied by effective tourism policies based on knowledge of the tourism system, which is not always the case.

As a consequence of the socio-economic backwardness, numerous initiatives have been launched to diversify production, thus giving substance to Article 20 of Law 45/2007 which is committed to the economic diversification of the rural world, with tourism specifically in its rural form occupying a privileged position, as can be seen from paragraph e of the aforementioned article. Since the 1990s therefore, projects involving the implementation of actions to support rural tourism have been initiated, although this trend has accelerated since the beginning of this century. It was during this period when there was a strong commitment to the development of this type of tourism, a trend which was prevalent even during the economic crisis and has continued until now. This circumstance has led to mismatches between the accommodation capacity in rural areas and the demand for accommodation in these establishments (Sánchez-Martín & Rengifo-Gallego, 2019). On the other hand, the commitment to rural tourism has concentrated on the creation of a significant rural accommodation pool as mentioned in the Rural Tourist Accommodation Occupancy Survey (*Encuesta de Ocupación en Alojamientos de Turismo Rural*, EOTR). This increase in the supply of accommodation was not initially accompanied by the implementation of other types of actions linked to the complementary offer in the form of activities, which would have meant a notable improvement in the enjoyment of the tourist experience. Fortunately, today there is a proliferation of tourist activity companies which enhance the tourist experience.



## 4.2 Data

The information supporting the research has been obtained from different sources. These include the Spanish National Institute of Statistics (*Instituto Nacional de Estadística*, INE) which provides all information collected at a regional level on parameters such as travellers, overnight stays, beds available and the number of estimated establishments, in addition to others such as the average stay or the level of occupancy. However, this information has been complemented with much more detailed data from the Register of Tourism Enterprises, which is accountable to the Regional Ministry of Culture, Tourism and Sports of the Regional Government of Extremadura, updated to 31 December 2019; these make up the database on the supply of tourist accommodation. These data, broken down by establishment, were georeferenced using the Google Maps application and corroborated with Street View to ensure that the locations were reliable. In addition, this database has been complemented in the form of consultations made to each of the establishments, indicating where appropriate whether they had a Facebook social network.

An initial approach to this database has shown that of the total number of rural tourism accommodation establishments in Extremadura (846), only 509 had the social network analysed. This figure represents 60.2% of the establishments, which is a significant proportion giving statistical solidity to the analyses carried out, as can be seen on the data sheet of the survey. It was however decided to use only establishments with at least 100 followers so as to make the values extracted from this sample even more reliable (Table 1).

In all the rural tourism establishments which had Facebook, the information available was complemented by 21 items which sought to find out the characteristics of the accommodation. These included the number of visitors, their reaction, the insertion of graphic material such as photos or videos, and also other information such as the interaction between owners and customers as shown in Table 2.

In addition, the alphanumeric information was supplemented with cartographic data from the National Geographic Institute (*Instituto Geográfico Nacional*, IGN) of 2001 under a Creative Commons CC-BY 4.0 International licence, which protects its free and unrestricted use for legitimate purposes with the sole obligation of acknowledging and mentioning its origin and ownership. Among the different alternatives, it

**Table 1** Data sheet

<b>Universe:</b>	846 rural accommodation establishments on 31st December 2019
<b>Sampling Size:</b>	447 (those with more than 100 followers on Facebook)
<b>Degree of confidence:</b>	95%
<b>Sampling error for the most unfavourable (pq=50%) and most favourable (pq=90%) scenario</b>	3.19; 1.91
<b>Date of completion</b>	15th March to 15th June 2020

Source: Own material

**Table 2** Information collected on each rural establishment using Facebook

Parameters
1. Does the hotel establishment have a Facebook profile?
2. Date of creation of the Facebook profile:
3. Number of people who have indicated that they like the page:
4. Number of people who follow the page:
5. Number of visits the page has received:
6. Type of content. Number of cover photos:
7. Type of content. Number of photos in the biography:
8. Type of content. Number of videos:
9. Type of content. Photos uploaded by mobile phone:
10. Use of hashtags:
11. Time (in days) since the most recent publication (in the “publications” tab) [Indicate the time fraction if <24 h has elapsed]
12. Time (in days) since the second most recent publication (in the “publications” tab) [Indicate the time fraction if <24 h has elapsed]
13. Time (in days) since the third most recent publication (in the “publications” tab) [Indicate the time fraction if <24 h has elapsed]
14. Time (in days) since the fourth most recent publication (in the “publications” tab) [Indicate the time fraction if <24 h has elapsed]
15. Time (in days) since the fifth most recent publication (in the “publications” tab) [Indicate the time fraction if <24 h has elapsed]
16. Interaction with followers: What is the score given by the followers to the accommodation establishment?
17. Interaction with followers: How many views have been used to calculate the above score?
18. Use of surveys:
19.1. Conducting sweepstakes: [Discounts]
19.2. Conducting prize draws: [Promotions]
19.3. Conducting prize draws: [Giveaways]
20.1. Interacting with followers/users (do you respond to comments in the “community” section?): [Respond to positive comments]
20.2. Interaction with followers/users (do you respond to comments in the “community” section?): [Reacts to positive comments (likes)]
20.3. Interaction with followers/users (do you respond to comments in the “community” section?): [Responds to negative comments]
20.4. Interaction with followers/users (do you respond to comments in the “community” section?): [Reacts to negative comments (I don’t like it, it makes me angry)]
21. Inclusion of the “Book Now” button for direct booking from the profile:

Source: Own material

was decided to use the National Topographical Base at a scale of 1:100,000 (BTN100), which provided sufficient spatial resolution for the purposes of this research (20 m). The information provided by this mapping is varied, although it has been complemented by the Spatial Data Infrastructure of Extremadura (*Infraestructura de Datos Espaciales de Extremadura*, IDEEX) of 2021, which is also under the same CC-BY 4.0 International licence (Table 3).

**Table 3** GIS design project

Data type	Source	Cartographic information	Alphanumerical information
Cartographic	IGN	Administrative units	Area
	IDEEX	Population centres Natural protected areas Bathing areas	Population Area Location
Alphanumeric	Extremadura Turismo	Georeferencing information on Google Maps	Type of accommodation Address Municipality Beds available
	Authors by means of Facebook enquiries		Information collected in Table 3

Source: Own material

All alphanumeric information has been implemented in a Geographic Information System based on the aforementioned cartography, using the ArcGIS 10.5 software.

### 4.3 Methodology

The methodology of analysis proposed in this research consists of six stages (Fig. 2).

During the first stage the specialised literature on the subject was reviewed. At the same time the alphanumeric information which served as the basis for the research and the cartographic information was compiled. In the second stage the two databases were purified. They were then implemented in a GIS after the corresponding designing of the relevant project. From this point only those rural establishments with Facebook were selected and specifically those with more than 100 followers. The third stage focused on the application of spatial statistics, taking advantage of the specific module integrated in the GIS software which was used. In this case, and given the wide variety of geostatistical techniques, Mapping Clusters and more specifically a Grouping Analysis were selected. This has been used to carry out numerous tests, the main results of which are presented in the research. During the fourth stage the results were studied in order to decide on the most suitable model and to focus on an exhaustive analysis of the most representative group.

In the fifth stage the results and the technique used were discussed, while in the sixth stage the main conclusions were drawn.

### 4.4 Analysis Techniques

The spatial statistics present on the ArcGIS software (10.5 version) have been used. Among all the Mapping Clusters tools included we specifically chose to use a

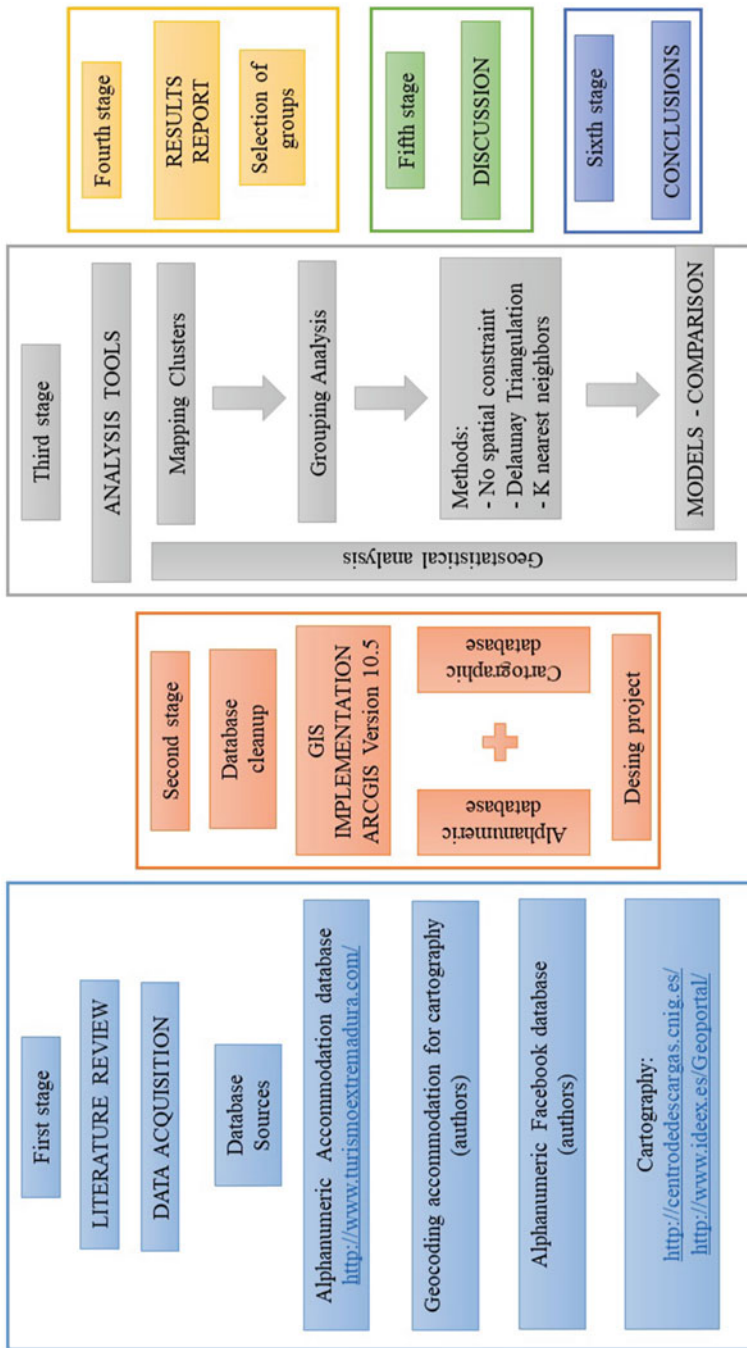


Fig. 2 Methodological scheme. Source: Own material

Grouping Analysis, the functionality of which aims to create groupings of a set of data represented cartographically considering numerical variables. For this purpose, the tool itself allows the use of several options, not only referring to the use of different variables but also to the selection of a spatial criterion which determines precisely the configuration of the neighbourhood criterion. In this way it is possible to differentiate between the use of a spatial criterion, based on the neighbourhood, or its omission. In this sense, and in order to make the results presented more rigorous, different tests have been carried out to combine both variables and types of spatial restriction, including two different models. The first did not use the territorial component, i.e., it established the groups by taking only the numerical attributes as a reference. On the other hand, the second was chosen to include the neighbourhood criterion according to two different models, Delaunay triangulation and K nearest neighbours. This double application aims to determine which type of technique obtains the best results for establishing clusters of properties according to their common criteria and at the same time those which are different from the rest.

The number of accommodation establishments used to carry out the analysis was 447, precisely those that had a Facebook social network and more than 100 followers. They were taken as specific entities, given that they were georeferenced in order to be able to carry out a more rigorous analysis. After extensive testing, it was decided to select the variables which were suitable for differentiating the groups. These variables concern three key aspects: the success of the page of the establishment, the content published and the interaction with followers. Logically other variables were discarded because their contribution to the creation of differentiated groups was low, as was deduced from the R2 coefficient calculated. Furthermore, according to the literature the inclusion of a greater number of variables does not imply greater rigour, and prior selection of these variables is advisable if suitable results are to be obtained (Mitchell, 2005; Venkatraman et al., 2015). Grouping analysis explores similar values, and if a spatial criterion is also used it can consider spatial proximity to configure different groupings. Each of the groups obtained presents the greatest similarity between its members and at the same time maximises its differences with the remainder of the groups (Cardona et al., 2007).

The technique has been applied following three basic references, taking into account that the geometry used is of the point type and not a polygon, which would allow other options, although this possibility was ruled out given that they did not share any segments. In view of the above, three ways of obtaining the groups are used. The first dispenses with the spatial relationship to use exclusively the numerical values of the parameters included; the second uses a Delaunay triangulation as a spatial restriction criterion. It is therefore obvious that the configuration of the groups is constructed taking into account three lodgings; the third uses its eight nearest neighbours as a spatial criterion. Its operation, which is described in numerous bibliographies (ESRI, 1999), is based on the calculation of a coefficient of determination for each of the variables analysed and the value they maintain after the construction of the group. However, both parameters vary according to the type of spatial restriction used. The result obtained also depends on the number of clusters

to be achieved, although the best way of calculating the number of ideal clusters is to use the F-Statistic index (Calinski & Harabasz, 1974).

The optimal number of clusters is determined by using the following equation:

$$R^2 = \frac{(TSS - ESS)}{TSS}$$

TSS corresponds to the total sum of squares obtained by squaring and then summing the deviations from the overall mean value of a variable. In contrast, ESS is the sum of squares explained and is calculated in a similar way, although in this case the deviations are grouped by each cluster. In other words, each value is subtracted from the average of the group to which it belongs and squared and summed, thus showing its degree of similarity. It can be deduced from this that the technique aims to obtain the greatest possible similarities between the components of the group and at the same time the most marked differences with regard to the rest of the groups.

On the other hand, the parameters which make up the above function are obtained from the following equation:

$$TSS = \sum_{i=1}^{n_c} \sum_{j=1}^{n_i} \sum_{v=1}^{n_v} \left( V_{ik}^k - \bar{V}^k \right)^2,$$

$$ESS = \sum_{i=1}^{n_c} \sum_{j=1}^{n_i} \sum_{v=1}^{n_v} \left( V_{ij}^k - \bar{V}_i^k \right)^2, \text{ in which } n \text{ is the number of characteristics; } n_i$$

the number of characteristics in group  $i$ ;  $n_c$  the number of classes or groups;  $n_v$  the number of variables used,  $V_{ij}^k$  the value which the variable takes on  $k$ th in the  $j$ th characteristic in the  $i$ th group,  $\bar{V}^k$  the average of the  $k$ th variable; and  $\bar{V}_i^k$  the mean value of the  $k$ th variable in the  $i$  group.

## 5 Results

The clustering analysis has been performed by taking into account the parameters affecting both the type of spatial constraint and the starting method (Table 4), since both the number of accommodation establishments used and the starting method remain unchanged. This makes it possible to assess whether using a configuration considering spatial relationships has substantial advantages over one which disregards them and focuses exclusively on numerical values. It also makes it possible to decide whether the clusters obtained are strengthened by including a higher volume of lodgings in the spatial configuration, as three and eight have been used, depending on the spatial constraint method used, either Delaunay triangulation or K nearest neighbours, respectively.

**Table 4** Parameters used in cluster analysis

Parameter name	Variable
Features	• Rural establishments with more than 100 followers on Facebook.
Fields of analysis	• People who follow the page (P4).
	• Visits to the page (Q5)
	• Cover photos (P6).
	• Photos in biography (P7).
	• Photos uploaded by mobile phone (P9).
	• Accommodation rating given by followers (P16).
Spatial constraints	• No spatial constraint. • Delaunay triangulation. • K nearest neighbours ( $K = 3$ & $K = 8$ ).
Distance method	• Euclidean.
Initialisation method	• Find seed locations.

Source: Own material

**Table 5** Group-wise summary

Variable	Mean	Std. Dev	Min.	Max.	No spatial constraint	Delaunay triangulation	K nearest neighbours (K=8)
P4	879.13	1346.09	101	14,271	0.865	0.123	0.609
P5	101.81	366.67	0	4629	0.898	0.477	0.865
P6	7.05	18.04	0	228	0.898	0.342	0.632
P7	102.97	216.46	0	2128	0.839	0.044	0.717
P9	84.95	209.78	0	1968	0.831	0.058	0.285
P16	3.83	1.98	0	5	0.939	0.087	0.072
Number of groups					15		

Source: Own material

When calculations are made according to these three methods (Table 5), certain conclusions can be drawn concerning the number of groups obtained by each of these methods.

The summary of the main parameters on which the technique is based offers sufficient variability as can be seen from the descriptive statistical analysis. In this sense it should be remembered that the values of each of the fields are standardised so that the variables reaching higher figures do not condition the formation of the groups. It is also significant that any of the methods recommend the creation of 15 groups using F-Statistic.

However, the first differences arise when R2 is analysed as the coefficient of determination is in general considerably higher when no spatial restriction is used. This is logical since we are only looking for numerical relationships and not for their conditioning on any other criterion. On the other hand, when using a Delaunay triangulation or a number of neighbours, 8 in particular, certain variables experience a notable reduction in the coefficient referred to; this decrease is more pronounced when the number of dwellings used as a spatial criterion is reduced.



In addition, the model that does not take into account the restriction considers that the score given to the accommodation establishment by visitors to the Facebook pages is the most effective parameter for classifying the groups. Despite this, the remainder of the variables also attain very significant values, which means that they are highly effective when it comes to establishing the groups. On the other hand, when the spatial restriction is applied following the Delaunay triangulation, apart from lowering the coefficient of determination in all the variables, the parameter which best discriminates the groups is the number of visits to the pages. Furthermore, if we take the number of neighbours as the neighbourhood criterion, the coefficients of determination are higher than in the previous case, although the same variable remains as the one best discriminating the groups. This circumstance makes it possible to observe an interesting differentiation: if only a numerical criterion is used, the most important factor for establishing differences between groups is the score on the Facebook page of the establishment. Meanwhile, if a spatial parameter is included, whatever it may be, the number of visits is the most important element.

Despite the differences between the three alternatives compared, it is worth noting that in any of the cases poorly defined clusters are obtained, which affects a variable number of accommodation establishments. At the same time, if we resort to spatial autocorrelation analysis to detect whether the groups are formed according to different spatial criteria, we can observe that when no spatial constraint is required the sets appear grouped as revealed by the spatial autocorrelation, which does not occur when any of the selected types of constraint are used.

This comparison between different methods of approaching cluster analysis establishes that there are two valid options, one disregarding the spatial relationship and the other taking into account a neighbourhood criterion based on the consideration of eight nearest neighbours. Meanwhile, the option of using Delaunay triangulation as a way of defining the neighbourhood criterion is discarded, as is the option of considering three nearest neighbours, as the results obtained are very similar.

Nevertheless, if we resort to obtaining the spatial autocorrelation of the results obtained in the form of clusters, Moran's Index reflects that it is clustered when there is no spatial constraint and random when this relationship is configured by means of the neighbourhood criterion as is also demonstrated by the log p-value. However, there are notable differences between the clusters obtained by Delaunay triangulation and the remainder of the spatial restrictions. In this sense, the highest z-score (standard deviation) is obtained using only numerical criteria, while it occupies an intermediate position when 8 nearest neighbours are considered. Similarly, the p-value (the probability of randomness) also considers these two forms as the most prominent when establishing groupings; there is some advantage in omitting the spatial restriction by considering that there is a prior grouping of the results, which may perhaps be explained by the distribution of the accommodation establishments.

Given this alternative, it is proposed to develop two options to illustrate the goodness of one versus the other, discarding the constraint imposed by Delaunay triangulation or with a number of neighbours of less than 8.

### ***5.1 Cluster Analysis Without Spatial Restriction***

As has been pointed out, the fact that no spatial restriction is used implies that the way of establishing the groups is exclusively numerical. The variables listed in the methodological section (P4, P5, P6, P7, P9 and P16) are used to establish the groups and the Pseudo F-Statistic analysis is used to verify the ideal number of groups. This statistic shows that the division into 15 groups is the most effective (Table 6).

However, the summary of the contribution of the groups (Table 7) shows that of the 15 groups obtained only 7 manage to bring together a significant number of establishments. These are groups 1, 3, 8, 9, 10, 13 and 14, although there are large differences between them, with group 9 being the most numerous with 229 establishments followed by group 10 with 88 and group 13 with 55. These three groups together account for 83.22% of the sample, although all the groups with more than five cases have been considered for a more detailed analysis in order to detect some kind of hidden territorial pattern.

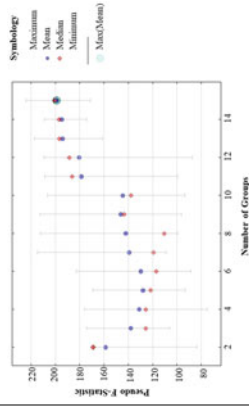
Schematically these groups are identified by a significant contribution in some of the variables considered.

- Group 1 (Table 8) is made up of 16 establishments, the main defining characteristics of which are that they outperform the average for the whole sample in all the variables considered. Particularly noteworthy is the excellent rating of 4.82 out of 5 given by the followers of the page. It is therefore a fairly dynamic group as far as Facebook actions are concerned and in addition is recognised by users.
- Group 3 (Table 9) is made up of 23 establishments sharing the dynamism and recognition which characterised the previous group, although there is a substantial difference in the number of photos uploaded by mobile phone (P6). In this parameter its values attain only 50% of the average of all rural accommodation establishments, this is the aspect which most needs improving.
- Group 8 (Table 10) is made up of only 10 accommodation establishments, the main distinguishing feature of which is that in all parameters it is above the average of all the accommodation establishments, except for the cover photos (P6). Among the positive aspects, it also stands out for having a very good rating (4.77) by the followers of the page, which is particularly relevant if one takes into account that it has a large number of them (P4).

**Table 6** Pseudo F-statistic summary

Number of groups	Pseudo F-statistic (max)		Number of groups	Pseudo F-statistic (max)	
2	169.91		9	212.65	
3	174.26		10	206.53	
4	176.16		11	208.62	
5	169.25		12	209.45	
6	182.75		13	217.17	
7	214.58		14	209.25	
8	212.25		15	224.39	

Source: Own material



**Table 7** Group-wise summary

Share Groups	Variable						Count	Std. distance	SSD
	P4	P5	P6	P7	P9	P16			
1	0.21	0.19	0.25	0.10	0.17	0.12	16	856.56	30.04
2	0.31	0.09	0.31	0.38	0.25	0.98	3	1874.57	29.77
3	0.13	0.15	0.14	0.24	0.21	0.10	23	606.65	24.98
4	0.43	0.28	0.01	0.14	0.01	0.04	2	3134.21	17.68
5	0	0	0	0	0	0	1	0	0
6	0	0	0	0	0	0	1	0	0
7	0	0	0	0	0	0	1	0	0
8	0.20	0.21	0.04	0.20	0.31	0.10	10	1082.40	21.57
9	0.09	0.06	0.09	0.11	0.08	0.46	229	240.54	40.30
10	0.24	0.04	0.08	0.20	0.26	0.00	88	531.48	50.59
11	0	0	0	0	0	0	1	0	0
12	0.06	0.01	0.18	0.03	0.06	0.98	2	422.05	5.94
13	0.08	0.27	0.11	0.18	0.17	0.2	55	632.53	54.25
14	0.36	0.19	0.12	0.32	0.18	1.00	13	1356.67	49.01
15	0.03	0.03	0.03	0.03	0.03	0.03	2	197.53	0.09

Source: Own material

**Table 8** Group 1

Variable	Mean	Std. Dev	Min	Max	Share
P4	1190.13	809.05	292	3303	0.21
P5	193.94	228.06	16	886	0.19
P6	37.25	13.09	23	80	0.25
P7	150.88	112.97	11	374	0.10
P9	108.94	119.13	0	335	0.17
P16	4.82	0.18	4	5	0.12

Source: Own material

**Table 9** Group 3

Variable	Mean	Std. Dev	Min	Max	Share
P4	995.52	561.45	239	2053	0.13
P5	134.22	168.04	0	705	0.15
P6	7.70	7.25	0	32	0.14
P7	430.09	130.62	241	743	0.24
P9	42.30	86.26	0	418	0.21
P16	4.87	0.17	5	5	0.10

Source: Own material

- Group 9 (Table 11) is the largest group, comprising 229 establishments. The main characteristic defining it is that in most of the established criteria it is below the average for all accommodation establishments. Nevertheless, it achieves the best rating by the followers of the page with an average score of 4.85.
- Group 10 (Table 12) is made up of 88 establishments in which there is no rating of the page (P16) and the remainder of the variables analysed are well below the

**Table 10** Group 8

Variable	Mean	Std. Dev	Min	Max	Share
P4	1609.00	1025.05	178	3020	0.20
P5	221.80	279.57	0	949	0.21
P6	4.10	3.62	1	11	0.04
P7	149.40	122.30	1	417	0.20
P9	675.10	166.53	430	1034	0.31
P16	4.77	0.16	5	5	0.10

Source: Own material

**Table 11** Group 9

Variable	Mean	Std. Dev	Min	Max	Share
P4	408.33	227.88	101	1339	0.09
P5	35.04	49.61	0	292	0.06
P6	2.92	3.00	0	21	0.09
P7	36.72	47.24	0	235	0.11
P9	26.27	35.06	0	157	0.08
P16	4.85	0.32	3	5	0.46

Source: Own material

**Table 12** Group 10

Variable	Mean	Std. Dev	Min	Max	Share	Variable
P4	487.56	513.89	101	3538	0.24	P4
P5	9.73	26.43	0	172	0.04	P5
P6	3.03	3.23	0	18	0.08	P6
P7	48.08	84.63	0	426	0.20	P7
P9	48.20	102.55	0	507	0.26	P9

Source: Own material

general average. This is one of the groups which should be most strongly supported, given that its values are well below average. In addition, it presents notable differences between the minimum and maximum values, which results in significant variability as is reflected in the standard deviation.

- Group 13 (Table 13) is made up of 55 rural accommodation establishments in which the followers give a very high score (4.8), with the remainder of the variables being well above the averages obtained by all the establishments, except for the number of followers of the page (P4) which is much lower.
- Group 14 (Table 14) is made up of 13 establishments, the rating of which is close to the average for all the establishments although it is low (3.75), which contrasts with the large number of followers. Moreover, it has very different values, which corroborates the high standard deviation in all the variables analysed.

The geographical distribution of the groups described shows that there are overlaps between some groups and others, which means that no general conclusion can

**Table 13** Group 13

Variable	Mean	Std. Dev	Min	Max	Share
P4	6.33	5.33	1	20	0.08
P5	166.69	210.13	3	1244	0.27
P6	73.91	62.00	0	238	0.11
P7	137.07	112.50	0	359	0.18
P9	1238.38	582.59	183	2643	0.17
P16	4.7982	0.2324	4	5	0.2

Source: Own material

**Table 14** Group 14

Variable	Mean	Std. Dev	Min	Max	Share
P4	4698.77	1312.91	3031	8148	0.36
P5	237.15	272.91	0	857	0.19
P6	11.38	9.23	0	28	0.12
P7	317.69	168.19	13	685	0.32
P9	102.92	118.18	0	357	0.18
P16	3.75	2.06	0	5	1.00

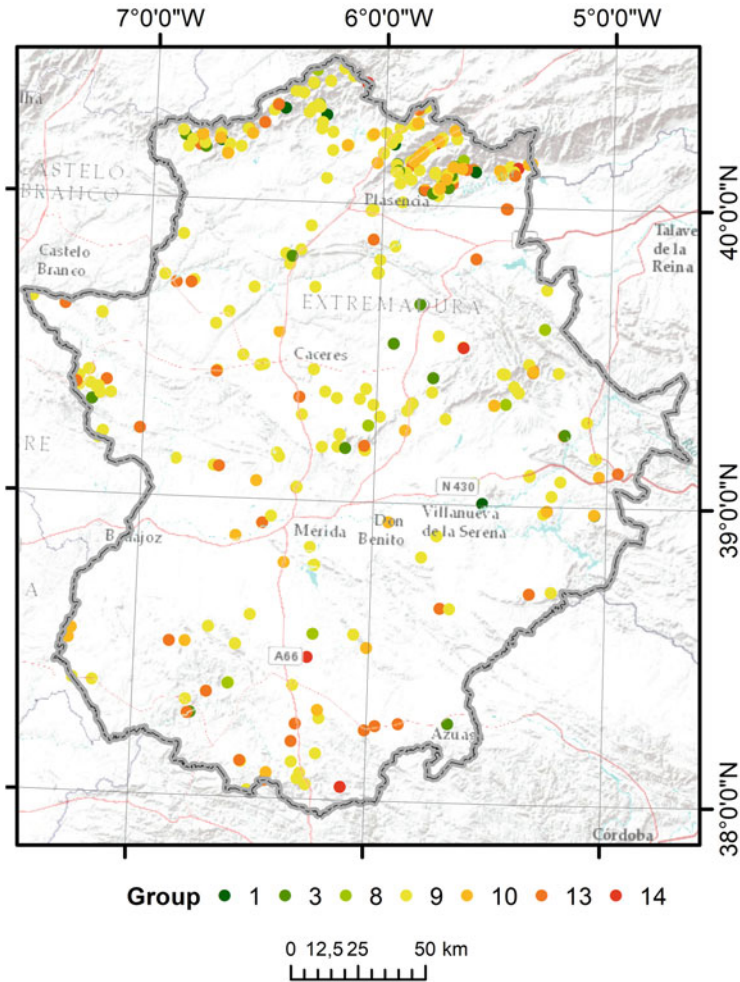
Source: Own material

be drawn as to the possible intervention of a territorial pattern which acts in an exclusive manner. A somewhat contradictory situation can be detected at a territorial level, since as can be seen in the north of the province of Cáceres there are very different groups interspersed throughout the territory. This fact can be observed in groups 9, 10 and 13, which bring together the largest volume of accommodation establishments and which are basically made up of rural lodgings with good ratings on Facebook profiles (groups 9 and 13). Their situations are however very different, as the remainder of the parameters of the first group are below average for accommodation and those of the second are above average. Group 10 deserves a separate mention as it has no ratings (Fig. 3).

## 5.2 *Spatially Constrained Cluster Analysis Using K Nearest Neighbours (K = 8)*

The use of a restriction criterion based on the consideration of the eight nearest neighbours following the Euclidean distance implies that the territory acquires significant importance in the configuration of the groups. As indicated in the methodology, the variables used are naturally the same (P4, P5, P6, P7, P9 and P16). On the other hand, by using the Pseudo F-Statistic analysis it can be verified that the most effective number of groups is 15 (Table 15).

However, the summary of the contribution of the groups (Table 16) shows that of the 15 groups constructed only two which manage to gather a significant group of cases can be distinguished. These are groups 12 and 15 which comprise 109 and



**Fig. 3** No spatial constraint distribution. Source: Own material

318 members, respectively. However, it was decided to also include group 10 despite its containing five establishments owing to its type of grouping; the remaining groups were discarded owing to their low representativeness as in most cases they consisted of only one establishment.

A more detailed analysis of each of the selected groups shows quite interesting patterns, which is further supported by their territorial proximity.

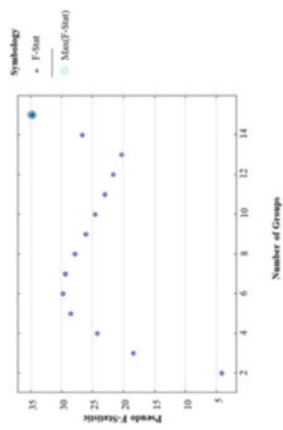
- Group 10 (Table 17) is composed of only five establishments. These are characterised by being well below the average of the total number of rural accommodation establishments with more than 100 followers on Facebook.



**Table 15** Pseudo F-Statistic Summary

Number of groups	Pseudo F-Statistic		Pseudo F-Statistic
	2	Number of groups	
2	4.092		9
3	18.323		10
4	24.173		11
5	28.473		12
6	29.750		13
7	29.339		14
8	27.785		15

Source: Own material



**Table 16** Group-Wise Summary

Share Groups	Variable						Count	Std. distance	SSD
	P4	P5	P6	P7	P9	P16			
1	0	0	0	0	0	0	1	0	0
2	0.184	0.069	0.057	0.164	0.102	0.080	3	1111.67	4.758
3	0	0	0	0	0	0	1	0	0
4	0	0	0	0	0	0	1	0	0
5	0	0	0	0	0	0	1	0	0
6	0	0	0	0	0	0	1	0	0
7	0	0	0	0	0	0	1	0	0
8	0	0	0	0	0	0	1	0	0
9	0	0	0	0	0	0	1	0	0
10	0.034	0.001	0.013	0.056	0.022	0.000	5	184.759	0.352
11	0	0	0	0	0	0	1	0	0
12	0.296	0.120	0.180	0.334	0.379	1.000	109	694.216	185.889
13	0	0	0	0	0	0	1	0	0
14	0.027	0.024	0.000	0.005	0.001	0.020	2	197.628	0.088
15	0.474	0.269	0.693	0.349	1.000	1.000	318	952.628	1069.382

Source: Own material

**Table 17** Group 10

Variable	Mean	Std. Dev	Min	Max	Share
P4	318.80	178.51	133	619	0.03
P5	1.20	2.40	0	6	0.00
P6	2.20	1.17	1	4	0.01
P7	32.60	44.80	1	121	0.06
P9	11.60	15.98	0	43	0.02
P16	0.00	0.00	0	0	0.00

Source: Own material

Moreover, the contribution made by most of the variables to the formation of the group is very small.

- Group 12 (Table 18) is made up of 109 establishments which share lower values than the general average in most of the variables, although they stand out for having an above-average rating. To be precise, the followers of their Facebook profiles give them an average rating of 4.34. However, all the variables show very disparate values with significantly high standard deviations. In this regard, it should also be noted that the variables which contribute most to the formation of the group are the rating (P16) and to a lesser extent the number of photos (P9 and P7) and the number of followers of the page (P4).
- On the other hand, group 15 (Table 19) is made up of 318 rural accommodation establishments in which once again the averages are evidently lower than those of the establishments as a whole. In addition, it is also noteworthy that the rating of

**Table 18** Group 12

Variable	Mean	Std. Dev	Min	Max	Share
P4	670.50	668.59	101	4296	0.30
P5	40.34	69.70	0	557	0.12
P6	5.34	7.99	0	41	0.18
P7	73.74	106.95	0	710	0.33
P9	75.91	136.25	0	745	0.38
P16	4.34	1.48	0	5	1.00

Source: Own material

**Table 19** Group 15

Variable	Mean	Std. dev	Min	Max	Share
P4	755.28	911.80	101	6816	0.47
P5	76.85	154.09	0	1244	0.27
P6	5.72	12.08	0	158	0.69
P7	77.63	120.20	0	743	0.35
P9	74.73	194.37	0	1968	1.00
P16	3.67	2.09	0	5	1.00

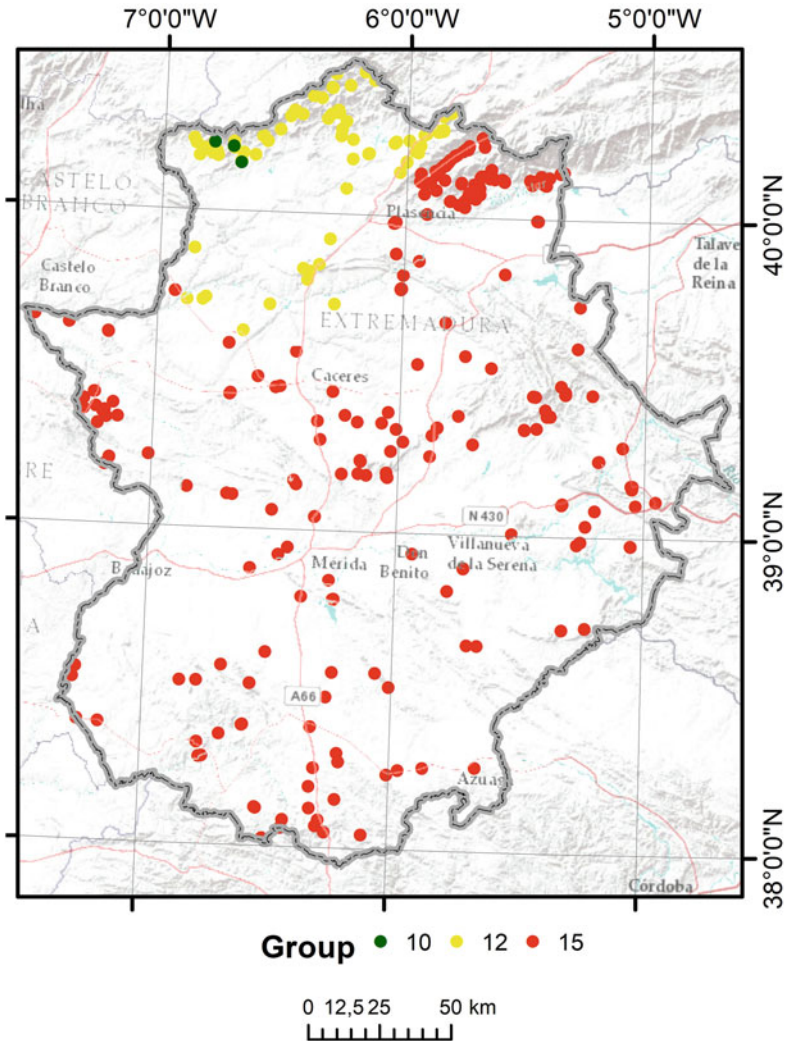
Source: Own material

these establishments is below that of the remainder of the groups at 3.67. It is worth noting in this respect that the rating of the establishments is lower than that of the remainder of the groups. In fact the contribution to the configuration of this group of the score given by the followers and the photos uploaded by mobile phone (P16 and P9) is striking in this group, although they are also very relevant in the remainder of the variables in their contribution to the group.

The geographical distribution of the groups described reflects well-defined territorial patterns. At first sight, it is striking that as general criteria there is a predominance of differentiated patterns in the different groups. In this sense, the north-western area of Extremadura stands out; within it, a small cluster with distinct characteristics can be observed. It is also evident that despite having above-average ratings of Facebook profiles these need to improve as to the remainder of the variables analysed. On the other hand, cluster 15 requires further action as it has lower than average ratings for the average number of establishments (Fig. 4).

## 6 Discussion

The aim of this study is to determine the degree of presence and the use that rural tourism is making of these new tools, focusing attention on what is undoubtedly the social network par excellence, Facebook, in a destination which is firmly committed to strengthening rural tourism as the main means of tourism development, i.e. the region of Extremadura.



**Fig. 4** K nearest neighbours (8) distribution. Source: Own material

The expansion of the use of social media has reshaped the way in which tourism activity is managed, which is why the presence and use of these tools is essential in the current context of the tourism sector. The low cost associated with the use of these social tools represents an opportunity for those accommodation establishments which do not have the means of carrying out advertising campaigns, as is the case of rural tourism and agritourism (Lane, 1994). However, the scarcity of studies on the subject, especially in comparison with the hotel sector, raises doubts as to whether this sector is really taking advantage of the development potential offered by social media.

On numerous occasions and in the most varied disciplines, statistical analysis is used to attempt to describe or explain a complex reality (Frías Guzmán, 2017). Tourism is no stranger to this trend in which the statistical analysis of data has been used for decades (Coenders & Ferrer-Rosell, 2020; Majewska & Truskolaski, 2019), although the literature specialising in geostatistical analysis has also developed considerably (Adamiak et al., 2019; Lisiak-Zielińska & Ziernicka-Wojtaszek, 2021; Rodríguez-Rangel et al., 2020; Rodríguez Rangel & Sánchez Rivero, 2020; van der Zee et al., 2020). Given these two ways of analysing tourism data and the difficulties deriving from the use of spatial criteria, this article has focused on solving the problem in both ways by using a grouping analysis. The numerical and spatial criteria have been used to carry out the analysis in such a way that the results allow the comparison of the two conceptualisations of the tool.

Perhaps the most striking aspect of the results is that regardless of the type of spatial relationship selected (none or the neighbourhood) the number of groups obtained is similar. This leads us to the conclusion that it is a very complex reality by placing its ideal number at 15, according to the Pseudo F-Statistic criterion. However, the groups obtained by means of both conceptualisations of the spatial criterion have nothing to do with each other, neither from a numerical nor from a territorial point of view. In view of this circumstance, the advantages or disadvantages deriving from each of them must be analysed.

When no spatial restriction of any kind is used it becomes clear that the groups show greater internal similarities and at the same time greater divergences with the remainder, which is certainly the aim of the technique. In this sense it can be argued that from a strictly numerical point of view they are more effective. However, when the results are reflected on the territory, no pattern can be observed which would make it possible to consider them as a homogeneous group. On the contrary, the predominant situation is one of plausible heterogeneity with the interspersed accommodation establishments belonging to various groups.

On the other hand, the results obtained with a spatial restriction, taking into account the eight nearest neighbours following a Euclidean distance, show at least two antagonistic groups which are very well differentiated at a territorial level. In this sense it is shown to be a much more efficient way of conceptualising the groups, as it is easy to obtain groups with similar characteristics. This favours the implementation of tourism policies promoting training and the updating of the Facebook profiles of rural accommodation establishments.

Despite everything, the tool used also has certain limitations when it comes to specifying the groups. Perhaps the most outstanding among them is the use of few variables to make the clustering analysis work more efficiently. However, the use of Euclidean distance instead of real distance or more accurately travel time to specify the number of neighbours can also be mentioned. This leads to the continuation of this line of geostatistical analysis, albeit combined with the use of even more efficient tools to establish models or clusters, such as Geographically Weighted Regression (GWR) and Multi-scale Geographically Weighted Regression (MGWR).

With regard to the results obtained in this study, the only precedent to the authors' knowledge in the literature which allows us to compare the results obtained with

previous data in order to be able to compare the evolution of the phenomenon under study is the work carried out by Rodríguez and Sánchez (2015). In this study they analyse the degree of presence of tourist accommodation establishments in Extremadura in 2013, with the results obtained showing that 67.6% of rural accommodation establishments had a Facebook profile in that year. This study reflects a certain decline or stagnation in the use of this network given that of the total of 846 accommodation establishments in the region only 60.2% are currently present on it. Moreover, this percentage is reduced to 52.84% when we consider those accommodation establishments which reach the significant number of 100 followers. It can therefore be concluded that the age of these tools, and consequently their increasingly widespread use among users, is not accompanied by an increase in the interest and implementation of rural tourism accommodation establishments in the region.

Finally, the fact that the largest group of accommodation establishments (group 15) is made up of more than half of the establishments analysed and that it is characterised by lower than average values of the remaining groups in all the variables of presence and activity on Facebook is a clear indication that at both public and private level this social network is undervalued in the region as a promotional and marketing tool. In this sense, the results obtained are in line with those obtained by Pesonen (2011).

## 7 Conclusions

From a generic point of view the usefulness of social networks is highly transverse; one of its purposes is to generate information. One of these networks is Facebook, which as has been shown in various reports is currently that with the largest number of users worldwide. In this sense Facebook is a communication channel of prime importance which has proved its usefulness as a valid tool for the management of tourism companies. However, despite the existence of a wide range of studies addressing the importance of social networks in the management and marketing of hotels and tourist destinations, there is a lack of studies to highlight the role played by Facebook in the rural tourism and agritourism sector. For this reason, in this study we have tried to provide knowledge in this regard, starting from the objective of finding out how rural accommodation establishments in Extremadura, of which there are many, use this social network. From the results obtained, after the relevant processing of the information using the spatial statistics techniques explained above the following conclusions can be drawn:

- Spatial statistics is a very useful tool for the detection of territorial groupings as it allows us to determine the areas that stand out owing to their greater or lesser use of Facebook, establishing notable differences between the use of this tool and traditional statistics.

- After using both techniques, the existence of 15 groups of rural accommodation establishments with common characteristics has been determined. However, in those groups obtained without spatial restriction the most important variable is the rating given to the Facebook page, while in the case of those deriving from the application of geostatistics this variable is the number of visits received by the profile of this social network.
- Among the groups developed by traditional statistics, there are seven groups which can be classified at the same time as follows:
  - Those with a large presence on Facebook and high scores in the rating of their profile (Groups 1, 3, 8 and 13).
  - Those with a low presence on Facebook, Groups 9 and 10, although the former has the highest score in terms of profile ratings.
  - Finally, there is Group 14 in which the accommodation establishments making up the group have a common characteristic: the lowest score with respect to the profile rating, despite having a large number of followers.
- The results deriving from the application of spatial restriction, taking eight close neighbours as a reference, determine the existence of 15 groups as was the case after using the statistics without spatial restriction. However, in this case only the coefficients obtained in groups 10, 12 and 15 stand out. The first of these (Group 10) stands out for presenting values below the average of the remainder of the accommodation establishments in the study sample. As for Group 12, it is made up of a wide range of accommodation establishments totalling 109, in which most of the variables present values below the general average except in the case of the assessment of the Facebook profile. Finally, Group 15 has a common characteristic: it shows the lowest values in all the variables analysed with regard to the remainder of the accommodation establishments.

On the other hand, the results obtained in this study have generated some very useful conclusions in terms of the management of the presence of rural accommodation establishments in Extremadura on social networks in general and on Facebook in particular.

Firstly, the fact that the number of accommodation groups identified was so high (15, both when using spatial restrictions and when not using them) shows that the behaviour of the profiles of rural accommodation establishments in the region on Facebook is highly heterogeneous. It is therefore not possible to define a clear pattern of behaviour of these establishments since both the regular publication of messages, photographs, videos, etc., on the social network and the degree of interaction with customers (real or potential) are so varied that it is not possible to define a single Facebook presence strategy for rural tourism in Extremadura for the whole region. It is clear that the degree of professionalisation of the managers of these establishments is the cause of the very high heterogeneity detected.

Another significant result is the fact that almost 40% of rural accommodation establishments in the region do not have a Facebook profile. In the highly connected social networking society of today, not being present on Facebook is practically



equivalent to being out of the tourism market. In response to the complaint of some owners that Extremadura is not sufficiently promoted as a rural tourism destination, it should be argued that this promotion is not only the responsibility of the public tourism administration but also that of private business initiative. Consequently, many of the rural tourism entrepreneurs should be more aware of the potential of Facebook as a tourism promotion tool.

The identification of different groups of rural accommodation establishments with different levels of presence and activity on Facebook in specific geographical areas of the region is a factor which will make it considerably easier for the tourism administration of the region to launch different campaigns with different content (raising awareness of the need to be present on Facebook, strategies to define more active profiles, assessment of customer opinions and comments, etc.), rather than a single regional campaign with monographic content.

Finally, interaction with customers (real or potential) of rural accommodation establishments with a Facebook profile requires certain language skills, especially English and Portuguese. The Facebook social network is an online platform which reaches every corner of the world. For this reason, it does not make much sense for the Regional Government of Extremadura to carry out campaigns to promote rural tourism at an international level (Lisbon, London, Berlin, New York, Beijing, etc.) without these campaigns being accompanied by a policy of training tourism entrepreneurs in the region to communicate with foreign customers in English and Portuguese. The use of the latter language is essential if we want to take advantage of the Portuguese market which, given its geographical proximity, should be where the main efforts to promote rural tourism in Extremadura are directed at an international level.

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