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Classification model for tourist **loyalty** towards **inland destinations**: A use case of a province in the north of Spain

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Abstract | Nowadays, tourism plays an important role in the economy, and specially, in inland destinations the tourism sector is a relevant economic and social development source. Thus, identifying the key factors in the tourist offer of an inland destination can be decisive in a tourist's decision when revisiting said destination. For this, the work presents a classification model of the loyalty of both domestic and international tourists to the province of Burgos, Spain. This model, with an accuracy level of 86.23%, is a diagnostic and decision-making tool for the province's tourism activity. In addition, the factors: type of motivation in carrying out the trip, origin of the main expenses during the visit, overnight stay during the trip, travel planning organized by an agency and level of total expenses have been identified as keys to enhance loyalty of tourists, causing important implications for improving the tourism management in Burgos.

Keywords | Tourist loyalty, classification model, tourist behaviour, tourist perceptions, inland destinations

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1. Introduction

Tourism is one of the most important economic industries in the world and particularly in Spain, as is shown by the macroeconomic indicators for 2019[1] that reflect the large amount of Gross Domestic Product (12.40%) and of employment (12.90%) directly resulting from tourism activity (INE, 2022). Tourism sector involves a massive phenomenon with significant economic, social, cultural, and environmental consequences and therefore, it plays a very important role in the growth of the economy (Osman, 2013).

Local communities find in tourism a source of competitive advantage since, unlike other industries, it offers better outputs compared to the human and material inputs needed for its operation (Cook, Yale, & Marqua, 2006; Crouch & Ritchie, 2011). Moreover, different works ratify the importance of the tourism sector in inland areas (Jesús & Franco, 2016; Campón-Cerro, Hernández-Mogollón, & Alves, 2017; Scorza, Pilogallo & Las Casas, 2019; Prat Forga, 2020; Alves, Manso, Teixeira, Estevão, & Nave, 2022; Gatto, Santopietro, & Scorza, 2022) placing it as a driver of rural development that attracts tourist flows to these areas and contributes to a better spatial and temporal distribution of these flows, reinforces the benefits of these areas through the additional income and improved quality of life of residents, improves infrastructures and employment levels, among other aspects. However, not many studies have focused on the province of Burgos (Antón Maraña, Aparicio Castillo, Puche Regaliza, & Arranz Val, 2021), which motivates this work to deepen the analysis of the tourism sector in this rural inland area.

Particularly, in the province of Burgos (Spain), tourism is a sector that promotes both economic and cultural activity. The tourism sector generated in this province an economic impact of 323.7 million euros and an employment of 11,558 affiliates and in terms of demand, it was visited in 2019 by 1,503,199 travellers (with 2,329,692 overnight stays), 633,450 excursionists and 319,561 private accommodation tourists (JCyL[2], 2022a). These figures show that tourism is an economic powerhouse, and it has the potential to contribute to all UNWTO[3] Sustainable Development Goals (SDGs). In the case of the province of Burgos, tourism provides income through job creation (SDG 1 – No poverty) and the tax income generated from tourism can be reinvested, for example, in health care and other services (SDG 3 – Good health and well-being) (SODEBUR, 2023a). Also, tourism in Burgos can be a powerful tool for development and reducing inequalities (SDG 10 – Reduced inequalities) in terms of developing the inland destination of Burgos with an integrative vision that focuses its tourism evolution on the joint development of new information technologies, sustainability, innovation, or social cohesion. Tourism can advance urban infrastructure and accessibility and promote regeneration and preservation of cultural and natural heritage, assets on which tourism depends (SDG 11 – Sustainable cities and communities) since rich biodiversity and natural heritage are often the main reasons why tourists visit a destination (SDG 15 – Life of land) (UNWTO, 2022). The pursuit of all these objectives will help to alleviate an important current problem which is that of the depopulation suffered by many places in the Spanish interior. This problem has numerous negative consequences in social, cultural, environmental and, above all, economic terms, and mainly affects inland and rural areas (Serra, Pallares-Barbera, & Salvati, 2022).

In this context and according to Spain's Sustainable Tourism Strategy 2030 (Ministry of Industry, Trade and Tourism, 2022) and the Strategic Tourism Plans of the region of Castilla y León (JCyL,

[1] All the data used in this work is relative to the year 2019 to avoid the effect caused by COVID-19 on the touristic sector
[2] Acronym for Board of Castilla y León in Spanish language
[3] Acronym for the United Nation World Tourism Organization

2022b), the Society for the Development of the Province of Burgos (SODEBUR), an instrumental entity of the Burgos Provincial Council, has developed the Burgos Rural Strategic Plan 2025 that states it is necessary to optimize the province's competitive advantages by creating a more sustainable and economically efficient tourist destination model in order to position Burgos as a benchmark for quality of life, economic activity and smart destination (SODEBUR, 2023a).

In keeping with this idea and given that tourism is fundamental in the generation of income, wealth and employment to tackle the problem of depopulation in an inland rural area like Burgos province, this work aims to provide the tourism sector with a support tool for decision-making aligned with sustainable development. Therefore, the objective pursued is to identify the meaningful variables of the loyalty of tourists visiting Burgos in order to define a model that increases the probability of success in management decision-making in the tourism sector in the province of Burgos. For this purpose, an exploratory empirical study has been carried out by applying a mathematical classification model that allows a multivariate analysis for tourist loyalty. The model based on domestic and international tourist profiles, includes sociodemographic characteristics and aspects related to all stages of the trip: the behaviour before and during the visit, the perception after the visit and the behavioural intention, i.e. the intention to revisit the destination (Kullada & Kurniadjie, 2021). So, this work supports those agents and institutions involved in tourism to monitor and better understand the profile of tourists, their behaviours and perceptions, facilitating the management of tourist destinations and businesses and decision making based on reliable and nuanced information. Knowing how tourists who visit destinations in Burgos are, how they behave and how they perceive their experience, allows tourism agents to adopt measures focused on improving the quality of tourist infrastructures and services and preserving natural and heritage resources, being a key factor in enhancing the value of destinations from the point of view of territorial sustainability and tourist attractiveness.

Thus, the main contribution of this work derives from applying a painstaking classification method in a case study with empirical support to analyse tourist loyalty in a specific inland destination, the province of Burgos.

To reach this goal, the rest of this paper is structures as follows. At first, the next section presents a literature review related to tourist loyalty. Secondly, the methodology used in the study is shown below. Then, in the results section, a practical validation of the defined methodology is carried out. Finally, the last section offers concluding remarks, highlights the limitations of the study, and proposes some future lines of research in favour of scientific progress.

2. Literature review

Consumer loyalty has been a relevant topic studied by many authors in the literature since the early 20th century (Rundle-Thiele, 2005; Jang & Feng, 2007; Assaker, Vinzi, & O'Connor, 2011; Dolnicar, Coltman, & Sharma, 2015). Loyalty is defined as a deep commitment to purchasing a product or service again in the future despite external factors that tend to provoke a change in behaviour such as social and marketing impact (Oliver, 1999). Increasing consumer loyalty has become one of the main objectives of marketing strategy as retaining existing consumers brings many benefits to businesses (McMullan & Gilmore, 2008). According to most marketers, consumer loyalty is considered to be one of the most significant determinants of the success of marketing strategies, and the theory also holds true for tourism products (Lee, 2009).

Loyal tourists not only represent a steady income stream, but also acting as information chan-

nels that in an informal way connect networks of friends or other potential travellers to a destination (positive worth-of-mouth endorsements); they are less price sensitive, showing a greater disposition to pay; and also, the cost of attracting repeat tourist is lower (Reichheld & Sasser, 1990; Oliver, 1999; Shoemaker & Lewis, 1999; Oppermann, 2000; Lau & McKercher, 2004; Wang, 2004). Further, repeated tourists tend to spend more (Letho et al., 2004) and stay longer than first-time visitors (Wang, 2004). This is why tourism agents make decisions aimed at competing in the number of repeated visitors.

Although different approaches in the conceptualization of loyalty have been adopted (Jacoby & Chestnut, 1978; Moore et al., 2015; Almeida-Santana & Moreno-Gil, 2018), the behavioural approach is the most appropriate in a tourism context since most of the benefits that a loyal tourist provides to the destination are basically motived by their behaviour (Oppermann, 2000; San Martin, Collado, & Rodriguez del Bosque, 2013; Antón, Camarero & Laguna-Garcia, 2017). This perspective measures loyalty as the intention to re-visit a destination and the number of repeat visits to a destination (McKercher, Denizci-Guillet, & Ng, 2012; Prada-Trigo, Armijos Chillogallo, Crespo Córdova, & Torres León, 2017; Malmiri, Isfahani, BahooToroody, & Abaei, 2021). The greater the number of times a tourist visits a destination, the greater the loyalty that the tourist has to that destination, and therefore, the greater the benefits for all the stakeholders involved (Meleddu, Paci, & Pulina, 2015; Almeida-Santana & Moreno-Gil, 2018). Accordingly, a destination must attract and retain its target tourists (Gursoy, Chen, & Chi, 2014) by giving an important role to loyalty as the best predictor of future behaviour and a source of competitive advantage and success in the tourism industry (Sun, Chi, & Xu, 2013; Gursoy et al., 2014). From this point of view, understanding the various elements that determine tourist loyalty and how they relate to each other has become an important topic. A deal of studies has tackled this and have tried to find out the antecedents that explain the tourist's loyalty such as tourist's profile, motivations, involvement, previous experiences, destination image, place attachment, service quality, perceived value, and satisfaction (Bigne, Sanchez, & Sanchez, 2001; Um, Chon, & Ro, 2006; Chen & Tsai, 2007; Faullant, Matzler, & Füller, 2008; Wang, Wu, & Yuan, 2010; Yuksel, Yuksel, & Bilim, 2010; Poria, Reichel & Cohen, 2011; Forgas-Coll, Palau-Saumell, Sánchez-García, & Callarisa-Fiol, 2012; Gursoy et al., 2014).

According to Chen and Chen (2010) loyalty to the destination is a key element in marketing strategies since it is the best predictor of post-visit behaviour. There are studies that predict the behaviour of tourists after the visit (Chi, 2012; Crilley, Weber, & Taplin, 2012; Bigovic & Prašnikar, 2015; Popa, Yusof, & Geok, 2017; Halpenny, Kono, & Moghimehfar, 2018; Lee, Coetzee, Hermann, & du Plessis, 2018). However, very few works have been found that make a prediction of tourists' post-visit behaviour, i.e., the tourist loyalty, in inland rural destinations (Correia-Loureiro & Miranda-González, 2008; Osman, 2013; Campón-Cerro et al., 2017; Constantin, Ispas, & Candrea, 2022). The techniques these papers use to study loyalty are structural equation modelling with PLS techniques and exploratory factor analysis.

Due to the fundamental role that loyalty plays in the competition (Weaver & Lawton, 2011) and profitability (Yoo & Bai, 2013; Campón-Cerro et al., 2017) of inland tourist destinations, it is important to analyse and use the information related to tourist loyalty properly as it will allow to identify different groups of tourists (Petrick, 2005; Meliá-González, Moreno-Gil, & Araña, 2011). In this sense, fully understanding the profile, behaviour, and perceptions of tourists and predicting their future behavioural intentions is a crucial task for decision making in the tourism sector in terms of designing memorable experiences and developing competitive marketing strategies to encourage tou-

rists to revisit the destination (Huang, Chang, & Backman, 2019). According to Eusébio and Vieira (2013), loyalty is key to maintain a destination's competitive advantage and this, in turn, translates into economic stability and employment for local communities. Moreover, the improvement of tourism decision-making may increase the province's competitiveness with respect to other destinations, easing the problem of depopulation, as the strengthening of the tourism sector is often considered as a local territorial development strategy linked to the attraction of new inhabitants in environments prone to population loss (Dot Jutglà, Romagosa, & Noguera, 2022).

The rise of rural tourism in recent years, especially after the Covid-19 pandemic, has forced destination managers to seek innovative marketing strategies and sustainable competitive advantages in the search for tourist loyalty, in the hope of increasing the benefits of repeat visits and recommendations (Fyall, Callod, & Edwards, 2003; Shirazi & Som, 2011; Streimikiene, Svagzdiene, Jasinskas, & Simanavicius, 2021). This need is even more accentuated in an activity as specialized as rural tourism, which has numerous micro-destinations.

Competitiveness and sustainable development - economic, social and environmental - can be addressed together through the implementation of innovative strategies and the promotion of sustainable consumption principles (Streimikiene et al., 2021). Therefore, it is important to know the market, the tourists, in order to achieve the desired development effect in the destination through rural tourism using well-planned and managed strategies that make efficient use of the rather limited resources available in these areas. By addressing the needs and desires of the market and the interests of local residents, rural tourism can play an important role in the sustainable development of destinations (Kastenholz, Carneiro, Marques, & Lima, 2012; Kastenholz, Eusébio, & Carneiro, 2018).

Ultimately, loyalty has been identified as a sustainable competitive advantage and therefore a long-term success factor of a destination, becoming the cornerstone for the creation of a sustainable destination strategy in rural destinations (Campón-Cerro et al., 2017).

Therefore, to the best of our knowledge, no studies have been found that use penalised regression methods to analyse the factors that influence the loyalty of tourists visiting an inland rural destination, which is identified as a research gap.

In order to overcome this shortcoming, the main contribution of this study is to carry out an exploratory empirical analysis to determine the significant factors that increase the probability that a tourist will return to the destination, i.e. that they will be loyal, using more precise methods than those commonly used in an inland destination in the north of Spain (province of Burgos).

3. Methodology

In the first place, the decision variables used to classify tourist loyalty in the province of Burgos have been identified. Subsequently, the design of the data collection process is presented, determining the technical characteristics of the study.

3.1. Decision variables for tourism loyalty classification model

The decision variables used to define the tourist loyalty classification model in the province of Burgos have been identified based on the tourists' profile, reflecting on socio-demographic characteristics, their behaviour before and during the trip and their perception after the trip. Finally, the variable intended to examine tourist loyalty (LOY) in the province of Burgos has been added to the set of variables. Table 1 summarizes all the variables considered, together with their code, description, values, type of variable and references of authors who include them in their works.

These 75 decision variables are the basis for designing the questionnaire[4] to survey the respondents, which was used in the data-collection process.

Table 1 | Decision variables for tourism loyalty classification model

CODE	VARIABLE	VALUE	TYPE	REFERENCES
Personal profile				
GEN	Gender	(Male; Female)	Binary	(Ozdemir et al., 2012)
AGE	Age	(<25; 25-39; 40-54; 55-65; >65)	Ordinal	
STS	Education level	(Undergraduate; Graduate)	Binary	
EME	Employee is the current occupation	(No; Yes)	Binary	
EMR	Employer is the current occupation	(No; Yes)	Binary	
UNE	Unemployed is the current occupation	(No; Yes)	Binary	
HOU	Housework is the current occupation	(No; Yes)	Binary	
STT	Student is the current occupation	(No; Yes)	Binary	
RET	Retired is the current occupation	(No; Yes)	Binary	
ORI	Origin Spain	(No; Yes)	Binary	
Planning the visit				
ALO	Travel alone	(No; Yes)	Binary	(Ozdemir et al., 2012)
COU	Travel in couple	(No; Yes)	Binary	
ORG	Travel through an organized trip	(No; Yes)	Binary	
FRI	Travel with Friends	(No; Yes)	Binary	
FAM	Travel in family	(No; Yes)	Binary	
NAT	Enjoying natural environment is the reason to travel	(No; Yes)	Binary	(Yoon \& Uysal, 2005; Sun et al., 2013; Prebensen, Woo, \& Uysal, 2014)
PRO	Professional reason to travel (work, studies, conferences…)	(No; Yes)	Binary	
SPO	Doing sport activities is the reason to travel	(No; Yes)	Binary	
ARC	Visiting archeological sites is the reason to travel	(No; Yes)	Binary	
HOL	Enjoying holidays/free time is the reason to travel	(No; Yes)	Binary	
MON	Visiting monuments/heritage is the reason to travel	(No; Yes)	Binary	
FAF	Visiting family/friends is the reason to travel	(No; Yes)	Binary	
ACT	Active tourism is the reason to travel (hiking, climbing…)	(No; Yes)	Binary	
NEW	Visiting new places is the reason to travel	(No; Yes)	Binary	
GAS	Tasting local gastronomy is the reason to travel	(No; Yes)	Binary	
EVE	Attending to events is the reason to travel	(No; Yes)	Binary	
ROS	Route to Santiago is the reason to travel	(No; Yes)	Binary	
ROC	Route to Cid is the reason to travel (No, Yes)	(No; Yes)	Binary	
WIN	Wine tourism is the reason to travel	(No; Yes)	Binary	
CEL	Celebrations is the reason to travel	(No; Yes)	Binary	
GUI	Knowing the place through the guides/brochures	(No; Yes)	Binary	(Prebensen et al., 2014; Llodrà-Riera, Martínez-Ruiz, Jiménez-Zarco, \& Izquierdo-Yusta, 2015; Almeida-Santana \& Moreno-Gil, 2018)
TOU	Knowing the place through the tourism information office	(No; Yes)	Binary	
MAS	Knowing the place through the mass media	(No; Yes)	Binary	
FRF	Knowing the place through the family/Friends	(No; Yes)	Binary	
LOC	Knowing the place because is local	(No; Yes)	Binary	
TOF	Knowing the place through the tourism fair	(No; Yes)	Binary	
SOC	Knowing the place through social networks	(No; Yes)	Binary	
INT	Knowing the place through the Internet	(No; Yes)	Binary	
CAR	Car is the type of transportation	(No; Yes)	Binary	(Ozdemir et al., 2012)
BIK	Bike is the type of transportation	(No; Yes)	Binary	
BUS	Bus is the type of transportation	(No; Yes)	Binary	
WAL	Walking is the type of transportation	(No; Yes)	Binary	
TRA	Train is the type of transportation	(No; Yes)	Binary	
PLA	Plane is the type of transportation	(No; Yes)	Binary	

[4]Questionnaire is available on request from the authors

Table 1 | Decision variables for tourism loyalty classification model (cont.)

WOB	Planning the trip without booking	(No; Yes)	Binary	
PHO	Planning the trip through the mobile phone	(No; Yes)	Binary	
INE	Planning the trip through the Internet	(No; Yes)	Binary	
TRY	Planning the trip through travel agency	(No; Yes)	Binary	
The visit				
HOT	Hotel is the type of accommodation	(No; Yes)	Binary	(Smeral, 2006; Ozdemir et al., 2012; Salmasi, Celidoni, \& Procidano, 2012; Pérez-Cabañero, Cervera-Taulet, \& Schlesinger et al., 2017)
HOS	Hostel is the type of accommodation	(No; Yes)	Binary	
RUR	Rural accommodation is the type of accommodation	(No; Yes)	Binary	
FFA	Family/friends' home is the type of accommodation	(No; Yes)	Binary	
CAM	Camping is the type of accommodation	(No; Yes)	Binary	
WOS	Without overnight stay	(No; Yes)	Binary	
ACC	Accommodation is the main expenses during the visit	(No; Yes)	Binary	(Kim Prideaux, \& Chon, 2010; Rong-Da Liang, Chen, Tung, \& Hu, 2013)
CUL	Culture/leisure is the main expenses during the visit	(No; Yes)	Binary	
BAC	Bar/cafe is the main expenses during the visit	(No; Yes)	Binary	
TRN	Transportation is the main expenses during the visit	(No; Yes)	Binary	
RES	Restaurant is the main expenses during the visit	(No; Yes)	Binary	
SHO	Shopping is the main expenses during the visit	(No; Yes)	Binary	
TOE	Total expenses per person/day (€)	(<50; 51-100; 101-150; 151-200; >200)	Ordinal	
SIP	Signpost quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	(Hui, Wan, \& Ho., 2007; Kozak, 2007; Chi \& Qu, 2008; Alrawadieh, Alrawadieh, \& Kozak, 2019).
CUA	Cultural areas quality (museums, exhibitions…)	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
HSF	Hotel staff quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
INP	Tourist information point quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
MVH	Monument visiting hours quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
ACO	Accommodation offer quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
LOG	Local guides quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
QUC	Quality-cost relation in restaurants	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
WEI	Webs/Internet quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
PAR	Parking quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
LOS	Local shop quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
BRM	Brochures/maps quality	(1: Not satisfied at all; 5: Very satisfied)	Ordinal	
INC	Any incident during the trip	(No; Yes)	Binary	
Loyalty				
LOY	Loyalty: 'I'll try to come back again'	(No, Yes)	Binary	(Croes, Shani, \& Walls., 2010; Wilkins, Wilkins, Merrilees, \& Herington., 2010; Song, Li, van der Veen, \& Chen 2011; Ozdemir et al., 2012)

3.2. Data-collection process

3.2.1. Survey instrument

The data necessary to achieve the main objective were collected by means of surveys using a structured questionnaire with mainly closed-ended questions (binary and ordinal). The questionnaire covers all the decision variables indicated in section 3.1. and groups them into personal profile, planning the visit, the visit and loyalty. It is structured and validated in accordance with the objective established for this study. As for the categorical variables related to the gender, the age, the education level, the current occupation and the origin, they will be used in future studies to stratify the sample.

In addition, the questionnaire was completed with open variables related to improvement ('If you wish, please describe briefly the incident.', 'Indi-

cate why you would recommend this destination.', 'We would be grateful if you pointed out those aspects that, in your opinion, should be improved.', 'What things are better in other visited places that there is not in the province of Burgos?', 'What other activities would you like to see carried out in the province of Burgos?') to collect the subjective opinion of the travelers. The open variables will allow gathering ideas for improvement and to conduct an evaluation to increase the performance of different service provision in future works.

3.2.2. Sampling procedure

The fieldwork was carried out by two professors and eight students from the University of Burgos as well as collaborating surveyors from tourist establishments and Tourist Offices, by means of face-to-face surveys during the holiday periods of Easter, Christmas and summer vacations (July and August). In order to avoid any bias derived from the different holiday periods, we tested the difference in means for each variable for the different holiday periods with a T-student test and found that there were no significant differences at a 95% confidence level between the samples collected in each period when we obtained statistical significance (p) values greater than 0.05.

The sample was carried out in eight villages in the province corresponding to the target points obtained on the basis of the Tourism Potential Index for the province of Burgos (Aparicio-Castillo et al., 2022). This Tourist Potential Index (TPI) is calculated by considering the tourist facilities, the tourist resources and the accessibility of the destination of each locality. These eight locations were Valle de Sedano, Miranda de Ebro, Lerma, Aranda de Duero, Villarcayo de Merendidad de Castilla la Vieja, Santo Domingo de Silos, Neila and rural surroundings of the Burgos capital.

Afterward, the distribution of the population and the distribution of the sample was done. With regard to the distribution of the population, the population under study was considered to be people who visit the province of Burgos, over 16 years of age and not resident in the locality where the survey is being carried out nor in the localities of the same administrative area (SODEBUR, 2023b). With regard to the distribution of the sample, a simple random sample at each target point was used. A total of 1,554 surveys were conducted, providing a confidence interval of over 95% with an error margin of less than [- 2.5%, + 2.5%].

Given that the dependent variable, Loyalty, to be studied is binary, and is measured through a single item 'I´ll try to come back again', it is not advisable to calculate Cronbach's Alpha scores to determine the internal consistency of items used to measure a variable (Frías-Navarro, 2022).

Table 2 shows the statistical technical file.

Table 2 | Statistical technical file

Year of realization	2019 (Easter, July-August, Christmas)
Methodology	Personal survey through questionnaire in tourist places and in collaborating establishments.
Information collection instrument	Questionnaire elaborated according to the proposed objective with application of ordinal and binary scales. Also, there are categorical variables and open variables.
Interviewers	Two professors and eight students from the University of Burgos, of the last university course, scholarships and trained for this purpose, as well as collaborating surveyors from tourist establishments and Tourist Offices.
Universe	People over 16 years of age, not resident in the administrative area, who visit the province of Burgos. 1,503,199 travellers + 633,450 trippers + 319,561 private accommodation tourists = 2,456,210 tourists.
Sample size	385 is the representative sample size with a heterogeneity of 50\%, a margin of error of 5\% and a confidence level of 95\%. Finally, 1,554 surveys were obtained.
Type of sampling	Simple Random Sample in 8 target points according to Tourism Potential Index of the province of Burgos.
Error margin	Lower than ± 2.5\% and a confidence level of 95\% for 1,554 interviews.

In summary, the information obtained through the 1,554 surveys of tourists in the province of Burgos, allows to know their socio-demographic profile, their behaviour before and during the trip, their perception after the trip and their intention to return, in other words, the degree of their loyalty.

3.3. Data analysis

Having collected the data through loyalty surveys, an empirical exploratory analysis is carried out with R statistical software. Firstly, some descriptive statistics were computed.

Secondly, pursuing the purpose of obtaining a mathematical model for the classification of tourist loyalty in the province of Burgos, a multivariate analysis was used with the decision variables identified as independent and with the data gathered through the surveys carried out. In supervised machine learning, dependency techniques like regressions can be used to predict continuous values or to classify discrete values. In particular, since the dependent variable (LOY) has a dichotomous character, a Binary Logistic Regression was used to classify individuals within the categories of the dependent variable, that is, obtain the probability that the dependent variable occurs, given the values of the independent variables, and to quantify the influence of the independent variables on the dependent variable, that is, determine which independent variables weigh more to increase or decrease the probability that the dependent variable will occur (Field, Miles, & Field, 2012). In this case, a factor analysis is not used because when using a binary variable as the dependent variable, logistic regression is the most appropriate technique. In addition, applying a factor analysis forces the observed variables to be included in a smaller number of unobserved variables or factors, and this is not the objective of the study, since the aim is to see the direct correlation between observed variables, both the dependent and the independent variables. Reducing the dimensionality of the data is likely to lead to a reduction of information in the study and what we aim to do is to make a thorough study of the impacts of each item on the loyalty variable.

Anyway, in general, this type of regression performs poorly in a situation where there are a high number of independent variables, how is this case. A better alternative is the penalized regression, in which the influence of less relevant independent variables is reduced by imposing a penalty to reduce the values of their coefficients towards zero, minimizing the risk of overfitting, reducing variance, and attenuating the effect of the correlation between independent variables. This is also known as shrinkage or regularization methods. Note that, the shrinkage requires the selection of a tuning parameter (lambda) that determines the amount of shrinkage. Thus, the most commonly used penalized regression methods are Ridge, where lambda = 0, Elastic Net, where 0 < lambda < 1, and Least Absolute Shrinkage and Selection Operator (LASSO), where lambda = 1. In general, by applying regularization, models with greater classification power (generalization) are obtained (James et al., 2014; Bruce & Bruce, 2017).

Finally, since we intend to rule out as many independent variables as possible, the least relevant to the model (regression coefficient equal to zero), the LASSO method is used to apply the largest penalty (lambda = 1). LASSO solutions are very unstable if the independent variables are highly correlated (Bruce & Bruce, 2017).

Next, to achieve the objective defined in section 2, the processing and analysis of the data was carried out, as shown in the following section on results.

4. Results

First, a descriptive analysis of the decision variables has been completed. Regarding the binary

decision variables (Figure 1), we highlight the high number of visitors (1,285) who have used the car (CAR) as a mode of transport and the high number of visitors (1,352) who consider the possibility of revisiting the province of Burgos (LOY). In contrast, very few visitors have chosen the plane (PLA) and the train (TRA) as a mode of transport (11 and 10 respectively), while very few also (10 and 17) define The Route to Cid as a motivation for make the trip (ROC) and have known Burgos through the tourism fair (TOF). Regarding the ordinal decision variables (Figure 2), it is noteworthy that most of the variables related to quality (ACO, BRM, CUA, HSF, INP, LOG, LOS, MVH, PAR, QUC, SIP, WEI) concentrate their responses at levels 3, 4 and 5, especially at level 3. The age of the visitors (AGE), although it does not present a great imbalance, the largest number of visitors (626) are between 40 and 54 years old. Finally, the number of visitors (1,094) who have a total expenses (TOE) of less than €50 on their trip clearly stands out. In general, the number of visitors decreases as the total expenses increase.

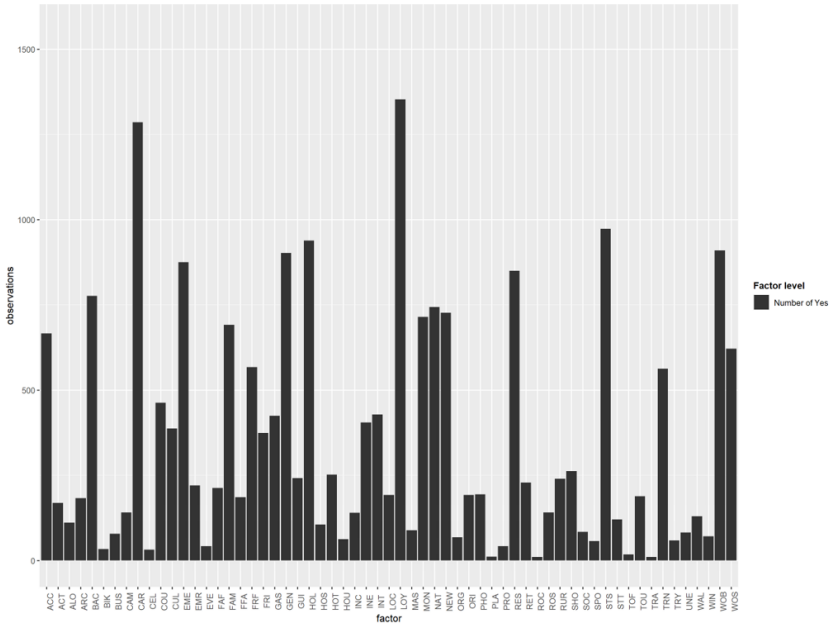

Figure 1 | Number of observations of each binary decision variable

So before applying the LASSO method, the correlation between the independent variables has been checked (Figure 3). The general appearance of soft or close to white colours indicates a low correlation between the independent variables (the quantitative values of the correlations are not shown in favour of the clarity of the figure). This allows applying the LASSO method, as a selection method, and obtaining the identification of 18 independent variables with coefficients different from 0, that is, 18 independent variables with relevant influence for the model (Figure 4). For the application of the LASSO method, the sample has been divided into two parts, one for training and the other for testing. Although it is advisable to divide the sample with an approximate proportion of 80% - 20%, due to the fact that we have a large number of observations, a proportion of 50% - 50% has been used in favour of a greater generalization of the classification model. Thus, each of the two parts has 777 observations. This division has been used in the rest of the study.

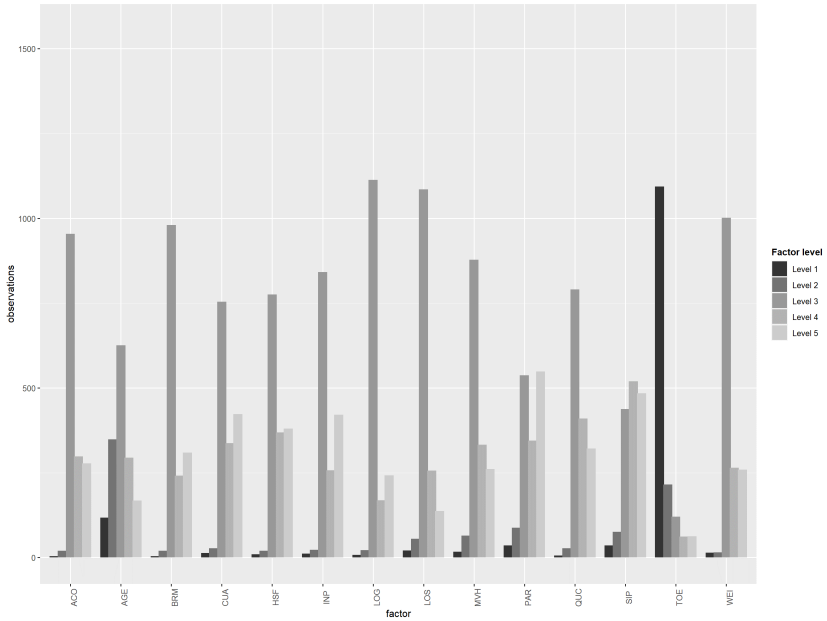

Figure 2 | Number of observations of each ordinal decision variable

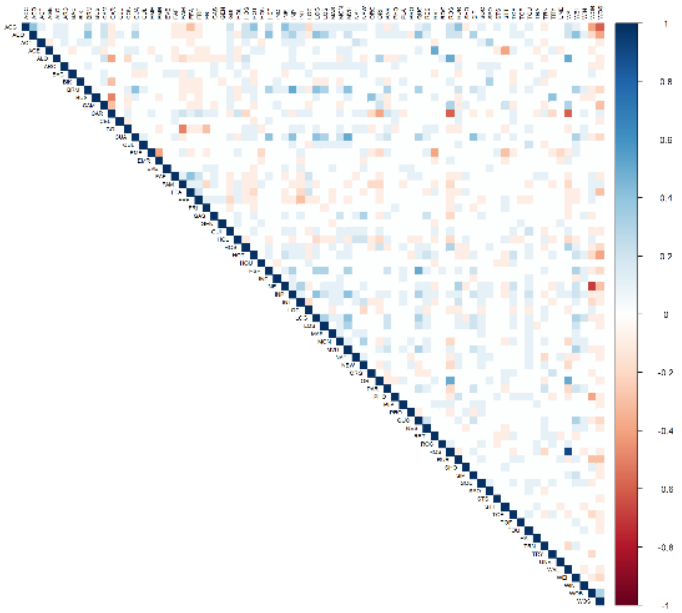

Figure 3 | Correlation of independent variables

With the 18 independent variables selected, a first iteration of the Binary Logistic Regression was made, obtaining 6 significant variables (see Figure 5), with which it was developed the classification model of tourist loyalty in the province of Burgos. In order to complete this second iteration of the Binary Logistic Regression, it made sure the condition that there is no multicollinearity between the 6 independent variables. The figure 5 shows the correlation between the independent variables, where none of the correlations reaches a value greater than 0.2, which indicates a low correlation

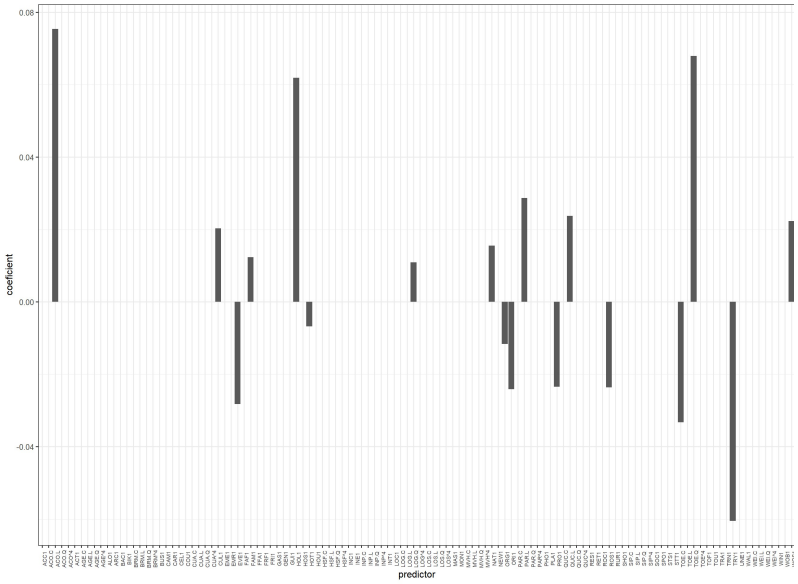

Figure 4 | LASSO model coefficients

(Hair et al., 1999). To reinforce this idea, the values of the generalized variance inflation factor (GVIF) (Fox & Monnette, 1992) (Table 3) have also been obtained, since the VIF values are not considered adequate to evaluate the inflation of the variance in categorical variables as described by Fox and Weisberg (2011). This new factor, as occurs with the VIF, if it takes values close to 1, it indicates that there is no correlation between independent variables, values between 1 and 5 indicate a moderate correlation, and a value greater than 5 indicates a potentially severe correlation, indicating that the estimates of the coefficients and the p-values in the regression result are probably not reliable (Montgomery et al., 2012).

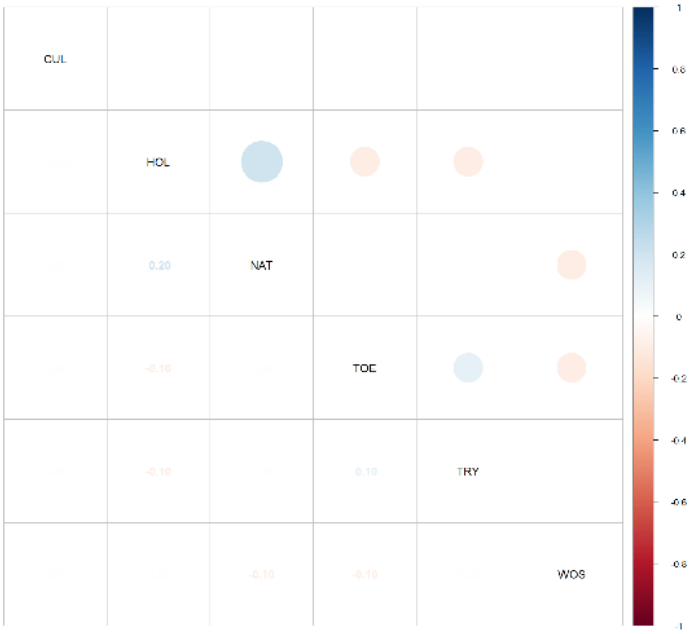

Figure 5 | Correlation between the independent variables of the Binary Logistic Regression

Table 3 | GVIF values of independent variables of the Binary Logistic Regression

	GVIF	Df	GVIF^(1/(2*Df))
NAT	1.048725	1	1.024073
HOL	1.048973	1	1.024194
TRY	1.027939	1	1.013873
WOS	1.049417	1	1.024411
CUL	1.014416	1	1.007182
TOE	1.077806	4	1.009410

Once multicollinearity issues have been ruled out, the Binary Logistic Regression was completed with the 6 variables finally selected. Table 4 shows the results obtained. The p-values indicate that all variables are significant in determining tourist loyalty. HOL at 0.1%, TRY, WOS and CUL at 5%, and NAT at 10% significance. For TOE variable, the dummy TOE.Q is statistically significant (5%) with respect to its reference category. The estimated values of the coefficients[5] allow to predict the dependent variable from the independent variables (Hosmer & Lemeshow, 2000; Agresti, 2002).

Table 4 | Binary Logistic Regression

Deviance Residuals:					
Min	1Q	Median	3Q	Max	
-27.348	0.3046	0.3920	0.5693	11.271	
Coefficients:					
	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	0.64926	0.23433	2.771	0.005593	**
NAT1	0.45176	0.23110	1.955	0.050601	.
HOL1	0.85792	0.22556	3.804	0.000143	***
TRY1	-0.97629	0.48778	-2.001	0.045339	*
WOS1	0.51994	0.24211	2.148	0.031750	*
CUL1	0.66828	0.28846	2.317	0.020520	*
TOE.L	-0.08790	0.35861	-0.245	0.806359	
TOE.Q	0.75581	0.35009	2.159	0.030858	*
TOE.C	-0.31318	0.38931	-0.804	0.421127	
TOE^4	0.08152	0.36275	0.225	0.822181	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					
(Dispersion parameter for binomial family taken to be 1)					
Null deviance: 607.97 on 776 degrees of freedom					
Residual deviance: 555.81 on 767 degrees of freedom					
AIC: 575.81					
Number of Fisher Scoring iterations: 5					

So, these results allow the definition of a classification model to estimate the probability that the tourist is loyal to the destination he has visited on the basis of the values taken by the coefficients of the independent variables. The model associated with the level of tourist loyalty toward inland destinations in the province of Burgos is represented by the following equation (equation 1):

$$P(LOY) = \frac{1}{(1 + e^{-(\beta_0 + \beta_1 X_1 + \cdots + \beta_n X_n)})} = \frac{1}{\left(1 + e^{-\left(0.64926 + 0.45176 * NAT + 0.85792 * HOL - 0.97629 * TRY + 0.51994 * WOS + 0.66828 * CUL + \begin{pmatrix} -0.08790 \\ 0.75581 \\ -0.31318 \\ 0.08152 \end{pmatrix} * TOE\right)}\right)} \quad (1)$$

[5] They are in log-odds units. Log-odds = Log(p/1-p), where p is the probability of being in loyal and 1-p is the probability of being not

In order to interpret the model, the probabilities of a tourist's loyalty have been calculated for each of the values that an independent variable can take, keeping the rest of the independent variables at their base level. The probability plots with a 95% confidence interval show these probabilities for each of the independent variables (Figure 4). The average marginal effect (AME) of each of the independent variables, that is, the variation in the loyalty probability caused by the change in one-unit in the value of an independent variable, keeping the rest of the independent variables at their base level, allows the analysis of the influence of said independent variable over the dependent variable (Field et al., 2012). Specifically, when a tourist goes from not making the trip for holidays/free time reasons to making the trip for holidays/free time reasons, the probability of loyalty increases by 11.69% (Figure 6). When a tourist goes from not making the trip for reasons of natural environment to making the trip for reasons of natural environment, the probability of loyalty increases by 6.99% (Figure 7). When a tourist goes from not having the main expenses during the visit in culture/leisure to having the main expenses during the visit in culture/leisure, the probability of loyalty increases by 9.66% (Figure 8). When a tourist goes from making the trip with an overnight stay to making the trip without an overnight stay, the probability of loyalty increases by 7.87% (Figure 9). On the contrary, when a tourist goes from not having the planning of the trip organized by a travel agency to having the planning of the trip organized by a travel agency, the probability of loyalty decreases by 21.16% (Figure 10). The TOE variable has a slightly different interpretation. When a tourist goes from having a total expense of less than €50 to having a total expense between €51 and €100, their loyalty decreases by 21.24% (Figure 11). When the tourist goes from having a total expense of less than €50 to having a total expense between €101 and €150, their loyalty decreases by 19.63%. When the tourist goes from having a total expense of less than €50 to having a total expense between €151 and €200, their loyalty decreases by 13.09%, and when the tourist goes from having a total expense less than €50 to having a total expense greater than €200, their loyalty decreases by 5.90%. Finally, considering all independent variables at their base level (intercept), i.e., a tourist whose motivation to make the trip is neither holidays/free time nor natural environment, the main expenses during the visit are not culture/leisure, does not plan the trip through travel agency, with overnight stay, and with total expenses under €50, the probability of having loyalty to the destination is 0.77.

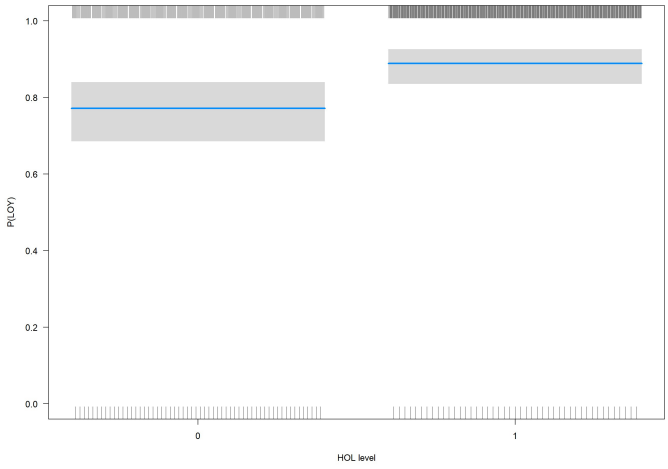

Figure 6 | Probability plot for HOL level

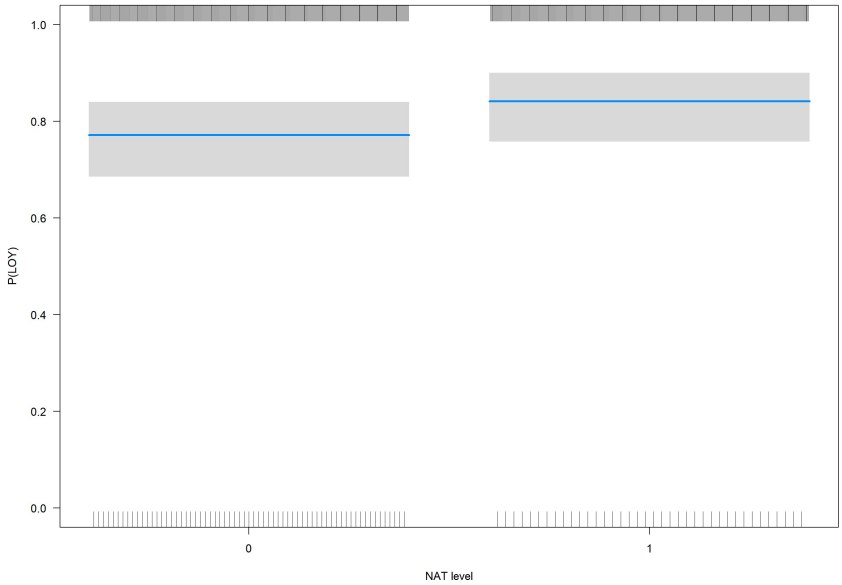

Figure 7 | Probability plot for NAT level

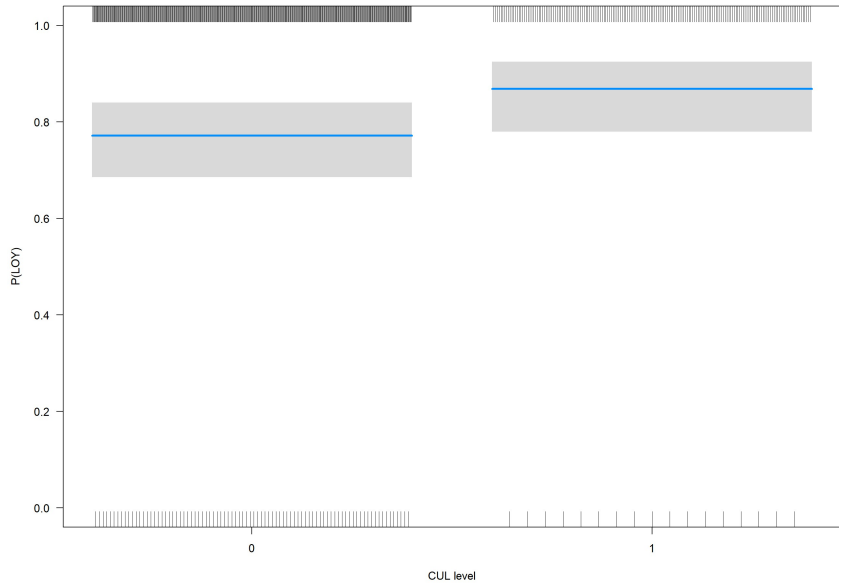

Figure 8 | Probability plot for CUL level

When carrying out any regression model, it is necessary before drawing conclusions to check that the model actually fits the data. McFadden's Pseudo-R2 value is the most commonly reported metric for evaluate the Binary Logistic Regression model goodness-of-fit (Field et al., 2012). The obtained value of 0.0857878 (Table 5) indicates a moderate fit of the model to classify the dependent variable, that is, we can consider that the model fits the data acceptably. According to McFadden himself, values of 0.2 to 0.4 for Pseudo-R^2 represent an excellent fit (McFadden, 1977).

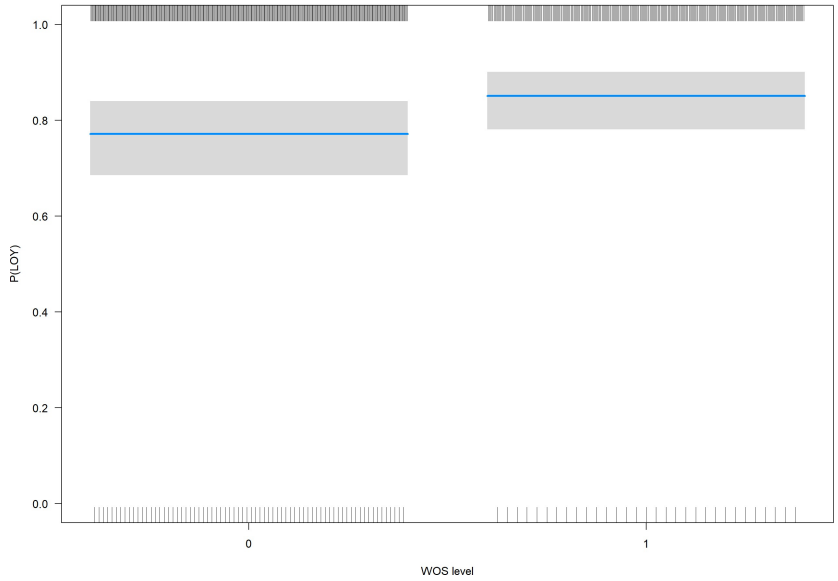

Figure 9 | Probability plot for WOS level

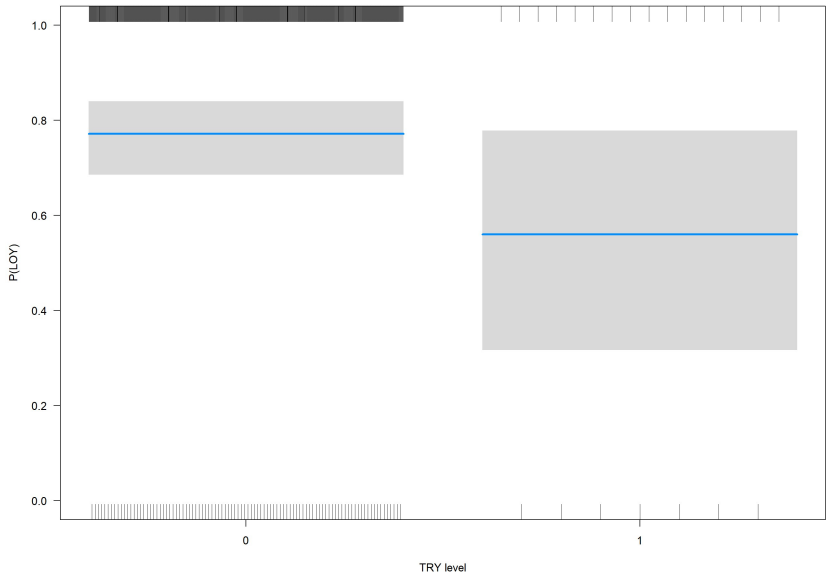

Figure 10 | Probability plot for TRY level

Also, the likelihood ratio test (LR test) is a goodness-of-fit test used to compare two models; the null model and the fitted model (Baggio & Klobas, 2017 p.109). The log-likelihood difference between the intercept-only model (null model) and the model with all independent variables (fitted model) is -26.078, indicating a better fit of the fitted model. The improvement of the fit is also significant (p-value <0.05). The positive value of χ^2 (52.156) indicates that the residual deviance (fitted model) is less than the null deviance (null model). Specifically, it goes from a value of 607.97 to a value of 555.81 (Table 4), which indicates that with the independent variables included in the model, the classification of the dependent variable is improved. As a conclusion, it can be said that, in general, the model has a significant contribution in classifying the loyalty of a tourist in the province of Burgos.

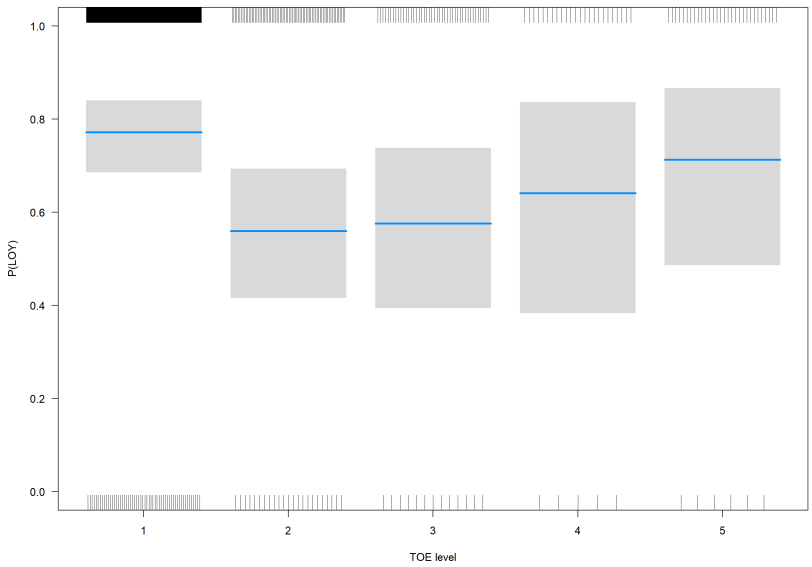

Figure 11 | Probability plot for TOE level

Table 5 | Model goodness-of-fit test

Pseudo.R.squared.for.model.vs.null			
			Pseudo.R.squared
McFadden			0.0857878
Cox and Snell (ML)			0.0649216
Nagelkerke (Cragg and Uhler)			0.1196230
Likelihood.ratio.test			
Df.diff	LogLik.diff	Chisq	p.value
-9	-26.078	52.156	4.2233e-08
Number.of.observations			
Model: 777			
Null: 777			
[1] "Note: For models fit with REML, these statistics are based on refitting with ML"			

Once the classification model has been defined with training data, its classification ability is evaluated using test data. The regression function has been used to classify whether a tourist is loyal or not in order to check whether the regression function classifies correctly. The model offers a very low mean squared error (MSE) (0.1074296) when classifying the same observations with which it has trained and a slightly higher value (0.1087022) when classifying the test observations, which reinforces the usefulness of the model. Once the probability of the tourist being loyal was calculated through the regression function, the tourists were classified by setting the cut-off point at 0.5592223 (probability threshold obtained with an accuracy level of 0.8622909) from which the loyalty variable is considered to belong to one group (0 = not loyal) or another (1 = loyal). Therefore, if the function has a result (after substituting the variables en each observation) lower than 0.5592223 the tourist is classified as not loyal, and on the contrary, if it is higher or equal than 0.5592223 it is classified as loyal. The confusion matrix allows visualizing the classification of the classes (the pro-

babilities of LOY) in the test data set (Figure 12). This matrix revealed that the test data set has 99 sample cases of negative (LOY = 0) and 678 sample cases of positive (LOY = 1). The model classified 12 negatives and 658 positives with precision. Thus, the model offers a sensitivity or true positive rate of 97.05% and a specificity or false positive rate of 12.12%.

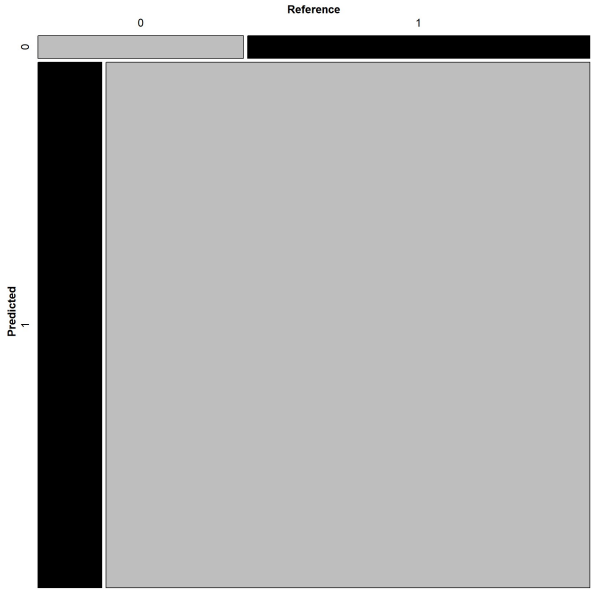

Figure 12 | Confusion matrix

Finally, the ROC curve (Figure 13) also evaluates the performance of the model. The ROC curve represents the true positive rate versus the false positive rate, indicating the ability of the model to distinguish between classes by the area under the curve (AUC). An AUC value of 0.6518 indicates a moderate performance of the model to distinguish between loyal and non-loyal tourists to the province of Burgos.

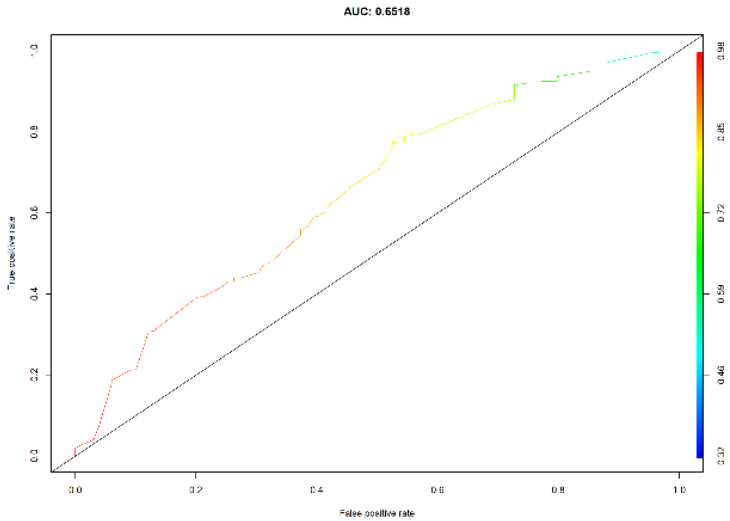

Figure 13 | ROC curve

5. Discussion and conclusions

5.1. Discussion

The empirical exploratory analysis has been carried out to detect the loyalty of tourists to the province of Burgos. A quick descriptive analysis of the data shows that 87% of visitors will be loyal to the destination and that most travellers travel by car, with total expenses of less than €50 and with a high perception of quality of services. Therefore, it follows that the province of Burgos is characterized by short, close trips, without overnight stays and with a high level of gratitude on the trip. More than remarkable conclusions for decision makers to take note of in their marketing campaigns to attract other segments of tourists and keep improving the levels of tourist loyalty.

In addition, a classification model has been offered to decision makers. In this sense, that the reason for making the trip is holidays/free time or natural environment, that the main expenses during the visit are in culture/leisure, that there is not overnight stay, that the planning of the trip is organized by a travel agency and the total expenses, are the significant variables to classify the loyalty of a tourist. The obtained model offers an accuracy level of 86.23% and is very good classifying the true positives (97.05%), that is, detecting the tourists that are loyal and more discreet classifying the false positives (12.12%), that is, detecting the tourists that are not loyal.

In the process of reviewing previous studies, it is seen how tourist revisit intention can be affected by a number of variables varying from the perceived attractiveness of the destination (Um et al., 2006) to the actual destination attributes (Mat Som, Marzuki, Yousefi, & AbuKhalifeh, 2012; Hsieh, 2012; Ngoc & Trinh, 2015). In addition, destination image, perceived quality or value, visitor motivation and satisfaction are possible predictors of future tourist behaviour (Lee, 2009; Ranjanthran & Mohammed, 2010; Elgammal & Ghanem, 2016; Jeong, & Kim, 2020).

For example, a study by Khuong and Ha (2014) revealed that motivational factors have a direct and indirect positive relationship with return intention. In contrast, Huang and Hsu's (2009) findings showed no significant relationships. On the other hand, the research by Martín-Santana, Beerli-Palacio and Nazzareno, (2017) states that trip involvement, time spent searching for information, and the number of attractions visited influence cognitive image change and a positive change in image leads to higher satisfaction and thus higher loyalty. The study by Nasir, Mohamad, Ghani and Afthanorhan, (2020) has confirmed that destination loyalty was explained by destination attractiveness, tourist satisfaction and place attachment, with a total explained variance achieved is 67%.

Therefore, there are no papers that analyse the characterisation of a loyal tourist, as most of them are structural investigations that try to analyse the relationships between constructs such as those mentioned above. The absence of tourism literature that defines with an accurate classification model the motivation that leads loyal tourists to make the trip, where they make their main expenditures, whether they stay overnight or not, how they plan their trip and the total expenditures they have, is the main reason for the present research.

5.2. Conclusions

Tourism has positive effects on the economy by generating greater consumption of its services and products and allows for the diversification of local economies. In this way, inland or less economically developed destinations find in tourism a source of income that allows them to finance public services and infrastructures. This prevents destinations with great tourist potential from being abandoned by the small population that inhabits them, as is the case with many villages in the province of Bur-

gos.

These positive effects only materialize if these tourist destinations are able to attract and retain their tourists with the appropriate marketing strategies. To do this, it is necessary to analyse the factors that affect tourists' behavioural intentions, and tourists' perceptions at the destination level. This analysis will allow both the government and private investors who have a vested interest in this industry to make decisions that will encourage tourists to revisit and recommend the destination (i.e. post-experience favourable behaviour).

In this sense, this study has aimed to deepen the knowledge of how to design sustainable pathways for rural tourism destinations to improve their competitiveness and the long-term socio-economic results derived from rural tourism, with special emphasis on increasing loyalty as a key driver.

In terms of theoretical implications, the main contribution of this work derives from applying a painstaking classification method in a case study with empirical support to analyse tourist loyalty in a specific inland rural destination, the province of Burgos. This paper has considered the research gap identified in the literature review to propose a methodology characterised by the evaluation of the impact of each item on loyalty, without grouping them into constructs or dimensions as other studies have done, losing information in the process. The use of a new, more appropriate and accurate technique for predicting loyalty when there are numerous independent variables, i.e. the penalized regression method with the algorithm called LASSO, differentiates this work from others that apply other more popular techniques such as structural equation modelling with PLS techniques and exploratory factor analysis to forecast the tourist loyalty. According to Wu and Riantama (2022), LASSO outperforms other algorithms and techniques in terms of results. This study uses LASSO for feature selection due to its powerful algorithm that allows to obtain the most important variables of tourist loyalty to the destination from the 1,554 surveys conducted. Likewise, there are few studies focused on the study of the loyalty variable in rural inland areas, as this study does.

Therefore, at a theoretical level, this work offers a guideline to follow for other studies of similar characteristics and that face similar challenges, i.e. focused on inland rural tourism, which want to be thorough in determining the relevant factors that influence the loyalty of their tourists.

Also, this work has important practical implications since it provides decision makers a clear guidance on the most effective destination management policies or strategies to bring tourists back to the destination, thus achieving an increase in tourism demand, which, in turn, provides positive socio-economic effects in the province of Burgos. Enhanced management of the tourism sector is often portrayed as a local territorial development strategy related to sustainability and attracting new inhabitants in environments likely to lose population (Dot Jutglà et al., 2022) or contributing to poverty reduction at territorial level (Gálvez Gamboa, & Muñoz Henríquez, 2022), thus furthering the UNWTO SDGs.

This study presents an in-depth understanding of how to encourage tourists to return to the destination through the identification of key factors at different stages of their trip. The findings provide recommendations for Destination Management Organisations (DMOs) to address issues related to accommodation management, closed package tour offerings, short-term experience options, road accessibility, environmental conservation, creating a variety of leisure and cultural activities, among others. It is also expected that the results will help tourism destination stakeholders to improve their tourism management by developing relational marketing communication strategies and adapting their offer to attract and retain the targeted tourist segments, in order to establish stable long-term relationships based on providing greater value to tourists to foster their loyalty.

So, this is one of the main limitations of the work carried out, probably motivated by its exploratory nature and the subjective character of the responses, as they are based on opinion surveys. As a consequence, the results should be interpreted with caution. To reduce this caution, some possible lines of future investigation which will drive the development and improvement of scientific progress initiated in this work are presented.

In this sense, first, it is proposed to group the independent variables used in dimensions that allow the causes and effects of concepts not asked in the survey to be measured directly. This will facilitate the development of more sophisticated models with higher performance in the analysis of tourist loyalty. Second, to adapt the data collection to avoid class imbalance of the dependent variable in the data set, thus improving the accuracy of the model. To balance the data, we could have selected the same number of observations of loyal tourist as of non-loyal tourists, but this situation would considerably reduce the total number of observations. For this work, we have preferred to maintain the sample size in favour of the generalization of the model and propose improvements for the next data collection process. Third, stratify the sample considering some categorization variables such as for example, gender, age groups or if the tourist uses Internet to search information about the visit or to contract or pay any aspect of the visit. A clustering process can also be done by making geographical groupings. In this work the observations have been compiled in 8 target points, but this grouping has not been considered because it is intended to analyse the loyalty of the tourist in the entire province of Burgos, without grouping by zones, counties or target points. All these variables have already been covered in the survey, in the same way as the subjective open opinions on the most notable aspects, the aspects for improvement and suggestions about activities or aspects that are better in other destinations. Their more detailed analysis can lead to significant improvements in tourist services and as a consequence to an increase in tourist loyalty with the destinations. Finally, considering the limitation of measuring the loyalty variable as a binary variable from the behavioural approach when a tourist who returns 2 times and one who returns 20 times are deemed equally loyal, it is proposed to ask the number of times they have visited Burgos, for example, in order to weight loyalty or to make clusters of more or less loyal tourists.

Acknowledgements

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