U.PORTO

MASTER DEGREE
ENVIRONMENTAL ECONOMICS AND MANAGEMENT

Willingness to Pay to enter on "Quinta do Castelo"

Tiago Manuel Sousa de Albergaria e Leite da Silva

M

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"Try to leave this world a little better than you found it and, when your turn comes to die, you can die happy in feeling that at any rate you have not wasted your time but have done your best."

Robert Baden-Powell

U.PORTO

FEP FACULDADE DE ECONOMIA UNIVERSIDADE DO PORTO

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Internship Report

Master in Environmental Economics and Management

Supervised by:

Professor Susana Maria Almeida da Silva, PhD

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Abstract

This study estimates the total economic value of the ecosystem services provided by the "Quinta do Castelo" that is an urban park placed in Santa Maria da Feira. To proceed to this study, we used the contingent valuation method and four payment methods. The sample was made up of 433 people, from which only 288 knew the urban park. The answers showed us that most of the sample disagrees with large scale events (>100 people), preferring guided and well-being activities. The mean willingness to pay values obtained for the different payment methods were, 0.61€ to the entrance value, 2.19€ to the guided activities, 1.97€ to the well-being activities and 4.68€ to the annual donation.

Keywords: willingness to pay, ecosystem services, environment, economic evaluation, contingent valuation method

Resumo

O estudo em causa estima o valor dos serviços dos ecossistemas fornecidos pela "Quinta do Castelo", que é um parque urbano situado em Santa Maria da Feira. Para proceder a este estudo foi utilizado o método de avaliação contingente e quatro métodos de pagamento. A amostra é composta por 433 pessoas, sendo que só 288 destas conheciam o parque urbano. Deste estudo concluiu-se que a grande maioria dos inquiridos discorda com atividades de grande escala (>100 pessoas), preferindo atividades de visita guiada ou bem-estar. Os valores da disposição a pagar média obtidos para os diferentes métodos de pagamento foram, 0,61€ para o valor de entrada, 2,19€ para as atividades guiadas, 1,97€ para as atividades de bem-estar e 4,68€ para o donativo anual.

Palavras-Chave: disposição a pagar, serviços dos ecossistemas, ambiente, avaliação económica, método de avaliação contingente

Summary

1. INTRODUCTION

When people think about ecosystem services, the first thing that they imagine are tangible goods that nature provide us with. But this is not the only thing that ecosystem provide us. They have a large group of intangible services that give us life supporting functions like air renewal and recreational services (Daily, 1997).

The Millennium Ecosystem Assessment in 2005 was a landmark in the history of the ecosystem services (Gómez-Baggethun & Ruiz-Pérez, 2011). They defined the ecosystem services in a more general and comprehensive way, declaring that they are all the benefits that we take from nature (Millennium Ecosystem Assessment, 2003). Gómez-Baggethun, de Groot, Lomas, & Montes (2010) found that the number of studies around ecosystem services have increased rapidly in the last decades.

These ecosystem services are essential for us humans but, many of us, do not care about them and are not aware of their existence (Daily, 1997). People, in general, do not value the benefits that ecosystems give us because they cannot see the direct effect that they have in our well-being. However, nature has a main role on human well-being and that is important to the real economy (Costanza, et al., 2014). So, if we know the value of ecosystems services, we can be more effective in their management and turn them on important assets for the economy and people.

The main subject of this work is the economic evaluation of an urban park placed in Santa Maria da Feira, the "Quinta do Castelo". Our objective is to estimate the total economic value of this park. Because it is an internship on the Municipally of Santa Maria da Feira, we also want to discover what kind of activities the population would like to do on the park and what is their opinion about its current use.

The "Quinta do Castelo" provides the city of Santa Maria da Feira with a wide range of ecosystem services. On this case, we will explore the cultural services behind it and collect an overview about the opinion on the present and future use of the park. To do this we adopted for the contingent valuation method, realising an online questionnaire.

The work is divided in five main parts. We start by presenting the "Quinta do Castelo" and its historical framework. Then we review some concepts and analyse some identical studies. The third part of the work explains the methodology used and right after that we discuss the results of the questionnaire. At the end we show the main conclusion and give some recommendations.

2. "QUINTA DO CASTELO"

The "Quinta do Castelo" is a huge urban park placed near the Castel of Santa Maria da Feira that was closed to the public until 2019. There are not many historical reports about this place and therefore it is difficult to know its origin and who created it. We tried to build a chronologic line with the information that is spread around many documents and used as main source a section of a book, Reis (2019).

When searching, we found three owners of this place. The first one was Mr António José Saraiva Castel Branco, who was the oldest one, registered in 1755. Then, in 1854, appeared Mr José Joaquim da Silva Pereira with a short description of the lands he possessed. The last known owner was not a person but a family, the "Família Brandão". The head of the family was Mr Alexandre Brandão on behalf of whom the park was registered. He inherited part of the land and bought the rest, being the only owner of "Quinta do Castelo" in its totality. This family owned a canned food factory in Espinho that allowed them to do improvements in their property.

The actual urban park was transformed into a recreational space in the beginnings of the XXth century, by the hands of Mr Alexandre Brandão. These improvements led to many protests by the local population. Mr Alexandre Brandão sealed all the land with a huge wall and, in 1920, he reconstructed his parents' house. This house had to be reconstructed in a different place because of the local protests. In 1921, the local population tried to expropriate part of the land near the Castel, to create a safety zone. But due to the high price that they would have to pay, this expropriation did not occur. Only in 1939 that became possible because Mrs Angelina de Matos Brandão, widow of Mr Alexandre Brandão, gave this land to the Municipality.

Regarding the improvements made in "Quinta do Castelo". We found a project done by the "Companhia Agrícola – Hortícola do Porto" published in a newspaper in 1914. It was done by Mr Jeronymo Monteiro da Costa and it showed some of the actual building like the cave, bridge, and lake, all with a romantic and naturalistic style. They created a recreational park with nature around the paths and wide views to the Castel. They planted exotic trees and tried to create some natural benches with concrete. The concrete constructions still on the park and some of the exotic trees continue preserved and uninjured.

With the death of Mr Alexandre Brandão and Mrs Angelina Brandão, this place entered on an inheritance process. Once they had no children, the park passed to their nephews who

decided to put it for sale. In 1961 the "Quinta do Castelo" was bought by a State department, the "Federação das Caixas de Providências – Obras Sociais", to do a summer camp. At that time, the "Quinta do Castelo" had 153,870 m^2 of surface. From 1966 to 1974, this park functioned as a summer camp and during the rest of the year with some other activities like professors training. On April 25, 1974, with the "Revolução dos Cravos", the park passed to the Social Security, ceasing the summer camps and being turned into a permanent kindergarten.

Over the years, we assisted to many expropriations and new constructions. Two of the main changes were the construction of a hotel in the former orchard and the establishment of the local scout's group in the caretaker's house. In 2013 the Social Security and the Municipality settled an agreement that allowed the Municipality to improve the "Quinta do Castelo".

With an increasing number of visitors, the Municipality decided to requalify this place in 2019. In this intervention, besides the requalification of the two main attractions (the cave and the lake), the paths were reconstructed, the gardens were improved, and the main roads enlightened. They also constructed two amphitheatres with a natural look and reconstructed an old house near the scout's headquarters, that now serves as a support to the park. Currently, the park is open to the public and shelters big events like "Perlim" and "Viagem Medieval".

3. LITERATURE REVIEW

3.1. ECOSYSTEM SERVICES

In economic history, the concerns about nature and natural resources started before the Classics. On the beginning, the production function was composed by labour and natural resources. Capital appeared later with the industrial revolution, the invention of the steam machine and the emerging of mass consumption. On these times, ecology did not exist, so the notion of ecosystem services was improbable to appear in economic literature. But nature itself was a really important factor in the production function (Gómez-Baggethun, de Groot, Lomas, & Montes, 2010).

On Classical economics, natural capital had a core position on the production function and was understood like land. Economists like Ricardo and Malthus built models where land and natural resources were their main concerns. Over time, this factor lost its significance and labour started to be the main force of production. In the 19th century, land lost all significance and was replaced by capital (Gómez-Baggethun, de Groot, Lomas, & Montes, 2010).

The Neoclassic economists brought different theories and concerns. Because markets were growing rapidly and getting out of limits they started worrying about the external effects of the economic activity. Beyond this, it appeared the concern about future generations and the exhaustion of natural resources. But there was a belief that technological innovation could help the economy to reach sustainability. With the emergence of environmental and ecological economics, new branches of economic literature appeared. These branches started worrying about natural resources and the benefits that we take from them. Here starts the ecosystem services history (Gómez-Baggethun, de Groot, Lomas, & Montes, 2010).

The ecosystem services started to be defined in 1977 by Westman. He suggested that was important to know the social value of ecosystem benefits to make informed decisions. Following Westman (1977), Ehrlich & Ehrlich (1981) were the first to use the term ecosystem services (Fisher, Turner, & Morling, 2009).

This concept started to expand on the 1990s, with the work of Daily (1997) among other authors. The Millennium Ecosystem Assessment in 2005 was a landmark in the history of the ecosystem services approach, settling down this concept on the international agenda. Since then, many projects have been developed around this concept (Gómez-Baggethun & Ruiz-Pérez, 2011).

Fisher, Turner, & Morling (2009) highlighted three definitions that were the most cited:

- "Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life." (Daily, 1997, p. 3).
- "Ecosystem goods (such as food) and services (such as waste assimilation) represent the benefits human populations derive, directly or indirectly, from ecosystem functions." (Costanza, et al., 1997, p. 253).
- "Ecosystem services are the benefits people obtain from ecosystems." (Millennium Ecosystem Assessment, 2003, p. 49).

Each of these definitions has different ends. Daily (1997) reinforces that ecosystem services are essential to sustain the daily routine of human life. On the other hand, Costanza, et al. (1997) points that ecosystem services are represented by the goods and services used by humanity but produced by the ecosystem functions. The final definition and the most used nowadays is the Millennium Ecosystem Assessment that joins the previous two and being more comprehensive and general.

According to the Millennium Ecosystem Assessment (2003), these ecosystem services can be divided into four categories described in Table 1:

Table 1 - Ecosystem Services Categories
Adapted from (Millennium Ecosystem Assessment, 2003, pp. 56-60)

Category	Description
Supporting services	These types of services are those who support and are directly interconnected with all other services. They do not have a direct impact on human, but they are essential to the maintenance and existence of ecosystems (ex: primary productions, soil formation and retention, provisioning of habitat).
Regulation services	When we are speaking about regulation services, we are referring to services who indirectly benefit humans, but are perceived by a human, because these are essential services (ex: air quality maintenance, climate regulation, water purification).
Provisioning services	These are the most visible services because we can take direct use from them. They are the products that we obtain from ecosystems (ex: food, fuel, freshwater).
Cultural services	These are nonmaterial benefits that the population can take from the ecosystem, enjoying a different range of opportunities that are provided by the ecosystems (ex: cultural diversity, spiritual values, social relations, recreation, ecotourism).

3.2. ECONOMIC EVALUATION OF ECOSYSTEM SERVICES

It is needed to evaluate the ecosystem services, so people can understand their true value and the need to maintain them stable (Daily, 1997). This evaluation can serve as a form of communication with society and raise awareness to the importance of ecosystem services (Costanza, et al., 2014).

There are three main types of values that we can attribute to ecosystems. The ecological value that refers to the integrity of the regulations and supporting services. The social-cultural value that is essentially related to the recreational/cultural functions of ecosystems and human well-being. And finally, the economic value that is important to scientists and economists to discover the economic value of ecosystems because it allows them to make better management and policy decisions (de Groot, Wilson, & Boumans, 2002).

There are many forms to evaluate ecosystems. On this study, we will consider The Economics of Ecosystems and Biodiversity (2010) procedure. On this initiative, they describe three major steps to achieve and capture the values of the ecosystems. First, we need to identify the ecosystems services under consideration and know their impact on human well-being. Then, we need to demonstrate and comprehend their value. On the end we try to capture the monetary value of the ecosystem service.

The value of ecosystems services can be divided into three types, as we can see in Figure 1. The sum of all these values is called the Total Economic Value (TEV).

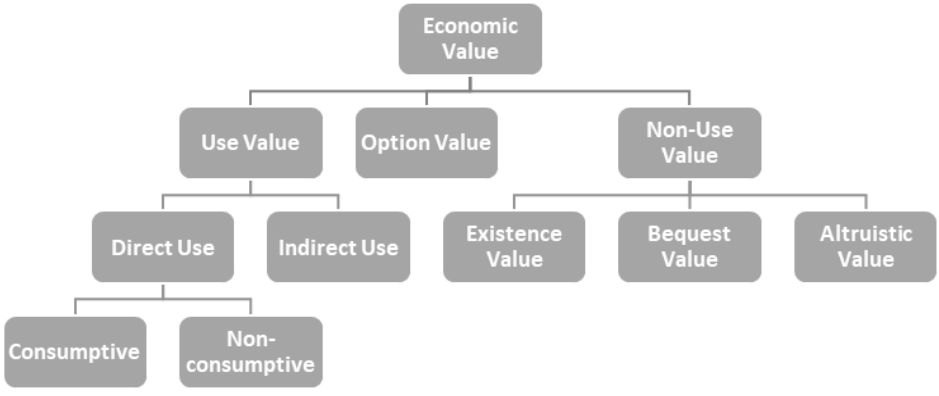

Figure 1 - Economic Values
Adapted from (Madureira, Magalhães, Silva, Marinho, & Oliveira, 2013, p. 47) & (de Groot, Alkemade, Braat, Hein, & Willemen, 2010, p. 262)

On this study we will focus on the non-use values. The non-use values or passive use values are divided into three different values. The existence value that is when human well-being is explained by the mere existence of the ecosystem or service benefits. The bequest value that is related to the preservation of the service and its benefits for future generations.

And the altruistic value that is attached to the fact of preserving a direct or indirect value to another person (Madureira, Magalhães, Silva, Marinho, & Oliveira, 2013).

On third step, we will try to achieve the TEV that is impossible to obtain directly from the market. To obtain these values we can follow two different measures. The most used is the willingness to pay (WTP) but we can also use the willingness to accept (WTA).

The WTP is the maximum value that people are willing to pay to obtain an increase or to maintain that ecosystem services. Alternatively, the WTA is the minimum value that people are willing to accept to see a decrease in the provisioning of that ecosystem service. The WTP is better on cases where we are trying to evaluate the variation of human well-being for consumers. On the other hand, the WTA is used on cases when we are trying to evaluate the variation of human well-being for providers (Madureira, Magalhães, Silva, Marinho, & Oliveira, 2013).

To execute these valuations, we have several methods. In this case we will focus on the differences between the Travel Cost Method (TCM) and the Contingent Valuation Method (CVM). This are the two main methods used to evaluate recreational services. The main difference between them is that the TCM analyses revealed preferences and the CVM analyses the stated preferences. This is, the TCM is directly related to the recreational/cultural services. It estimates the ecosystem value through the cost of the trip and all the visit cost around it. On the other hand, the CVM is the creation of hypothetical markets through a survey where people state their WTP (Madureira, Magalhães, Silva, Marinho, & Oliveira, 2013).

3.3. SIMILAR STUDIES

Several authors study the WTP for recreational ecosystem services.

For example, Šebo, Gróf, & Šebová (2019) evaluated the WTP for the recreational value of a lake in Kosice, Slovakia using the contingent valuation methodology. The authors also analysed which factors could influence that WTP of the inhabitants of Kosice. This city is the second largest city in Slovakia with 240,000 inhabitants. The questionnaire used included questions about the lake, the water quality, using frequency, WTP and demographic characteristics. The study used dichotomous choice questions and local charge as a payment mechanism. The data collection occurred between December 2017 and April 2018 and obtained a total of 283 usable responses. The main conclusions were that the mean of the people who were willing to pay (40%), was 11€, and the aggregated WTP was estimated at 2,630,551€. They have also concluded that WTP was positively influenced by income, water

skiing, swimming, knowledge about environmental problems and the number of children per household. On the other hand, the bid amount and the knowledge about the ongoing lake cleaning had a negative impact on the WTP.

Paola, Mustafa, & Giacomo (2018), evaluated the recreational benefits of the water reuse project in Ferrara Municipality, north Italy. The authors used the contingent valuation approach and collected a set of 400 surveys by interviewees. Their main conclusions were that 25% of respondents were not willing to pay for the project. Additionally, WTP for the project was positively influenced by the family income, the location of residence (downtown and the east), and the education level. The average WTP was 48.10€ per person, which gave a total of 3,100,000€ for the total reference population.

Brown, et al. (2018) studied the economic value of managing water through the Northern boundary of Everglades National Park, which has an approximate area of 1,700km^2. The model used analysed three different factors. The first one was related to the health of the ecosystem and the fishery habitat. Then they analysed the attributes for the fisherman related with their fishing experience, including the catch per effort, and enjoying a healthy environment. Lastly, they tried to capture the WTP of the anglers and use the mean WTP of all of them to value the recreational services. The payment mechanism was through a penalty, that tried to capture the recreational ecosystem loss due to maintaining periodic water flows below the targets. The authors concluded that the highest values of WTP were attached to recreational anglers, but also that anglers who valuate the fishing attributes were significant. Additionally, climatic factor such as rainfall, evapotranspiration and other hydrological factor influenced the recreational services. the study achieved a total penalty of 68.81$ million, divided in two parts, 4.16$ million to fish catch and 64.66$ million to ecosystem health.

Another identical study but with a different methodology was the study of Othman & Jafari (2019) where the authors evaluated the economic value of the recreational services provided by Taman Tasik Cempaka in Selangor, Malaysia. This study used the travel cost method. With the application of the survey they concluded that most of the visitors lived close to the park, the mean visitor's age was 29 years and they normally came on groups. They first concluded that the park was a place where families and groups liked to go to socialise and do some activities. About the WTP to maintain and conserve the park, most of the respondents (65%) were not willing to pay anything since they though that it was the government's responsibility to maintain the park, only 15% agreed with this payment. The

average group size was 3.33-person, and they did 3 trips per month, on average. The WTP was related to the travel cost, which was highly significant. Respondents that used the park for leisure were those who used it more often and respondents that come to the park with friends or family had lower visitation frequency than those who came alone. The main discovery was that each individual visitor was willing to pay 5.9 MYR to 6.2 MYR, which gave a monthly recreational benefit of 121,176 MYR. Also, an average entrance fee of 1.30 MYR per individual per entry was calculated.

Zambrano-Monserrate, Silva-Zambrano, & Ruano (2018) conducted a study about the Villamil Beach National Recreation Area to estimate an economic value using the individual travel cost method. This beach has an area of 2,472 hectares that are mainly used to relax, hiking surfing and taste the local cuisine. The authors constructed a survey and collected data for 17 days, gathering a total of 406 valid responses. Their main conclusions were that the average number of tourists were lower than the residents, as expectable, the substitute places and age were significant and had a positive impact on the visit frequency. The WTP was estimated to be 16.95 USD, which gave a total of 21.3 million USD per year because the average number of visitors was 1.25 million per year. The authors concluded that this value was negatively impacted by the travel cost, and positively impacted by the perception of environmental quality. However, beach improvements would have greater impacts than environment quality. After analysing all these factors, they concluded that this beach area was important for the Ecuador economy so they must maintain it.

The last case that we analysed was performed by Heagney, Rose, Ardeshiri, & Kovac (2019). This is one of the first studies that use the travel cost method to estimate the WTP for recreational benefits in an entire protected area network. This network has a total of 728 protected areas across 800,000 km^2 in Australia. The authors used phone surveys to a total of 62,337 individuals. Only nearly 7,000 respondents said that they had visited the protected areas on the last four weeks. The estimation of total WTP for tourism was 3.3 billion $AUD per annum. Residents were those who visited the area more frequently, more than 98% making an average of 5 visits a year. Tourism and recreational services were the most famous for communities. The individual WTP was estimated to be around 31 $AUD per visit. The authors also concluded that protected areas were providing important recreational services to the nearest communities that had low-income levels and did not have urban parks.

4. METHODOLOGY

The methodology adopted to obtain the TEV of the urban park "Quinta do Castelo", was the CVM with the application of a questionnaire (Attachment 1 – Questionnaire). Data was collected between March and April of 2020. It was an online questionnaire with anonymous and volunteer participation.

This was divided in two main sections, with a total of 32 questions. The first section was designed to gather demographic data with personal and professional questions. Right before the second section, there was a conditional question to understand if the respondents knew the "Quinta do Castelo". If they did not know it, they would not be able to answer the rest of the questions and would be redirected to the end of the questionnaire.

The second section was divided in two groups of questions. The first group asked about the knowledge of the urban park, ecosystem services provided by it and questions about the use made, both by the individual and the municipality. The second group was about the WTP. We used 4 different questions with different payment methods. All of them had an option of no payment (0€) and an option where respondents could choose other value if they thought that those values were too low and wanted to be specific.

The first WTP question used the entrance value as payment method. This value allowed visitors to move freely around the park. On second and third questions we proposed two different groups of activities, wellbeing activities and guided activities, and asked how much the respondents were willing to pay for them. The final WTP question asked for an annual donation. With this payment method, people could donate an annual value to preserve the park's natural patrimony and is intrinsic environmental value.

At the end of this section, and the questionnaire, existed an open-ended question where respondents could voluntarily add comments about the "Quinta do Castelo".

5. RESULTS

5.1. DESCRIPTIVE ANALYSIS

We obtained a random sample of 433 respondents to the questionnaire. 57% of respondents lived in the Municipality of Santa Maria da Feira, but respondents were from 30 different localities/regions. Figure 2 shows the five major residence localities.

Most respondents were female (75%), and 50% were aged between 25-50 years, while 34% had between 18 and 25 years (Figure 3). Regarding the marital status, respondents were mainly single (49%) or married (47%). 62% of the households had 3 to 4 people, while 24% had 1 to 2 people, and 13% had 5 or more people. Most respondents had no children (52%), 15% had one child, 27% had two children, and 6% had three or more children. Most respondents (68%) had higher education, whereas 26% had upper secondary education and 6% had basic education.

Regarding the professional situation, Figure 4, 64% of the respondents were employed while 27% were students. As we can observe in Figure 5, most respondents (56%) had a monthly income lower than 1,000€, which can be related to the fact that a significant part of our sample (27%) consisted on students.

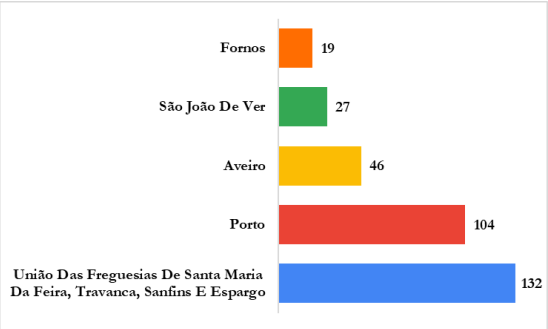

Figure 2 – Five Major Localities

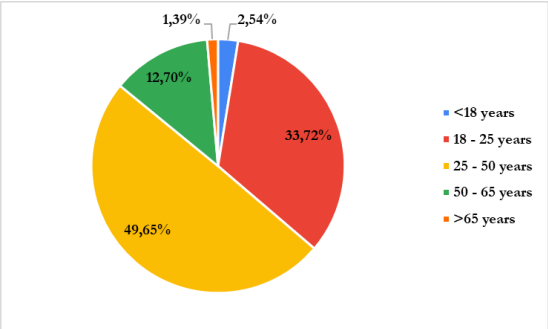

Figure 3 – Respondents Age

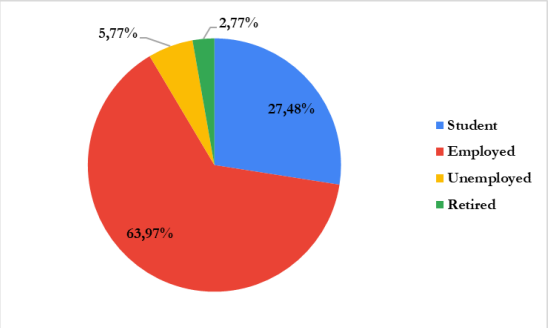

Figure 4 – Professional Situation

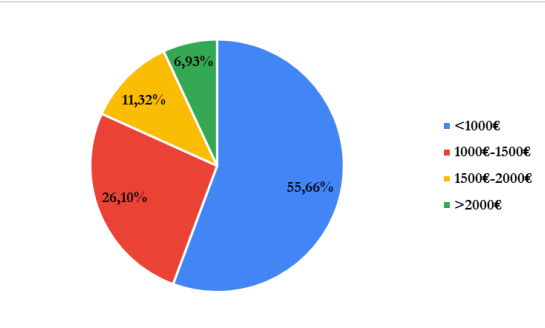

Figure 5 – Monthly Income

Moving on to the second part of the questionnaire, which concerned the knowledge of the park and its associated services, most respondents (67%) knew the park. Only these 288 respondents were able to answer the remaining questions concerning the ecosystem services evaluation and are, therefore, going to be the base (100%) for the following analysis. About 80% of these respondents, who knew the park, were from the municipality of Santa Maria da Feira.

From the respondents who knew the park, 86% knew that it had been requalified and 84% knew that it was open to the public. When asked about what services were provided by the park, 261 respondents considered that it provides recreational services and only 7 respondents considered provisioning services (Figure 6).

On average, 38% of respondents who knew the park, visit it one to two times a year while only 5% had never been there (Figure 7). Most respondents (71%) intend to visit the park more often in the future, 26% considered (but were uncertain about) the possibility of increasing the number of visits in the future, and 3% had no interest in such increase.

Simultaneously, 54% of respondents disagreed with the use of the urban park for large scale events. Figure 8 depicts the results concerning the activities to be performed in the park, highlighting the importance of physical activities, guided tours, but also biodiversity observation. These results show a strong interest of respondents to perform small scale activities in the park.

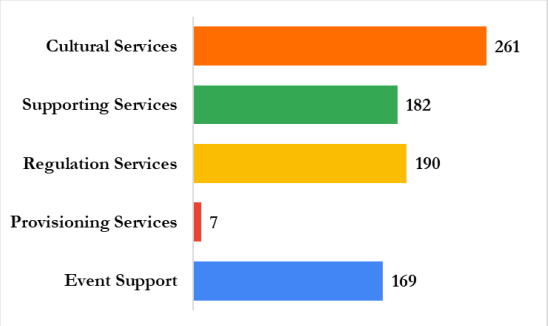

Figure 6 – Services Provided

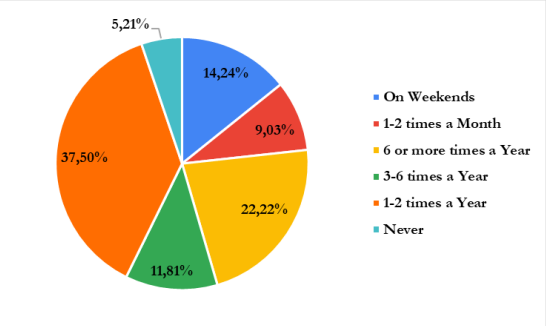

Figure 7 – Visit Frequency

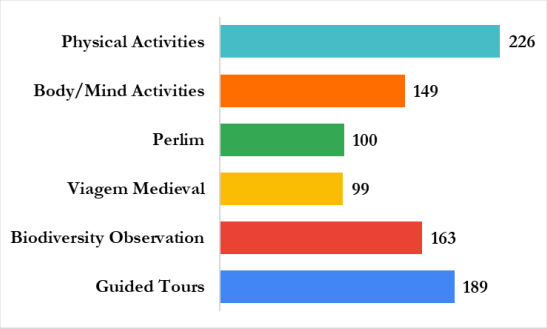

Figure 8 – Activity Preferences

Finally, the third part of the questionnaire concerned the WTP of respondents for the several activities to be performed in the park. 62% of respondents had a positive WTP to enter the park. From these, the largest percentage were willing to pay between 0.50€ and 1€ (Figure 9).

Figure 10 shows the WTP for guided activities. A large part of the respondents (48%) were willing to pay between 0€ and 2€, followed by 38% who were willing to pay between 2€ and 5€. Regarding the WTP for wellbeing activities, 32% of respondents were willing to pay from 1€ to 2.50€ while around 33% where willing to pay a higher value (Figure 11). Comparing the percentage of respondents with a zero WTP, we can conclude that guided activities have more acceptance than wellbeing ones.

Finally, when asked about a possible annual donation, around 36% were willing to pay an amount between 0€ and 5€, 34% were willing to pay a higher value, but 30% had a zero WTP. Despite the majority being willing to do an annual donation, 86 (30%) respondents were not willing to do it (Figure 12).

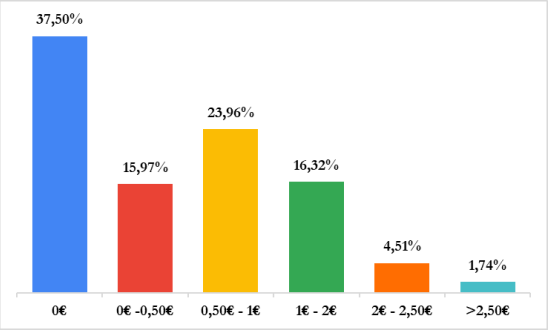

Figure 9 – WTP for Entrance Value

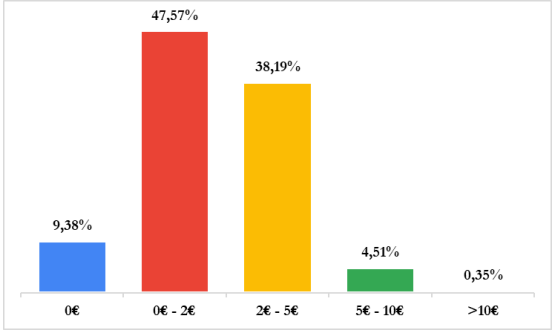

Figure 10 – WTP for Guided Activities

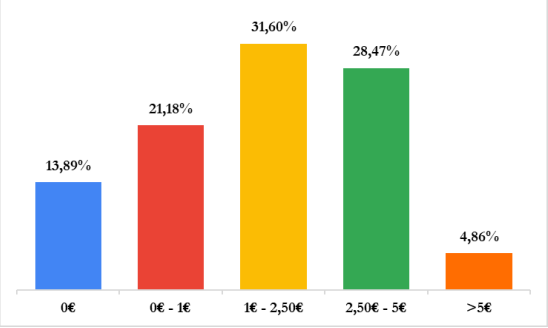

Figure 11 – WTP for Wellbeing Activities

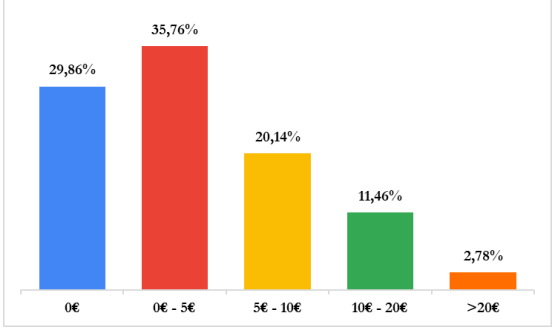

Figure 12 – WTP for Annual Donation

With these responses we were able to estimate the mean WTP for each payment type. We used the following expression, Eq. (1):

$$\overline{WTP} = \frac{Value_1 * Nº\ of\ answers_1 + Value_2 * Nº\ of\ answers_2 + \cdots + Value_n * Nº\ of\ answers_n}{Total\ Sample} \quad (1)$$

Where $\overline{WTP}$ is the mean WTP; $Value$ are the middle values of the proposed intervals; $Nº\ of\ answers$ are the answers that correspond to that value; and $Total\ Sample$ are the 288 respondents that knew the "Quinta do Castelo".

Table 2 presents the results for average WTP as well as total WTP.

Table 2 - WTP Results

Payment type		Mean WTP	Total WTP
Entrance value		0.61 €	175.50 €
Activity value	Guided activities	2.19 €	629.50 €
	Wellbeing activities	1.97 €	567.25 €
Annual donation		4.68 €	1,347.50 €

5.2. ECONOMETRIC ANALYSIS

With the 288 respondents that knew the "Quinta do Castelo", we constructed four regression models. Each of them had the WTP values as their dependent variable and all the other variables as independent. To proceed to the estimation, we transformed some of the variables (Attachment 2 – Regression Variables), so they could be analysed, and used the EViews 10 software, applying the Least Squares method for the equation estimation.

When we used the WTP for an Entrance Value as dependent variable we obtained the results expressed in Figure 13. With these results we were able to conclude that the significant variables were Resident in Santa Maria da Feira, Gender, Age and those who selected Environmental Services and Events. From these variables, only the Age and Events had a significant impact on the WTP. The other variables had all a negative impact on the dependent variable. Despise this data, the model only was able to explain 17.8% of the behaviour of the dependent variable.

For the WTP for Guided Activities as dependent variable, only the Gender, Marital Status, Education and Income were significant (Figure 14). As expected, the Education and Income had a positive impact on the WTP, but, interestingly, the Education had a higher impact than the Income. Both Gender and Social Status variables had a negative in the dependent variable. Like the model above, it only explains 13.1% of the behaviour of the dependent variable.

The model with the WTP for Well-being Activities as dependent variable had similar results (Figure 15). Only two significant variable, Gender and Household, both with a negative impact on the WTP. Also, the estimation only explained 11.1% of the behaviour of the dependent variable.

The last estimation done was with the WTP for Annual Donation (Figure 16). The Number of sons and those who knew that the urban park was opened to the public were the only significant variables and both had a positive impact in the dependent variable. This estimation only explained 9.1% of the dependent variable.

Dependent Variable: WTP_EV
Method: Least Squares
Date: 07/24/20 Time: 20:02
Sample: 1 288
Included observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.461591	0.418771	1.102254	0.2713
RES_SMF	-0.332469	0.103504	-3.212129	0.0015
GENDER	-0.231834	0.093384	-2.482574	0.0137
AGE	0.154958	0.075120	2.062791	0.0401
SOC_STAT	-0.015396	0.119930	-0.128379	0.8979
HOUSEHOLD	-0.009553	0.076751	-0.124466	0.9010
N_SONS	0.060663	0.055953	1.084183	0.2793
EDUC	-0.009946	0.069347	-0.143424	0.8861
PROF_STAT	-0.025919	0.101748	-0.254739	0.7991
INC	0.000125	0.000138	0.909159	0.3641
QC_REQ	-0.035930	0.126476	-0.284084	0.7766
QC_OP	0.120199	0.122884	0.978150	0.3289
C_SERV	-0.064055	0.206926	-0.309556	0.7571
E_SERV	-0.235141	0.103098	-2.280764	0.0233
N_VISIT	-0.038984	0.027609	-1.412011	0.1591
W_ACT	-0.174081	0.132120	-1.317599	0.1888
EVENTS	0.204872	0.095545	2.144251	0.0329
G_ACT	0.102704	0.103611	0.991248	0.3225
VISIT_FUT	0.081128	0.079700	1.017911	0.3096
LSE	-0.031661	0.090913	-0.348257	0.7279

R-squared	0.178050	Mean dependent var	0.609375
Adjusted R-squared	0.119778	S.D. dependent var	0.692304
S.E. of regression	0.649521	Akaike info criterion	2.041751
Sum squared resid	113.0630	Schwarz criterion	2.296123
Log likelihood	-274.0121	Hannan-Quinn criter.	2.143688
F-statistic	3.055478	Durbin-Watson stat	2.075479
Prob(F-statistic)	0.000031		

Figure 13 – Regression WTP_EV

Dependent Variable: WTP_GA
Method: Least Squares
Date: 07/24/20 Time: 20:03
Sample: 1 288
Included observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.948967	1.125465	0.843178	0.3999
RES_SMF	-0.311192	0.278172	-1.118704	0.2643
GENDER	-0.852582	0.250975	-3.397079	0.0008
AGE	0.012226	0.201889	0.060556	0.9518
SOC_STAT	-0.587621	0.322318	-1.823111	0.0694
HOUSEHOLD	-0.030914	0.206272	-0.149870	0.8810
N_SONS	0.067673	0.150376	0.450028	0.6531
EDUC	0.392353	0.186373	2.105204	0.0362
PROF_STAT	-0.176196	0.273451	-0.644340	0.5199
INC	0.000680	0.000370	1.837739	0.0672
QC_REQ	-0.067863	0.339910	-0.199649	0.8419
QC_OP	0.249614	0.330255	0.755822	0.4504
C_SERV	-0.272870	0.556124	-0.490664	0.6241
E_SERV	-0.320298	0.277079	-1.155978	0.2487
N_VISIT	-0.033942	0.074200	-0.457435	0.6477
W_ACT	0.224249	0.355079	0.631548	0.5282
EVENTS	-0.341135	0.256780	-1.328510	0.1851
G_ACT	0.175254	0.278459	0.629370	0.5296
VISIT_FUT	0.212767	0.214198	0.993318	0.3215
LSE	0.331397	0.244332	1.356339	0.1761

R-squared	0.131057	Mean dependent var	2.185764
Adjusted R-squared	0.069453	S.D. dependent var	1.809587
S.E. of regression	1.745616	Akaike info criterion	4.019007
Sum squared resid	816.6426	Schwarz criterion	4.273379
Log likelihood	-558.7370	Hannan-Quinn criter.	4.120944
F-statistic	2.127408	Durbin-Watson stat	1.975830
Prob(F-statistic)	0.004659		

Figure 14 – Regression WTP_GA

Dependent Variable: WTP_WA
Method: Least Squares
Date: 07/24/20 Time: 20:04
Sample: 1 288
Included observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.194887	0.968185	1.234151	0.2182
RES_SMF	0.102151	0.239298	0.426877	0.6698
GENDER	-0.652288	0.215902	-3.021219	0.0028
AGE	-0.108375	0.173676	-0.624005	0.5332
SOC_STAT	0.123178	0.277275	0.444246	0.6572
HOUSEHOLD	-0.304003	0.177446	-1.713210	0.0878
N_SONS	-0.018164	0.129361	-0.140413	0.8884
EDUC	0.192463	0.160328	1.200434	0.2310
PROF_STAT	-0.316388	0.235237	-1.344976	0.1798
INC	0.000447	0.000319	1.402864	0.1618
QC_REQ	0.452418	0.292409	1.547211	0.1230
QC_OP	0.098107	0.284103	0.345323	0.7301
C_SERV	-0.268427	0.478408	-0.561085	0.5752
E_SERV	0.030301	0.238359	0.127125	0.8989
N_VISIT	-0.095390	0.063831	-1.494414	0.1362
W_ACT	0.474957	0.305458	1.554902	0.1211
EVENTS	0.023350	0.220896	0.105707	0.9159
G_ACT	0.363264	0.239546	1.516470	0.1306
VISIT_FUT	0.082823	0.184265	0.449475	0.6535
LSE	0.038393	0.210188	0.182660	0.8552

R-squared	0.110991	Mean dependent var	1.969618
Adjusted R-squared	0.047965	S.D. dependent var	1.539035
S.E. of regression	1.501672	Akaike info criterion	3.717951
Sum squared resid	604.3451	Schwarz criterion	3.972323
Log likelihood	-515.3849	Hannan-Quinn criter.	3.819888
F-statistic	1.761020	Durbin-Watson stat	2.240521
Prob(F-statistic)	0.027335		

Figure 15 – Regression WTP_WA

Dependent Variable: WTP_AD
Method: Least Squares
Date: 07/24/20 Time: 20:05
Sample: 1 288
Included observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.414749	3.404918	0.121809	0.9031
RES_SMF	0.291553	0.841566	0.346441	0.7293
GENDER	-0.625809	0.759286	-0.824207	0.4106
AGE	0.045562	0.610785	0.074596	0.9406
SOC_STAT	-0.660876	0.975121	-0.677737	0.4985
HOUSEHOLD	-0.630734	0.624044	-1.010720	0.3131
N_SONS	0.795262	0.454938	1.748069	0.0816
EDUC	0.861139	0.563842	1.527269	0.1279
PROF_STAT	-1.038497	0.827283	-1.255310	0.2105
INC	0.000926	0.001120	0.826202	0.4094
QC_REQ	-1.284618	1.028345	-1.249210	0.2127
QC_OP	2.085142	0.999135	2.086947	0.0378
C_SERV	-0.831185	1.682467	-0.494028	0.6217
E_SERV	-0.520070	0.838261	-0.620415	0.5355
N_VISIT	0.169790	0.224481	0.756365	0.4501
W_ACT	-0.084561	1.074235	-0.078718	0.9373
EVENTS	-0.040448	0.776849	-0.052067	0.9585
G_ACT	1.260855	0.842435	1.496680	0.1357
VISIT_FUT	0.831217	0.648024	1.282695	0.2007
LSE	-0.058511	0.739189	-0.079155	0.9370

R-squared	0.091418	Mean dependent var	4.678819
Adjusted R-squared	0.027004	S.D. dependent var	5.353868
S.E. of regression	5.281087	Akaike info criterion	6.233056
Sum squared resid	7474.487	Schwarz criterion	6.487429
Log likelihood	-877.5601	Hannan-Quinn criter.	6.334993
F-statistic	1.419216	Durbin-Watson stat	1.839936
Prob(F-statistic)	0.116941		

Figure 16 – Regression WTP_AD

6. CONCLUSION

The aim of this study was to discover an entrance value for the urban park "Quinta do Castelo". To achieve such value, we used the CVM and built a questionnaire where we obtained a sample of 433 respondents, from which 288 knew the urban park. About their demographic data, they were mainly female and had between 25-50 years. Also, most of the had no children, were employed and had monthly income lower than 1,000€. It is important to note that 230 of the 288 who knew the park were from the Municipality of Santa Maria da Feira.

From those who knew the urban park, 38% visit the park 1-2 times a year and 71% intend to increase their visit frequency. A valuable information that this questionnaire gave us was about the activities and services the park provided or could provide us with. In question 27 we asked if the respondents agreed with the use of the park for large scale activities and 54% of them disagree with that.

The environmental services of this place were not undervalued by their users because most of them recognize them (Figure 6). Also, when asked about activities, those who had more answer were not the big events like "Perlim" or "Viagem Medieval", but the smaller ones (Figure 8).

As expected, the Annual Donation was the payment method that had the highest value. But when compared with the other ones, we can see that, for example, the Guided Activities or the Wellbeing Activities could give a higher value to the space in the range of a year. This because it is almost half of the value attributed to the Annual Donation and this kind of activities would probably happen more than three times a year.

Regarding the regression models, all of them showed a low determination coefficient (lower than 20%) indicating that these estimations can be improved. This part will have to stay for future investigations that can find new and more suitable formulations.

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8. ATTACHMENTS

8.1. ATTACHMENT 1 – QUESTIONNAIRE

"Quinta Do Castelo"

No âmbito do Mestrado em Economia e Gestão do Ambiente, da Faculdade de Economia do Porto, mostrou-se necessário realizar este inquérito cujo objetivo é perceber qual a valorização, por parte da população residente e não residente, da Quinta do Castelo.

Pedia então a sua colaboração na resposta a este questionário, que não deverá demorar mais de 5 minutos. A resposta é anónima e agradeço desde já se puder partilhar este questionário com os seus contactos de forma a obter o maior número de respostas possível.

Desde já muito obrigado pela participação!

* Obrigatório

1. Residente do Conselho de Santa Maria da Feira? *

(Marque só uma resposta)

◯ Sim (Prosseguir para a pergunta 2)

◯ Não (Prosseguir para a pergunta 11)

Dados Demográficos – Residentes

2. Freguesia*

(Marque só uma resposta)

◯ Argoncilhe

◯ Arrifana

◯ Escapães

◯ Fiães

◯ Fornos

◯ Lourosa

◯ Milheirós De Poiares

◯ Mozelos

◯ Nogueira Da Regedoura

◯ Paços De Brandão

◯ Rio Meão

◯ Romariz

◯ Sanguedo

- ◯ Santa Maria De Lamas
- ◯ São João De Ver
- ◯ São Paio De Oleiros
- ◯ União Das Freguesias De Caldas De São Jorge E Pigeiros
- ◯ União Das Freguesias De Canedo, Vale E Vila Maior
- ◯ União Das Freguesias De Lobão, Gião, Louredo E Guizande
- ◯ União Das Freguesias De Santa Maria Da Feira, Travanca, Sanfins E Espargo
- ◯ União Das Freguesias De São Miguel Do Souto E Mosteirô

3. Género*

(Marque só uma resposta)

- ◯ Masculino
- ◯ Feminino

4. Idade*

(Marque só uma resposta)

- ◯ <18 anos
- ◯ 18 anos – 25 anos
- ◯ 25 anos – 50 anos
- ◯ 50 anos – 65 anos
- ◯ >65 anos

5. Estado Civil*

(Marque só uma resposta)

- ◯ Solteiro (a)
- ◯ Casado (a) / Em união de Facto
- ◯ Outro: _____

6. Agregado Familiar*

(Marque só uma resposta)

- ◯ 1 – 2 Pessoas
- ◯ 3 – 4 Pessoas
- ◯ 5 ou mais Pessoas

7. Filhos*

(Marque só uma resposta)

- ◯ 0
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 ou mais

8. Formação*

(Marque só uma resposta)

- ◯ Ensino Primário (4º Ano de Escolaridade)
- ◯ Ensino Básica (9º Ano de Escolaridade)
- ◯ Ensino Secundário (12º Ano de Escolaridade)
- ◯ Ensino Superior (Licenciatura, Pós-Graduação, Mestrado ou Doutoramento)

9. Situação Laboral*

(Marque só uma resposta)

- ◯ Estudante
- ◯ Empregado
- ◯ Desempregado
- ◯ Reformado

10. Rendimento Mensal*

(Marque só uma resposta)

- ◯ <1000€
- ◯ 1000€ – 1500€
- ◯ 1500€ – 2000€
- ◯ >2000€

(Prosseguir para a pergunta 20)

Dados Demográficos – Não Residente

11.Distrito*

(Marque só uma resposta)

- ◯ Açores
- ◯ Aveiro
- ◯ Beja
- ◯ Braga
- ◯ Bragança
- ◯ Castelo Branco
- ◯ Coimbra
- ◯ Évora
- ◯ Faro
- ◯ Guarda
- ◯ Leiria
- ◯ Lisboa
- ◯ Madeira
- ◯ Portalegre
- ◯ Porto
- ◯ Santarém
- ◯ Setúbal
- ◯ Viana do Castelo
- ◯ Vila Real
- ◯ Viseu

12.Género*

(Marque só uma resposta)

- ◯ Masculino
- ◯ Feminino

13.Idade*

(Marque só uma resposta)

◯ < 18 anos

◯ 18 anos – 25 anos

◯ 25 anos – 50 anos

◯ 50 anos – 65 anos

◯ >65 anos

14.Estado Civil*

(Marque só uma resposta)

◯ Solteiro (a)

◯ Casado (a) / Em União de Facto

◯ Outro: _____

15.Agregado Familiar*

(Marque só uma resposta)

◯ 1 – 2 Pessoas

◯ 3 – 4 Pessoas

◯ 5 ou mais Pessoas

16.Filhos*

(Marque só uma resposta)

◯ 0

◯ 1

◯ 2

◯ 3

◯ 4

◯ 5 ou mais

17.Formação*

(Marque só uma resposta)

◯ Ensino Primário (4º Ano de Escolaridade)

◯ Ensino Básico (9º Ano de Escolaridade)

◯ Ensino Secundário (12º Ano de Escolaridade)

◯ Ensino Superior (Licenciatura, Pós-Graduação, Mestrado ou Doutoramento)

18.Situação Laboral*

(Marque só uma resposta)

◯ Estudante

◯ Empregado

◯ Desempregado

◯ Reformado

19.Rendimento Mensal*

(Marque só uma resposta)

◯ <1000€

◯ 1000€ – 1500€

◯ 1500€ – 2000€

◯ >2000€

(Prosseguir para a pergunta 20)

Quinta do Castelo

20.Conhece a Quinta do Castelo? *

(Marque só uma resposta)

◯ Sim (Prosseguir para a pergunta 21)

◯ Não (Fim do questionário)

21.Sabia que a Quinta do Castelo foi requalificada? *

(Marque só uma resposta)

◯ Sim

◯ Não

22.Sabia que a Quinta do Castelo se encontra aberta ao Publico? *

(Marque só uma resposta)

◯ Sim

◯ Não

23.Considera a Quinta do Castelo um local com apetências para: *

(Marque as que se aplicam)

☐ Lazer e Recreio (ex.: passeios)

☐ Suporte à biodiversidade (ex.: suporte à vida animal criando habitats)

☐ Regulação ambiental (ex.: melhora/mantém a qualidade do ar)

☐ Aprovisionamento (ex.: fornecimento de madeira)

☐ Suporte a eventos (ex.: Perlim e Viagem Medieval)

24.Já a foi visitar? Se sim, quantas vezes? (Em Média) *

(Marque só uma resposta)

◯ Nunca
◯ Aos Fins de Semana
◯ 1-2 vezes ao Mês
◯ 1-2 vezes ao Ano
◯ 3-6 vezes ao Ano
◯ 9 ou mais vezes ao Ano

25.Que atividades gostaria de lá realizar? *

(Marque as que se aplicam)

☐ Atividades físicas (ex.: caminhadas, correr, etc.)
☐ Atividades de corpo/mente (ex.: yoga, tai chi, etc.)
☐ Perlim
☐ Viagem Medieval
☐ Observação da Biodiversidade (ex.: Rota das Árvores)
☐ Visitas Guiadas (ex.: História da Quinta e do Castelo)
☐ Outras: _____

26.No futuro, gostaria de aumentar o seu número de visitas à Quinta? *

(Marque só uma resposta)

◯ Sim
◯ Não
◯ Talvez

27.Concorda que a Quinta seja usada para eventos de grande escala (mais de 100 pessoas por dia)? *

(Marque só uma resposta)

◯ Sim
◯ Não

28. Se lhe fosse pedido uma quantia de entrada, para usufruir livremente do espaço da Quinta do Castelo, qual o valor que consideraria mais justo? (Por Entrada) *

(Marque só uma resposta)

- ◯ 0€
- ◯ 0€ – 0,50€
- ◯ 0,50€ – 1€
- ◯ 1€ – 2€
- ◯ 2€ – 2,50€
- ◯ >2,50€
- ◯ Outro: _____

29. Se lhe fosse pedido uma quantia para participar em atividades guiadas ligadas à Observação da Biodiversidade/História da Quinta, qual o valor que consideraria mais justo? (Por Atividade) *

(Marque só uma resposta)

- ◯ 0€
- ◯ 0€ – 2€
- ◯ 2€ – 5€
- ◯ 5€ – 10€
- ◯ >10€
- ◯ Outro: _____

30. Se lhe fosse pedido uma quantia para participar em atividades de carácter físico/mente, qual o valor que consideraria mais justo? (Por Atividade) *

(Marque só uma resposta)

- ◯ 0€
- ◯ 0€ – 1€
- ◯ 1€ – 2,50€
- ◯ 2,50€ – 5€
- ◯ >5€
- ◯ Outro: _____

31. Caso lhe fosse pedido uma quantia anual para manter a existência da Quinta do Castelo, com a garantia de proteção de todo o seu património natural e consequentemente o seu valor ambiental intrínseco, com quanto estaria disposto a contribuir? *

(Marque só uma resposta)

- ◯ 0€
- ◯ 0€ – 5€
- ◯ 5€ – 10€
- ◯ 10€ – 20€
- ◯ >20€
- ◯ Outro: _____

32. Gostaria de fazer algum comentário adicional relativamente à utilização da Quinta do Castelo?

(Resposta Livre)

_____

_____

_____

_____

_____

_____

_____

(Fim do Questionário)

8.2. ATTACHMENT 2 – REGRESSION VARIABLES

Variable	Description	Variable Type
res_smf	Resident in Santa Maria da Feira	Independent
gender	Gender	Independent
age	Age	Independent
soc_stat	Marital Status	Independent
household	Household	Independent
n_sons	Number of Sons	Independent
educ	Education	Independent
prof_stat	Professional Status	Independent
inc	Monthly Income	Independent
qc_req	Knowledge of Requalification	Independent
qc_op	Knowledge of Open to Public	Independent
c_serv	Cultural Services	Independent
e_serv	Environmental Services	Independent
n_visit	Number of Visits	Independent
w_act	Well-being Activities	Independent
events	Events	Independent
g_act	Guided Activities	Independent
visit_fut	Increase Future Visits	Independent
lse	Large Scale Events	Independent
wtp_ev	WTP for Entrance Value	Dependent
wtp_ga	WTP for Guided Activities	Dependent
wtp_wa	WTP for Well-being Activities	Dependent
wtp_ad	WTP for Annual Donation	Dependent

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