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Analysing preference heterogeneity and willingness to pay for nature-based tourism activities in Gran Canaria for young Germans

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Abstract:

This paper examines the heterogeneity in preferences and willingness to pay for various nature-based tourism activities that can be carried out in natural areas on Gran Canaria Island (Spain). A discrete choice experiment is designed to obtain information about potential visitors' preferences in a set of hypothetical scenarios involving various activity packages created by combining the levels of the attributes according to an efficient design. Collected information is used to estimate a Mixed Logit model which will allow us to evaluate random and systematic heterogeneity in preferences. A key finding of the research emanates from obtaining individual-specific parameters to calculate not only the willingness to pay for the various activities, but also the amount that could guide a potential compensation when undesired activities are included in the package. Results provide interesting managerial tools that can be used by tourism entrepreneurs to promote nature-based tourism products in the area.

KEYWORDS: Nature-based Tourism, Sustainable Tourism, Active Tourism, Discrete Choice Experiment, Willingness to Pay, Preference Heterogeneity

1 Introduction

Tourism as a fundamental component of the global economy is essential to achieve the Sustainable Development Goals of the 2030 Agenda such as responsible consumption and production, decent work, economic growth or climate action (Mulder, 2020). The new scenario created after the global Covid-19 pandemic has triggered a debate on how countries should deal with the aftermath of the crisis, taking into account the lessons learned and addressing reforms that will increase the value of promoting more sustainable tourism development. Han (2021) highlights the importance of academic research in the tourist industry in minimizing environmental impacts caused by consumer behaviour and encouraging customers' consumption patterns to transition toward more sustainable tourism.

However, the concept of sustainable tourism is still controversial, existing numerous definitions on the topic. For the World Tourism Organization, sustainable tourism addresses the demands of travellers, the industry, the environment, and host communities, taking full account of its current and future economic, social, and environmental implications (UNWTO, 2017, 2023). Buckley (2006a, 2006b) contends that the lines separating terms such as nature tourism, ecotourism, adventure tourism, adventure travel, commercial expeditions, outdoor recreation, and outdoor education are diffuse.

A popular form of sustainable travel is active tourism. This type of tourism encompasses responsible travel to foreign countries that involves the tourist's physical and mental activity and adheres to the tenets of sustainability, biodiversity protection, and cultural preservation. (International Organization for Active Tourism, 2002). Similar definitions are ACE tourism (Fennell, 1999) which represents a combination of adventure, eco and cultural tourism, or NEAT, which stands for nature, eco and adventure tourism (Buckley, 2000). Hanna et. al. (2019) further contend that outdoor adventure activities, as a kind of sustainable tourism, improve participants' understanding and engagement with sustainability through fostering connections between visitors and the local people, which is, according to Gautam (2023), crucial to support the sustainable growth of the tourism sector.

In recent years, there has been an upsurge in the use of discrete choice analysis to investigate various issues affecting the tourism industry. Discrete choice models (DCMs) and discrete choice experiments (DCEs), in particular, have been used to investigate a wide range of aspects related to sustainable tourism, including: (a) cultural tourism (Fitch et al., 2022; Hearne & Tuscherer Tuscherer, 2008); (b) ecosystems preservation (Coayla, 2022; Estifanos et al. 2021); (c) ecotourism (Xu et al., 2021); (d) residents perception (Birenboim, Farkash, & Fleischer, 2022); and (e) rural tourism (Fichter & Román, 2022; Li, Yao & Guo, 2023).

In addition, various types of activities have also been investigated, namely: (a) scubadiving (Hindsley, Morgan & Whitehead, 2023; Kim et al., 2022; Makumbirofa & Saayman, 2022); (b) sport hunting (Fischer et al., 2015); (c) stargazing (Fernández-Hernández et al., 2022); and (d) wildlife viewing (Bach & Burton, 2017; Kubo & Shoji, 2016; Lindberg, Veisten & Halse, 2019; Stemmer et al., 2022).

Most of the literature contributions address the study of preference heterogeneity using different modelling approaches ranging from simpler specifications, such as the Multinomial Logit model (MNL), to more flexible ones, such as Mixed Logit (ML) family and Latent Class (LC) models. Hybrid Choice (HC) models offer a more advanced modelling approach that integrates a latent variable model into a discrete choice model, extending the classical discrete choice modelling framework.

Although the application of ML models is becoming more and more widespread, their full potential for estimating preferences at the individual level is still seldom used. To the authors' knowledge, only the work of Nicolau (2009) estimated individual parameters to test the effect of price sensitivity on holiday packages.

This paper aims to fill this gap by analysing preferences and willingness to pay for nature-based tourism activities at the individual level in the island of Gran Canaria (Spain). The island is commonly known as the miniature continent due to the diverse range of landscapes and microclimates it offers. These particular characteristics allow visitors to perform an ample variety of nature-based tourism activities ranging from beach, mountain and water activities, to other more cultural-related. The analysis targets a market segment of potential visitors consisting mainly of young Germans belonging to Generation Y and the first cohorts of Generation Z. Germans are the island's most important source of incoming tourists (Patronato de Turismo de Gran Canaria, 2021). As a result, focusing on this segment represents an opportunity to link a category of young and environmentally conscious customers with a holiday destination like Gran Canaria, which is primarily dominated by sun, sand and sea (3S) mass tourism, which has a negative image on social and ecological issues such as local population quality of life or environmental impact (Parsons, 1973).

The analysis is based on the design of a discrete choice experiment (DCE) consisting of several hypothetical scenarios in which participants express their preferences regarding different packages of nature-based tourism activities. The objective of conducting a DCE is to identify the independent influence of design attributes on the choices made by respondents (ChoiceMetrics, 2009). DCEs provide fundamental data sources to estimate DCMs which, in turn, represent the appropriate methodology for the evaluation of different policies, leading companies to the optimization of the economic value (Bliemer and Rose, 2006). Their theoretical underpinnings are very well grounded in the discrete choice theory (McFadden, 1981) and have become an essential tool in many different fields including transportation, health, tourism and environmental studies.

It is important to keep in mind that most tourists are keen to the excitement of leisure activities but are not willing to take risks. According to Buckley (2007), the majority of the adventure market is made up of high-volume, low-difficulty products for unskilled customers. The cutting edge, in contrast, consists of low-volume, high-cost products that need prior abilities, involve significant individual risk for clients, and operate in more distant and hostile places.

The importance of pricing competitiveness as a crucial element of a destination's overall tourist competitiveness was also highlighted by Dwyer et al. (2000). They pointed out that there is broad consensus that one of the key elements influencing whether and where tourists travel is pricing. Therefore, in light of these findings, the activities selected are consistent with the classification of rural clusters suggested by Pesonen (2015) and Eusébio et al. (2017); and include cultural trails (nature), active hiking (active tourists), diving/snorkelling (water activities), and stargazing (passives). The cost of the package and the type of accommodation are also considered relevant in order to conform the experiment.

Data collected from the choice experiment is used to estimate a Mixed Logit model that will allow us to investigate the presence of random or unexplained heterogeneity in the preferences of potential visitors. Individual specific parameter estimates will allow us to calculate not only the willingness to pay for the various activities but also the amount accepted as compensation when undesired activities are included in the tourism package. In particular, the utility specification is represented by a linear-in-the-parameter function where attributes' coefficients are continuous random variables following the Normal distribution.

Finally, the specification also considers the systematic heterogeneity in the population mean of the coefficients, allowing it to be explained by some socioeconomic characteristics of the individual.

The overarching goal of this research is to contribute to the development of nature-based tourism products for these particular segments understudied in the previous literature and, thus, to encourage a more sustainable development in mass tourism destinations. In this regard, our findings will offer interesting information that can shed light in answering the central research question related to our choice experiment which is "how could preference heterogeneity be used to develop nature-based tourism packages that better meet the demand needs of the target group?"

The rest of the paper is organized as follows. The materials and methods used for the analysis presented in section two. Section three focus on the analysis of preferences and willingness to pay for nature-based tourism activities. The discussion of results and managerial implications are presented in section four. The final section presents the main conclusions and limitations of the research.

2 Materials and methods

2.1 The stated choice experiment

The context of the choice experiment takes place in the Veneguera area of Gran Canaria, a protected natural zone rich in natural resources that runs through a ravine leading to a beautiful beach. It simulates a tourist product for a group of four people spending two nights in this destination, where participants can engage in activities that allow them to enjoy the natural environment in a sustainable way.

The experiment consisted of 12 choice tasks in which the respondent had to choose between two hypothetical nature-based active tourism packages with varying activities, accommodation type, and costs, and a non-choice alternative. Thus, considering the utility maximization behavioural rule, the alternative chosen is interpreted, for modelling purposes, as that producing the highest utility to the individual.

Table 1 shows the attributes and levels considered in this experiment, which include price per person, the type of accommodation and the following activities: cultural trail, active hiking, diving/snorkelling and a stargazing workshop. The price had three different levels whereas the rest of the attributes had only two.

One of the key drawbacks of DCEs is hypothetical bias, stemming from individuals' inclination to deviate from their stated preferences in real-world market settings. This bias can be mitigated by designing scenarios that closely mirror respondents' real-world experiences. Thus, to make the choice scenarios more realistic, some images were shown to respondents to better define the tourism packages considered in each choice task. Some extra information on the activity, such as the duration and the group size, was also provided.

[Insert Table 1 here]

The combination of the attribute levels that define the different choice tasks was obtained through an efficient design using the specialized software N-gene (Choicemetrics, 2009). Efficient designs are created to obtain asymptotically efficient parameter estimates with a minimum sample size. Thus, considering a fixed number of choice observations, the design produces parameter estimates with the smallest possible standard errors. The efficiency

criteria considered in our experiment is the minimization of the D-error, which requires parameters' prior information as well as the type of model to estimate (Rose and Bliemer, 2004). In this case, an efficient design was generated for a Multinomial Logit model and parameters' priors were obtained from pilot tests and qualitative information consistent with the obtaining of willingness to pay figures for potential visitors within an acceptable range.

In the experiment, the packages shown to respondents consisted of two or three activities each. An example of a choice scenario is presented in Figure 1. In this case, the holiday package corresponding to option A costs 60 Euro and includes two nights of tent accommodation, active hiking, and diving/snorkelling activities. Option B costs 40 Euro and includes two nights' accommodation in a rural house, active hiking, and a stargazing workshop.

[Insert Figure 1 here]

2.2 The questionnaire and data collection

The questionnaire was structured in different sections. The first two requested tourists' concerns and attitudes regarding the environment and were not used in the current study. Questions related to the choice experiment were then displayed and included the 12 hypothetical scenarios as well as the importance given by respondents to the different attributes while responding to the choice tasks. Previously, the context of the choice experiment was duly introduced by the interviewer, explaining the characteristics of the place, the duration of the stay, the description of the activities that could be carried out, including the duration and group size as well as accommodation options. The questionnaire concluded with sociodemographic information and an open question inviting participants to list up to five activities that would be willing to perform as active tourists during their vacation.

Data were collected in the village Carcans Plage, in the popular holiday-region of Gironde in the southwest of France. Participants were surveyed during their summer vacation on a campsite with a high proportion of German customers. The most favoured tourist activities typically involve surfing and other beach-related pursuits, although there are plenty of options for biking and hiking trails inside the pine forests. In addition, many visitors enjoy unguided stargazing on the beach at night due to the exceptional clarity of the night sky. A significant proportion of respondents had participated in a summer sports camp, which offers guided adventure tourism packages that include sports lessons, food and accommodation in tents.

Consequently, all participants in the experiment shared the characteristic of being interested in active tourism activities in contact with nature. A total of 238 valid questionnaires were obtained for the sample. Face-to-face interviews were conducted during the data collection process to ensure that respondents could answer questions in English and had a good understanding of the choice experiment, hence improving the survey's overall quality.

Regarding the sample composition, there is a moderately higher proportion of female respondents (55.04%), the average age is 24 years and the annual income is 8885 Euro. The significantly lower income compared to the average gross wage of 45000 Euro in Germany can be attributable to the fact that the majority of the participants are university students (Statista, 2017). 81.93 percent of the sample is employed, which is assumed to be mostly part-time work while studying, but there are some respondents with higher salaries who have completed university education and are working in full-time jobs.

2.3 The discrete choice model

To analyse preferences for nature-based tourism activities a discrete choice model is estimated using data obtained from the choice experiment described in the previous section.

Disaggregate demand analysis uses discrete choice models as the main toolbox and their theoretical principles are very well grounded in the random utility theory (Domencich & McFadden, 1975). It states that rational decision makers, when faced with the choice among a finite set of mutually exclusive alternatives, always choose the one that maximizes their utility. The utility is a mathematical function representing individual's preferences and normally adopts the linear functional form. As the analyst has not perfect information about all the factors considered by decision makers, a stochastic error term must be added to the measurable component of the utility (also known as the systematic utility) in order to account for all the unobserved effects.

When using data obtained from discrete choice experiments, each individual provides several statistical observations. In these cases, it is important to account for the pseudo panel nature of the data set. Then, it is assumed that preferences could vary between individuals but not within the set of observations provided by the same respondent. In addition, the potential correlation among choices made by the same individual must be accounted by the model (see e.g. Train, 2009; Bliemer & Rose, 2010; and Ortúzar & Willumsen, 2011). Thus, for the panel Mixed Logit (ML) model, the utility U_{iqs} of alternative i for individual q in choice scenario s is represented by:

$$U_{iqs} = V_{iqs} + \xi_{iq} + \varepsilon_{iqs}$$

Where ε_{iqs} distributes iid extreme value and accounts for the effect of unobserved factors; ξ_{iq} is an error component (EC) represented by a random variable following the Normal distribution $N(0, \sigma)$, where σ represents the degree of correlation among choices made by the same respondent; and V_{iqs} is the systematic component of the utility which is expressed in terms of: i) the attributes vector of the alternative i for individual q in choice scenario s (X_{iqs}), ii) the vector of socioeconomic characteristics of the individual q (S_q); and iii) a set of unknown parameters β_i. Model parameters can be either fixed or random variables representing, in this case, the random heterogeneity in the individual's preferences. In our model, V_{iqs} is represented by a linear-in-the parameters function, thus the systematic utility is expressed as:

$$V_{iqs} = \alpha_i + \sum_k \beta_i^k X_{iqs}^k$$

Where α_i is the alternative specific constant, X_{iqs}^k represents the value of attribute k in alternative i to individual q in choice scenario s; and coefficients β_i^k, representing the marginal utilities, distribute $N(\tau_k, \sigma_k)$, being the mean τ_k, the standard deviation σ_k and α_i unknown parameters to estimate. It is important to note that when the attribute k refers to activities or accommodation type, $X_{iqs}^k = 1$ when the activity is offered, or the accommodation is a rural house, and 0 otherwise.

Attribute coefficients can be expressed in terms of the standard Normal distribution as $\beta_i^k = \tau_k + \sigma_k \eta_k$, where η_k distribute $N(0,1)$. If we allow for the systematic heterogeneity in the population mean, τ_k may vary according to some socioeconomic characteristics of the individual as:

$$\tau_k = \mu_k + \sum_r \mu_{k S_{qr}} S_{qr}$$

Where μ_k and $\mu_{kS_{qr}}$ are parameters to estimate and S_{qr} represents the socioeconomic characteristic r of individual q. Thus, the marginal utilities in our model must be interpreted as random Normal variables whose population mean may vary according to some socioeconomic group.

The incorporation of random parameters in the model prevents the choice probabilities from having a closed form. Thus, the maximum simulated likelihood technique is used to estimate the unknown parameters. Once the (unconditional) distribution of model coefficients is estimated, it is possible to use the Bayes rule to derive the distribution of these coefficients conditional on individual's choices. Then, simulation techniques are applied to approach individual specific parameters estimates by computing the conditional expectation of the coefficients. The authors refer the reader to Train (2009), chapters 6 and 11, for a comprehensive description of these methods.

3 Results

Estimation results, obtained with the Nlogit6 software package (Greene, 2016), are presented in Table 2 where the columns include the name of the parameter as well as the corresponding attribute, the estimated coefficient, the significance test, the probability value, and the extremes of the confidence interval for the parameter. All the parameters included in the specification of the utility were statistically significant considering the 99% confidence level. The only exception was found for the mean of the accommodation that was significant at the 95% level. In contrast, the standard deviation of the error components included in the first and second alternatives did not result statistically significant suggesting that choices made by the same respondent in the 12 choice scenarios were treated independently.

The only fixed parameter was the alternative-specific constant included in the third option (no-choice) which was estimated with a negative sign. This suggests that respondents typically prefer the activity packages (options A and B) over not experiencing either of them when the effect of the attributes included in the experiment is negligible.

Since the standard deviation of the attributes' coefficients was highly significant, the hypothesis of random heterogeneity in preferences is confirmed. Also the systematic heterogeneity in the population mean was proved significant for some of the random coefficients. Thus, in the population mean, the negative effect of price decreases as income rises, and the preference for lodging in a rural house rather than a tent increases with age. In this regard, it is important to highlight that that the mean of the coefficient could be negative for the youngest individuals, indicating their preference for staying in a tent rather than a rural house; finally, the preference for undertaking diving/snorkelling activities is reduced as age increases. For the rest of the activities, namely cultural trail, active hiking and stargazing, the mean of the random parameter was fixed and positive, indicating in average, a preference in the population for the inclusion of these activities in the package.

Assuming that model coefficients follow the Normal distribution implies that coefficients can take both positive and negative values, indicating a potential positive or negative preference for the corresponding attribute. While this is advantageous in the case of the coefficients associated with activities and type of accommodation because it demonstrates the richness of the model in analysing whether individuals have a positive or negative preference for the attribute, it may be problematic in the case of the price coefficient because positive values can reveal the microeconomic inconsistency of the model. In this regard, it should be emphasized that the negative of the price coefficient corresponds to the marginal

utility of income, which is always positive according to discrete choice theory (McFadden, 1981).

Thus, considering the estimated distribution and evaluating the population mean in the average of the socioeconomic variables (age and income), the probability of obtaining the incorrect sign (positive) for the price coefficient is 0.008. This low figure, ensures the microeconomic consistency of the model because a high proportion of individuals with positive marginal utility of price would result in a misinterpretation of the willingness to pay figures and other model applications.

[Insert Table 2 here]

The rest of the coefficients could eventually take both positive and negative sign as they are subject to consumers' preferences. Thus, a positive sign would imply that the inclusion of the activity in the package would generate an increase in the individual's utility whereas a negative sign would represent a source of dissatisfaction. According to our model, the probability of perceiving disutility for including active hiking and diving/snorkelling activities is also very low (less than 0.02) indicating that these activities are positively perceived by the majority of the individuals. In contrast, the probability of obtaining a negative preference for the cultural trail activity and the rural house accommodation would be higher, with 0.20 and 0.36, respectively. This result suggests that for a significant proportion of customers a compensation should be offered in case these options were included in the package.

3.1 Willingness to pay for nature-based tourism activities

One of the most widely used applications of discrete choice experiments is the derivation of the willingness to pay (WTP) measures which are essential inputs to evaluate different policies or programs. Once the discrete choice model is estimated, the WTP to improve a given attribute k is calculated as the quotient between the marginal utility of this attribute and the marginal utility of the price (Train, 2009), that is:

$$WTP_k = -\frac{\partial V_i / \partial x_i^k}{\partial V_i / Price_i} = -\frac{\beta_i^k}{\beta_i^{Price}}$$

When random coefficients are considered, this ratio is a random variable that normally has an unknown probability distribution (Sillano and Ortúzar, 2005). One way to address this problem is to estimate individual-level parameters using the information revealed by the individual's choices. In this way, one can derive individual specific WTP estimates by applying a similar method to that used to obtain individual specific parameters (Train, 2009).

Figure 2 shows the kernel density plots of the WTP for the different activities obtained from individual specific estimates. The shape of these probability distributions highlights the existence of heterogeneity in the WTP for the activities considered in the experiment. Thus, the highest dispersion in the WTP distribution is obtained for the diving/snorkelling activity whereas the highest concentration is found for stargazing. Observing the area under the plot and the negative part of the horizontal axis, the highest proportion of individuals with negative WTP is obtained for the accommodation in a rural house instead of a tent (black line), while the lowest is found for the diving/snorkelling activity (purple line).

[Insert Figure 2 here]

Table 3 presents the average WTP figures obtained for the whole sample as well as the average for different socioeconomic groups. Thus, the highest WTP is obtained for diving/snorkelling activities (47.91€) followed by active hiking (30.32€). In contrast, the least valued activities are cultural trail and stargazing with 14.46€ and 11.05€ respectively. It is also worth to point out that individuals are only willing to pay 8.46€ for staying in a rural house instead of tent. Regarding the different socioeconomic groups, it is interesting to note that those living independently of their families exhibit substantially higher willingness to pay figures for all the activities. In addition, active workers and those having a car available for leisure use are more willing to pay for accommodation in a rural house and for the stargazing activity than non-workers and those without car.

Average figures in Table 3 were obtained including individuals who perceive disutility for doing certain activities; that is, those with negative willingness to pay. In other words, these

individuals would be willing to accept a monetary compensation if such activities were included in the package.

[Insert Table 3 here]

In order to obtain a more accurate segmentation of our sample, the Table 4 presents a characterization of the individuals who are willing to pay a positive amount of money for including the different activities in the package. The vast majority of individuals (more than 86%) are willing to pay for the activities considered in the analysis and 66.95% would be willing to pay 19.10€ for accommodating in a rural house. The most valued activity is diving/snorkelling (52.31€) whereas the least valued one is stargazing, with only 12.88€. For all the activities, this group contains a higher proportion of females, active workers, car users and individuals who do not live with the family. The average age is around 24 years and the monthly income is between 712 and 720 Euro.

[Insert Table 4 here]

Individuals exhibiting a negative WTP would be those willing to accept (WTA) a compensation if the activity is included in the package. The characterization of these individuals is presented in Table 5. This group consists of a minority of individuals (less than 13.14%), with 33.05% being individuals who should be compensated with 13.09€ for staying in a rural house rather than a tent. Those who dislike diving/snorkelling activity would claim for the highest compensation (63.03€), whilst the lowest figure is claimed for those who dislike cultural trails (11.17€). The composition of this group is more heterogeneous in terms of gender, age and income; with a higher proportion of individuals living with the family in most of the cases.

[Insert Table 5 here]

4 Discussion and managerial implications

This section evaluates and discusses the results of the study in order to provide interesting insights to different stakeholders on addressing the central research topic of identifying how preference heterogeneity can be used in developing nature-based tourism products that better meet the demand needs of the target group. Furthermore, the debate focuses on how the findings might aid in the development of suitable holiday packages for young clients and contribute to a sustainable development of the tourism sector in a mass tourism destination like Gran Canaria.

4.1 Integrating active tourism consumption into a broader framework of sustainable tourism development

Active tourism places significant emphasis on sustainable elements. It can be regarded as an adventure tourism product, which sets value on sustainable aspects, setting it apart from the 3S mass tourism in Gran Canaria (Buckley, 2006a, 2006b).

The tourism industry is characterized by high competitiveness and many destinations are competing for the same travellers. Conducting market research on the alternative tourism market, as illustrated in this study, is vital for gaining a deeper understanding of the target audience, identifying customer preferences, and developing appropriate pricing strategies (Dwyer et. al. 2000, Vukic et. al, 2015).

This, in turn, enables destinations to gain a competitive advantage, which is critical in attracting more visitors, generating higher revenue, and attracting investment from tourism-related enterprises. Ultimately, this can also drive a greater emphasis on sustainable tourism

practices, such as promoting responsible tourism, minimizing the environmental impact of tourism, creating job opportunities with better conditions and supporting local communities.

Buckley (2006a, 2006b) suggested that activities with lower skill and risk levels tend to attract a larger volume of customers, bigger group sizes, and a worldwide participation. To align with these findings, the experiment investigates customer preferences for activities that can attract to a larger audience. The ability to reach a wider customer base can have a significant impact on sustainable development by generating a greater demand for sustainable products and services.

4.2 The suitability of the chosen activities for the target group of young Germans

The activities are chosen based on the categorisation of rural tourism clusters and comprise active, passive, cultural, and water activities (Pesonen, 2015). The experiment also takes into account the results of a survey performed by a German public healthcare firm, which found that hiking, diving, swimming, and cycling are among the top six favoured activities of young German consumers aged 18 to 39 (Techniker Krankenkasse, 2016, 2022).

Furthermore, the analysis results indicate that the inclusion of all the considered attributes increased (in average) the utility of the individuals, revealing the presence of a latent demand for all these activities among the experiment participants.

Moreover, the analysis of the open question in which participants were asked about their favourite sports activities during vacation demonstrates that the activities chosen were appropriate for the sample under consideration. Hiking trails, walking, trekking, and landscapes were ranked second with 16.4 percent, followed by bike riding and mountain biking in third place with 9.74 percent among the ten most popular activities found in the survey. Swimming, while not a core activity in the DCE, is a side activity of active hiking and ranks fourth with 7.33 percent. Diving and snorkelling were also popular activities, with about 9% of people interested.

Fitness and running sports are not regarded as essential during vacation (3.97%), compared to favourite activities in everyday life, when fitness and running sports are very important (Techniker Krankenkasse, 2016, 2022). One possible explanation for this finding is that when customers go on vacation, they break away from their typical routines and their tastes may vary.

The popularity of surfing among active tourists in the study can be attributed to the fact that the survey was conducted in an environment where surfing was the most popular activity. However, this finding also emphasizes the significance of water-based activities as a vital component of active tourist packages.

Another piece of evidence was how respondents prioritized the importance of various attributes when completing the DCE questions. Diving/snorkelling is evaluated as an important selection criterion by 68.9 percent of the sample, followed by active hiking at 57.14 percent. In comparison, the stargazing workshop is important to only 25.63 percent of people, while the cultural trail is crucial to 28.15 percent. In summary, hiking, biking, and diving are all suitable options for active tourism in Veneguera. In contrast, it appears that stargazing and culturally oriented trails are not the most significant activities for the majority of respondents.

4.3 The most valued activities by potential nature-based tourists

The estimated WTP figures in Table 4 are consistent with the previous results from 4.2. Thus, in average, the highest WTP values are for diving/snorkelling with 52.31€ and active hiking with 34.40€; whereas the WTP for cultural trail is significantly lower with 18.31€. In

the previous section, the stargazing workshop was assumed to be the least important activity among tourists. This result is consistent with lowest WTP figure (12.88€) obtained for this activity.

When creating active tourism products, entrepreneurs must have in mind the heterogeneous customer preferences, meaning that not all the activities are equally preferred. There are individuals who dislike participating in certain activities and they could be compensated in case they were included in the package. Even considering that the research context is that of voluntary consumption of activity packages, it is important to note that, in some cases, customers may have imperfect information when making the purchase decisions. Thus, as more information about the product becomes available, the a priori perceived utility is re-evaluated. For example, a tourist may be unaware of the real difficulty of a hiking trail or a diving experience, but once he acquires more information, the participation in the activity might eventually cause disutility.

Ultimately, once the package is purchased, individuals may choose not to participate in an activity if they believe it will result in disutility, but it is certain that they would be better off if some form of compensation (either monetary or in the form of a substitution for another activity) was offered.

In our analysis, the highest compensation should be given to those who do not like diving/snorkelling with 63.04€; but this amount would be claimed only by 3.81 percent of individuals. Similarly, there is also a small group (5.51%) that must be compensated for including the activities of hiking and stargazing in the package. However, a significant proportion of respondents (33.05%) manifested their preference for accommodation in a tent, claiming 13.09€ in case the package include staying in a rural house (Table 5). In this regard, the information provided in Tables 4 and 5 represent and interesting managerial tool to create active tourism products that better fit to customers' preferences. Thus, in order to reduce the number of unsatisfied clients, the creation of customized packages where tourist could choose the activities to participate seems to be the best option to promote active tourism in Veneguera.

Our WTP results are not easily comparable with other figures obtained in previous research as these seems to be highly context and methodology dependent. For example, Fitch at al. (2022) used a discrete choice experiment to analyse millennials' preferences for Native American cultural tourism and obtained rather high figures for guided hiking trails (US$116) and stargazing and storytelling (US$92). These results contrast with those reported by Loomis (2005) who obtained an average net WTP of US$30.84 for hiking, US$32.36 for scuba-diving and US$30.31for snorkelling, based on studies conducted in the United States between 1967 and 2003. Other cultural related activities such as visiting environmental education centres are substantially less valued (US$6.01). A more recent study by Lorber et al. (2021) obtained WTP figures for hiking trails to Multnomah Falls, Oregon, ranging from US$8.24 to US$9.66 using the contingent valuation method.

Diving activities are very appreciated by young tourists. Existing research on preferences and willingness to pay for scuba diving, using different methods, has found that divers are willing to pay US$4.51 to avoid crowding at dive sites (Schuhmann, 2013), with an average willingness to pay of US$4.51 per additional diver. In specific locations, such as the Mu Ko Similan Marine National Park in Thailand, divers are willing to pay between US$27.07 and US$62.64 per dive, resulting in significant aggregate benefits (Asafu-Adjaye, 2008). This willingness to pay is also evident in the context of marine sanctuaries, where divers are willing to pay entrance fees to support coral reef conservation (Arin, 2002). Furthermore, in

the case of cave diving, divers are willing to pay between US$52 and US$83 per dive, with a preference for higher quality dive sites (Huth, 2011).

Stargazing is also becoming a strategic option for a growing number of destinations who aim to exploit their natural and land-based resources. The study by Fernández-Hernández et al. (2022) estimated a Latent Class model that analyses heterogeneity and willingness to pay for stargazing tourism activities on the island of La Palma (Canary Islands). The authors identified three segments of tourists which are those interested in culture, active stargazers and those focused on astronomic tourism, obtaining WTP figures for a network of walking paths for stargazing observation ranging from 1.67 to 10.67 euros. Due to the similarity of the research context these figures are pretty consistent with those obtained in the present study.

4.4 Critical aspects of the studied holiday packages that are crucial to make them a feasible economic activity

The holiday packages included in the DCE usually consisted of accommodation, combined with two or three outdoor activities. As shown in the previous sections the best suitable holiday package (in the DCE) for young Germans is active hiking or cycling with a visit to natural pools (active) and diving or snorkelling (water), with accommodation in rural houses.

One important aspect is that, in average, individuals are only willing to pay €8.46 for overnight stay in a house instead of a tent, which suggests that from an economic perspective, it could be a feasible option to offer camping holidays with lower purchasing costs, for this specific target group.

Vital seems the age of the active tourists. With increasing age, the importance for the price becomes less important, the preference for house over tent becomes more important and the preference for the water activity decreases. This suggests that as the age of active visitors increases, clusters of nature, active and passive should be more integrated. In fact, we observe that active employees are more willing to pay for accommodation in a rural house and for the activity of stargazing.

Despite preferences for the experiment's activities, it is crucial to consider potential improvements. It is possible to classify the preferred holiday activities using the ones listed in the open question. Water activities and mountain-related activities are thus the most popular categories, accounting for 32.99 and 31.48 percent, respectively.

The popularity of water sports in the sample brings the idea of setting more focus on various activities by using the available natural resources in Gran Canaria. Stand up Paddle, Surf, Windsurf, Kitesurf, Canoe, Kayak, and Fishing are among the other popular activities that can attract a larger volume of customers (Buckley, 2006a), as highlighted by the Gran Canaria Tourist Board (Patronato de Turismo de Gran Canaria, 2023).

Mountain related sports are the second most popular activities. This group includes not only hiking activities and cycling activities, but also climbing, bouldering and mountaineering. The popularity for climbing activities in the sample makes to think about potential products with focus on this more action orientated category for young tourists. It also seems to be reasonable to connect mountain activities with water related sports, as it is the case in the attribute active hiking with includes visiting the blue pools in Veneguera.

While a study by León, Araña & Melián (2003) highlights the importance of leisure activities as a primary motive of holiday choice, another study by Vukic et. al (2015) finds that other attributes seems to be more important. The authors undertook a conjoint analysis to examine the importance of attributes of Generation Y travellers´ destination choice. While pricing

was the most important factor, leisure and cultural offerings were less relevant in comparison to political stability and duration of permanence. According to the study, respondents preferred trips lasting 8 to 12 days and 4 to 7 days over those lasting 2 to 3 days. Thus, to make active tourism packages more appealing to young tourists, it is suggested that packages should be offered for a longer duration compared to the 2 days packages in the DCE.

Another night-time activity, related to nature, local culture and food could complement the activity of stargazing, which is not well-liked by the sample. This suggestion aligns with the findings of Reiseanalyse (2018), which indicates that the most important holiday expectations for German tourists are excellent weather, scenic views, regional cuisine and beverages, as well as the opportunity to engage with local life and people.

5 Conclusions and limitations

This study investigates the heterogeneity in preferences and willingness to pay for the development of nature-based tourism activities in a natural setting on the Spanish island of Gran Canaria for a market segment made up of young German potential visitors. The estimation of a flexible choice model, which allow us to derive preferences at the individual level, is the basis of the analysis. Our results reveal that customers' preferences are very heterogeneous regarding the studied activities. For this reason, the commercialization of not flexible tourism products, which is a very common practice in most destinations, could not adequately meet the demand needs.

According to our findings, the most suitable holiday package for the majority of potential visitors (young German tourists) might include sleeping in cottages or tents, hiking trails visiting some natural sites and diving or snorkelling activities. Other activities such as cultural tours and stargazing workshops were less appealing to research participants.

The obtained results emphasize the importance of market research in identifying customer preferences and tailoring products accordingly, in order to ensure that the activities offered are attractive and relevant to the target population. By doing so, entrepreneurs could increase company competitiveness and profitability while also improving customer satisfaction and retention through creating alternative nature-based products.

In particular, our findings provide interesting managerial tools that may be applied to the promotion of products based on the interaction with nature and aimed at consumers who enjoy outdoor activities. These products represent a more sustainable alternative for Gran Canaria, which has traditionally been dominated by mass tourism (3S-Tourism). As a result, when designing these products, it should be taken into account that there are consumers who have a negative preference for particular activities. Therefore, nature-based tourism packages should be flexible in order to satisfy customers' preferences; otherwise, they should include mechanisms for compensating activities that report a negative utility.

The study has several limitations. Firstly, it focused only on the German market and was limited to Generation Y (with a small portion belonging to Generation Z), which represents a relatively small segment of the population. The idea of this specific sample is to commit a younger customer group to destinations and to ensure long-term profitability. Although Germans may constitute a considerable proportion of tourists visiting Gran Canaria (approximately 20%), the scope of the conclusions reached in this study should be limited to the market segment under consideration.

Moreover, the clusters are studied by a limited number of attributes, and for water-related activities like diving/snorkelling, it was not possible to distinguish between scuba diving and

snorkelling as to which option would maximize the utility of holiday packages. The same applies for hiking and mountain biking in the active cluster. Future research can address these limitations by exploring preferences for various activities suitable for young active tourists.

It should be noted that regardless of tourists' preferences for different attributes, the price remains the most crucial purchase factor for Generation Y tourists. Therefore, future research should also examine alternative water-related activities that are more affordable for young active tourists. Scuba diving, for example, requires a lot of expensive equipment as well as skilled guiding.

Nevertheless, our findings provide a foundation for studying the demand for active tourism products in a natural environment and pave the way for future research. An interesting line that could extend the scope of the present study is the analysis of the effect of latent variables related to tourists' environmental concerns and attitudes on their preferences for these type of products using hybrid choice models. Such studies can assist entrepreneurs and decision-makers in developing sustainable tourism and achieving the Sustainable Development Goals of the 2030 Agenda.

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Declaration of interest

The authors report there are no competing interests to declare.

Tables

Table 1. Attributes and levels in the choice experiment

Attributes	Level 1	Level 2	Level 3
Price per person 2 nights (P)	80 €	60 €	40 €
Type of accommodation (AC)	Tent	Rural House	-
Cultural trail (CT)	Not Included	Included	-
Active hiking (AH)	Not Included	Included	-
Diving / snorkelling (DS)	Not Included	Included	-
Stargazing workshop (SG)	Not Included	Included	-

Table 2. Estimation results

Parameter and attribute names		Estimated coefficient	t-test	p-value	Confidence interval Lower	Upper.
Fixed parameters						
α_{ASC3}	Asc None	-2.45839	-5.99	0.000	-3.26213	-1.65465
Random parameters (estimated mean)						
μ_{P}	Price	-0.08244	-12.59	0.000	-0.09528	-0.06961
μ_{AC}	Accommodation	-1.24299	-2.00	0.046	-2.46392	-0.02205
μ_{CT}	Cultural trail	0.80645	5.32	0.000	0.50932	1.10358
μ_{AH}	Active Hiking	1.77707	11.67	0.000	1.47851	2.07563
μ_{DS}	Diving / snorkelling	4.69427	5.75	0.000	3.09383	6.29472
μ_{SG}	Stargazing	0.71035	5.45	0.000	0.45493	0.96577
Random parameters (estimated standard deviation)						
σ_{P}	Price	0.02832	10.64	0.000	0.02310	0.03353
σ_{AC}	Accommodation	1.20555	12.49	0.000	1.01643	1.39468
σ_{CT}	Cultural trail	0.95542	8.04	0.000	0.72237	1.18848
σ_{AH}	Active hiking	0.86036	6.96	0.000	0.61801	1.10270
σ_{DS}	Diving / snorkelling	1.22862	11.16	0.000	1.01294	1.44431
σ_{SG}	Stargazing	0.50380	3.94	0.000	0.25312	0.75448
Systematic heterogeneity in mean (Interactions)						
μ_{P*INC}	Price*Income	0.00002	3.16	0.002	0.00001	0.00003
μ_{AC*AGE}	Accommodation*Age	0.06944	2.76	0.006	0.02012	0.11877
μ_{DS*AGE}	Diving / Snorkelling*Age	-0.08110	-2.61	0.009	-0.14190	-0.02030
Error components for panel correlation						
Standard deviation EC (Alt1)		0.30467	1.88	0.061	-0.01361	0.62296
Standard deviation EC (Alt2)		0.15481	0.65	0.518	-0.31492	0.62454
$l^*(0)$	-3137.63670					
$l^*(\theta)$	-1882.52106					
ρ^2	0.4000					
Observations	2586					

Table 3. WTP figures. Average for socioeconomic group

Socioeconomic Group	Willingness to pay (€)				
	Accommodation in rural house vs tent	Cultural trail	Active hiking	Diving / Snorkelling	Stargazing
Gender					
Female	8.37	14.25	30.80	47.11	11.03
Male	8.57	14.72	29.72	48.89	11.09
Car availability for leisure					
No	5.97	14.09	30.78	48.04	10.50
Yes	10.74	14.81	29.90	47.79	11.57
Live with the family					
No	10.07	15.29	31.87	50.00	11.83
Yes	1.00	10.66	23.14	38.27	7.45
Active worker					
No	5.81	15.45	31.56	47.09	8.96
Yes	9.05	14.25	30.04	48.09	11.52
Total	8.46	14.46	30.32	47.91	11.05

Table 4. Characterization of individuals who are willing to pay for the different activities

	Accommodation in rural house vs. tent	Cultural trail	Active hiking	Diving / Snorkelling	Stargazing
Individuals [a]	66.95%	86.86%	94.49%	96.19%	94.49%
WTP for the activity	19.10€	18.34€	34.40€	52.31€	12.88€
Males [b]	47.47%	44.39%	43.95%	44.05%	44.39%
Car available for leisure activities [b]	53.16%	51.71%	51.12%	51.54%	51.57%
Live with the family [b]	13.92%	16.10%	17.49%	17.62%	17.94%
Active workers [b]	84.18%	81.46%	81.61%	81.94%	82.06%
Age [c]	25	24	24	24	24
Income [c]	713	720	715	713	712

[a] *% with respect to total*
[b] *% with respect to the number of individuals who are willing to pay for the activity*
[c] *average with respect to the number of individuals who are willing to pay for the activity*

Table 5. Characterization of individuals who are not willing to pay for the different activities

	Accommodation in rural house vs. tent	Cultural trail	Active hiking	Diving / Snorkelling	Stargazing
Individuals [a]	33.05%	13.14%	5.51%	3.81%	5.51%
WTA for the activity (compensation)	13.09€	11.17€	39.73€	63.04€	20.28€
Males [b]	39.74%	48.39%	61.54%	66.67%	53.85%
Car available for leisure activities [b]	50.00%	54.84%	69.23%	66.67%	61.54%
Live with the family [b]	25.64%	29.03%	23.08%	22.22%	15.38%
Active workers [b]	76.92%	83.87%	84.62%	77.78%	76.92%
Age [c]	23	25	25	25	26
Income [c]	778	830	1065	1276	1117

[a] *% with respect to total*
[b] *% with respect to the number of individuals who are not willing to pay for the activity*
[c] *average with respect to the number of individuals who are not willing to pay for the activity*

Figures

Figure 1. Example of choice scenario.

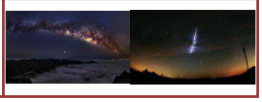
SCENARIO 1		
ATTRIBUTES	**OPTION A**	**OPTION B**
PRICE PER PERSON 2 NIGHTS (FOOD NOT INCLUDED)	60.00 €	40.00 €
TYPE OF ACCOMMODATION	TENT 	RURAL HOUSE 
CULTURAL TRAIL Duration of the activity: 3 hours Guided route where you can see native species of fauna and flora and heritage sites (Group 12 people maximum)	NOT INCLUDED	NOT INCLUDED
ACTIVE HIKING Duration of the activity: 3 hours Guided tour to Veneguera Blue Pools. The route includes a bath in natural pools. Optional race/mountain-bike circuit. (Group 12 people maximum)		
DIVE / SNORKEL (Duration of the activity: 1:30 hours) Scuba diving or snorkeling activity with monitor in the Beach of Veneguera. (Group 12 people maximum)		NOT INCLUDED
STAR GAZING WORKSHOP Duration of the activity: 2 hours (Group 24 people maximum)	NOT INCLUDED	
☐ None of the two	☐ Choose A	☐ Choose B

Figure 2. Distribution of the WTP. Kernel density estimates