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EXTENDED ABSTRACT

PCA, CHAID AND PLS-SEM ANALYSIS ON THE SATISFACTION OF VISITORS OF PROTECTED NATURAL SPACES. APPLICATION TO THE NATIONAL PARK OF AIGÜESTORTES IN LLEIDA

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INTRODUCTION. OBJECTIVES, THEORETICAL AND METHODOLOGICAL CONTEXT

Tourism is in Spain one of the most important activities of the economy of the country. Spanish development and growth cannot be understood without taking into account the role that tourism has played, is and has been one of the main sectors generating growth in a mature economy such as the Spanish one (García et al., 2013). Within tourism activities, in general, nature-oriented tourism becomes increasingly important and socio-economic, increasing the use and enjoyment of natural spaces over time (Blanco and Benayas, 1994).

With the research that has led to this article, we have tried to achieve the following objectives:

1. General objective: Analyse the variables and inputs to be considered in the instruments used for the monitoring and evaluation of the public use of the Protected Natural Spaces, in application to the National Park of Aigüestortes (NPA), which serve to identify and assess the satisfaction and the expectations of visitors, also analysing aspects related to quality and ecotourism activity.

2. Specific objectives:

- Assess if among the prior information and knowledge about the NPA, and the planning of visits there is a relationship, with the level of satisfaction of the visitor, and therefore, try to assess if the type of services offered in advance is known before of the visit.

- Relate if the valuation of services and infrastructures affects the final assessment of the visit and the satisfaction of the user or visitor and their loyalty.

The evolution of traditional tourism has been giving way to the phenomenon of mass consumption of nature in its recreational and tourist forms, the basic destinations of recreation in natural areas that are the rural environment and natural spaces (Blanco and Benayas, 1994).

The nature tourism model (SGT, 2004) consists of an individualized and specialized tourism model, compared to mass tourism models. In the emergence of terms to designate these alternative forms of tourism, we find: green tourism, rural tourism, alternative tourism, inland tourism, environmental tourism, but there are two concepts that have been clearly established: ecotourism and sustainable tourism (Donaire, 2002), although some literature generates confusion among them.

Ecotourism or ecotourism corresponds to tourism that is motivated by nature, to discover it, to know it and to enjoy it, and it is the most suitable tourist modality in protected natural spaces (Gómez-Limón et al., 2010 and Pérez de las Heras, 2004).

Regarding the evaluation of visitor satisfaction of the Aigüestortes National Park, the European Customer Satisfaction Index (ECSI) was used, following Tenenhaus et al. (2005). As is known, it is based on the methodology of the National Quality Research Centre of the University of Michigan, and is considered a model very similar to the American Customer Satisfaction Index (ACSI), with a few slight modifications (Tenenhaus et al., 2005).

In this ECSI model, seven interrelated variables are introduced: Consumer Expectations, Perceived Quality, Perceived Value, Image, Complaints, Consumer Satisfaction and Loyalty. The first five are the independent variables that will try to explain Consumer Satisfaction and Loyalty (dependent or explained variables). It is based on well-established theories and approaches in customer behaviour and is recommended to be applied to many different industries, to determine an index of customer satisfaction (in our case Visitor of the National Park), in the respective industry (Ecotourism in a Protected Natural Space). ECSI, in fact, is an adaptation of the Swedish customer satisfaction barometer (Fornell, 1992) and is compatible with the American Customer Satisfaction Index (ACSI). This ECSI model is developed in greater detail, and its use for the analysis applied with a system of structural equations (SEM).

After carrying out the corresponding bibliographic search, carrying out its analysis, and completing the previous exploration with information and data from experts, the design and application of the survey forms used in the evaluation of the public use of the Aigüestortes National Park continued. The forms consisted of 65 questions that served to measure the different variables proposed, and among the questions there were Identification questions, Substantive questions, filter and control questions. The guidelines defined by Europarc, to characterize the profile of the visitor (Europarc, 2005) were taken into account.

The sample was calculated taking into account the number of visitors to the Park in the ten years prior to the completion of the survey, average value located around 350,000 visitors, and based on a sampling error $\varepsilon = 5.0\%$ and a confidence interval of 95.5%. The sample size needed was $n = 400$ correct surveys. In fact, 452 representative surveys

of the two sectors of the NAP were used (sector of Aigüestortes or headquarters of Boí and sector Lake of San Mauricio or headquarters of Espot). In a first stage, the statistical program DYANE (Design and Analysis of Surveys) was applied in its version 4 (Santesmases, 2009) to the data of the surveys, to perform the multivariate statistical analysis of 1st generation: Principal Components Analysis (PCA)) and Chi-square Automatic Interactions Detection (CHAID).

In a second stage, the variables were reconfigured according to the causality model of the European Customer Satisfaction Index (ECSI). The ECSI relational system was used, the internal construct of latent variables and its relationship with the Measurable variables, applying the SmartPLS 3 program in its version 3.2.7 (Ringle et alt., 2015) to determine the parameters of the second generation multivariate PLS-SEM model. From all these results, analysis, diagnostics and testing to the relevant conclusions.

PRINCIPAL COMPONENTS ANALYSIS (PCA), CHAID, AND PLS-SEM

With the PCA, a total of 5 Factors with own value higher than 1 were found, which together explained 61.22% of the variance. The associations of variables involved in the factors were:

- The Factor 1 (F1), explains 22.58% of the variance, is associated with the variables: LIMP-ENT, SEÑAL, CAMINO, PAISAJE and ENTORNO. These positive relationships can be interpreted as the valuation of the infrastructures and the environment, and it is considered as PERCEIVED QUALITY.

- Factor 2 (F2), explains 16.51% of the variance, accumulates 39.09% and is associated with the variables VALORGLO, RECOMPN and VOLVER. These positive relationships would be equated to the Final Product or Result of the Visit, so it could be identified as SATISFACTION + LOYALTY = FINAL RESULT.

- Factor 3 (F3), explains the 8.57% of the variance, accumulates 47.66%, is associated with the variables OBJETIVO, SATGENT2 and VAL-VISI. These positive relationships indicate the concrete evaluation of the visit according to the defined objectives. It could be identified as PERCEIVED VALUE.

- Factor 4 (F4), explains 7.01% of the variance, accumulates 54.67%, is associated with OPIN PUB and PAGARIA variables. It presents a negative correlation, which would indicate an antagonism in the opinions that they represent and it is considered that this interpretation does not make any sense.

- Factor 5 (F5), explains 6.55% of the variance, accumulates 61.22%, is associated with the variables NORMAS, LIMP-SIT and VALSERAC. They present a negative correlation with the variable 51, which would indicate a certain antagonism in the opinions represented by the evaluation of services and activities based on knowledge of the norms and objectives of the space and which would indicate that they already know what can be found, what this factor could be identified with the IMAGE.

The CHAID analysis design has been defined based on the variables VALORGLO and RECOMPN, which are both considered separately as dependent variables. The specific explanatory variables are the same as in the PCA, since they suppose a relevant and causal content with respect to the ultimate goal of explaining the overall satisfaction of the visitor

and their loyalty or fidelity. Next, the CHAID analysis has been applied with the DYANE v4 program (Santesmases, 2009), separately one by one, with respect to the two criteria variables: VALORGLO or Total Satisfaction Level of the visit, and RECOMPN or Would you recommend this National Park to other people ?, which indicates or is synonymous with the level of loyalty of the visitor, and the same set of explanatory variables (13 variables) used in the PCA analysis.

- In the CHAID VALORGLO design and results (Total Level of Satisfaction of the Visit) with respect to the explanatory variables, the corresponding dendrogram was obtained and the CHAID analysis of the Global Assessment of the Visit to the following grouping of the variables has been obtained:

Level of Total Satisfaction of the Visit ➔ Landscape ➔ State of signalling ➔ Achieved objectives

- In the CHAID RECOMPN design and results (you would recommend the National Park) with respect to the explanatory variables, the dendrogram has also been obtained and in the CHAID analysis with respect to the variable RECOMPN, the variables of the form have been grouped:

Recommend the NP ➔	Assessment of the Visit ➔	State of the roads	
		P I would pay ➔	Achieved objectives
			Satisfaction for the people found

Finally, with the PLS-SEM application, 7 latent interrelated variables are analysed: Consumer Expectations, Perceived Quality, Perceived Value, Image, Complaints, Consumer Satisfaction and Loyalty. The first five are independent, which will try to explain Consumer Satisfaction and Loyalty (dependent variables), according to the ECSI model.

Visitor Expectations is measured by the measurable variable VAL-EXPEC; The Perceived Quality is measured by the measurable variables CAMINO, ENTORNO, HORARIOS, LIMP-INS, LIMP-SIT and PAISAJE; the Perceived Value is measured by the measurable variable VAL-VISI; the Image is measured by the measurable variables ATEN-PER, LIMP-ENT, NORMAS, OPINPUB and VALSERAC; and the variable Complaints is measured by the measurable variable OPSERSUF.

After the application of SmartPLS version 3.2.7 (Ringle et alt., 2015) and the respective analyses, the results and analysis of the previous methods are endorsed.

TO SUMMARY THE CONCLUSIONS

It is possible to conclude the degree of importance of the Perceived Value, through the Expectations of the User of the National Park, as builder of the Global Satisfaction of the Visitor, where Image and Perceived Quality have less influence. In relation to the Image, the Opinion on the Publications and the Evaluation of the Services and Activities of the park contribute more weight. Regarding Perceived Quality, the measurable varia-

bles that contribute the most weight are the Landscape Assessment and the Environment Assessment. Also highlight the confirmation through the PLS-SEM analysis, that the Global Satisfaction of the Visitor is manifested with a high level of correlation, from the Total Satisfaction Value declared by the visitor attending all the components or aspects of the park, the satisfaction derived from the environment and meeting of people, and the declaration of recommendation of the park to other people. Likewise, a strong path is observed from this Global Satisfaction of the Visitor towards Loyalty.