

Research Article

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Determinants of environmental certification in Portuguese hotel companies

<https://doi.org/10.2478/ejthr-2023-0018>

received June 27, 2023; accepted November 17, 2023

Abstract: There are many responsible business and investment initiatives in the field of environmental performance, and among these, certification is a targeted mechanism. In this work, we intend to study the determinants of environmental certification of hotel companies, analysing the Portuguese case. The empirical study considers hotel companies established in Portugal that may operate one or more hotel units. The information retrieved from the Portuguese National Tourism Registry and Iberian Balance Sheet Analysis System database was coded, and a database was built in the SAS software. Variable and data analysis was conducted using descriptive statistics, variable correlations, and the Tobit regression model. The results indicate that affiliation to a brand, hotel classification and hotel size are factors that explain environmental certification, but the return on sales was not statistically significant in this study. These results are important to understanding the determinants of environmental certification in hotel companies since, as a topic of research, it has had little attention prior to the study for the Portuguese case, thus reinforcing the importance of this research. The study also reveals the restricted sample of hotel companies with environmental certification in Portugal, which did not allow computing other study variables that would improve the empirical work.

Keywords: Environmental certification; Hotel affiliation; Hotel companies; Hotel profitability

1 Introduction

Tourism involves several stakeholders, who are asked to install responsible businesses and investments. The hotel sector is one of the most relevant of these stakeholders. Environmental management, strategy, and performance are concepts related to tourism organisations' sustainability. Environmental management emphasises the company's mission since it includes the study of all technical and organisational activities aimed at reducing the environmental impact caused by a company's operations (Carmona-Moreno et al., 2004). As Cramer (1998, p. 162) defines it, 'environmental management is a budding discipline that studies the development and shaping of environmental policy in business'. Thus, companies include environmental-related questions in their strategy, leading to the consideration of environmental strategy as 'the strategic orientation a firm gives to environmental questions and how it uses them as a competitive tool' (Carmona-Moreno et al., 2004, p. 104). The authors add that proper implementation of the different environmental initiatives should improve the firm's environmental performance, introducing the concept of environmental performance. According to the United Nations Environment Programme (2022), environmental management refers to activities that aim to protect the environment, while environmental strategy concerns a firm's competitive orientation, and environmental performance involves the results achieved.

According to Caverro-Rubio and Amorós-Martínez (2020), numerous variables can be used to measure environmental management and environmental certification is widely used to measure the relationship between environmental management and the financial performance of hotels. In fact, many responsible business and investment initiatives in the field of environmental performance will be referred to in the literature review, and among these, certification is a targeted mechanism.

Certification might be used to declare compliance with particular responsibility requirements, in this case environmental practices. Although environmental cer-

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tification could be treated as a small step towards more responsible business organisation practices and investments, understanding and explaining a company's environmental certification and how it relates to financial performance is an important topic of investigation. There are a few contributions in literature dealing with determinants of environmental certification in hotel companies (Dodds & Holmes, 2016; Elkhwesky, 2022; Preziosi *et al.*, 2019), which will be discussed in the literature review, and there is no evidence of a nationwide study in the Portuguese case. In fact, after a major literature review on the proactive environmental strategies in hospitality and tourism industries, Elkhwesky (2022) suggests exploring the importance of these strategies, which include ecolabelling, certification for financial performance and the effect of financial resources on proactive environmental strategies investment in hotels. The author adds another line of investigation suggesting the assessment of implementing proactive environmental strategies on generating economic revenues in the hotel industry.

In the present work, we intend to study the determinants of environmental certification of hotel companies, analysing the Portuguese case. The present paper is organised as follows. After the literature review section, methodological considerations are explained. The following section presents the results and discussion. The paper ends with conclusions and limitations of the study.

2 Literature Review

2.1 Sustainability and the proactive environmental strategies in the hospitality sector

A major topic of tourism research is sustainability. It is a major issue of interest for all tourism actors in tourism supply and a major concern for tourism demand. Our planet faces enormous economic, social and environmental challenges. The 17 Sustainable Development Goals (SDG) of the 2030 Agenda for Sustainable Development were put into practice by almost all countries in the United Nations. These SDGs define the priorities and aspirations for global sustainable development by 2030. The SDGs were set worldwide for governments, enterprises and communities to eliminate poverty and create opportunity and dignity for all. The SDGs are established in five main areas: people, planet, prosperity, peace and partnerships. According to the United Nations Global Compact, implementing these main goals will unite all global stake-

holders to end extreme poverty, fight inequality and injustice, and protect the planet (United Nations Environment Programme, 2022). Tourism activity encompasses several sectors with evident impacts on the economies of countries. Hotel accommodation is one of the most important sectors, accounting for several positive and negative economic, social and environmental impacts. General concern about the environment and climate change leads hotels to try to limit the negative impacts of their daily production processes for several reasons, including marketing and better cost control. There are a plethora of studies related to marketing sustainability and environmental strategy (Chandran & Bhattacharya, 2019; Choi *et al.*, 2015; Dodds & Holmes, 2016; Han *et al.*, 2018; Preziosi *et al.*, 2019; Santos *et al.*, 2019; Ting *et al.*, 2019) and financial performance related to environmental strategy (Carmona-Moreno *et al.*, 2004; Caverro-Rubio & Amorós-Martínez, 2020; Claver-Cortés *et al.*, 2007; Gil *et al.*, 2001; Segarra-Oña *et al.*, 2012; Singal, 2014).

Concerning marketing sustainability, hotel certification is crucial in communicating production and management standards. According to Jones *et al.* (2014), sustainable commitments and achievements can establish a reputation among clients and become a source of competitive advantage. However, Geerts (2014) concluded after interviewing 21 London hoteliers that the effect of certifications on profitability was uncertain because certifications were not providing guests with more accurate information and because of limited communication of certifications by hotels. The author also concluded that, for hotels beginning to implement sustainability practices, certification schemes could provide a structured plan for implementation and expertise to use; however, as a promotional tool, certifications could not be as effective as was often discussed in the existing literature.

Other contributions in the literature, like the one of Dodds and Holmes (2016), examined hotels with Green Key certification to assess the benefits of undertaking environmental practices. The study concludes that hotel managers participating in the Green Key certification programme believed that it allowed them to attract new and retain old customers. Likewise, Han *et al.* (2018) studied green hotel visitors in Vietnam and examined guest participation in green practices and loyalty by considering the moderating effect of environmental concern. The authors concluded that increasing environmental concern ultimately triggers guests' active participation in green practices and their loyalty to green hotels. Several studies in the literature conclude that marketing communication is critical to obtaining the best certification results. Garay *et al.* (2017) studied 408 hospitality enterprises in Catalonia

(Spain). They identified the key motivations for introducing sustainability practices: altruistic (related to environment protection 83.3%, lifestyle 63.1% and commitment to society 56.3%), and business-related (cost reduction 65.4%; image and marketing improvements 43.2%).

Preziosi et al. (2019, p. 10) studied how environmental practices and communication could play an important role in guest loyalty, examining EU-Ecolabel certification in Portuguese hotels and concluding that ‘when guests are able to relate themselves to the hotel approach and motivations regarding the environment, this will more likely create a relation leading to guest loyalty toward green hotels’. Moreover, the authors conclude that, mostly by emphasising genuine care for the environment rather than an effort to reduce costs and gain competitive advantage, communication plays a role in this identification process between the hotel and the guest, improving loyalty. Santos et al. (2019) emphasise this thinking and advise companies to move beyond what they call the rational appeal. This rational appeal should be enough for a niche tourist market that already engages in sustainable practices in daily routines and tourism-related choices. The authors suggest that hotel managers targeting other tourist markets should use a mixed appeal based on videos and other sensorial stimuli rather than merely offering proof of environmental certifications or awards.

Chen et al. (2018) established a comprehensive theoretical framework for examining learning effects in green and conventionally managed hotels. The authors concluded, among other aspects, that the learning efforts of green management can improve cost saving, employee loyalty, and customer retention. Besides, green management’s learning efforts helped meet short-term operational targets. Indeed, hotels with green management can establish better networks with other stakeholders and exhibit improved social responsibility and good reputations.

Proactive environmental strategies in the hotel and tourism industry focus on sustainable and environmentally responsible practices to minimise negative environmental impacts and enhance long-term sustainability. These strategies have gained significant attention in recent years due to growing environmental concerns and changing consumer preferences. Concerning what is already known about the subject of proactive environmental strategies in hotel and tourism, there are some main areas of action like energy efficiency and conservation, water conservation, waste reduction and recycling, green building and certification, local sourcing and sustainable food practices, transportation initiatives, education and guest engagement, biodiversity and habitat preservation,

certification and ecolabels, government regulations, cost savings and brand reputation and resilience to climate change. We should refer to the work of Elkhwesky (2022), who undertook a quite complete review of proactive environmental strategies in the hospitality and tourism industries for the last 26 years and made important conclusions. The author refers to the paucity of research on proactive environmental strategies in hospitality and tourism and presents several important lines of research. Also, following a major and systematic literature review, Elkhwesky (2022) lists the best proactive environmental strategies in hospitality and tourism: energy saving, waste management, providing environmental training, rewarding environmental initiatives and establishing environmental goals and plans, among many others. Additionally, Jiang et al. (2021) studied how managerial ties (informal personal relations) could lead to adopting proactive environmental strategies. The authors concluded that political ties hinder a hotel’s adoption of proactive environmental practices while business ties enable them.

2.2 Environmental certification and the Portuguese case

Concerning environmental certification, it is referred to in the literature as a proactive environmental strategy (Cembruch-Nowakowski, 2020; Elkhwesky, 2022; Schott, 2006). The present study intends to contribute to the literature on certification as a proactive environmental strategy. Certification increases the company’s competitiveness concerning quality and image, promoting positive business activities and social responsibility. On the consumer side, ecological certification facilitates decision-making processes regarding choosing a supplier of environmentally friendly products and services. Moreover, eco-certification or ecolabelling increases the availability of information about implemented ecological activities. According to Schott (2006), ecolabels are a proactive mechanism to create a more sustainable future.

The choice of ecolabelling adoption is explained in the study of Leroux and Pupion (2018), who account for risk and the ability to enact ecolabelling as the two dimensions of entrepreneurial orientation that can explain this choice. The institutional pressure explained by a tendency to cope with competitors can also explain ecolabelling adoption. The authors also studied the risk of reversing the ecolabelling process. They advise organisations that have not yet adopted the certification that the intention to reverse the ecolabelling process depends on hotel sector normative pressures and entrepreneurial characteristics,

like risk-taking or the fear of bureaucracy. Moreover, for the case of certificated hotels, the authors point out the main reason for abandoning the certification: the complexity of the certification system. On the other hand, a positive attitude towards environmental logic and pressures of the reference group would help maintain the ecolabel adoption. Cembruch-Nowakowski (2020) refers to the different dimensions of the benefits of using Eco-Certification and Ecolabels: environmental, socio-cultural, organisational and economic. However, the author points out the main benefit of using Eco-certification as the 'contribution to the harmonisation of pro-environmental and pro-social activities of various entities, and providing support to the sustainable development in the region' (Cembruch-Nowakowski, 2020, p. 311).

According to the International Organization for Standardization (2023), standards are the collected wisdom of people with expertise in their subject matter. These people know the needs of the organisations they represent, and environmental management standards help reduce environmental impacts and waste.

Certification in the environmental domain refers to a rigorous procedure that verifies and assesses whether a given product, service or process complies with specific environmental standards or requirements. Certificates are generally issued by accredited institutions or entities of general trust, totally independent of the entities requesting a certificate (Koraus & Rusko, 2013). The International Organization for Standardization (ISO) has defined three general types of voluntary labels. Type I labels are certified ecolabels. There is an independent and voluntary programme for these labels based on several criteria. This programme assigns labels to products and fosters their differentiation according to their environmental performance. Certification is associated with the concepts of transparency and credibility. Type II labels are called environmental self-declarations, as they appear as declarations developed by manufacturers to transmit environmental information about their products or services.

Type III labels are environmental product declarations (EPD) and have standardised information about a product or service. This information appears through diagrams with critical environmental indicators, such as waste production, global warming and others (Fet & Skaar, 2006; Minkov *et al.*, 2020). Types I and III are, in fact, ecolabels, as they are awarded to entities that meet the requirements of the multicriteria procedure carried out by authorities that assess and quantify the environmental data of a product using the life cycle approach (Minkov *et al.*, 2020).

Both eco-certificates and ecolabels can be international in nature, e.g., ISO 14001 or Green Globe Certificate, or they can be recognised only locally, e.g., 'Nature's Best Sweden' (Cembruch-Nowakowski, 2020). The author also notes that eco-certification or ecolabelling processes may involve procedures accredited by a state institution. Still, they may also be initiated and conducted by non-profit organisations, associations, foundations or other entities. Al-Aomar and Hussain (2017) argue that the hotel supply chain is open to green practices and that the strong competition among hotel supply chains has led hotel managers to believe that the effective adoption of green practices would automatically support growth and long-term economic sustainability. Also, Segarra-Oña *et al.* (2012) conclude that the results of proactive environmental strategies, namely implementing ISO 14001 in the hotel sector, will enhance economic returns, total income and net sales.

Portuguese hotel certification encompasses several environmental labels that can be identified in the Portuguese National Tourism Registry (RNT) (<https://rnt.turismodeportugal.pt>) for each hotel establishment: ISO 14001, Green Key and the EU Ecolabel. According to the International Organization for Standardization (2023), ISO 14001:2015, in its current version, specifies the requirements for an environmental management system that an organisation can use to enhance its environmental performance. The main objectives of this norm are for organisations to systematically manage their environmental responsibilities, contributing to the environmental pillar of sustainability, and create value for the environment, the organisation, and interested parties.

The Green Key programme is an international award coordinated by the Foundation for Environmental Education (FEE) developed in Portugal by the Associação Bandeira Azul da Europa (ABAE), since 2007. According to Turismo de Portugal (2023), the Green Key certificate aims to promote Sustainable Tourism by recognising tourist facilities (accommodation, conference centres, restaurants, among others) that implement good environmental and social practices, value environmental management in their establishments and promote environmental education for sustainability. Following the global trend toward green marketing, the programme attracts the national and international tourist market and motivates the staff towards the objectives defined by the establishment (Turismo de Portugal, 2023).

The EU Ecolabel is a voluntary European instrument applicable to products and services that aims to reduce the negative impact of production and consumption on the environment, health, climate and natural resources, promoting products with high environmental perfor-

mance (Turismo de Portugal, 2023). According to Turismo de Portugal, the EU Ecolabel is a relevant element of differentiation for companies with several advantages: the guarantee to customers and consumers that a product meets strict environmental criteria, which could be decisive for their choice; third-party verification and recognition in all EU countries; reinforcing reputation, showing a high degree of social responsibility.

The present study is innovative since it is the first to address nationwide the determinants of certification of hotel establishments in Portugal. We should refer to the work of Preziosi et al. (2019), who examined the EU Ecolabel in Portuguese hotels and concluded about environmental practices and communication on guest loyalty. We should also refer to the work of Heras-Saizarbitoria et al. (2020), who studied the environmental best practices and performance benchmarks among EMAS (Eco-management and Audit Scheme from the European Commission) certified organisations in several countries, including Portugal. The present work intends to fill a gap in the literature since it includes the study of all hotel establishments in Portugal, trying to assess which factors determine the certification of hotels in Portugal. There are some studies for the Portuguese case on ISO certification (Cândido et al., 2021; Esgarrancho & Cândido, 2020; Santos et al., 2016), but they do not address both the environmental certifications and hotel sector.

The literature review presented the theoretical background to identify which determinants can explain hotel environmental certification, studying the case of companies that manage hotels in Portugal. In the present study, we will consider the size or dimension of hotel companies, hotel classification, hotel affiliation and the financial performance of hotel companies to explore the determinants of certification. Some studies in the literature allow us to identify these variables. Claver-Cortés et al. (2007) establish a relationship between cost reduction and certification, and Darnall et al. (2010) explore the relationship between company size and certification and conclude that smaller firms adopt fewer proactive environmental practices than their larger counterparts. Concerning other determinants like hotel classification and affiliation, Sanchez-Ollero et al. (2016) establish a positive relationship between hotel classification and environmental proactivity. In fact, according to the authors, the hotel category and affiliation increase the likelihood of hotels being considered environmentally proactive. O'Neill and Carlbäck (2011) also discuss the relationship between affiliation and environmental certification since affiliated hotels develop common management strategies (human

resources, marketing, procurement) for the hotel chain and environmental certification programmes.

Considering the relationship between financial performance and environmental certification, we compute return on sales (ROS) to assess the study's financial performance dimension. ROS is considered one of the main performance measures used to evaluate the financial performance of hotel companies by Chen (2011) and Pnevmatikoudi and Stavrinoudis (2016), who classified it as a return on invested capital ratio. More recent studies (Martins et al., 2021; Martins et al., 2019) also used these variables to assess the performance of branded and non-branded hotel companies in Portugal. Hence, the present study establishes four hypotheses: H1 – Brand affiliation explains environmental certification; H2 – The hotel classification explains environmental certification; H3 – The hotel dimension explains the environmental certification; and H4 – Financial performance explains environmental certification.

3 Methodology

The present study aims to assess the main determinants of environmental certification of hotel companies in Portugal and considers companies established in Portugal that may operate one or more hotel units. Data from the companies under study were collected from two different databases. Portugal's RNT allowed for collecting information on existing hotel establishments in Portugal. As it was also intended to analyse the financial performance of companies operating hotel establishments, data from the financial statements of companies with the Economic Activity Code (CAE) 551 – 'Hotel Establishments' were collected in the Iberian Balance Sheet Analysis System (SABI) database. The companies (public limited companies and limited liability partnerships) were selected. After merging the two databases matching hotel establishments and hotel companies according to the tax number provided in both databases, several companies were eliminated: companies with hotel establishments not considered as such by the RNT (CAE 551 includes Tourist Villages, Tourist Apartments and Other Hotel Establishments, which are not considered hotel establishments by RNT); companies under individual names which are not included in SABI; and companies with missing data in SABI for the selected variables. The empirical study is comprised of 947 companies for the 2021 fiscal year since those were the data available at the time of the study.

After collecting the data, the information was coded, and the database was built in the SAS software, where the data was treated and analysed using descriptive statistics, variable correlations, and the Tobit regression model.

To test the hypotheses formulated considering the available information, the following model is presented:

$$MCERT_i = \beta_0 + \beta_1 ROS_i + \beta_2 MCAP_i + \beta_3 MNST_i + \beta_4 MBRAND_i + e_i \quad (1)$$

where:

$MCERT_i$ – Dependent variable that computes the average number of hotels with environmental certification in each hotel company.

ROS_i – Independent variable, ROS is calculated as Operating Profit Before Interest, Taxes and Depreciations (EBITDA) divided by total sales ($\frac{EBITDA}{Total\ sales}$), representing the profitability per euro sold. It is expected a positive coefficient since the return on sales is considered a financial ratio that allows the assessment of the financial performance of hotel companies, according to literature: Palacios-Marqués *et al.* (2011), Martins *et al.* (2021), Garay *et al.* (2017), Elkhwesky (2022) and Segarra-Oña (2012) establish a positive relationship between environmental certification and profitability.

$MCAP_i$ – Independent variable computes the average size of hotels in each hotel company_{*i*}, calculated according to the number of beds. It is expected to have a positive coefficient since according to the literature, environmental certification is related to cost reduction (Claver-Cortés *et al.*, 2007) and company size (Darnall *et al.*, 2010).

$MNST_i$ – Independent variable computes the average number of stars of hotels in each hotel company_{*i*}. It is expected to have a positive coefficient, since the higher

the hotel classification, the higher the expectations of customers. In fact, according to Sanchez-Ollero *et al.* (2016), there is a positive relationship between hotel classification and environmental proactivity.

$MBRAND_i$ – Independent variable computes the average number of affiliated hotels in each hotel company_{*i*}. It is expected to have a positive coefficient since hotel chains develop common strategies for human resources, marketing and procurement, and environmental certification (O'Neill & Carlbäck, 2011). Also, according to Sanchez-Ollero *et al.* (2016), hotels considered environmentally proactive are associated with affiliation, among other factors.

e_i – Error term.

In the following section, the main results are discussed.

4 Discussion of results

The present study's sample considers 947 companies, as previously referred to in the methodology section. These companies account for 1196 units with 1043 hotels (87%), 119 apart-hotels and 34 bed and breakfasts distributed along 18 districts and two autonomous regions. Most hotel establishments (35%) are located in the Lisbon and Faro districts. According to hotel operations, 58% are independently managed, and 42% are affiliated. Only 9.9% of hotel establishments have environmental certification.

We also computed some descriptive statistics about hotel companies and the different variables that will allow the testing of the proposed hypotheses. Table 1 summarises the main characteristics of hotel companies in the present study. Among the 947 companies under

Table 1: Descriptive statistics of main variables in the study

Variable	n	Average	STD	Median	Minimum	Maximum
MCERT _{<i>i</i>}	947	0.085	0.271	0.000	0.000	1.000
ROS _{<i>i</i>}	947	0.071	1.198	0.192	11.000	13.293
MCAP _{<i>i</i>}	947	139,941	132.374	93.000	11.000	1008.000
MNST _{<i>i</i>}	947	3.264	0.983	3.000	1.000	5.000
MBRAND _{<i>i</i>}	947	0.325	0.461	0.000	0.000	1.000

Note: 1) Variable definition: MCERT - average number of hotels with environmental certification in each hotel company; ROS - return on sales; MCAP - the average size (number of beds) of hotels in each hotel company; MNST - average number of stars of hotels in each hotel company; MBRAND - average number of affiliated hotels in each hotel company; STD – standard deviation.

study, only 108 (11.4%) have hotel establishments with some type of environmental certification since each hotel company can have hotel establishments with certification and hotel establishments without certification, resulting in an average of 0.085. Regarding sales profitability, it appears that, on average, for each euro of sales or turnover, there is a net return of 0.07 euros. Concerning the size i.e., the average capacity of each company's hotel establishments is 139.94 beds, and the average rating of each company's hotel establishments is 3.26 stars. Concerning affiliation to a brand, 311 companies have affiliated establishments, representing 33% of the companies studied. The variable MCAP shows a standard deviation of 132.37, which indicates that the capacity of establishments has a wide variety, from 11 to 1008 rooms. In general, the greater the standard deviation, the greater the variation of values in relation to the mean, which may indicate increased sample heterogeneity.

Pearson's r is used to test the relationship between the variables since this test does not require a normal distribution and the correlation coefficient is not sensitive to distribution asymmetry nor the presence of outliers to test the relationship between the variables in the model [1]. Thus, the correlation is positive or negative, and the variable's value indicates the correlation's intensity. The closer it is to the extreme values (1 and -1), the greater the linear association (Marôco, 2011).

Table 2 presents the Pearson correlation coefficients to measure the intensity of the association between the variables in the model [1]. By analysing the test for the correlation of variables, we conclude that the variable MCERT is positively correlated, as expected, with all the variables. This correlation is statistically significant at less than 1%

for the different variables, except for the variable that expresses the return on sales. Thus, the results of the correlations are in line with the formulated hypotheses; that is, the variables in the model that refer to size, number of stars and affiliation explain the certification of hotel establishments.

The analysis that allows identifying the variables that can explain the existence of companies with certified hotel establishments will be carried out using a Tobit regression. This approach is appropriate since the dependent variable, the MCERT variable (which represents the average number of certified establishments in each hotel company), varies between 0 and 1.

Table 3 presents the Tobit regression performed to identify the determinants of certification of hotel establishments from the different companies under study. According to the results obtained, it appears that the main model adjustment indicators - Log Likelihood, AIC, Schwarz Criterion - are considered adequate and that there are variables with a significant impact on the model, such as the affiliation to a brand of the hotel establishments in each hotel company and the respective classification measured by the average number of stars of hotel establishments in each hotel company. Hence, regarding affiliation to a brand, the MBRAND variable has a statistically significant ($p=0.004$) value of 3.230, which means that an increase of one unit in the MBRAND variable implies an increase of 3.23 units in the MCERT variable, keeping all model variables constant. This result allows us to conclude that Hypothesis 1 (affiliation to a brand determines environmental certification) is confirmed. These results confirm the contributions of O'Neill & Carlback (2011) and those of Sanchez-Ollero et al. (2016), who establish a relationship

Table 2: Pearson correlation

Variables	MCERT _i	ROS _i	MCAP _i	MNST _i	MBRAND _i
MCERT _i	1.000	0.031	0.143	0.152	0.127
P-Value		0.335	<0.001	<0.001	<0.001
ROS _i		1.000	0.007	0.058	0.027
P-Value			0.831	0.074	0.395
MCAP _i			1.000	0.452	0.281
P-Value				<0.001	<0.001
MNST _i				1.000	0.229
P-Value					<0.001
MBRAND _i					1.000

Note: Variable definition is presented in Table 1.

Table 3: Determinants of environmental certification

Variable	Coefficient	Expected Sign	t Value	P-Value
Constant	-3.751	+/-	-7.100	<0.001
ROS _{<i>i</i>}	0.092	+	0.930	0.352
MCAP _{<i>i</i>}	0.001	+	1.720	0.085
MNST _{<i>i</i>}	0.574	+	2.940	0.003
MBRAND _{<i>i</i>}	3.230	+	2.870	0.004
Sigma	1.570		10.590	<0.001
Log Likelihood	-89.540			
AIC	191.079			
Schwarz Criterion	220.199			

Note: Variable definition is presented in Table 1.

between environmentally proactive hotel companies and affiliation to a brand.

Regarding the classification of hotel establishments, the MNST variable also has a statistically significant ($p=0.003$) value of 2.940, which means that the increase of 1 star in the hotel classification implies an increase of 2.9 units in the MCERT variable, keeping all model variables constant. This result allows us to conclude that Hypothesis 2 (hotel classification determines environmental certification) is confirmed. These results also confirm the results of Sanchez-Ollero *et al.* (2016) on the existence of a positive relationship between hotel classification and environmental proactivity.

As for the size of the hotel establishments, if an error value of 10% is considered instead of 5%, it can be assumed that the bigger the size of the hotels belonging to hotel companies, the more likely there is to be certified, which allows confirming Hypothesis 3 (hotel size determines environmental certification). These results are in line with the results related to cost reduction (Claver-Cortés *et al.*, 2007) and company size (Darnall *et al.*, 2010).

Finally, regarding the variable that measures the return on sales, although the value of the coefficient is positive and, therefore, there is a positive relationship between the return on sales of hotel companies and environmental certification, this is not statistically significant; therefore Hypothesis 4 (financial performance determines environmental certification) cannot be confirmed. Although in line with the positive relationship between environmental certification and profitability established by Garay *et al.* (2017), Elkhwesky (2022) and Segarra-Oña *et al.* (2012), these results could be explained by the fact that only 11% of the companies in the study have hotel

establishments with some type of environmental certification.

The following section presents the main conclusions, limitations of the study and suggestions for future investigations.

5 Conclusions

The aim of the present study is the identification of the determinants of environmental certification in hotel companies. Theoretical contribution is made on the topic of sustainability practices in hospitality and tourism, and, in more detail, the proactive environmental strategies in the hospitality sector, addressing the state of the art on environmental certification for the Portuguese case. Concerning practical contribution, the results indicate that affiliation to a brand, hotel classification and hotel size are factors that explain environmental certification. On the other hand, the return on sales was not statistically significant in this study. This result could be explained by the restricted sample of hotel companies with environmental certification in Portugal, which did not allow a more robust comparison between hotel companies.

Regarding brand affiliation, the results indicate that companies with affiliated hotel establishments are three times more likely to be environmentally certified than those without affiliation. As for the hotel classification, the increase of one star implies an increase of 2.9 units in the MCERT variable, keeping all model variables constant. The hotel dimension, when considering an error value of 10%, suggests that certification is more likely to be found in companies with hotels with larger sizes.

These results are essential to understanding the determinants of environmental certification in hotel companies and may have practical implications for the environmental management of these companies. For example, brand affiliation could be considered a strategic decision when hotels want to implement environmental certification. The support of higher classification of hotels in hotel investments in destinations will enhance the existence of enterprises with a greater propensity for environmental certification issues, which, as already discussed, can be explained by the existence of more demanding customers, attentive to issues of environmental sustainability. Regarding larger hotel establishments, a greater focus on reducing fixed costs could encourage the certification decision and, as such, this study is a guide for all hoteliers considering environmental certification.

In terms of limitations, this study had a restricted sample of hotel companies with environmental certification, which did not allow equating other study variables that would enrich the empirical work. In addition, only variables internal to hotel companies were considered, not considering external variables that can also influence environmental certification. However, this study contributes to the existing literature on environmental certification in hotel companies and can serve as a basis for future studies.

Disclosure statement

No financial interest or benefit has arisen from the direct applications of this research.

Conflicts of Interest

The authors of the article ‘Determinants of environmental certification in Portuguese hotel companies’ declare no conflict of interest.

Bionotes

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