Reach environmentally responsible behaviour in island tourism, in the context of Ecotourism

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Abstract

Over the years, tourism has established itself as the most prominent global industry. Studies on the impact of tourism on the environment have aroused research interest due to the saturation of natural resources. The main objective of this dissertation is to study Ecotourism in the context of islands and understand if it is a plausible solution to mitigate the adverse effects of tourism. To support the thesis, hypotheses were elaborated, which, using a quantitative approach as the primary method, were analysed for their significance. The quantitative study was carried out with resources from the questionnaire, developed through the Conceptual Framework and adapted from the previous literature. The questionnaire was posted online on social media platforms. Through the IBM SPSS Statistics 26 software, it was possible to test the hypotheses and conclude that Place Attachment, Environmental Sensitivity, has a significant effect on environmentally responsible behaviour instead of environmental knowledge that is not statistically significant.

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Resumo

Ao longo dos anos, o turismo tem se estabelecido como uma das indústrias mais predominantes a nível mundial. Deste modo, o número de estudos com o propósito de estudar o impacto do turismo tem crescido devido à sobrecarga sobre os recursos naturais. O principal objetivo desta dissertação é estudar o Ecoturismo em contexto das ilhas e compreender se este, é uma solução plausível para mitigar os efeitos adversos do turismo. Neste estudo, a metodologia quantitativa foi a selecionada para analisar e estudar a significância estatística das hipóteses. A análise quantitativa, teve como suporte, questionários adaptados de literatura validada, tendo sido publicados em redes sociais. Por meio do software IBM SPSS Statistics 26, foi possível testar as hipóteses e concluir que apego ao local e a sensibilidade ambiental, possuem um efeito significativo no comportamento ambientalmente responsável, ao contrário do conhecimento ambiental que não é estatisticamente significativo.

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1. Introduction

In recent decades, tourism is no longer used strictly out of necessity and has become an important means of leisure for consumers (Atan & Arslanturk, 2012). In this sense, tourism is the largest industry in the world and one of the fastest growing sectors, accounting for more than a third of the value of total trade in services worldwide (Atan & Arslanturk, 2012).

Tourism on the islands is attracting many tourists to spend their vacation days. Its unique characteristics such as unique cultures, wild habitats and exoticism are the main reason for its choice (Hall, 2010). The problem is that many of the islands have limited resources and are environmentally, socially and economically vulnerable (Nesticò et al. 2020). Therefore, ecotourism in protected locations can mitigate the negative impacts of tourism and build an informed and motivated community that supports environmental preservation and social progress (Powell et al. 2008).

The rapid advance of technology is changing how consumers evaluate and purchase their trips (Cohen, Prayag & Moital, 2014). The rise of ethical concerns in consumption decisions affects the tourism consumption landscape (Cohen, Prayag & Moital, 2014). So, the importance of movements such as incentive-based conservation (e.g., Ecological services, employment, tourism evolution) is growing and plays a critical role in encouraging conservation (Spiteri & Nepal, 2006). According to Stronza (2007), these approaches make it possible to change lived panoramas, passing on the perception that the conservation and sustainable use of natural resources generate benefits. Therefore, in recent years, the shape of the travel industry has changed, with the emergence of new trends such as the sharing economy, the practical case being Airbnb, which promotes sustainability (social and environmental responsibility), the feeling of community (interactions social) and economic benefits (lower cost) for customers (Bowen & Whalen, 2017).

In recent years, in the literature (Ritch et al., 2009; Terlau & Hirsch, 2015; Young et al., 2010), it is possible to verify an increase in studies related to behaviour and how these influence the conservation of natural resources. According to the report by Nilsson et al. (2016), economic benefits are essential, in the short term, to catalyse local support, specifically in developing countries. However, non-economic motivations are vital to long-term protection viability and must be contemplated when implementing preservation and projects.

The concept of Ecotourism arose due to problems such as the devastation of natural habitat, environmental degradation, economic imbalance, fluctuation and cultural preservation (Gulinck et al., 2001). In contrast to mass tourism, the ecotourism experience must be nature-based, ecologically sustainable, environmentally educative, and locally beneficial (Donohoe & Needham, 2006).

Ecotourism appears on the islands in the context of promoting the sustainability of tourism and in the problematic implementation of sustainable practices even more on the islands, as they have limited evolution opportunities (Gough et al., 2010). There is constant pressure on the islands for residents to maintain the landscapes tourists desire, but this becomes a difficult task with limited resources and a growing population of residents and tourists (Mathis & Rose, 2016). Thus, ecotourism appears to reduce this pressure, as it intends to conserve the environment and, at the same time, encourage the well-being of community residents (Rozzi et al., 2010).

According to Han (2021), there is a lack of studies on environmentally sustainable consumer behaviour and their theories, which is crucial for creating efficient strategies to reduce the negative environmental consequences of tourism. Therefore, this study aims to reduce this gap and report ecotourism as a new way of consuming sustainably from the perspective of tourism.

In short, the main research question is defined as:

Does place attachment, environmental sensitivity and environmental knowledge lead to environmentally responsible behaviour?

In practice, the results of this study should show the direct impact of three essential components of Ecotourism (place attachment, environmental sensitivity and environmental knowledge) on environmentally responsible behaviour in the context of islands.

Through the literature review, it was possible to identify the main variables to test the hypotheses of the created model. The target population of the study was identified and questioned through surveys. After having a significant sample base, the results will be interpreted in SPSS.
The test was organized as follows. The article's starting point aims to review the literature contextualizing the problem with theoretical concepts that support the entire analysis carried out

in the study. Second, the focus will be on examining the social, economic and environmental impacts of tourism on the islands. Consequently, the history and theoretical notes related to tourism and ecotourism provide the background to understand the proposed solution to the impacts of tourism. Finally, with the quantitative analysis, the results assess the proposed solution and whether it is suitable for solving the problem.

2. Literature Review

2.1. Tourism

In the past decade, tourism has seen a renewed importance in economies. In 2019, international incomes hit 1.5 billion, and the forecast predicts 1.8 billion for 2030 (World Travel & Tourism Council, 2021).

With the recent phenomenon of tourism and its exploitation, the sector realizes that resources are limited, so the best path to maintain competitiveness in the market, in the long run, is through conservation and preservation of the environment. Thus, visitors will notice that places committed to the concern of the environment and local communities are very likely to do the same to defend their interests and guarantee the quality of the destination (Commission of the European Communities, 2007).

Over the years, millions of tourists have chosen to vacation on islands for their incomparable advantage of the nearby sea and its natural resources. Furthermore, the United Nations (1994) identified significant vulnerabilities that small islands suffer compared to large developing countries. These vulnerabilities include peripherality (distance and isolation have created relatively high transport costs), vulnerability to natural catastrophes, and urbanization pressures. In addition, economic vulnerability leads to difficulties in trade and a high level of dependence on tourism for exports and percentage in GDP.

Over the centuries, islands have evolved economically and politically, and many went through the decolonization process and guaranteed their political autonomy. The focus changed from traditional trading such as agricultural goods and fish to mass tourism and financial services.

In order to overcome vulnerabilities, the islands reinvigorate themselves by offering beneficial fiscal and regulatory topography, attracting wealthy people, offshore corporations and external investment to develop the island. (Hampton & Christensen, 2007)

2.1.1. Impacts on island tourism

Tourism is a critical part of the island economies, so it’s increasingly becoming a vital factor to analyse tourism's social, economic, and environmental impacts and figure out the best solution (McElroy, 2003).

Islands exhibit a single combination of available natural assets, such as beaches, beautiful coastline, and good weather, and these elements provide a comparative advantage in tourism.

Therefore, according to Ricardo (1891), a country will specialise in delivering goods with a comparatively lower production opportunity cost.

Although this theoretical perspective is interesting, in the context of the islands, the specialisation in tourism can compromise future growth and provide Dutch disease (Torvik, 2001).

On the islands, tourism has a very significant weight on GDP and exportation. With high demand for tourism, employees increased salaries, which diverted production resources away from the agricultural and manufacturing sectors, which is more sensitive to technological improvement and modernisation (Torvik, 2001).

A critical problem regarding the movement of production resources is that one of the most important origins of long-term economic growth is the investment in research and development (R&D) (Segerstrom, 1991).

Since tourism sector workers have less propensity to innovation levels and require lower training levels than tradable sectors, it restricts a vital source of human improvement and productivity increase, which could lead to Dutch disease. So, the specialisation can compromise the long-run economy and be highly vulnerable to external disturbances (Gylfason,2001a; Gylfason, 2001b)

Nowadays, sustainable consumption is an emerging issue in tourism and hospitality, concerning the issue of tourists visiting and enjoying the islands without creating negative externalities (Kiatkawsin & Han, 2017; Wang et al., 2020). On small islands, the negative impacts of tourism produce proportionately more significant consequences than larger areas and coastal regions due to their fragile ecosystem and dependence on natural resources (Nath et al., 2010). Therefore, preserving cultures, unique landforms, vegetation and fauna, and marine and coastal reserves are imperative (Gössling, 2002). So, it is crucial to classify various tourist consequences of tourist activity in the local environment through the literature.

According to (Vitousek 1994, 1997), area alteration is a global environmental change that influences biological systems. Land use is vital for tourism as it is used to increase tourism infrastructure and housing construction.

Gössling (2002) identifies wildlife extinction as another result of visitors' extremes, attacking natural diversity and ecosystem functioning. For example, tourists promote species extinction by destroying their habitat and negotiating the purchase of animal species or products. In some countries, guides may feel forced to comply with tourists' requests to interact closely with the animals.

This topic is vital due to the island's dependence on this resource for local life. These activities

contribute to the degeneration of coastal and marine environments, including coral reefs that provide fundamental safeguards against coastal corrosion, lessening the impact of wave action on the coast. Discharges of sewage-related to the influx of tourism and marine-based activities such as fish feeding during free diving and snorkelling reduce water quality and the biological stability of species, compromising the environment's future (Craig-Smith et al., 2006).
Therefore, to mitigate the negative impacts of tourism on the islands, the concept of Ecotourism appeared to assist in environmental conservation and socio-economic development (Anup et al., 2015.

2.2. Ecotourism

To ensure competitiveness, long-term viability and mitigate the consequences of tourism, tourist destinations, more than ever, have to combine the concern with sustainability in the decisions and practices of their executives. To respond to these circumstances, the concept of Ecotourism arises (Commission of the European Communities, 2007).

In the literature, there seems to be no clear definition of Ecotourism. According to Fennell (2002), Ecotourism contradicts mass tourism, ensures sustainability and education, and secures nature-based activities that respect nature and human systems.
Combining several studies from the literature, Donohoe & Needham (2006) convey five main consensual premises of Ecotourism. The first is that it must be nature-based, allowing tourists to visit natural areas knowing that they are not affecting them. Following this logic, the second premise states that all ecotourism activities must promote preservation/protection. The third premise promotes environmental knowledge, raising awareness of the culture of natural areas and allowing visitors to immerse themselves in the heritage. Moreover, finally, the distribution of benefits, to share gains and improvements in the quality of life of the hosts, allows for equity, justice in the community and the maintenance of environmental integrity.

Neger (2021) analysis identified the most common limitations and problems of Ecotourism. The most problematic are the difficulties in accessibility and infrastructure and the lack of promotion. The accessibility and infrastructure problems stem from the need for adequate accommodation for guests, the local population's inadequate capacity, and the lack of public services infrastructure. The lack of promotion is derived from a low variety and quality of offers and attractions, and the distance from potential markets can make it challenging to promote to new customers (Ghorbani et al., 2015; Tesfaye, 2017). Most of the time, the social component does not work because the financial gains of Ecotourism are made by external investors and not by the local population.

Therefore, the unequal allocation of income can create a population shortage to help preserve biodiversity.

Although all previously mentioned limitations, Buckley et al. (2016) conclude that Ecotourism has a positive net effect on threatened species in the extended period. Ecotourism can increase the likely survival rate and combat the adverse effects until other, more effective solutions are applied.
The country's reality can affect the economic gains of Ecotourism. Buckley (2021) identified that earnings are an instant and delicate source of funding operational protection projects in the poorest countries. In contrast, in wealthy nations, ecological impacts are used to maintain state assistance for preservation. Consequently, ecological earnings may not be used for their true purpose.

Therefore, this study intends to study the relationship between three essential ecotourism components in environmentally responsible behaviour.

2.2.1. Environmentally responsible behaviour

According to Poudel et al. (2016), environmentally responsible behaviour is the conduct that deliberately aims to reduce harmful consequences and maximize positive effects on the economic, ecological and socio-cultural environment.
Therefore, it is a consequence of environmentally conscious attitudes and is displayed in the individual's environmental care, engagement and pursuit of ecological knowledge before travel (Kang & Moscardo, 2006). This is an important theme, as ecotourism emphasizes environmentally responsible behaviour as an environmental conservation mechanism, helping to limit and prevent environmental damage by tourists (Chiu et al., 2014).
According to Puhakka (2011), environmentally responsible behaviour in the context of ecotourism results when tourists recognize that their actions impact the environment and accept the ecotourism area's norms.
In short, this is the independent variable; that is, it is the object of the study variable. Consequently, the model intends to verify whether the variables Environmental knowledge, Environmental sensitivity, and Place attachment have significantly directly affected the environmentally responsible behaviour and that ecotourism can promote environmentally responsible behaviour in the islands.

2.2.2. Environmental knowledge

H1: *Environmental knowledge possesses a significant and direct impact on Environmentally responsible behaviour.*

Environmental knowledge is becoming vital for environmental sustainability, as the improvement of individual behaviours can solve the environmental problems caused by tourism activities (Halder et al., 2020; Steg & Vlek, 2009). Thus, this study aims to study whether this component of Ecotourism can mitigate the negative impacts of tourism on the islands.

According to Pagiaslis and Krontalis (2014), Environmental knowledge refers to information individuals hold regarding the circumstances of the environmental views, climate change, environment, and the ecological outcomes of consumption and production.

The environmental knowledge component started to gain importance in the literature; according to Wurzinger & Johansson (2006) and Han & Hyun (2017), visitors with higher ecological education will be more concerned about the environmental problems of the places where they stay, which consequently activates the individual ethical need to protect the place (an environmentally responsible behaviour). This ethical consumption is crucial for preserving and conserving tourist destinations (Kiatkawsin & Han, 2017). Environmental knowledge is present in ecotourism, requiring specialized training of all operators in communication, ecology and resource management (Jurdana, 2009).

So, it's important to explore the direct relationship between environmental knowledge influences the behavioural intention and sustainable consumption behaviour.

2.2.3. Environmental sensitivity

H2: *Environmental sensitivity exerts a significant and direct impact on tourist Environmentally responsible behaviour.*

Environmental sensitivity is a measure of environmental concern and incorporates both the preference for natural environments and the intention to act for their preservation (Bilim, 2010). It represents another dimension worth studying because a high environmental sensitivity provides a concerned personal attitude about the environment, promotes greater awareness of tourism's negative consequences, and adopts responsible behaviour (ERB) (Confente & Scarpi 2021).

Ecotourism has a profound relation with Environmental sensitivity (awareness) because those who choose this type of tourism are aware of its impacts and are willing to change their behaviour. Therefore, Environmental sensitivity is a fundamental instrument for Ecotourism (Sharpley, 2006).

2.2.4. Place attachment

H3: *Place attachment exercises a significant and direct impact on Environmentally responsible behaviour.*

According to Zhang et al. (2014), place attachment exhibits links and a sense of belonging to a specific place, which leads to bonds between people, communities, and their quotidian life context. Therefore, the hypothesis is that if people feel attached to a place, they have a higher dynamic behaviour towards the environment than the less attached. Tsai (2012) separated place attachment into place dependence and place identity. Place dependence is defined as a functional and behavioural devotion to a precise location (Raymondd et al., 2017). Brehm et al. (2006) enunciate place identity as individuals' cognitive and emotional attachment to place as they identify with the location.

In ecotourism, the attachment to the place is influenced by the emotional aspects of the environmental experience provided and is seen as a reservoir of feelings and connections that deliver purpose and meaning, encouraging individuals to act positively with nature (ERB) (Ginting & Siregar, 2020). Consequently, attachment to a place creates a sense of belonging, encouraging engagement in civic actions, including pro-environmental conduct (Daryanto, & Song, 2021).

So, it is vital to understand if place attachment plays a significant role in explaining an individual's behavioural intentions (ERB) in the Ecotourism context.

To summarise, this study aims to extend the previous research and propose Ecotourism as a solution to the environmental problems of tourism in islands. The dimensions: environmentally responsible behaviour, environmental sensitivity, attachment to the place and knowledge of the environment represent the main components of Ecotourism. Since these components represent what Ecotourism is all about, the research will study the relationship between them and see if they have an essential role in developing environmentally responsible behaviour on the islands and mitigating the consequences of tourism (Figure 1).

2.3. Conceptual Framework

The following conceptual framework represented in Figure 1 describes the suggested hypotheses developed based on the literature review. This dissertation intends to test the Model inspired by the investigation of Cheng & Wu (2015), intending to study the impact environmental knowledge, environmental sensitivity, and place attachment on environmentally responsible behaviour in Ecotourism context.

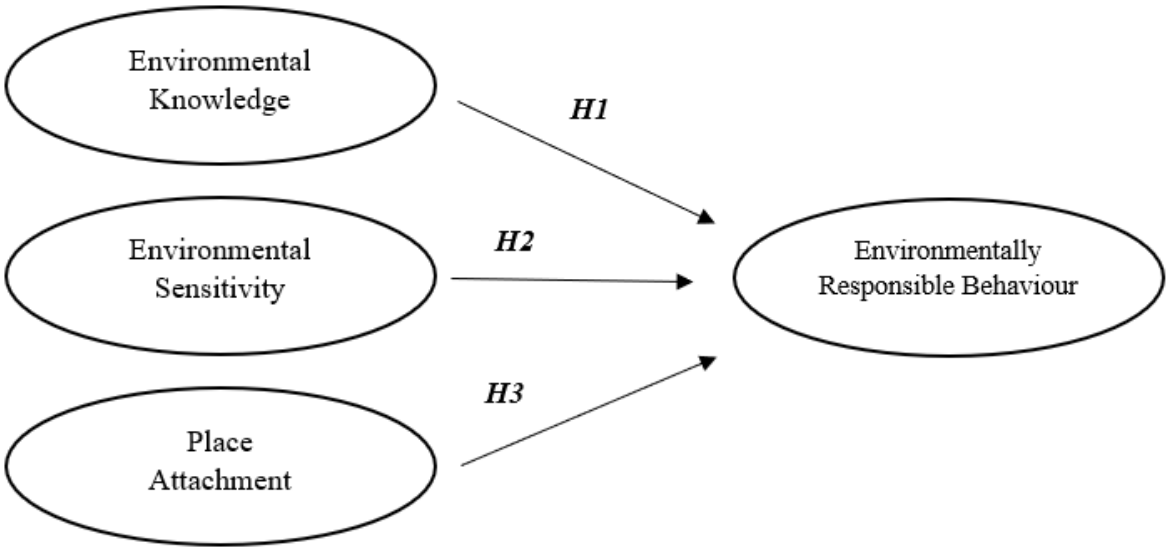

Figure 1- Conceptual model Adapted from Cheng & Wu (2015)

Hypothesis:

H1: *Environmental knowledge possesses a significant and direct impact on Environmentally responsible behaviour.*

H2: *Environmental sensitivity exerts a significant and direct impact on tourist Environmentally responsible behaviour.*

H3: *Place attachment exercises a significant and direct impact on Environmentally responsible behaviour.*

3. Methodology

This section outlines the methodological approach to answering the research question stated earlier. Following the context of the selected methodology, proceeds with detailed disclosure of data collection and analysis procedures are carried out.

3.1 Research Approach

The dissertation intends to understand if Ecotourism can be a solution to tourism problems in the context of islands. With this generic theme, the research aims to define the main components of Ecotourism, which are environmental knowledge, environmental sensitivity and the fixation of a place, and if they promote environmentally responsible behaviour by all actors in island tourism.
First, Cheng et al. (2015) states that quantitative dimensions are the most appropriate to measure the correlation between environmental knowledge, environmental sensitivity and place attachment to environmentally responsible behaviour. Dimensional analysis is performed through questionnaires, considering the previous literature and its criteria.
Basely, SPSS will contribute to examining all hypotheses made to respond to the research question. Furthermore, the data collected from the questionnaires undergo analytical analysis in the SPSS software, consequently obtaining the functional relationships between the variables and their correlations (Verma, 2012). The validations are shown in Graph 1, together with the conceptual summary. Overall, the results agree with the current background on Ecotourism and tourism sustainability disciplines.

3.2 Location selection

This research chose Madeira archipelago, the largest island Madeira, as the focus place. The region has a sensitive ecosystem, and its forest was considered a UNESCO World Heritage in 1999 (United Nations Educational, Scientific and Cultural Organization, 2009). Madeira island also has been selected as World's Leading Island Destination eight times by *World Travel Awards (*World Travel Awards (2021).
Another factor in choosing Madeira Island is the importance of tourism as the region grows year after year, directly impacting the GDP weight of 26.6%. In this context, the number of jobs represented 16.7% of total regional employment (Direção Regional de Estatística da Madeira ,2018).
Additionally, the region wants to include the local community, pulling up a guide to good practices that incorporate the environmental, economic and socio-cultural segments to achieve the 'Certified

Destination' by the 'Global Sustainable Tourism Council' and guarantee the sustainability seal (Direção Regional do Turismo, 2021).

Thus, understanding the importance of tourists' environmental knowledge and their sensitivity to the environment to promote sustainable tourism and, ultimately, the application of ecotourism is a fundamental point for the island of Madeira.

3.3 Data Collection

For this study, data collection included a specific segment of the population. The sample is uniform regarding eligibility criteria, with only people who have visited Madeira Island at least once being eligible for the study. Among the different types of research, this study implemented a Descriptive and Quantitative approach using a Survey as a Primary Survey. The research used specialized forums and social networks to reach the target segment, requesting questionnaires.

The questionnaire was prepared based on the hypotheses described and the Conceptual Framework, but also according to previous research trials, being carefully adjusted to the main problem of this study. This method allows reaching a large group and, consequently, greater analytical capacity and availability to use confirmed models (Jones et al., 2013). In contrast, Savela (2018) identified several disadvantages, such as not understanding the items deeply and ignoring participants' experiences. In short, the data describes the responses of 133 people. To circumvent the disadvantages of the quantitative method, the scales used in the survey are based on the 5-point Likert scale, with the end points "strongly disagree (1)" to "strongly agree (5)".

At the beginning of the research, participants are notified of the confidentiality terms and then an introductory statement to frame the participants about the purpose of the investigation. Next, the survey takes into account four fundamental dimensions to answer the research question.

The first, "environmental knowledge", is presented by Haron et al. (2005) and contains nine dimensions items. The second measure, "environmental sensitivity", uses four items based on Daniel (2002). In addition, the "place Attachment" was generated by Williams and Roggenbuck (1989) and contained eight items. Finally, Smith-Sebasto and D'Costa (1995) produced environmentally responsible behaviour, including eight items. Additionally, there is a segment for the demographic variables of the analysis: age, sex and nationality to profile the sample.

Constructs	Scale	Items	Source
Environmental Knowledge	5-point Likert	8	Haron et al. (2005)
Environmental Sensitivity	5-point Likert	4	Daniel (2002)

Place Attachment	5-point Likert	8	Williams & Roggenbuck (1989)
Environmentally responsible behaviour	5-point Likert	8	Smith-Sebasto & D'Costa (1995)

Table 1 - Constructs and Scales

3.2.1. The Target Population

For this research, it is considered the primary target population, people who have already visited the island of Madeira at least once, in order to collect data relevant to the research. Thus, it was necessary to generate elimination questions to filter the survey and confirm that only people belonging to the target population could answer the questionnaire. The survey was released online, through various platforms, as it has several benefits such as - have more immediate data collection, the ability to get an accurate target, to contact a wide range of participants and organise the results efficiently. Between the 20th and 30th of November, the survey was disseminated on Social Media platforms, shared by close ones, to obtain a considerable number of participants. After accumulating the required responses, the questionnaire was closed, obtaining 133 valid responses.

3.4. Data Analysis Tool

The SPSS software platform extends high-analytical interpretation, making it easy to use for people of any skill level. In addition, it supports the examination of the hypothesis we want to study (SPSS, 2021).

The benefits of applying SPSS as software are that data analysis is straightforward and fast, and no programming skills are required. In addition, there are several statistical tests available, checking the validity of the models and the relationships between variables. Finally, the way the data is presented facilitates the interpretation of results (Milovanović & Perišić, 2020).

Only complete questionnaires that meet the sample requirements were considered for data analysis. After the selection, using the IBM Statistical Package for Social Sciences (SPSS version 26.0), the sample was characterised (age, sex, nationality, country where it currently resides, educational qualifications and employment status), followed by the analysis of the psychometric quality of the instruments of measurement, more specifically the analysis of principal components, internal consistency and correlations between variables.

4. Results

4.1. Sample Characterization

In the data collection process, the number of people who, at the time of filling out the questionnaire, had already visited Madeira Island at least once as a specific sampling criterion.

The study had 133 participants, of which 215 completed the survey. Thus, is an adequate number of responses taking into account Hair (2009), which states that the number of respondents by variable should be between ten and twenty, that is, in this case, the minimum acceptable would be forty as the study has four variables.

Concerning the level of education, 65.4% have tertiary education, followed by 33.1% with high school, and, in the minority, 1.5% have primary education.

Regarding nationality, most participants, 94.2% have Portuguese nationality, following, 1.6 % British and 0.8 % corresponding consecutively to Belgian, Croatian, Spanish, Swedish nationality.

About the country where currently reside, the majority, 88.9%, lives in Portugal, heeding, 1.6% in Poland and 0.8 % corresponding consecutively to Germany, Croatia, Denmark England, Spain, Holland, Luxembourg, Scotland, Sweden, Uk.

In relation to the occupational situation, the prevalence, 45.1%, is of the employee, succeeding, 32,3%, students, and 22.6% to unemployed, retired, working-student and others.

Demographics		**Total Sample (N= 133)**
Age		M=27.47 SD=10.14
Gender	Female	60.9%
	Male	38.3%
	Other	0.8 %
	Total	100%
Nationality	Portuguese	94.2%
	British	1.6 %
	Belgian	0.8 %
	Croatian	0.8 %
	Spanish	0.8 %
	Swedish	0.8 %
	Total	100%
Country of residence	Portugal	88.9%
	Poland	1.6%
	Germany	0.8 %
	Croatia	0.8 %
	Denmark	0.8 %
	England	0.8 %
	Spain	0.8 %
	Holland	0.8 %
	Luxembourg	0.8 %
	Scotland	0.8 %

	Sweden	0.8 %
	Uk	0.8 %
	Total	100%
Level of Education	Less than high school	1.5 %
	High School	33.1%
	Bachelor	44.4%
	Master	18.0%
	Ph.D	0.8%
	Other	2.3%
	Total	100%
Employment status	Employee	45.1%
	Unemployed	9.8%
	Retired	2.3%
	Student	32.3%
	Student worker	7.5%
	Other	3.0%
	Total	100%

Table 2 – Demographics

4.2. Descriptive analysis and correlation between variables

Correlation coefficients indicate the significance of a relationship between two variables. If Pearson's correlation is higher than 0, the relationship is positive and vice versa. Furthermore, according to Pallant (2016), correlations from 0.1 to 0.29 are considered small, correlations from 0.3 to 0.49 as medium and correlations above 0.5 as large. Before testing the previously mentioned hypotheses, a descriptive analysis of the study variables (standard deviations, means and Pearson correlations) and their internal consistency. The Table 3 guides you to the matrix of means, the lowest mean for Environmental Responsible Behaviour (M = 3.17; SD = 0.93) and the highest for Environmental Knowledge (M = 4.48; SD = 0.47).

	M	SD	1	2	3	4	5
1. Age	27,47	10,14	-				
2. Environmental Knowledge	4,48	0,47	-0,07	(0,75)			
3. Environmental Responsible Behavior	3,17	0,93	0.21*	0,10	(0,87)		
4. Environmental Sensitivity	4,61	0,51	0,07	0,41**	0,38**	(0,59)	
5. Place Attachment	4,21	0,81	0,13	0,15	0,41**	0,39**	(0,89)

n = 133. Note: *p < 0,05; **p < 0,01 (2-tailed). Values in parentheses correspond to Cronbach's alphas.

Table 3- Matrix of Means, Standard Deviation, Correlations and Internal Consistency of the variables under study

4.3. Reliability Analysis

The measure's reliability ensures internal consistency and is executed using scales already used and experimented with in prior examinations. The reliability of individual variables was experimented with by computing Cronbach's Alpha scores. For Field (2009), Cronbach's Alpha values, measures are considered reasonable reliability with at least 0.6, good reliability with values of at least 0.7, and excellent reliability with scores higher than 0.9. The statistical analysis reported a Cronbach's Alpha of 0.87 in the ERB, 0.89 for Place Attachment, and 0.76 for Environmental Knowledge. For the Brand Credibility scale, the reliability analysis indicated that by deleting an item, we would go from a 0.59 alpha to a 0.61 Cronbach's Alpha. Therefore, practically all variables were considered as good. The only exception is Environmental Sensitivity, which has a score of 0.59.

Scale	**Cronbach's Alpha**	**Cronbach's Alpha if item deleted**	**Items deleted**	**Final items**
Environmental Responsible Behaviour	0.87	-	-	8
Place Attachment	0.89	-	-	8
Environmental Sensitivity	0.59	0. 61	1	3
Environmental Knowledge	0.76	-		8

Table 4 - Scale Reliability Measures

4.4. Hypothesis Testing

IIn this section, the ANOVA test evaluates the statistically significant relation and supports whether the hypotheses are significant. The ANOVA test assumes the null hypothesis (H0), where all coefficients are zero and, consequently, the independent variables do not affect the dependent variable. To reject this hypothesis, the p-value (Sig.) must be less than 5%.

H1: *Environmental knowledge possesses a significant and direct impact on ERB.*

Independent Variables	**Dependent Variable**	**R Square**	**Sig. (ANOVA)**	**Unstd. Beta**	**Sig.**
Environmental Knowledge	Environmental Responsible Behavior	0.011	.238	0.203	.238

Table 5 - Linear Regression to test H1

As can be seen in Table 5 the result of the significance of ANOVA shows that Environmental knowledge is not statistically significant in Environmentally responsible behaviour ((p<0.05) (p=0.238). This result may come from the fact that Environmental knowledge explains only 1.1% of the model-dependent variable, despite having a positive value of coefficient (0.203).

H2: *Environmental sensitivity exerts a significant and direct impact on tourist ERB.*

Independent Variables	**Dependent Variable**	**R Square**	**Sig. (ANOVA)**	**Unstd. Beta**	**Sig.**
Environmental Sensitivity	Environmental Responsible Behavior	0.142	.000	0.685	.000

Table 6 - Linear Regression to test H2

The ANOVA tests (Table 6) the effect of Environmental Sensitivity on ERB is statistically significant ((p<0.01) (p=0.000); R^2 = 0,15)) the p-value is lower than 5%, meaning that we reject the null hypothesis and, indeed, the independent variables affect the dependent variable supporting H2. This means that environmental sensitivity significantly impacts the ERB and has a positive effect of 0.685.

H3: *Place attachment exercises a significant and direct impact on ERB.*

Independent Variables	**Dependent Variable**	**R Square**	**Sig. (ANOVA)**	**Unstd. Beta**	**Sig.**
Place Attachment	Environmental Responsible Behavior	0.166	.000	0.471	.000

Table 7 - Linear Regression to test H3

Finally, through empirical demonstrations, it is possible to state that Place Attachment is statistically significant over ERB (p<0.01) (p=0.000) supporting H3. This significance can be explained because Place Attachment accounts for 16.6% of the ERB. So, the Place Attachment is statistically significant about the ERB and has a positive impact of 0.471 on the ERB.

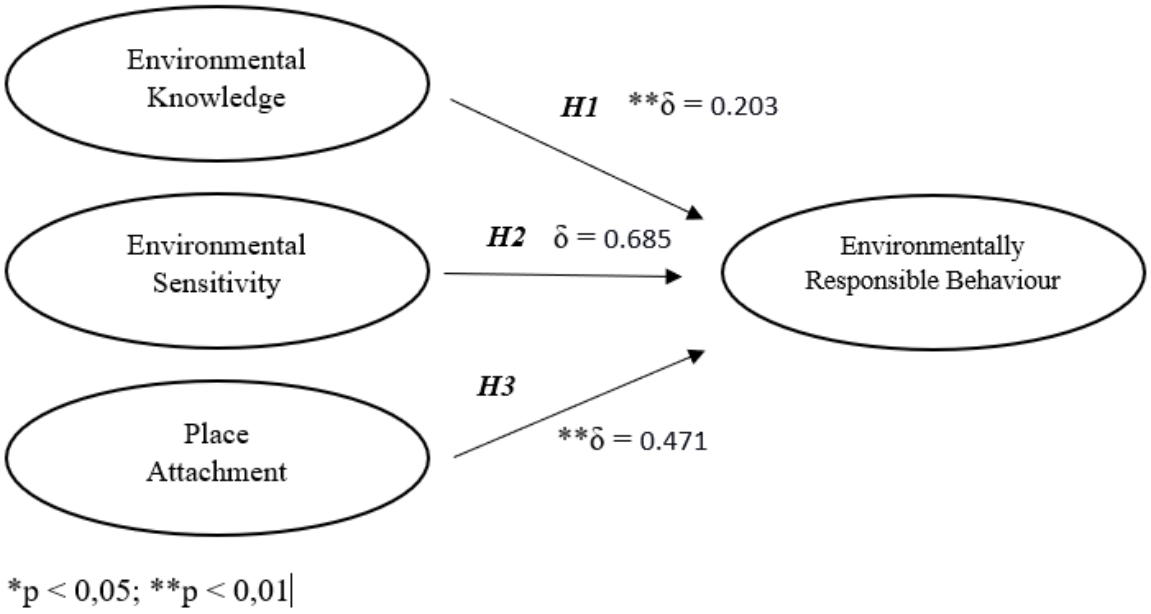

Figure 2-Estimated Conceptual model (Adapted from Cheng & Wu (2015))

5. Discussion

This dissertation aims to propose a possible solution to mitigate the impact of tourism on the islands. For this, the study investigates the impact of local attachment, environmental sensitivity and environmental knowledge on environmentally responsible behaviour in an ecotourism context. The methodology used an online survey based on recognised literature to collect data from 133 participants. The hypothesis test was carried out after ANOVA tests so that we realised the significance of the impact of the independent variables on the dependent variable.

H1: *Environmental knowledge possesses a significant and direct impact on ERB.*

The first hypothesis proposes that Environmental knowledge has a significant and direct impact on the Environmentally responsible behaviour. The statistical analysis of the collected data made it impossible to support this hypothesis, making it conceivable to state that if an individual has Environmental knowledge, it will not translate into an ERB. Through the literature, there is a sign of agreement with the study results, referring that although environmental knowledge is a condition for action, knowledge isolated is not sufficient to promote the ERB (Coppola, 1999; Frick, Kaiser, & Wilson, 2004; Wiek, Withycombe, & Redman, 2011). Frick et al. (2004), in their investigation, pointed out that knowledge, however, of the type, explained only 6%. So, it was possible to identify barriers of environmental knowledge to realise an action. Thus,

comprehending the environment does not easily translate into action. Emotions, second Carmi et al. (2015), play the primary role in the process of converting knowledge into action. Once the affective system is triggered, preventive behaviour is much more likely to happen (Weber, 2006). Agyeman (2002) and (Weber, 2006), found the non-immediacy of multiple ecological issues as obstacles for turning knowledge into action, since the harmful implications of our environmental attitude are often abstract, time-consuming, complex problems, and not directly connected to the person personally.

H2: *Environmental sensitivity exerts a significant and direct impact on tourist ERB.*

The second hypothesis proposes to evaluate the explanatory strength of Environmental sensitivity in ERB, having the results support the hypothesis. However, the relationship is still not well-founded in the literature, as the information available is limited (Snyder et al., 2013; Luo et al., 2017). These results are in accordance with Confente and Scarpi (2020) study, which shows that a high environmental sensitivity encourages a compassionate attitude that helps implement awareness of tourism's damaging impacts and stimulates environmentally sustainable behaviour. So, with the encouragement of psychological elements and emotional forces, the purpose of performing ecologically correct actions is increased (Noordin & Sulaiman, 2010).

H3: *Place attachment exercises a significant and direct impact on ERB.*

To answer H3, the influence of the place attachment on the ERB was analysed, having been proven by the sample results. These results align with the investigation by Lee et al. (2011), which confirms that attachment to place is an antecedent of environmentally responsible behaviour, and if attachment to place increases, the probability of environmentally responsible behaviour increases. Furthermore, Clayton (2003) states that people who identify strongly with the natural environment have higher ecological behaviours than those with lower environmental identity, although they maintain constant values, attitudes and ideologies.

The Place attachment has a fundamental role in the CRS of the business fabric, being one of the central premises of ecotourism. In accordance with McKeever et al. (2015), entrepreneurs with attachment to place understand the connection between themselves and places from the point of view of reciprocity and shared purposes and recognize the issue of social responsibility. In this way, promoting environmentally and socially responsible activities can reduce the negative impact

of tourism on the islands.

Another essential factor in the approval of the H3 is that the islands are home to unique natural landscapes and marine biodiversity; this unique competitive advantage can produce high levels of site satisfaction (Ramkissoon & Uysal, 2010). Therefore, as natural and cultural places increase satisfaction levels, this can increase the visitor's attachment levels to the place and consequently promote a greater environmentally responsible behaviour (Ramkissoon & Mavondo, 2014).

5.1. Contributions

This study contributes to theory as it expands scientific knowledge in the field of Ecotourism along with tourist behaviour while introducing a refreshing view on the island context. Altogether, the study proved that Place attachment and Environmental sensitivity significantly impact environmentally responsible behaviour. It also demonstrated that Environmental knowledge does not significantly impact environmentally responsible behaviour. The study also contributes to the emergence of a conceptual concept for Ecotourism, as in the scarcity of a standard characterisation or set of fundamental principles, it becomes challenging to operationalise this type of tourism and safeguard its legitimacy in the industry (Donohoe & Needham, 2006).

The theoretical contribution of this investigation is to develop a framework to clarify the ancestors of environmentally responsible behaviour. The framework demonstrates distinct paths through which environmentally responsible behaviour can be established and extended during a tourist's travel experience.

Tourism is one of the main ways to globalize the islands' economies and reduce their isolation (Storey et al., 2005). The sustainability of tourism has been a recurrent problem in the literature, which is critical since the islands have a strong dependence on the tourism sector. Therefore, this study intends to hypothesize Ecotourism as a solution to the problem of environmental, social and economic sustainability. Empowerment of the residents and more significant participation in planning and decision-making on tourism development is seen as one of the main ways of reaping the benefits of tourism and solving tourism problems (Scheyvens et al., 2008), being the main objective of Ecotourism mentioned in the literature of this study. Since the Government has a fundamental role, the study's conclusions allow it to be the basis for the formulation and implementation of policies in terms of environmental protection.

The results of this investigation suggest that Attachment to Place and Environmental Sensitivity have a significant and positive impact on environmentally responsible behaviour, so that pooling practices adopted in both the private and public sectors should focus on and promote these two crucial components. Therefore, the results can be helpful to identify the training and skills needed for both the tourism sector in general and for ecotourism. Therefore, the study proposes holding seminars and training for workers in the tourism sector in order to influence the environmentally responsible behaviour of tourists.

To increase its competitive advantage, the ecotourism industry must concentrate its attention on the determinants that influence the behavioural intentions of visitors (the variables studied in this investigation). The ecotourism industry could support the degree of client involvement with attachment to the place, as social or natural experiences and social identity would greatly affect the intentions of a sense of belonging and the adoption of environmentally responsible actions.

5.2. Limitations and Future Research

Limitations must be assessed when analysing the results of this research. The first limitation recognised concerns the method of receiving data. The study sample is intertwined with various units, such as residents and tourists. Future research should consider the use of data only from tourists. Furthermore, the study in question represents a very young stratum of society, and its values and perceptions may differ from those of an older social stratum, so the sample used does not allow us to generalize our findings to the population as it was not representative of it and may constitute a bias.

The second limitation is the sample dimension (N=133), although investigators assume that a representative of 100-150 people is the baseline minimum for practical use (Ding, Velicer, & Harlow, 1995). The sample size of this study was adequate to create an accurate analysis, although containing a larger sample would increase the sampling confidence level and the certainty of the findings.

The study does provide some direction for future research. In future investigations, it would be interesting to evaluate and introduce other variables such as marketing and understand how these variables influence tourist behaviour and whether it would have a significant and positive impact on the ERB. The introduction of this variable would be important at a practical level, since the expense of promoting the islands to the external market is recurrent every year, being a component

with considerable weight in the islands' budgets.

Another recommendation would be to understand if effectively high levels of ERB translate into lower levels of pollution. Thus, it would be important to assess whether tourists who have a smaller ERB pollute more than tourists who have a larger ERB, thus verifying whether the ERB contributes to people effectively polluting less.

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Appendix

A. Survey (English version)

Dimension	Original Question	Adapted Question	Author
I-Environmental Knowledge	EKO1- I know that the maintenance of ecological balance will enhance the sustainable development of islands.	EK1- I know that maintaining the ecological balance will improve the islands' sustainable development.	Haron et al. (2005)
I-Environmental Knowledge	EKO2-I know that for the next generation, we should protect the natural resources of islands.	EK2- I know we must protect the islands' natural resources for the next generation.	Haron et al. (2005)
I-Environmental Knowledge	EKO3-I know that the maintenance of diversity of species on islands will balance the ecology	EK3- I know that maintaining species diversity on the islands will balance the ecology.	Haron et al. (2005)
I-Environmental Knowledge	EKO4-I know that extensive development of natural resources will consume the islands.	EK4- I know that extensive development of natural resources will deplete the islands.	Haron et al. (2005)
I-Environmental Knowledge	EKO5-I know that excessive ocean recreational activities will damage oceanic environments of islands.	EK5- I know that excessive ocean recreational activities will harm the islands' ocean environments.	Haron et al. (2005)
I-Environmental Knowledge	EKO6-I know that carbon dioxide emissions by automobiles and motorcycles will pollute the islands	EK6- I know that carbon dioxide emissions from cars and motorcycles will pollute the islands.	Haron et al. (2005)
I-Environmental Knowledge	EKO7-I know that over extensive tourism development will sacrifice natural resources and environments.	EK7- I know that excessive tourism development will sacrifice natural resources and environments.	Haron et al. (2005)
I-Environmental Knowledge	EKO8-I know that, in the trip, the use of green tableware, such as bowls and chopsticks	EK8-I know that, on the trip, the use of green cutlery, such as bowls and recycled cardboard,	Haron et al. (2005)

	will avoid damage to the environment.	will prevent damage to the environment.	
I-Environmental Knowledge	EKO9-I know that the use of public transportation or biking can avoid air pollution.	EK9-I know that using public transport or cycling can prevent air pollution.	Haron et al. (2005)
II-Environmental Sensitivity	ESO10-I enjoy natural environments	ES10- I like natural environments.	Daniel (2002)
II-Environmental Sensitivity	ESO11-I am concerned about the ecological preservation in Penghu	ES11- I am concerned about ecological preservation in Madeira.	Daniel (2002)
II-Environmental Sensitivity	ESO12-I appreciate the natural environment of Penghu	ES12- I appreciate the natural environment of Madeira.	Daniel (2002)
II-Environmental Sensitivity	ESO13-I care about the impact of my living habits on the natural environments of Penghu.	ES13- I´m concerned about the impact of my activity on Madeira's environment.	Daniel (2002)
III- Place Attachment	PAO14-Touring Penghu has a deep meaning for me	PA14-Traveling through Madeira has a deep meaning for me.	Williams and Roggenbuck (1989)
III- Place Attachment	PAO15-I have a strong sense of identifying with Penghu	PA15- I identify with Madeira.	Williams and Roggenbuck (1989)
III- Place Attachment	PAO16-I have a strong sense of belonging in regard to Penghu.	PA16- I have a strong feeling of belonging to Madeira.	Williams and Roggenbuck (1989)
III- Place Attachment	PAO17-I have special feelings for the Penghu and the tourists.	PA17- I have special feelings for Madeira and tourists.	Williams and Roggenbuck (1989)
III- Place Attachment	PAO18-I enjoy traveling in Penghu more than other tourism destinations.	PA18- I like traveling to Madeira more than other tourist destinations.	Williams and Roggenbuck (1989)
III- Place Attachment	PAO19-I am more satisfied with traveling in Penghu than other tourism destinations.	PA119- I am more satisfied traveling in Madeira than in other tourist destinations.	Williams and Roggenbuck (1989)
III- Place Attachment	PAO20-It is more important to visit Penghu than other	PA20- It is more important to visit Madeira than other	Williams and Roggenbuck (1989)

	tourism destinations.	tourist destinations.	
III- Place Attachment	PAO21- No other tourism locations can replace the tourism of Penghu	PA21- No other tourist location can replace Madeira's tourism.	Williams and Roggenbuck (1989)
IV- Environmentally Responsible Behaviour	ERBO22-I try to solve the environmental problems in Penghu.	ERB22- I try to solve Madeira's environmental problems.	Smith-Sebasto and D'Costa (2005)
IV- Environmentally Responsible Behaviour	ERBO23-I read the reports, advertising, and books related to the environments of Penghu	ERB23- I read the reports, advertisements and books related to Madeira's environment.	Smith-Sebasto and D'Costa (2005)
IV- Environmentally Responsible Behaviour	ERBO24-I discuss with others about environmental protection of Penghu.	ERB24- I discuss with others about the environmental protection of Madeira.	Smith-Sebasto and D'Costa (2005)
IV- Environmentally Responsible Behaviour	ERBO25-I try to convince companions to adopt positive behaviours in the natural environments of Penghu.	ERB25- I try to convince my companions to adopt positive behaviours in the Madeira environment.	Smith-Sebasto and D'Costa (2005)
IV- Environmentally Responsible Behaviour	ERBO26-When I see others' inadequate environmental behaviour in Penghu, I will report it to the authorities.	ERB26- If I see inappropriate environmental behaviour by others in Madeira, I will report it to the authorities.	Smith-Sebasto and D'Costa (2005)
IV- Environmentally Responsible Behaviour	ERBO27-According to the law, I will deter any behaviour damaging the environment of Penghu.	ERB27- According to the law, I will deter any behaviour that damages Madeira's environment.	Smith-Sebasto and D'Costa (2005)
IV- Environmentally Responsible Behaviour	ERBO28-I pick up trash and branches when I see them on the beach.	ERB28- I pick up trash and plastic when I see them on the beach.	Smith-Sebasto and D'Costa (2005)

IV- Environmentally Responsible Behaviour	ERBO29-I participate in activities to clean the beach (such as picking up trash on the beach).	ERB29- I participate in beach cleaning activities.	Smith-Sebasto and D'Costa (2005)

Group V -Demographic profile:

Age__
Genre:
feminine
Masculine
Other

Nationality__
Country where you currently reside__

Highest level of education completed:
Lower than secondary education
High school
Graduation
Master's degree
Ph.D.
Other__

Employment status:
Employee_
Unemployed_
Retired_
Student_
Student worker_
Other_