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RESEARCH ARTICLE



Assessing social carrying capacity of tourists in protected natural areas

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ABSTRACT

Knowing the limits of the social carrying capacity of tourism is a fundamental component of sustainable destination management, especially in protected natural areas, which implies understanding the characteristics of demand and travel. The research presented in this paper was conducted in a natural destination, the Sierras de Cazorla, Segura y Las Villas National Park (Spain), identifying two segments of tourists by means of cluster analysis according to a set of sociodemographic and socioeconomic variables, as well as their willingness to pay to improve the sustainability of destinations. Subsequently, each cluster was related to the variables of the social carrying capacity of tourism, and multivariate logistic regression analysis was applied. The results indicate that there is a relationship between the clusters identified and their social carrying capacity, which would be very useful to policy makers, managers, and business owners in protected natural areas, in terms of designing of pro-sustainability strategies.

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1. Introduction

There is a very strong link between sustainable development and the tourism carrying capacity (TCC) of a destination (Zekan et al., 2022), since TCC measures the volume of tourists who can visit a destination without causing serious physical, economic, or sociocultural alterations within the territory on the one hand, and without affecting visitor satisfaction on the other (UNWTO, 1981). This last aspect refers to one of the dimensions of TCC, known as the social carrying capacity (SCC) of tourism, which measures the maximum number of visitors tolerated by tourists themselves, after which their level of satisfaction with their experience would decrease, affecting their desire to visit an alternative destination or their loyalty to a given destination (Kong et al., 2014; Li et al., 2021; Tokarchuk et al., 2020).

In order to establish tourists' limits when it comes to SCC, it is important to know the characteristics of demand, since tourist behaviour is central to decision-making in the management of tourism (Jurado et al., 2013). There are different factors that influence decisions to visit a tourist destination, including the perceived image of the destination (Tapachai & Waryszak, 2000), so it is crucial to study the perceptions of tourists about the saturation of a destination.

Protected areas have highly vulnerable ecological systems that are sensitive to the presence of tourists, and 'improper tourism management can accelerate or consolidate environmental degradation and deterioration of the quality of life enjoyed by surrounding communities' (Pavón et al.,

2017, p. 165). Therefore, to ensure sustainable tourism management and planning in these types of destinations, it is essential to analyse TCC in all its dimensions, including SCC, since this allows managers to know how it relates to tourist satisfaction and their loyalty to the destination, as well as the likelihood of recommending the destination to other potential tourists (Chen & Tsai, 2007).

Li et al. (2021) propose that, in order to promote sustainability within destination management, future research should encourage the development of innovative management policies or measures, with a balanced interest orientation, leading to more reasonable flows of tourism, within TCC limits. To achieve this, close attention must be paid to the agents involved, including tourists themselves, which is the field into which this research fits.

The Sierras de Cazorla, Segura y Las Villas National Park (NPSCSV) is the largest protected area in Spain and the second largest in Europe. For years, it was the most visited protected area in Andalusia, where 'the spatial concentration of tourism is, in fact, one of its main territorial characteristics' (Martínez et al., 2012, p. 35). The aim of this research, therefore, is to determine the types of tourists who visit the NPSCSV National Park, according to the characteristics of their demand and travel, as well as to associate these characteristics with the variables related to the SCC of tourists, such as the desire for non-crowding, expectations regarding non-crowding, and the perceived lack of crowding in the destination studied, through the creation of indicators for non-return to the destination, non-tolerance, and dissatisfaction with overcrowding at the destination.

In this context, the starting hypothesis for this research states that tourist demand within the NPSCSV National Park can be classified into different clusters, depending on the characteristics of the trip and the socio-demographic characteristics of the tourists, which, in turn, are associated with the SCC of these tourists, measured using indicators of non-return to the destination, non-tolerance, and dissatisfaction with overcrowding at the destination.

2. Literature review

There are many definitions of TCC. O'Reilly (1986, p. 254), giving its most simplistic definition, states that this is the 'maximum number of tourists that can be contained in a certain destination area'. Over time, elements have been added, such as the consequences of the volume of visits (Mathieson & Wall, 1982), temporal delimitation (Chávez, 2005), the relationship with the life cycle of a tourist destination (O'Reilly, 1986), and its importance for the sustainability of a tourist destination (Gonzalez et al., 2018; Vera et al., 1997).

For its part, UNWTO (1981, p. 5) defined CBT as 'the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic and socio-cultural environment and unacceptable decrease in the quality of visitors' satisfaction'. TCC allows us, therefore, to solve certain problems related to environmental integrity by combining natural, social, and economic indicators, thereby favouring economic and social development (Li et al., 2021; Wang et al., 2020).

TCC is crucial for tourism sustainability. In mature or developing destinations, anticipating and managing this capacity is essential to prevent problems such as congestion and degradation, balancing economic benefits with preservation (Jurado et al., 2013).

Studies on the TCC of tourist destinations (Aktsoğlu & Gaidajis, 2020; Ceballos, 1998; Chen, 2015; Jurado et al., 2013; Lobo, 2015; López-Bonilla & López-Bonilla, 2008; McCool & Lime, 2001; Sha, 2020; Zhao & Jiao, 2019) seek to define the limits of TCC. In this endeavour, it is essential to analyse the type of destination beforehand, since the result will vary depending on the characteristics of the destination (Boullón, 2003). However, TCC is not without criticism (Buckley, 1999; Lindberg et al., 1997; McCool & Lime, 2001; O'Reilly, 1991; Simón et al., 2004; Vera et al., 1997), given the difficulty encountered in establishing the threshold after which the impacts of tourism are not acceptable, with some critics stating that TCC is not an indicator of these effects.

Among the papers that explore how to calculate TCC (Jurado et al., 2012; Navarro, 2005; Wang et al., 2020), the study by Bonilla and Bonilla (2008) summarises the seven dimensions that make

up TCC: ecological, urban, cultural, economic, institutional, psychological of the residents, and psychological of the tourists. Therefore, the environmental dimension is not the only one to take into account in relation to TCC, but also aspects related to human needs, benefits, expectations, and levels of satisfaction. Analysis of SCC, therefore, which includes the last two elements identified by Bonilla and Bonilla (2008), is essential, and it refers to the maximum number of tourists that can be admitted to a destination without their activities being rejected by the local population and without impeding tourists' enjoyment of the destination (Saveriades, 2000). It is crucial for destinations to have methods in place that can identify and measure SCC before reaching what is known as over-tourism (Tokarchuk et al., 2020). This calculation should be understood as a dynamic methodology to support tourism management (Chen et al., 2021).

The scientific literature (Brandolini & Mosetti, 2005; De Ruyck et al., 1997; Kong et al., 2014) offers two perspectives on SCC: the psychological carrying capacity (CC) of tourists, which refers to the maximum number of visitors tolerated by tourists themselves without reducing the quality of their recreational experience, and without wishing to go to an alternative destination or even return home; and the psychological CC of the residents, referring to the maximum number of visitors tolerated by the host population without diminishing their quality of life.

The concept of SCC refers to the psychological dimension of CC and, when analysed from the perspective of tourists, it is the number of visitors after which tourist satisfaction starts to fall, thereby leading to a decline in the number of arrivals at the destination (Ceballos, 1998; Joshi & Dahal, 2019; Li et al., 2021; O'Reilly, 1991; Shelby & Heberlein, 1986; Tokarchuk et al., 2020).

Major advances were made in the study of saturation levels perceived by tourists in the 1980s, incorporating density and levels of use, confluences with other tourists, norms of tolerance and expectations about the experience (Ecahmendi, 2001). Shelby and Heberlein (1986) highlighted the need to determine TCC by studying the expectations of tourists along with the predetermined norms of destination managers. These authors put forward a model that still remains a valid method for assessing the TCC of destinations, based on the levels of congestion perceived by tourists.

The CC of tourists is made up of three dimensions (Hernández et al., 2011): (i) physical CC, which represents the maximum number of people a space can accommodate; (ii) perceptual CC, which refers to the maximum number of people with which a tourist is willing to coexist, without reducing their level of satisfaction; and (iii) administrative CC, which refers to the maximum number of visitors a place is able to manage.

Some authors extend the concept of perceptual CC to psychosocial CC, which encompasses the first and other aspects, such as the level of conflict between tourists and the local population, the level of conflict in space usage, and tourist motivations (Burns et al., 2010; Gregory et al., 2019).

The relationship between levels of congestion in a destination, tourist satisfaction, and tourist loyalty indicates that, by increasing the number of people in a destination, the satisfaction of the tourist declines, which can in turn influence loyalty to the destination and the likelihood of repeating the visit or recommending it to other potential tourists (Chen & Tsai, 2007). Tourists even show a willingness to pay for lower saturation at destinations (Gregory et al., 2019).

However, it should be remembered that the SCC of tourists is not static, but dynamic, and depends on the situation of alternative destinations (Eugenio-Martin, 2011). Shelby and Heberlein (1986, p. 62) quantified this CC, which they understood to have been exceeded when 'more than two-thirds of visitors feel overcrowded', in other words, when the destination has gone beyond its CC.

Since the 1980s, several case studies have been carried out that analyse the factors that affect SCC as perceived by tourists (Table 1).

The CC of natural protected areas has been analysed by several authors (Aktsoğlu & Gaidajis, 2020; Burns et al., 2010; Chen, 2015; Fleishman et al., 2004; Joshi & Dahal, 2019; Lawson et al., 2003; Mestanza et al., 2019; Pavón et al., 2017; Vujko et al., 2017), who have developed different methodologies for measuring the CC of a destination, the factors affecting its saturation, its relationship with sustainability, the periods of maximum use, the most intensively used areas, those that

Table 1. Literature on factors affecting the social carrying capacity of tourists.

	Age	Education	Income level	Type of accommodation	Origin	Infrastructure	Lifecycle	Expectations	Activities carried out	Prior Information	Location and attractions of alternative destinations	High season
Hayduk (1983)			X									
Getz (1983)										X		
Mieczkowski (1995)									X			
Morgan and Lok (2000)						X						
Fleishman et al. (2004)	X	X										
Damián and Navarro (2005)			X	X		X					X	
Navarro (2005)	X	X	X	X	X	X						
López-Bonilla and López-Bonilla (2008)												X
Vaske and Shelby (2008)									X			
Santana-Jiménez and Hernández (2011)					X		X	X				
Eugenio-Martin (2011)								X	X		X	
Jurado et al. (2013)	X	X	X					X		X		
Gregory et al. (2019)					X							X
Sharma and Bisht (2019)						X		X	X		X	
Szromek et al. (2019)	X											
Enseñat-Soberanis et al. (2020)					X							
Chen et al. (2021)									X			X
Schuckert and Wu (2021)					X							
Tokarchuk et al. (2022)								X				
Papadopoulou et al. (2023)								X				

Source: Authors' own.

attract users who reject crowded places, the perception of residents and tourists, etc., as well as the implications for the management of these destinations. In this type of destination, with special protection requirements, it is essential to bear in mind that TCC implies a series of cyclical and seasonal variations, resulting from geographical, climatic, and biological indicators, etc. (Fernandez-Cortes et al., 2006).

3. Methodology

To tackle the aims of this study, a survey was carried out on a significant sample of tourists at the NPSCSV National Park. The two-step cluster analysis technique and a multivariate model were applied to the results of these surveys to analyse the SCC of tourists, the risk that the tourist will not return due to overcrowding, and their tolerance and satisfaction related to the level of crowding in the destination.

3.1. Geographical framework

The NPSCSV National Park is located in Andalusia, in the north-eastern part of Jaén province, covering an area of 209,434 hectares and encompassing 23 municipalities. It was declared a National Park in February 1986 (Martínez et al., 2012) and is the largest protected area in the whole of Spain.

In 1960, part of this territory was declared a National Game Reserve, due to the large number of species it contains, such as mountain goats, wild boar, red deer, fallow deer, and mouflon sheep. In 1983, UNESCO declared it a Biosphere Reserve, considering it a model in terms of its activities in innovation and nature conservation, and a driving force for sustainable development (Junta de Andalucía, 2022). The NPSCSV National Park has also been certified by the European Charter for Sustainable Tourism and declared a Site of Community Importance since 2004, in addition to a Special Area of Conservation since 2017, all certificates and acknowledgements related to sustainability.

It is home to some hugely important natural heritage, resulting from its characteristic relief, soil, and climate. More than 1,800 different species of flora have been identified in this territory, some of which are endemic or distributed within a very limited area. It is also home to a wide variety of wildlife, especially birds and large ungulates.

Over time, the development of tourism here has undergone different phases, including one of unchecked expansion, which created a negative image of this tourist destination, to other stages focusing on sustainable development and reclassification (Martínez et al., 2012). At present, the NPSCSV National Park is in the process of implementing a sustainable tourism development plan, in which sustainability is a key factor in the competitiveness of the destination.

This tourist destination received almost 140,000 tourists in 2019, a figure that fell by 35% in 2020, as a result of the COVID-19 pandemic, before recovering in 2021, to 134,500 tourists (National Institute of Statistics, 2022).

3.2. Statistical treatment of information

To verify the hypotheses set out, a survey was conducted using the Computer Assisted Personal Interview (CAPI) methodology, although in this case the electronic device used was a PDA/Tablet. The survey was conducted between June and September 2022 on a sample of 1,188 tourists. In order to do this, given the impossibility of identifying the object of study (all tourists who visit the NPSCSV National Park), a simple random sampling approach was proposed in which the only selection criterion was that the participant had spent at least one night in the destination. With this sample size, the maximum sampling error for a 95% confidence level and the worst case ($p = q = 0.50$) is $\pm 2.8\%$.

The survey consisted of four major sections. The first section was used to characterise tourists, compiling socio-demographic information and aspects related to the reservation and characteristics

of the trip. In the second section, respondents were asked about their concept of a sustainable tourist destination, the importance of working towards sustainability, the aspects they consider key when travelling and choosing a destination, and the activities they carry out during the trip. The third section sought to ascertain the perception of these tourists regarding the sustainability of the destination, investigating the changes (for better or worse) observed in the destination, as well as the expectations and perceptions of tourists. Finally, section four asked about the willingness of respondents to pay for a more sustainable destination. Through this survey, a great deal of information was obtained that has been applied in various investigations, using in this article only the information needed to fulfil the aims of this research.

For the descriptive analysis, qualitative variables are described using frequencies and percentages, whereas quantitative variables are summarised in terms of their mean and standard deviation.

In the second stage, in order to characterise tourists according to the features of demand, two-step clustering was applied. Cluster selection based on the BIC criterion and considering a silhouette coefficient higher than 0.3 to determine the quality of the selected clusters. Subsequently, the results of the cluster were confirmed using a logistic regression model, correctly classifying the clusters in 96% of cases, highlighting the reliability and accuracy of the cluster solution to classify tourists according to the type of demand, thus segmenting tourists into two groups.

In the third stage, the sociodemographic characteristics and preferences of the tourists categorised in each of the clusters were described, using frequencies and percentages in the case of categorical variables, and the mean value with its standard deviation in the case of continuous variables. Bivariate comparisons were made using the chi-squared or Mann–Whitney statistical test, according to whether the variables were categorical or continuous.

In order to answer the main research questions of this study, the variables related to the SCC of tourists were analysed. On the basis of these variables, we created the non-return indicator, defined as a strong desire for no crowds at the destination, and the non-tolerance indicator, defining those tourists whose expectations of no crowds in the studied destination was greater than the desire for no crowds at any destination, since this indicates that tourists demand more of the destination studied than of any other. Similarly, we obtained an indicator of dissatisfaction with the destination studied, referring to tourists whose perception was worse than their expectation. Subsequently, using multivariate logistic models, we analysed the association between sociodemographic variables, cluster according to demand, and activities that tourists like to carry out, on the one hand, and the risk of non-return, non-tolerance, and dissatisfaction on the other.

The regression model selection process was backward, in which variables with non-significant parameters were discarded, and we verified that there was no change in the other parameters of the model, in order to study the possible confounding effects among the variables. We tested for correlations between the estimated parameters to study possible collinearities between independent variables and interactions between relevant factors. In the variable selection process, the BIC information criterion was used to determine improvement in the model goodness-of-fit and standardised residuals with expected values between -2 and 2 .

4. Results

The results achieved in the different phases of the research are presented in two sections: cluster analysis and the SCC of tourists.

4.1. Cluster analysis

As noted above, the questionnaire was completed by a total of 1,188 tourists. The first step was to analyse the questionnaire variables related to the characteristics of tourist demand. The results were grouped by different response categories (Table 2).

Table 2. Summary of results by categories of demand characteristic variables.

Variables	Categories	N	%	Variables	Categories	N	%
Nights you plan to stay at the destination	1–3	197	16.6	Reservations for this trip: fully organised trip	Yes	237	19.9
	4–5	262	22.1		No	951	80.1
	6–7	340	28.6	Reservations for this trip: accommodation	Yes	539	45.4
	8–14	211	17.8		No	649	54.6
Overnight accommodation chosen	15–29	107	9	Reservations for this trip: transport	Yes	276	23.2
	30 or more	71	6		No	912	76.8
	5 and 4* hotel	286	24.1	Reservations for this trip: extras	Yes	36	3
	3* hotel	269	22.6		No	1152	97
	1 or 2* hotel/hostel/B&B	208	17.5	How have you booked these services? Travel agency	Yes	101	8.5
	Campsite/guest house/halls of residence/other	48	4		No	1087	91.5
	Aparthotel	49	4.1	How have you booked these services? Online operators	Yes	318	26.8
	Rented Houses or Apartments (rural and non-rural)	97	8.2		No	870	73.2
	House/Apartment owned or timeshare	126	10.6	How have you booked these services? Directly from the service provider	Yes	279	23.5
	House/Apartment of family/friends	105	8.8		No	909	76.5
Who are you travelling with during this holiday?	Alone	245	20.6	How often do you visit this destination?	Several times a year/ every summer	267	23.8
	Family	753	63.4		Frequently (Regularly/ Occasionally)	406	36.3
	Friends	190	16		First time	447	39.9
Main reason for the trip	Leisure/Holiday	1038	87.4				
	Business/Work	36	3				
	Sports and Health	8	0.7				
	Visiting relatives/ friends	75	6.3				
	Cultural/ Gastronomic/ Tourist/Other	31	2.6				

Source: Authors' own.

To be able to determine the types of tourists according to the characteristics of demand, two-step clustering was applied, since the demand variables are categorical. Based on the BIC criterion, two clusters were identified, formed in relation to the variables pertaining to the characteristics of demand.

The main differences between the two clusters are that Cluster 2 contains a greater percentage of tourists who spend more than 15 days in the destination, staying in houses/apartments rented or owned, or with family and friends, with a predominance of people travelling alone in this cluster, compared to Cluster 1. Although it should be noted that travelling with a companion is one of the least relevant variables for cluster differentiation, since the vast majority of interviewees travel with their families.

In turn, the main reason for travelling given by tourists in Cluster 1 is leisure/holiday (96% of tourists in Cluster 1 travel for that reason), while in Cluster 2 there is greater variability in terms of their reason for travel, with a high percentage of tourists for whom the main reason is to visit family and friends; almost all those interviewed who were travelling for that reason were classified in Cluster 2.

100% of tourists in Cluster 1 did not have their trip completely organised, but 98.40% of these tourists had booked accommodation, as opposed to 100% of tourists in Cluster 2 who had not

booked accommodation. A higher percentage of tourists in Cluster 1 made transport reservations (37% in Cluster 1 vs. 11% in Cluster 2) and almost all tourists who had booked any extras were in Cluster 1.

With regard to the services of travel agencies, online operators, and booking directly with the provider, Cluster 1 included the majority of tourists who had made use of one of these services, while more than 95% of the tourists in Cluster 2 had not used any of these services. Finally, in relation to the frequency with which they visit the destination, almost 50% of the tourists in Cluster 1 were visiting for the first time. More than 60% of tourists in Cluster 2 had visited the area several times a year or frequently.

Subsequently, using cluster classification, a multivariate logistic model was applied to determine the correct degree of classification based on the characteristics of the demand (selected variables) to form tourist population groups and to establish the probability that a given tourist, based on their sociodemographic characteristics and preference for activities, belongs to a certain cluster based on type of demand (Table 3).

The corresponding cluster was successfully determined in 96% of cases. This indicates good reliability of the cluster results. It should be noted that the cluster number was determined based on the BIC information criterion. Cluster 1 encompassed 45.1% of the tourists surveyed and Cluster 2 contained 54.9%.

Table 3 gives descriptions of the clusters in relation to socio-demographic variables and the activities that tourists carry out on their trips. Significant differences were found in the clusters according to level of education, employment status, and occupation. In particular, tourists with a low level of education are more likely to be classified according to the characteristics of demand in Cluster 2 than tourists with a higher level of education. With regard to employment status, tourists who are in active employment are more likely to be part of Cluster 1 than retired tourists. Retired tourists are more likely to be found in Cluster 2. In general, therefore, tourists with a high level of education, who are currently in employment, are more likely to be classified in Cluster 1 according to their type of demand. Whereas tourists with a low level of education who are retired are more likely to be classified in Cluster 2 according to their type of demand.

The results marked in bold in Table 3 indicate the factors that differentiate between the clusters in an adjusted model. Regarding the types of activities that tourists wish to carry out during their trip, those who want to enjoy nature and engage in local consumption are more likely to be classified in Cluster 1 in terms of demand. In the multivariate model, neither age nor occupation were significant variables associated with the cluster, once adjusted for relevant factors.

4.2. Social carrying capacity of tourists

In order to analyse SSC, the variable 'desire for non-crowding at any destination' was studied, determined by the importance that tourists give to non-crowding when choosing a holiday destination. Thus, if tourists do not attach great importance to the fact that the destination is not overcrowded, it implies that tourists accept a high level of crowding, whereas, if tourists value an absence of crowding as being very important, then they will not want overcrowding at any destination. All of this is measured on a scale from 1 to 7, where 1 represents the desire for large crowds in any destination, and 7 represents the tourist's desire for no crowding at all.

Of the tourists interviewed, 2.2% indicated that their desired value is that there should be no crowding in any destination (value 7 on the scale), 10% accept a little crowding, 34.3% accept some crowding, 36.7% accept a medium level of crowding, 10.5% a fair amount of crowding, 4.2% a high degree of crowding, and 2.0% want crowds at the destination (value 1 on the scale).

Based on this variable, the main interest is to analyse the risk that the tourist will not return to the destination due to crowding at that destination. Therefore, tourists who value their desire for non-crowding at the destination as being very important potentially present a risk of not returning to the destination analysed. Tourists whose desire for non-crowding at any destination

Table 3. Bivariate analysis of clusters according to sociodemographic variables and activities carried out by the tourist.

Variable	Categories	Cluster 1		Cluster 2		Chi squared test	P-VALUE
		N	%	N	%		
Gender	Male	298	46.90	337	53.10	2.005 (1)	0.157
	Female	207	42.70	278	57.30		
Education	Don't know/Primary	9	16.40	46	83.60	20.711 (3)	<0.001
	Secondary	121	44.00	154	56.00		
	High school	180	46.30	209	53.70		
	Higher/Master/Doctorate	195	48.60	206	51.40		
Employment status	Employed	398	54.50	332	45.50	88.940 (3)	<0.001
	Unemployed	24	39.30	37	60.70		
	Retired/Homemaker	24	16.00	126	84.00		
Occupation	Student and others	59	33.00	120	67.00	31.448 (4)	<0.001
	Liberal Profession/Entrepreneur	87	46.30	101	53.70		
	Executive/middle management	46	58.20	33	41.80		
	Civil servant	55	48.70	58	51.30		
	Employee	227	49.90	228	50.10		
Income	Other	90	31.60	195	68.40	3.886 (4)	0.422
	Up to €900	65	40.10	97	59.90		
	From €901 to €1200	137	47.90	149	52.10		
	From €1201 to €1500	121	43.70	156	56.30		
	From €1501 to €1800	72	49.30	74	50.70		
	More than €1800	110	44.20	139	55.80		
Continuous variables		Cluster 1		Cluster 2			
Frequency with which you carry out the following activities during this trip: enjoy nature	Mean	6.06		5.9		0.032	
	SD	1.157		1.348			
	95% LL	5.96		5.79			
	95% UL	6.16		6.01			
Cultural activities	Mean	3.36		3.4		0.654	
	SD	1.548		1.648			
	95% LL	3.23		3.27			
	95% UL	3.5		3.53			
Local consumption	Mean	4.64		3.4		0.046	
	SD	1.548		1.648			
	95% LL	3.23		3.27			
	95% UL	3.5		3.53			
Fun	Mean	4.64		4.48		0.219	
	SD	1.637		1.374			
	95% LL	4.6		4.48			
	95% UL	4.88		4.75			
Go shopping	Mean	4.74		4.62		0.183	
	SD	1.637		1.74			
	95% LL	4.6		4.48			
	95% UL	4.88		4.75			
Quiet leisure	Mean	3.99		3.82		0.134	
	SD	1.486		1.734			
	95% LL	3.47		3.34			
	95% UL	3.73		3.96			
Age	Mean	36.65		38.61		0.022	
	SD	12.038		16.575			
	95% LL	35.6		37.3			
	95% UL	37.7		39.92			

Source: Authors' own.

was greater than or equal to 5 were established as a cut-off point, and these cases were determined as possible risks of non-return. In order to identify tourists, multivariate logistic regression analysis was performed, analysing the association between sociodemographic variables and

tourist profile according to demand and the risk that the tourist would not return to the destination (Table 4).

The model was adjusted for gender. Although this was not a relevant factor, it is a possible confounding factor and, for that reason, it remained in the final model. As shown in Table 4, a significant association with the cluster was found. The type of tourist demand in Cluster 2 was associated with a lower probability of non-return. Specifically, a tourist who presents type 2 demand has a 30% lower risk of non-return ($1/0.77$ is approximately 1.30 times less likely) than a tourist with type 1 demand. We should remember that Cluster 1 was determined by those who wanted to do more activities to enjoy nature and local consumption. However, these tourists have a greater probability of non-return due to the levels of crowding found. This is a significant association with non-return indirectly through the result obtained in the cluster model. So, a tourist from Cluster 2 is more likely to return to the destination analysed than a tourist from Cluster 1. In relation to age, as tourist age increases there is a greater risk of non-return. In turn, the more the tourist is interested in carrying out activities related to cultural visits or shopping, the greater the risk of non-return.

Next, a tolerance risk indicator was constructed to identify less tolerant tourists and be able to determine the sociodemographic characteristics and segmentation according to the type of demand presented by less tolerant tourists. For this purpose, we used the questionnaire variables that indicate expected satisfaction at the destination with respect to non-crowding (such as the expected desire for non-crowding at the destination, a variable scored on a scale ranging from 1 to 7 where 1 is not satisfied with non-crowding and 7 is very satisfied with non-crowding), and the previously defined variable of desire for non-crowding at any destination (where 1 is a strong desire for crowding and 7 is a desire for non-crowding). The difference between the two variables was made and the results were classified as follows: if the expected value at the destination minus the desired value at any destination is less than 0, this indicates that the desire for non-crowding at any destination is greater than expected at the destination, showing that the tourist is more tolerant of crowding at the NPSCSV National Park than at any other destination. However, if the expected value for non-crowding is greater than the desired value at any destination, this signifies that the tourist is more demanding (less tolerant) that there should not be crowding at the NPSCSV National Park compared to any other destination. A value of 0 means that the expected value is the same as the desired value at any destination.

The descriptive results according to socio-demographic variables, activities and type of demand are shown in Table 5, together with the factors significantly associated with a less tolerant tourist profile. Older tourists have a lower risk of being non-tolerant, with younger tourists being less tolerant. No differences were found in the risk of non-tolerance between demand clusters, but it is observed that tourists who engage in the activity of enjoying nature more frequently are more likely to be non-tolerant.

Finally, non-indifference or dissatisfaction is defined as the difference between what is expected at the destination and what is perceived, so that if the result is less than zero then the degree of perceived satisfaction is greater than expected, while if it is less than 0, more is expected than perceived and, therefore, the tourist is at risk of dissatisfaction. The association between sociodemographic characteristics and the classification of tourists according to demand, on the one hand, and the indicator of tourist dissatisfaction on the other was studied using a multivariate logistic regression model (Table 6).

Unemployed tourists have a lower risk of dissatisfaction than those who are in employment. In turn, as tourist age increases, so does the risk of dissatisfaction. Tourists who are more interested in shopping and quiet leisure have less risk of dissatisfaction.

5. Discussion and conclusions

The study of TCC at a destination is fundamental for destination managers and sustainable tourism development. TCC must be adapted to the characteristics of the surrounding environment and the

Table 4. Results of the multivariate logistic model for the risk of non-return variable.

		Risk of non-return				Adjusted Results Multivariate Model			
		No		Yes		Risk (OR)	95% CI	P-value	
		N	%	N	%				
Sex	Male	370	54.90	304	45.10	1.15	0.9	1.47	0.26
	Female	265	51.60	249	48.40				
Education	Don't know/Primary	25	44.60	31	55.40	1.15	0.9	1.47	0.26
	Secondary	164	58.40	117	41.60				
	High school	256	60.70	166	39.30				
	Higher/Master/Doctorate	190	44.30	239	55.70				
Employment status	Employed	397	52.00	367	48.00				
	Unemployed	45	67.20	22	32.80				
	Retired/Homemaker	74	47.10	83	52.90				
	Student and others	119	59.50	81	40.50				
Occupation	Liberal Profession/Entrepreneur	88	44.90	108	55.10				
	Executive/middle management	36	45.00	44	55.00				
	Civil servant.	57	46.00	67	54.00				
	Employee	270	57.40	200	42.60				
	Other	184	57.90	134	42.10				
Income	Up to €900	103	57.50	76	42.50				
	From €901 to €1200	172	58.50	122	41.50				
	From €1201 to €1500	170	56.50	131	43.50				
	From €1501 to €1800	79	51.60	74	48.40				
	More than €1800	111	42.50	150	57.50				
Cluster	1	255	50.50	250	49.50	0.779	0.61	0.99	0.045
	2	343	55.80	272	44.20				
	Mean (SD)	35.48 (14.539)	95% (LL. UP)	(34.34–36.61)	Mean (SD)				
Age	Enjoy nature	5.98 (1.314)	(5.88–6.09)	5.92 (1.243)	(5.82–6.03)	1.02	1.01	1.027	<0.001
Frequency with which you carry out the following activities during this trip:	Cultural activities	3.21 (1.576)	(3.09–3.34)	3.62 (1.634)	(3.48–3.76)	1.09	1.01	1.18	0.035
	Local consumption	4.45 (1.347)	(4.34–4.55)	4.63 (1.325)	(4.52–4.74)	1.21	1.11	1.31	<0.001
	Fun	4.69 (1.745)	(4.55–4.83)	4.67 (1.645)	(4.53–4.81)				
	Go shopping	3.3 (1.532)	(3.18–3.42)	3.84 (1.555)	(3.71–3.97)				
	Quiet leisure	3.75 (1.815)	(3.61–3.9)	4.03 (1.784)	(3.88–4.17)				

Source: Authors' own.

Table 5. Results of the multivariate logistic model adjusted for non-tolerance.

		Risk non-tolerance				Risk (OR)	95% CI		P-value
		No		Yes					
		N	%	N	%				
Sex	Male	447	66.30	227	33.70	0.85	0.662	1.089	0.201
	Female	355	69.10	159	30.90				
Education	Don't know/Primary	42	75.00	14	25.00				
	Secondary	183	65.10	98	34.90				
	High school	263	62.30	159	37.70				
	Higher/Master/Doctorate	314	73.20	115	26.80				
Employment status	Employed	523	68.50	241	31.50				
	Unemployed	42	62.70	25	37.30				
	Retired/Homemaker	115	73.20	42	26.80				
	Student and others	122	61.00	78	39.00				
Occupation	Liberal Profession/Entrepreneur	136	69.40	60	30.60				
	Executive/middle management	58	72.50	22	27.50				
	Civil servant.	87	70.20	37	29.80				
	Employee	314	66.80	156	33.20				
Income	Other	207	65.10	111	34.90				
	Up to €900	120	67.00	59	33.00				
	From €901 to €1200	192	65.30	102	34.70				
	From €1201 to €1500	211	70.10	90	29.90				
	From €1501 to €1800	100	65.40	53	34.60				
Cluster	More than €1800	179	68.60	82	31.40				
	1	344	68.10	161	31.90				
	2	407	66.20	208	33.80				
Age		Mean (SD)	95% (LL. UP)	Mean (SD)	95% (LL. UP)	0.988	0.98	0.997	0.01
Frequency with which you carry out the following activities during this trip:	Enjoy nature	5.89 (1.291)	(5.8–5.98)	6.09 (1.252)	(5.97–6.22)	1.138	1.031	1.261	0.011
	Cultural activities	3.43 (1.636)	(3.32–3.55)	3.34 (1.571)	(3.18–3.5)				
	Local consumption	4.53 (1.348)	(4.44–4.62)	4.53 (1.323)	(4.4–4.67)				
	Fun	4.66 (1.683)	(4.54–4.78)	4.73 (1.732)	(4.55–4.9)				
	Go shopping	3.59 (1.586)	(3.48–3.7)	3.45 (1.52)	(3.3–3.61)				
	Quiet leisure	3.89 (1.814)	(3.76–4.02)	3.86 (1.789)	(3.68–4.04)				

Source: Authors' own.

Table 6. Results of the multivariate logistic model adjusted for non-indifference/dissatisfaction.

		Non-indifference/dissatisfaction				Risk (OR)	95% CI		P-value
		No		Yes					
		N	%	N	%				
Sex	Male	113	16.80	561	83.20	0.973	0.711	1.335	0.866
	Female	100	19.50	414	80.50				
Education	Don't know/Primary	4	7.10	52	92.90	0.553	0.314	0.99	0.044
	Secondary	40	14.20	241	85.80				
	High school	100	23.70	322	76.30				
	Higher/Master/Doctorate	69	16.10	360	83.90				
Employment status	Employed	128	16.80	636	83.20	1.057	0.562	2.068	0.865
	Unemployed	21	31.30	46	68.70				
	Retired/Homemaker	16	10.20	141	89.80				
	Student and others	48	24.00	152	76.00				
Occupation	Liberal Profession/Entrepreneur	35	17.90	161	82.10	0.824	0.532	1.288	0.392
	Executive/middle management	11	13.80	69	86.30				
	Civil servant.	17	13.70	107	86.30				
	Employee	79	16.80	391	83.20				
	Other	71	22.30	247	77.70				
	Income	Up to €900	31	17.30	148				
	From €901 to €1200	67	22.80	227	77.20				
	From €1201 to €1500	61	20.30	240	79.70				
	From €1501 to €1800	19	12.40	134	87.60				
	More than €1800	35	13.40	226	86.60				
Cluster	1	91	18.00	414	82.00	1.024	1.008	1.041	0.002
	2	104	16.90	511	83.10				
	Mean (SD)	32.9 (13.087)	95% (LL, UP)	(31.13–34.66)	Mean (SD)				
Age	Frequency with which you carry out the following activities during this trip:	5.78 (1.346)	(5.6–5.97)	5.99 (1.264)	(5.91–6.07)	0.873	0.79	0.963	0.001
	Enjoy nature	3.62 (1.554)	(3.41–3.83)	3.36 (1.625)	(3.25–3.46)				
	Cultural activities	4.54 (1.287)	(4.37–4.71)	4.53 (1.351)	(4.45–4.62)				
	Local consumption	4.7 (1.623)	(4.49–4.92)	4.68 (1.715)	(4.57–4.78)				
	Fun	3.8 (1.384)	(3.61–3.99)	3.49 (1.598)	(3.39–3.59)				
	Go shopping	4.26 (1.681)	(4.03–4.49)	3.8 (1.822)	(3.68–3.91)				
	Quiet leisure					0.872	0.798	0.952	0.001

Source: Authors' own.

tourist activities of each area (Chen et al., 2021), in general, as well as to the tourists visiting that area, which is of interest here.

Protected areas encompass ecologically sensitive systems that are highly susceptible to the impact of tourism. An inadequate tourism management has the potential to expedite or solidify environmental degradation, leading to a decline in the quality of life for nearby communities (Pavón et al., 2017). Consequently, in order to guarantee sustainable tourism management and planning within such destinations, a comprehensive analysis of SCC enables managers to understand its correlation with tourist satisfaction, loyalty to the destination, and the likelihood of recommending the destination to potential tourists (Chen & Tsai, 2007).

Having achieved the research goals set, the starting hypothesis has been partially validated, using a dynamic methodology to support tourism management (Chen et al., 2021).

On the one hand, tourist demand in the NPSCSV National Park can be classified into different clusters, depending on the characteristics of the trip and the sociodemographic characteristics of the tourist. In fact, using two-step cluster analysis, two distinct clusters were identified. Cluster 1 largely contains tourists who travel for leisure/holidays and who organise their trip in advance, visiting the destination for the first time. In addition, in terms of the characteristics of the demand, tourists in Cluster 1 are more likely to have a higher level of education, be employed, and wish to enjoy nature and consume local products than tourists in Cluster 2. Cluster 2 consists mainly of tourists travelling alone, who spend more than 15 days in the destination and who stay in rented or owned houses/apartments or with family and friends, whose visit is the main reason for the trip. These are tourists who improvise more, with little prior organisation and who had already been to the destination.

In the last part of this investigation, by means of multivariate logistic regression analysis, differentiated clusters are linked to the SCC of tourists, measured by the indicator of non-return to the destination, that of non-tolerance and dissatisfaction with levels of crowding at the destination, and thus be able to know how tourist satisfaction decreases depending on their relationship and perception with crowding, which translates into a reduction in the total number of arrivals at the destination (Joshi & Dahal, 2019; Papadopoulou et al., 2023; Tokarchuk et al., 2020, 2022). In this case, this direct association with the clusters could only be established for the probability of non-return indicator. For the others, a direct relationship has not been demonstrated, although we have observed an association with certain sociodemographic characteristics of the tourists and aspects of the trip.

In general, the tourists interviewed (81%) are able to accept up to a medium level of crowding. However, it has been shown that Cluster 1 tourists are more likely not to return to the destination due to crowding than Cluster 2 tourists. Therefore, the study indicates that the relationship between education, employment, and the propensity to return to the destination is nuanced (Damián & Navarro, 2005; Jurado et al., 2013; Navarro, 2005). Tourists with higher education and current employment appear to be more sensitive to crowding, impacting their decision to revisit, whereas those with lower education and retired status exhibit a relatively higher tolerance for crowding, contradicting what was stated by Fleishman et al. (2004), influencing a greater likelihood of return to the destination.

The employment status of the tourist affects their SCC, already demonstrated by the scientific literature, which links it to the level of income (Damián & Navarro, 2005; Gregory et al., 2019; Jurado et al., 2013; Navarro, 2005). Unemployed tourists have a lower risk of dissatisfaction than those who are in employment.

With regard to tolerance to certain levels of crowding, this has an inverse relationship with the age of the tourist, while the opposite is seen with the risk of dissatisfaction due to crowding, which increases with the age of the tourist, thus verifying that the age factor affects the SCC of tourists, as noted by Fleishman et al. (2004), Navarro (2005), Jurado et al. (2013) and Szromek et al. (2019).

In addition, it has been demonstrated that the activities carried out during the visit influence the SCC of tourists (Chen et al., 2021; Eugenio-Martin, 2011; Getz, 1983; Sharma & Bisht, 2019; Vaske &

Shelby, 2008). Indeed, individuals who frequently engage in the activity of enjoying of nature tend to exhibit a heightened intolerance towards crowding at the destination. Conversely, those with a preference for shopping and tranquil quiet leisure activities more frequently appear to be less susceptible to dissatisfaction arising from crowding. These distinctions highlight different patterns associated with distinct tourist preferences and motivations, suggesting the presence of diverse tourist profiles that respond differently to destination crowding. In conclusion, the observed patterns not only highlight variations in tourist motivations but also illuminate the existence of distinct tourist profiles, indicating that diverse types of tourists respond differently to destination attributes.

Finally, gender was not found to be a significant factor in the determination of clusters or in its relationship with SCC indicators.

The results of this research are very important for policy makers, managers, and business owners within protected natural areas, since tourists visiting this type of destination display a similar behaviour. Thus, knowing the profile of tourists linked to their SCC is fundamental to guide tourists towards the satisfaction of their needs and the sustainable management of the destination.

Future lines of research include the possibility of conducting this analysis in other destinations and comparing the results or analysing other dimensions of TCC at this same destination. In addition, following Li et al. (2021), it would be interesting to quantify the TCC of the NPSCSV National Park through a series of evolutionary indicators, depending on the life cycle of the destination.

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