



UNIVERSIDADE CATÓLICA PORTUGUESA

Hotel's End Users Preferences on Green Hotel Attributes: An Application of the Quality Function Deployment

Master's Final Work in the modality of Dissertation presented to
Universidade Católica Portuguesa to fulfil the requirements for the degree of
MSc. in Management

by

Lurdes Inês Nunes Monteiro

Católica Porto Business School
February 2020



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under the orientation of
Professor Dr. Jorge Julião
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Abstract

Hotels have been suffering environmentally friendly pressure since customers are increasingly demanding more hotel green attributes. In order to identify which green attributes hotel end-users are positively perceived and how can the hotel meet the customer's demand, this study, through the construction of a House of Quality, aims to identify which green features hoteliers should focus, without jeopardizing service quality.

This research develops the Quality Function Deployment tool, House of Quality, since it establishes relationships between the hotel end-users' ratings and the green hotel design features that fulfill the customer desires. By implementing a qualitative research methodology, the hotel customer's preferences were analyzed through a survey. The data was collected through a questionnaire and it focused solely on the city of Porto, Portugal.

Findings reveal that hotel end-users perceive as more important the attribute "Active system to detect and repair water leakage in toilets, sinks and showerheads", followed by the implementation "Good sanitation practices (such as saving water)". On the other hand, the "Change of bedsheets only upon request (option for multiple night guests)" and the "Use of low-flow toilets and sinks" were the least favorably perceived attributes.

The HOQ construction reveals that hotels should prioritize the implementation of a program of "Waste reuse and recycling" and "Use of energy efficiency techniques and technologies".

Keywords: Environmentally Friendly, Green-Hotel Attributes, Green Hotel, Quality Function Deployment (QFD), House of Quality (HOQ)

Resumo

Os hotéis têm vindo a sofrer uma pressão “amiga do ambiente”, dado que os consumidores procuram cada vez mais atributos ecológicos nos hotéis. De forma a identificar quais os atributos ecológicos avaliados positivamente pelos consumidores finais dos hotéis e de que forma o hotel consegue responder à procura dos consumidores, este estudo, através da construção da House of Quality, pretende identificar quais as funcionalidades ecológicas nas quais os hotéis se devem focar, sem prejudicar a qualidade do serviço.

Esta investigação desenvolve a ferramenta da Quality Function Deployment, a House of Quality, visto que estabelece uma relação entre a importância avaliada pelos consumidores finais dos hotéis e as características ecológicas de design nos hotéis que satisfazem os desejos dos consumidores. Através da adoção de uma metodologia qualitativa, as preferências dos consumidores do hotel foram analisadas através de um inquérito. Os dados foram recolhidos através de um questionário distribuído na zona da cidade do Porto, Portugal.

Os resultados revelam que os consumidores finais dos hotéis consideram mais importante a existência de um “Sistema ativo de deteção e reparação de fugas de água em sanitas, lavatórios e chuveiros”, seguido pela implementação de “Boas práticas sanitárias (tal como a poupança de água)”. Por outro lado, a “Mudança dos lençóis apenas quando pedido (opção para estadias de várias noites)” e o “Uso de sanitas e lavatórios com baixa pressão de água” foram os atributos ecológicos avaliados menos favoravelmente.

A construção da House of Quality revela que os hotéis deviam priorizar a implementação de um programa de “Gestão de Resíduos e Reciclagem” e o “Uso de técnicas e tecnologias com eficiência energética”.

Palavras-Chave: Sustentabilidade Ambiental, Atributos Ecológicos, Hotéis Ecológicos, Quality Function Deployment (QFD), House of Quality (HOQ)

Index

Acknowledgments.....	v
Abstract.....	vii
Resumo.....	ix
Index.....	xii
Figures Index.....	xv
Table Index.....	xvi
Chapter 1 - Introduction.....	1
1.1 Problem Situation and Motivation.....	1
1.2 Research Definition.....	3
1.3 Methodology.....	3
1.4 Thesis Outline.....	4
Chapter 2 - Literature Review.....	7
2.1 Background.....	7
2.2 Green Hotels.....	8
2.3 Position of Hotel Guests About Hotels Eco-Initiatives.....	12
2.4 Green Design.....	15
2.5 Quality Function Deployment.....	16
2.6 House of Quality.....	19
2.6.1 HOQ – Customer Demands.....	20
2.6.2 HOQ – Technical Requirements.....	22
Chapter 3 - Research Methodology.....	25
1. Survey Design.....	26
3.2 Data Analysis.....	30
Chapter 4 - Results.....	34
4.1 Result's Presentation and Analysis.....	34
4.1.1 Impact of the Role in the Hotel.....	37
4.1.2 Impact of Gender.....	38
4.1.3 Impact of Academic Qualifications.....	39
4.1.4 Impact of Age.....	40
4.1.5 Impact of Family Monthly Income.....	41

4.2 Building the House of Quality	41
Chapter 5 - Discussion and Conclusions.....	48
5.1 Discussion	49
5.2 Conclusions.....	51
5.3 Limitations	52
5.4 Recommendations.....	53
References	55
Appendix I – Hotel Guests Questionnaire.....	64
Appendix II – Hotel Staff Questionnaire.....	69

Figures Index

Figure 1 - House of Quality	45
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Table Index

Table 1: Consumers demands from hotel green attributes	21
Table 2 - Green building features.....	23
Table 3 - Relationship between Portuguese Qualification Levels and the European Qualification Framework	29
Table 4 - Questionnaire Respondents Profile	35
Table 5 - Importance Raking between the Green Hotel Attributes	36
Table 6 - Significant Results where groups of the position in the hotel rated the importance of factors differently	38
Table 7 - Significant results where male and female respondents rated the importance of factors differently	39
Table 8 - Significant results where groups with different levels of education rated the importance of factors differently	40
Table 9 - Significant results where age groups rated the importance of factors differently	40
Table 10 - Relationship Matrix Symbols	42

Chapter 1

Introduction

1.1 Problem Situation and Motivation

Environmental awareness is a trending subject, so that sustainability researches have been receiving more attention from scholars. The concept of sustainability and sustainability development have been explored, not only by academics but also by government agencies and international organizations (Olawumi & Chan, 2018). This new way of thinking also reached the construction industry. The implementation of sustainable theory in building construction has been well established (Tam et al., 2017).

The hospitality industry was also affected by this “green wave”. The research on hotel sustainability is due to the increasing demand for green initiatives by hotel customers. The consumers are changing the way they think and, consequently, their desires are also changing, to the point that the hotel’s environmental attributes are evaluated by guests as “basic factors”, constituting an integral part of the service (Robinot & Giannelloni, 2010). The consumers growing attention towards environmental issues and sustainability fostered hoteliers to transform their businesses implementing green practices in hospitality management. This is a great opportunity for hotel managers to exploit this differentiation factor in the market (Dodds & Holmes, 2016). Actually, “going green” is becoming an effective strategy to boost hotel competitiveness

and gaining market share acquiring sustainability-sensitive guest segments (Yi et al., 2018).

The study conducted by Kassinis & Soteriou, (2003) suggests that performance gains associated with the adoption of environmental practices are related to cost reductions, resource savings, opportunities for innovation, customer retention and improves employee morale. Despite the motivations to invest in eco-innovations, there are still more barriers than incentives, highly related to the financial subject and lack of interest (Menezes & Cunha, 2016).

Implementing an environmentally strategy has benefits for hotels, however, the adoption of these green initiatives must be done carefully. Efforts made by hotels to reduce their environmental impact may be viewed as a mere ploy to improve the company's profitability, allowing it to reduce costs without having to reduce prices (Robinot & Giannelloni, 2010). On the other hand, hotels should know exactly where to innovate, to meet customer needs, since customer satisfaction is considered a crucial element to sustain financial success (Anderson et al., 1994).

Recent researches have been focusing on which green hotel attributes are more valued by hotel guests. However, little attention was provided to know how the hotel staff feels and thinks about the hotel's green attributes when hotel employees are internal customers and vital stakeholders (Sever, 2018).

One way of knowing which green attributes should be primarily focused by hoteliers, considering hotel customer evaluations, can be achieved through the Quality Function Deployment. The QFD is a customer-driven process that integrates customer requirements into every aspect of the design and delivery of products and services (Masoudi et al., 2013) and its output is knowing how to better fulfill the customer wants (Zairi & Youssef, 1995).

The QFD is a good tool to ensure that the customer requirements are integrated into new products or innovation in the design phase (Zairi & Youssef,

1995). Despite the growing interest in QFD applications to service design, there are only a small number of QFD studies in the hotel service design (Cai & Yan, 2016).

1.2 Research Definition

Regarding the research gaps, this thesis aims to identify which green attributes the hotel end-users value the most, concerning the hotel design. From previous studies, hotels know that green hotel attributes are favorably evaluated by hotel guests. However, this study also addresses the hotel staff satisfaction on the adoption of green hotel attributes. Besides, simply knowing which hotel eco-initiatives are more important accordingly to hotel end-users, does not help the hoteliers to efficiently implement these green attributes. The application of the QFD tries to tackle this gap by connecting what consumers want with the technical requirements that meet customer needs.

Therefore, the main objective of this study is to provide hotel managers which green building features they should focus, during the design phase, based on the importance assessed by the hotel end-users.

1.3 Methodology

In order to achieve this investigation objective, the research methodology applied was qualitative, with an exploratory nature. To explore the hotel end-users' preferences on green hotel attributes, initially, it was developed a literature

review to look into what is already known about the hotel customer's satisfaction and secondly, data from hotel end-users was collected to analyze how they evaluate some green hotel attributes. Collected through a questionnaire distributed to Porto's hotels and citizens, the survey methodology allowed to analyze the questionnaire responses using descriptive statistics.

A statistical analysis was developed to discover how strongly the hotel end-users agree with the implementation of green hotel attributes. These results were later applied to the construct of the House of Quality, which links the customer demands with the technical requirements, through a relationship matrix. The construction of the HOQ helps hoteliers to know which green initiatives to implement, without sacrificing the service quality (Yi et al., 2018). In other words, the HOQ provides a direction, underpinned by the hotels end-users' preferences, of which green building features should receive more attention from them.

1.4 Thesis Outline

The next chapter presents the literature review. Primarily, a brief introduction about how environmentally awareness trend and how it affected the hospitality industry was made to provide an initial context about the thesis subject. The first subchapter analyzes how hotels are adapting to this "green wave" and if that is beneficial for the hotel's daily operations. Additionally, the main advantages and barriers to implementing green initiatives in hotels are explored. Afterward, on the second subchapter, it is reviewed what the literature already knows about how the hotel guests feel about green hotel initiatives. At the end of this subchapter, the best hotel green practices are gathered, to provide hoteliers an insight into how they should integrate eco-initiatives in their business. The third

subchapter introduces the importance of green design. The Quality Function Deployment is explored on subchapter four, along with its benefits and applications. The literature review chapter ends with the House of Quality and by assessing its customer demands and technical requirements.

The third chapter explains how this study was conducted through its research methodology. Not only is the research method fully explained, in this chapter, the design of the data collection tool used was also presented. The last section of this chapter explains how the data analysis was conducted using the SPSS.

The study findings are revealed in the fourth chapter. Firstly, the data analysis results were presented, so that later on this chapter the House of Quality could be constructed.

The last chapter is introduced by the discussion of the results with the literature review. A summary and the conclusions achieved by this study are also presented, followed by the research limitations and future recommendations.

Chapter 2

Literature Review

2.1 Background

Nowadays, environmental issues are faced all over the world (Yusof et al., 2017). Even though tourism was once considered a non-polluting industry with few if any, environmental impacts, awareness of its potential for negative impacts has been recently increasing (Raggi & Petti, 2006). As revealed in numerous studies, tourism development is associated with both positive impacts as well as negative impacts (Das & Mukherjee, 2007).

Most tourism activities are strongly related to the environment, since the natural environment itself may be considered as a major input resource to the processes of tourism industries. But, on the other hand, the development of tourism as a mass industry may severely increase its overall impact on the environment (Raggi & Petti, 2006). It is a given that hotels are one of the main contributors to the tourism sector, as they are the primary form of accommodation that tourists seek. However, hotels perform energy and water-intensive activities every day, which translates to a big environmental impact (Han et al., 2018; Verma & Chandra, 2016). As the environmental awareness of the population has been rising, it has become common knowledge that the hotel industry does more than its share in harming and wasting environmental resources with their day-to-day activities. (Manaktola & Jauhari, 2007). As a

result, practitioners in the hospitality and tourism industry are under pressure to be eco-friendly, one of the main reasons being the customers' increasing demand for environmentally conscious products and services (Han et al., 2010).

Recently, Hotel guests have shown a stronger awareness of hotels' green operations. There is no doubt that sustainability has become a critical issue within the global lodging industry (Han & Yoon, 2015b).

2.2 Green Hotels

Forecasts indicate that the tourism industry is becoming more energy, water, land, and food intense, and, within 25 and 45 years, tourism resource usage will double, highlighting how important it is to think about sustainability (Gössling & Peeters, 2015). This issue is increasingly receiving attention, not only by scholars but also by the consumers (Olawumi & Chan, 2018). On one hand, the growing attention toward environmental issues and sustainability by the consumers has fostered hoteliers to transform their business, implementing green practices in hospitality management (Dodds & Holmes, 2016). On the other hand, a significant number of environmentally related regulatory pressures are being imposed upon the lodging industry internationally (Revilla, Dodd, & Hoover, 2001). Thus, hotels should be aware of this trend and adopt various green practices (Yi et al., 2018).

Hoteliers are adapting to this "green wave", providing eco-friendly attributes to their services and transforming their businesses in "green hotels" or "environmentally friendly hotels" (Verma & Chandra, 2016). These terms, which refer to an environmentally responsible hotel, describe a hotel that is under the guidance of sustainable development throughout the course of its service offer (Han & Yoon, 2015b). Greening hotels is believed to be one of the critical facets

of sustainable development in the hotel industry (Han et al., 2010), becoming a great opportunity for hotel managers to exploit as a differentiation factor in the market (Dodds & Holmes, 2016). Hence, green practices are being adopted as part of the hotel's competitive strategy (Manaktola & Jauhari, 2007).

In the business strategy literature, in order to obtain success, companies should own competitive advantages (Ryan, 2002). The creation of competitive advantage is derived from the possession of a valuable resource that allows better performance than achieved by the competitors. In light of the demand for sustainable services, to possess this potential it is necessary to look at the features of heterogeneity and sustainability (Ryan, 2002). In a study done in 2007, the "green" hotel business was considered a growing niche (Manaktola & Jauhari, 2007). This is because these establishments differentiate themselves from similar non-green hotels, but they also fulfill a need in the market for less environmentally damaging hotels. Nowadays that market niche is getting wider, as going green is becoming an effective strategy to boost hotel's competitiveness and gaining market share, through acquiring sustainability-sensitive guest segments (Verma & Chandra, 2018; Yi et al., 2018). However, this greening trend has an impact on all customers, not only on the environmentally friendly ones. Green activities have a strategic value for companies, but also represent the "right thing to do" and "the smart thing to do" to succeed in the marketplace (Luo & Bhattacharya, 2006). As green services and operations are becoming more widely embraced, environmentally friendly attributes are now considered to be a basic measure of a hotel service (Robinot & Giannelloni, 2010). To that end, sustainable services have stopped being an extra offer in order to fulfill a niche and started being a requirement.

Despite the competitive advantage being the most attractive advantage, hotels have more motivation to embrace green initiatives (Menezes & Cunha, 2016). Cost-saving is an important incentive for green practices in the hotel industry,

due to being a highly energy-intensive sector (Schubert, Kandampully, Solnet, & Kralj, 2010)(Revilla et al., 2001); hence, adopting green practices can have financial benefits (Dodds & Holmes, 2016). Some hotels have energy and waste management measures, which improves hotel technical efficiency (Kularatne, Wilson, Månsson, Hoang, & Lee, 2019). Besides, preservation and recycling programs in hotels are a mean to reduce energy costs and waste (Revilla et al., 2001). At the same time, the adoption of environmental practices is associated with performance gains, opportunities for innovation, customer retention and loyalty, and improvements in employee morale (Kassinis & Soteriou, 2003)(W. G. Kim, Li, Han, & Kim, 2017). Green initiatives create perceived value for customers (Robinot & Giannelloni, 2010), so much that environmental practices are positively related to performance through the mediating effect of enhanced customer satisfaction (Kassinis & Soteriou, 2003).

Besides all these advantages to go green, there are still more barriers than incentives for the development of environmentally focused innovations. These are directly related to financial issues and a lack of interest (Menezes & Cunha, 2016). Al-aomar and Hussain (2017) found that the key challenges to adopting green practices are mainly the lack of “know-how” and insufficient management support. Hoteliers still view sustainability as adhering to environmental standards and audits, rather than the effective implementation of green initiatives to reduce waste, conserve resources, have a better social impact and to achieve higher guest satisfaction and retention (Al-aomar & Hussain, 2017). Furthermore, when hotels decide to embrace green initiatives, they face some obstacles, regarding how the guests perceive these changes. Efforts made by hotels to reduce their environmental impact may be viewed by guests as a mere ploy to improve the company’s profitability, allowing it to reduce costs without having to reduce prices (Robinot & Giannelloni, 2010). In addition, some green initiatives involve water and energy management programs. The major difficulty

of implementing these green practices is that they can limit the guests' comfort level (J.-Y. Kim, Hlee, & Joun, 2016). For example, reducing water consumption can cause inefficiencies in customer satisfaction (Kularatne et al., 2019). Additionally, several hotel guests assert that hotels may just be using green practices as a marketing tool to attract more customers (Yi et al., 2018). To clearly show customers hotel's intentions, hotel managers need to think about how to communicate the green initiatives to their guests. Guest perception of hotel green communication is a key factor in the evaluation of green practices by guests (Preziosi, Tourais, Acampora, Videira, & Merli, 2019) because hotels can use tactics that deceive consumers regarding the environmental practices of a company or the environmental benefits of a product or service – the greenwashing effect (Parguel, Benoît-Moreau, & Larceneux, 2011). Greenwashing is a growing concern among hotel consumers, which pose a threat to green hotel patronage (Chen, Bernard, & Rahman, 2019), highlighting the fact that hotels should be cautious when communication with the guests, and should communicate more with actions and pieces of evidence (Gupta, Dash, & Mishra, 2019). As a result, perceived greenwashing negatively affects green trust (Chen et al., 2019).

Despite the existing barriers of becoming green, “being green” has become an effective strategic approach to differentiate and position companies' products and services (Han & Yoon, 2015a). Environmental competencies become a source of value and uniqueness for the company itself (Raggi & Petti, 2006) and therefore hotels may be able to have a competitive advantage over similar non-green hotels if they follow green practices (Han et al., 2010). However, the hotel industry not only stands to gain in terms of profitability; through green practices hotels can also become a source of social change and leadership (Ryan, 2002). With leadership comes advantages such as the increase in customer satisfaction (Revilla et al., 2001). Consequently, the degree of environmental management practices in the

hotel industry is positively related to good market performance, through the mediating effect of customer satisfaction and loyalty (Kassinis & Soteriou, 2003). In other words, a hotel with sound and reputable green practices can lower operating costs, appeal to stakeholders, enhance employee morale and consequently enjoy financial prosperity (Han et al., 2011).

2.3 Position of Hotel Guests About Hotels Eco-Initiatives

In a hospitality service, it is vital to know what customers feel and think. Not only because customer satisfaction is considered a crucial element to sustain financial success (Anderson et al., 1994) and competitive business, it is also a critical indicator of the firms' performances (Kassinis & Soteriou, 2003). Furthermore, hoteliers need to understand customers' needs and desires so that they can explore the factors that customers truly want when choosing a hotel (Trang et al., 2019).

Ten years ago, green practices were employed randomly and without research on how specific practices might influence a customer's hotel selection (Millar & Baloglu, 2008). However, with recent studies, hoteliers know that insight about the customer values derived through green attributes will help them develop effective and appropriate strategies in designing a hotel's servicescape, with a special focus on the green elements that enhance trust (Gupta et al., 2019). Additionally, increased levels of spending on environmental initiatives lead to a perceived increase of visitors, length of stay and revenue (Dodds & Holmes, 2016).

Consumers display their environmental concerns by choosing a variety of behaviors, and one of them could be selecting green hotels for a stay (Robinot & Giannelloni, 2010). However, hotels can try to instigate the green thinking into

their customers. Increasing environmental concern ultimately contributes to triggering guest's active participation in green practices and their loyalty for green lodging firms (Han et al., 2018). Consequently, staying at a green hotel may lead guests to develop a specific loyalty towards the whole range of eco-friendly hotels (Merli et al., 2019). Moreover, to stimulate the guest's repurchase of environmentally friendly lodging products efficiently, eco-friendly hotels marketers should intensify guests' satisfaction by providing them with pleasant experiences during their stay (Han & Yoon, 2015a).

Consumers would prefer to use lodging that follows green practices, despite not being willing to pay extra for these services (Manaktola & Jauhari, 2007), as hotel environmental attributes are evaluated as minimal requires (Robinot & Giannelloni, 2010). Due to being considered as a "basic factor", customers expect a tangible commitment with the environment from hotels (Yi et al., 2018). So much that even the non-green hotels have to practice green or follow environmentally friendly procedures in order to obtain a positive perception from their customers (Yusof et al., 2017).

Overall, hotels' green attributes have a positive impact on their customers' satisfaction, loyalty and return intentions (Merli et al., 2019; Berezan et al., & Love, 2013; Kassinis & Soteriou, 2003).

As hotel guests are becoming more environmentally aware, they are willing to accept certain minor inconveniences to support sustainability (Berezan et al., 2013). However, basic needs such as comfort and the feeling of being well treated should not be neglected (Yi et al., 2018). One of the most important factors that should be handled very carefully is water, which is a critical component of guest comfort, and therefore may impact guest perceptions and, hence, the demand. Even though green initiatives are considered as standard, guests are more willing to return to a green hotel, when compared to a non-green hotel, and to recommend it through positive word of mouth (Merli et al., 2019). In contrast, it

should be noted that the hotel guest's positive perceptions toward green practices do not necessarily drive their willingness to pay for a hotel's green practices (Verma & Chandra, 2016). Although a higher intensity of green practices enhances customer satisfaction, it does so indirectly, through perceived relative quality (J.-Y. Kim et al., 2016). Hence, green attributes do not appear to significantly determine the consumer's choice of hotels and hotel rooms (Njite & Schaffer, 2017).

As customers' wants and needs are becoming more complex (Berezan et al., 2013), more and more eco-conscious customers look for hotels that follow practices that protect the environment (Manaktola & Jauhari, 2007). However, these practices do not only attract environmentally worried customers. In general, hotel guests perceive environmental protection programs as a necessity in a hotel (Verma & Chandra, 2016). So, managers when choosing among available strategies to enhance service quality should invest in sustainability practices, since these enhance guest satisfaction and behavioral intentions (Merli et al., 2019). Although, managers should treat green initiatives as an attribute that contributes to satisfaction in a way very different from what is expected. Green initiatives, when evaluated positively by consumers, will add very little to the positive evaluation of a company, but when evaluated negatively, it will drastically drop the current level of evaluation a consumer holds of a company (Njite & Schaffer, 2017).

The environmental concern is becoming deep-rooted the young consumers, as they may be more worried about their future. This creates both a prospect and a challenge for hotel operators (Verma & Chandra, 2016). As some sustainable efforts are indeed desired by guests (Berezan et al., 2013), to survive in the highly competitive environment such as the hotel industry, the hoteliers need to show

concern and participate towards conserving the environment (Yusof et al., 2017). However, there is no single strategy to improve a hotels' green performance, each hotel should analyze its situation and then determine the most effective strategy accordingly (Sari & Suslu, 2018). In particular, management should make sustainable practices as convenient as possible for their guests (Berezan et al., 2013).

Hotel marketers' emphasis and the green initiatives embraced by hotels need to be tailored to their target market (Berezan et al., 2013). Hotels should focus on finding optimal points of service encounter for their green practices to minimize guest complaints (Yi et al., 2018). Furthermore, hotel managers must pay close attention to whether green practices undermine guest service because customers may link inconvenience to green attributes (Kim et al., 2016). Besides, hotels should keep in mind that they need to provide alternatives for hotel guests who do not want to follow green practices (Yi et al., 2018).

As soon as hotels implement these green practices into their environmental strategy, better they can position to gain a competitive advantage in the future (Verma & Chandra, 2016).

Additionally, one environmentally favorable action is not necessarily related to the intention to revisit a green thinking hotel (Han et al., 2010). It is important to design green programs that motivate guest participation and engagement (Kim et al., 2016).

2.4 Green Design

Environmental impacts of buildings over their entire life cycle have been recognized as a serious problem for the construction industry (Polster et al., 1996). With time, the greenway of thinking grew within this industry, so much

that the implementation of sustainable theory in building construction has been well established in the past few years (Tam et al., 2017).

Incorporating environmentally sustainable products and design into one's companies, while making customers aware of such facts, can have a positive influence on perceived profitability and sustainability of the environment (Dodds & Holmes, 2016). In reality, design and aesthetics can have real business benefits for attracting and retaining customers and encouraging them to spend their time in the hotel (Alfakhri et al., 2018).

Hotels should not focus only on specific elements of a hotel's green service, such as green initiatives themselves; hotels should consider the overall perception of the green service efficacy, evaluating all the components, namely social, design and ambiance (Gupta et al., 2019). Also, believability in green claims can be enhanced by providing an attractive eco-friendly architectural design, incorporating natural surroundings and providing attractive eco-friendly interior decorations (Gupta et al., 2019).

2.5 Quality Function Deployment

Quality in a service or product is no longer "conformance to specifications" or "fitness for use" because these definitions look at quality from a narrow perspective (Zairi & Youssef, 1995). And the hospitality industry, hotels, in particular, have known that the difference between success and failure depends upon customer satisfaction (Masoudi et al., 2013). So, companies, such as hotels, should focus on finding optimal points of service encounters for their green practices to minimize customer complaints (and indirectly increasing their satisfaction) (Yi et al., 2018).

In the 1960s Akao introduced a customer-driven methodology process that integrates customer requirements into every aspect of the design and delivery of products and services (Masoudi et al., 2013). This methodology is called Quality Function Deployment (QFD) and it was born in Japan, within Mitsubishi Heavy Industries, as a strategy for assuring that quality is built into new products (Zairi & Youssef, 1995). The main idea behind QFD is to understand the customer needs and determine the problems associated with a product or service provided by an enterprise (Sever, 2018).

More than three decades have passed since Japanese academics and industrialists began to formalize the QFD process, due to its effectiveness in product development and quality management (Paryani, Masoudi, & Cudney, 2010). There are many similarities between today's service sector and the industrial sector context under which this tool was first developed, such as increased operative and overhead costs, increased workers' competences and, most importantly, greater customer expectations (Cesarotti & Spada, 2009).

The QFD was created under the promise of decreasing product-development costs, product-development time and increasing customer satisfaction (Griffin & Hauser, 1993). Nowadays, the main benefits of using the QFD process are in determining both the "spoken" and "unspoken" customer requirements, maximizing "positive" quality that creates value, reducing development time, reducing design changes, reducing design and development costs and reducing time to market (Masoudi et al., 2013). Given these advantages, the QFD is a culture change agent and has to be gradually integrated as a part of a bigger umbrella of change, ideally, a quality management program that drives for efficiency, effectiveness and continuous measurement for superior competitiveness (Zairi & Youssef, 1995).

QFD takes the customer as a starting point, it reflects the ideal opportunity to move away from "we know best what the customer wants" to a new culture of

“let’s hear the voice of the customer” (Zairi & Youssef, 1995). Understanding what the customer desires from a product or service is crucial to the successful design and development of new products and services (Masoudi et al., 2013). Customers are the real people who face the problems and know the solution, so the closest person to the solution is the customer. Consequently, in order to find the best solution and the best way to fulfill it, is to listen to the voice of the customer (VOC) (Sever, 2018). The QFD is a way of communicating the VOC throughout an organization. Therefore, industries benefit from the QFD methodology to bond customer wants to the internal procedures or actions of the organization, to gratify customer by exceeding their expectations (Masoudi et al., 2013).

Even though this tool is a little old, QFD is still largely used, not only on products but increasingly in services, because the QFD begins with the VOC (Griffin & Hauser, 1993) and the result is to satisfy the customer requirements, using existing resources and optimizing process capabilities (Zairi & Youssef, 1995). The ultimate intent of the QFD process is to integrate the VOC into all phases of the product or service development cycle, because, with the QFD, the quality is defined by the customer (Masoudi et al., 2013). But the success of this technique is also due to the fact that QFD is an inter-functional process, based on inter-functional teams (marketing, manufacturing, engineering, and R&D) and market research (Griffin & Hauser, 1993).

In the hospitality industry, the QFD is a very profitable and powerful tool (Masoudi et al., 2013; Paryani et al., 2010), since it is a suitable approach for understanding the expectations of hotel guests from services provided to them and designing the new one (Sever, 2018). However, despite the growing interest in QFD applications to service design, there are only a small number of QFD studies in the hotel service design (Cai & Yan, 2016). The beauty of the correct application of QFD is that the industry where it is being applied also has a voice,

in this case, the Voice of the Hotel (VOH). VOH is listening to what the hotel management has to say about the problems, solutions and the issues highlighted by the customers. The hotel employees are certainly internal customer and vital stakeholders and their voices must be heard (Sever, 2018). Little attention has been given by the literature to what hoteliers have to say about QFD and their inputs in this tool.

2.6 House of Quality

As seen the QFD is a useful tool to understand customer needs and to relate them to design specifications (Cai & Yan, 2016), it shows a bigger picture of the problem whilst providing more targeted information to achieve greater impacts (Erdil & Arani, 2019).

The QFD is a matrix-based approach and its implementation involves a set of matrices, 4 in total (Sever, 2018). The first one is called the House of Quality (HOQ). The term House of Quality is often used to refer to QFD, but this initial matrix does not constitute the full implementation of QFD (Erdil & Arani, 2019). The HOQ portrays all the information about the customer requirements and the service characteristics and provides useful information for determining what service attributes are important in meeting the needs of the customers (Masoudi et al., 2013). The analysis in every phase of this matrix will lead to the identification of the design weaknesses, which must be dealt with as potential strength opportunities, to make the product or service the best in its class (Paryani et al., 2010). The greatness of this methodology is because the HOQ forces the inter-functional product-development team to come to a common understanding of the design issues (Griffin & Hauser, 1993). It is important that all employees, from all different hotel positions, acquire customer-focused

thinking, creating awareness that “the next process is your customer” (Akao & Mazur, 2003) because the cognitive and normative environments that facilitate environmentally friendly practices are developed through shared notions and values (Ouyang, Wei, & Chi, 2019).

The HOQ starts with the customers’ needs and wants, called the customer requirements or the “whats” (Paryani et al., 2010) and links them to technical requirements (Erdil & Arani, 2019). These technical requirements also called design requirements or the “hows” are the engineering measures of the product performance (Griffin & Hauser, 1993), which answers the question of how to fulfill the customer’s wants (Das & Mukherjee, 2007). Besides, the HOQ provides information about the correlation between the hows and the whats and reveals the priorities of the customer and design requirements (Zairi & Youssef, 1995). This relationship between customer demands and the requirements placed on the product attributes are then represented in a diagram (which visually looks like a house) (Griffin & Hauser, 1993).

2.6.1 HOQ – Customer Demands

This study aims at understanding how hotel guests perceive green hotel design, concerning the green hotel attributes. The customer requirements, or the quality demands, analyzed were obtained through the literature review. These demand qualities are expressed in Table 1 and are organized into 4 categories – application of green products and materials, waste reduction management, energy management and water management.

Demand Quality	Source
I. Application of green products and materials	
Use of recycled materials (i.e. paper, plastic, etc.).	(Manaktola & Jauhari, 2007)
Use of environmentally friendly products	(Manaktola & Jauhari, 2007) (Verma & Chandra, 2016)
II. Waste reduction management	
Use of refillable soaps/shampoo dispensers	(Millar & Baloglu, 2008) (Verma & Chandra, 2016)
Special containers/bins for various recyclable items	(Millar & Baloglu, 2008) (Verma & Chandra, 2016)
Use of durable items rather than disposable products (i.e. napkins rather than paper towels)	(Verma & Chandra, 2016)
Active recycling program for materials in all the hotel's sections	(Manaktola & Jauhari, 2007)
III. Energy management	
Use of occupancy sensors to control lighting in the hotel	(Manaktola & Jauhari, 2007) (Millar & Baloglu, 2008) (Verma & Chandra, 2016)
Use of keycards to turn the power on and off in the guest rooms	(Millar & Baloglu, 2008) (Verma & Chandra, 2016)
Towel re-use program	(Millar & Baloglu, 2008) (Verma & Chandra, 2016)
Change of bed sheets only upon request (option for multiple night guests)	(Manaktola & Jauhari, 2007) (Millar & Baloglu, 2008) (Verma & Chandra, 2016)
Use of energy saving light bulbs	(Manaktola & Jauhari, 2007) (Millar & Baloglu, 2008) (Verma & Chandra, 2016)
Use of renewable energy	(Trang et al., 2019)
IV. Water management	
Use of low-flow toilets and sinks	(Millar & Baloglu, 2008)
Good sanitation practices (such as saving water)	(Millar & Baloglu, 2008)
Active system to detect and repair water leakage in toilets, sinks and shower heads	(Manaktola & Jauhari, 2007)

Table 1: Consumers demands from hotel green attributes

2.6.2 HOQ – Technical Requirements

After listing the customer needs, the technical requirements have to be established (Erdil & Arani, 2019), in order to see how the hotel can answer the customer requirements. These quality elements consist of design characteristics, processes, facilities and methods to fulfill the given demanded qualities (Wood et al., 2016).

One way of providing these green attributes to the hotel guests can be through green building principles. A green building uses resources such as water, materials, energy, and land more efficiently and economically than typical buildings (Tam et al., 2017). As the building's impact on the environment has been recognized as a serious problem, regulation has emerged in some countries. There are about 27 established countries around the world that have green building councils (Tam et al., 2017), however, Portugal is not one of them. This can be seen as a constraint for the green construction in Portugal.

A study done in 2017 did a review of some international green building designs, through different six case studies (Tam et al., 2017). This study assembled five green building design principles: connecting with nature, understanding place, understanding natural processes, understanding the environmental impact and understanding people. Each green building design principles splits into green building features. Table 2 presents a list of the green building features that can be implemented in green hotel design as design requirements.

Quality demand
I. Connecting with Nature
Use of natural lighting
II. Understanding the Place
Efficient use of solar energy
Water conservation
III. Understanding Natural Processes
Waste reuse and recycling
Use of recycled materials
Waste sorting
IV. Understanding Environmental Impact
Use of low volatile organic compound emission materials
Use of energy efficiency techniques and technologies
Use of energy-efficient lighting fixtures
V. Understanding People
Internal Organizational Design

Table 2 - Green building features

Chapter 3

Research Methodology

This research aims to identify the key factors that affect the quality of green hotel design, by building a House of Quality. The QFD tool uses customers' feedback, and with their experience and desires evaluates the service, by quantifying unsystematic service data into diagrammatic representations for meaningful analysis and better decision-making (Raggi & Petti, 2006). Luckily, hotels have an infinitive source of help and a pool of solution called the "customer", or its end-users. After all, they are the ones who face the problems, develop anger and frustration; and, in most cases, they have the answers, revealing how important it is to know how they feel (Sever, 2018).

To examine which eco-initiatives the hotel end-users value the most, this study applied a qualitative research method, with an exploratory nature. Qualitative research analyzes participants' meanings and the relationships between them, using a variety of data collection techniques and analytical procedures, to develop a conceptual framework (Saunders et al., 2016). An exploratory study is useful if you wish to clarify your understanding of a problem (Saunders et al., 2016). One of the alternatives to conduct exploratory research include a search of the literature. In order to provide hoteliers an informed direction on which green building attributes should receive more focus, it was necessary to know how the hotel end-users felt about green hotel attributes. The study involves researching what was already found about hotel customers' perception of green attributes.

Some studies try to understand customer satisfaction regarding green hotel attributes through a survey, however, no study developed a HOQ regarding hotel eco-initiatives. Moreover, this exploratory research also needs to collect information about the hotel end-users.

The survey research methodology allows collecting data, which can be analyzed quantitatively using descriptive statistics. Additionally, these data can be used to suggest possible reasons for relationships between variables (Saunders et al., 2016).

1. Survey Design

In order to survey how the hotel guests see the green attributes, the data collection instrument selected was a questionnaire. The use of a questionnaire was preferred, in contrast to interviews, because since it was a self-completion questionnaire, the risk of potential bias caused the interviewer is removed and it makes it easier for respondents to be honest with sensitive subjects (Brace, 2004). The role of the questionnaire is to elicit the information that is required to enable the researcher to answer the objectives of the survey (Brace, 2004). In the case of the exploratory study, the major task of the questionnaire writer is to determine which data needs to be collected and how they are best collected. The questions asked on the questionnaire were obtained through the literature review. No pilot study was conducted, however, all the green attributes selected were already used and tested in previous studies disclosing their relevance in the study of hotel guests' green satisfaction. Nevertheless, no study focused on how the hotel staff sees the hotel green attributes.

Since the hotel attributes affect not only the guests but also the hoteliers (personnel who works in the hotel), how a hotel decides to implement eco-initiatives in its design should have into consideration the opinions of all its end-

users. The questionnaire was then distributed to these two groups: hotel guests and hotel staff. The distribution channel for the hotel guests' respondents was social media. The hotels selected for this study were all located in Porto and, inside the city, were chosen randomly and within all the hotel ratings. The questionnaire for hoteliers was distributed via e-mail and by hand to their staff. All the respondents were chosen randomly. The analysis of the data collected determined the factors of a green hotel design better perceived by the hotel end-users, which serves as a support to construct the House of Quality. Both questionnaires (for hotel guests and hotel staff) can be found on the Appendix I and II.

The questionnaire was divided into two sets of questions. The sequence of the different topics covered by the questionnaire, the sequence of individual questions and the sequence in which prompted responses are given can affect the accuracy of the collected data (Brace, 2004). Having been prepared to divulge less sensitive information in earlier questions may be less difficult for respondents than to disclose more sensitive data right in the beginning, so the first section of the questionnaire featured the guest's opinions about the green hotel attributes (Brace, 2004). Each question represents a different attribute. Respondents were asked how strongly they agreed with the green hotel attributes, within a scale from 1 – Strongly Disagree to 5 – Strongly Agree. This 'agree-disagree' scale is called the Likert scale, and it was first published by the psychologist Rensis Likert in 1932 (Brace, 2004). This technique presents respondents with a series of attitude dimensions, for each, they are asked whether, and how strongly, they agree or disagree, using one of several positions on a five-point scale. The Likert scale is largely used, mainly because it is easy to administer in self-completion questionnaires. The full application of this technique is to sum the scores for each respondent to provide an overall attitudinal score for each individual and each dimension (Brace, 2004). This questionnaire was formulated to ascertain the

perceived importance of 15 demand quality factors over four categories. These 15 green hotel attributes were obtained through a literature review and then converted into questions. These demand qualities are expressed in Table 1.

In the second section of the questionnaire, the intention was to gather demographic information about the respondents. This type of question, called classification questions, are normally asked at the end because they are usually disconnected from the subject matter of the questionnaire (Brace, 2004). The targeted hotel guests were asked to provide information about their gender, age, academic qualifications, and family monthly income, while the hotel staff respondents were only questioned about their gender, age and hotel position. Regarding gender, the question was made under the multiple-choice format with three options: "Male", "Female" and "I'd rather not say". In terms of age, the respondents were divided on the different ranges: "Less than 20 years old", "Between 20 and 29 years old", "Between 30 and 40 years old" and "More than 41 years old". The question about the hotel guests' academic qualifications considered the Portuguese education levels: "Ensino Básico", "Ensino Secundário", "Curso Técnico-Profissional", "Licenciatura", "Mestrado" and "Doutoramento". However, in order to be internationally understandable and measurable, these Portuguese education levels were adapted to the European Qualification Framework (EQF) levels. Firstly developed in 2008, the EQF has become a common reference point for comparing qualifications across national and institutional borders and making them easier to understand. It consists of eight learning-outcomes-based levels, ranging from basic (level 1) to most advanced (level 8), to which each National Qualifications Framework (NQF) is linked (Cedefop, ETF, UNESCO, & UNESCO UIL, 2019). According to the 2019th edition of the EQF, the Portuguese qualification framework corresponds to the following levels (Table 3):

NQF LEVELS	QUALIFICATION TYPES	EQF LEVELS
8	Doctoral degree (<i>Doutoramento</i>)	8
7	Master degree (<i>Mestrado</i>)	7
6	Bachelor degree (<i>Licenciatura</i>)	6
5	Diploma in technological specialisation (<i>Diploma de Especialização Tecnológica</i>)	5
4	Upper secondary education and professional certification (<i>Ensino secundário obtido por percursos de dupla certificação</i>) Upper secondary education and professional internship – minimum six months (<i>Ensino secundário vocacionado para prosseguimento de estudos de nível superior acrescido de estágio profissional – mínimo de seis meses</i>)	4
3	Upper secondary general education school leaving certificate (<i>Ensino secundário vocacionado para prosseguimento de estudos de nível superior</i>)	3
2	Third cycle of basic education (<i>3º ciclo do ensino básico obtido no ensino regular</i>) Third cycle of basic education and professional certification (<i>3º ciclo do ensino básico obtido por percursos de dupla certificação</i>)	2
1	Second cycle of basic education (<i>2º ciclo do ensino básico</i>)	1

Source: Portuguese National Agency for Qualifications and VET, 2016.

Table 3 - Relationship between Portuguese Qualification Levels and the European Qualification Framework

The obtained responses fit the Portuguese NQF levels: NQF 2, NQF 3, NQF 5, NQF 6, NQF 7 and NQF 8, which correspond to the respectively EQF levels: EQF 2, EQF 3, EQF 5, EQF 6, EQF 7 and EQF 8. Concerning the family monthly income, the hotel guests were divided per the following groups: “< 1500€”, between “1500€ - 2999€”, between “3000€ - 5000€”, “> 5000€” and “I’d rather not say”. Lastly, the respondents were asked about their role in the hotel. Only the hotel staff was asked this question since there were different questionnaires for hotel guests and hoteliers (and the hotel guests only had access to the guests’ questionnaire). The “What is your position in the Hotel” question had several options: “Front Desk Services and Housekeeping”, “Foods & Beverage”, “Maintenance”, “Executives” and “Other”. The option “Executives” includes the sales department, the human resources department, the financial department, and the top management and administration. These categories were obtained through an interview with a hotel manager.

3.2 Data Analysis

To statistically analyze these responses, the software Statistical Package for Social Sciences (SPSS) was adopted. The literature review on similar studies revealed that this software is commonly and widely used when trying to understand customer satisfaction (Pakdil & Kurtulmuşoğlu, 2018; Khorshidi et al., 2016; John et al., 2014; Tahir Jan & Abdullah, 2014; Keisidou et al., 2013; Paltayian et al., 2012; Akao & Mazur, 2003; Hauser & Clausing, 1998; Balthazard & Gargeya, 1995).

In order to understand how the different groups evaluate the fifteen green hotel attributes, all the respondent's data was combined.

Before the data analysis, the questionnaire data underwent a reliability test. Reliability is an assessment of the degree of consistency between multiple measurements of a variable. The most common measure of reliability is internal consistency, which applies to the consistency among the variables in a summated scale (Hair et al., 2014). The guests and hotel staff responses were analyzed by the Cronbach's alpha and the internal consistency was found to be 0.822. In the Cronbach's alpha assessment, an item is considered as reliable when its value is greater than 0.7 (Hair et al., 2014). Hence, the questionnaire questions about the hotel green attributes were found to have relatively high internal consistency.

The studies that aspire to understand how the different hotel guests evaluated the green hotel attributes are usually analyzed by the MANOVA technique (Multivariate Analysis of Variance). The MANOVA is used to simultaneously explore the relationship between several categorical independent variables and two or more dependent variables (Hair et al., 2014). However, this function can only be used when the data follows a normal distribution. To assess if this research could be studied through the MANOVA, a normality test was prepared. A statistical test to assess normality is based on the skewness and kurtosis values (Hair et al., 2014). The kurtosis measures the "peakedness" of a distribution and

a value near to zero indicates a shape close to normal. The skewness measures to what extent a distribution of values deviates from symmetry around the mean, and a value of zero represents a symmetric or evenly balanced distribution. Both measures should have values between ± 1.0 to be considered as excellent for psychometric purposes (George & Mallery, 2020). This normality test, performed on SPSS, revealed that the kurtosis and skewness values were found outside the range for a normal distribution.

Nonparametric methods were used, since they do not assume a population probability distribution, and are therefore valid for data from any population with any probability distribution (Conover, 1999). This study is characterized as having the hotel eco-initiatives as dependent variables and the demographic characteristics as dependent variables. In order to analyze how each group evaluates the green attributes, the Kruskal-Wallis test was applied. The Kruskal-Wallis is used to test the null hypothesis that all of the populations are identical against the alternative that some of the populations tend to furnish greater observed values than other populations (Conover, 1999). In practice, by rejecting the null hypothesis, the Kruskal Wallis reveals that there are statistically significant differences between how different independent groups evaluated the green hotel attributes. All the tests were conducted with a confidence level of 95%, so the null hypothesis is rejected when the p-value < 0.05 . When analyzing this data, it can occur the error of incorrectly rejecting the null hypothesis, called a Type I error (Conover, 1999). However, while using the Kruskal-Wallis in analyzing the data, pairwise comparisons were performed using the Bonferroni correction. The Bonferroni test is the approach for trying to control the Type I error, by adjusting the analysis to the number of tests being made (Conover, 1999).

The Kruskal-Wallis was used to study how the different levels of each independent variable, like age, academic qualifications, family monthly income

and role in the hotel, perceive the importance of the green hotel attributes. On the other hand, this test was not applicable to study the independent variable gender. The Kruskal-Wallis only tests problems of analyzing three or more independent sample groups (Conover, 1999). To analyze two independent samples is used the Mann-Whitney test. Similarly to the Kruskal-Wallis, the Mann-Whitney test also uses a statistical test to see if the null hypothesis that the two populations are identical can be rejected (Conover, 1999). This test reveals which attributes are statistically more significant better evaluated by females and males.

Chapter 4

Results

4.1 Result's Presentation and Analysis

The hotel end-users' insights were analyzed to provide an understanding of the customer demand on the hotel green initiatives. The data gathered was analyzed to later be applied to the construction of the House of Quality.

A total of 396 questionnaire responses were received, 307 (78%) from hotel guests and 89 (22%) from hotel staff. The response rate by hoteliers was lower than by guests because the hotel staff revealed themselves as apprehensive regarding the questionnaire.

Most of the respondents were female (50,4%) and between 20 and 29 years old (32,1%). About the hotel guests, most were on the EQF 6 (45,3%), which corresponds to the Portuguese bachelor's degree, and have a family monthly income between 1500€ and 2999€ (43%). Among the hotel staff, the majority of hoteliers inquired belongs to the Front Desk Services and Housekeeping (43,8%), followed by the Executives (21%). Table 4 presents the demographic profile of respondents.

	Frequency	Valid Percent (%)
Gender		
Male	195	49,6
Female	198	50,4
Omitted	3	0
Total	396	100
Age		
Less than 20 years old	15	3,8
Between 20 and 29 years old	127	32,1
Between 30 and 40 years old	73	18,4
More than 41 years old	181	45,7
Total	396	100
Academic Qualifications		
EQF 2	8	2,6
EQF 3	106	34,5
EQF 5	2	0,7
EQF 6	139	45,3
EQF 7	48	15,6
EQF 8	4	1,3
Total	307	100
Family Monthly Income		
I'd rather not say	34	11,1
<1500€	94	30,6
Between 1500€ and 2999€	132	43
Between 3000€ and 5000€	36	11,7
>5000€	11	3,6
Total	307	100
Role in the Hotel		
Guest	307	77,5
Front Desk Services and Housekeeping	39	9,8
Foods & Beverage	15	3,8
Maintenance	3	0,8
Executives	19	4,8
Other	13	3,3
Total	396	100

Table 4 - Questionnaire Respondents Profile

The questionnaire aims to understand how strongly hotel guests agreed with the implementation of the 15 green attributes presented in Table 1. Given their responses, it was calculated how the attributes are evaluated, on average. The average level of agreement with these attributes allowed to rank them in terms

of what hotel end-users think are more important (from 1="Strongly Disagree" to 5= "Strongly Agree"). Based on this Likert scale, Table 5 shows the average importance for each green attribute as rated by the respondents and each attribute means.

	<u>Mean</u>	<u>Ranking</u>
Active system to detect and repair water leakage in toilets, sinks and shower heads	4,55	1
Good sanitation practices (such as saving water)	4,49	2
Active recycling program for materials in all the hotel's sections	4,43	3
Use of keycards to turn the power on and off in the guest rooms	4,39	4
Use of occupancy sensors to control lighting in the hotel	4,37	5
Use of energy saving light bulbs	4,35	6
Use of refillable soaps/shampoo dispensers	4,20	7
Special containers/bins for various recyclable items	4,16	8
Use of durable items rather than disposable products (i.e. napkins rather than paper towels)	4,10	9
Use of recycled materials (i.e. paper, plastic, etc.).	3,96	10
Towel re-use program	3,96	11
Use of renewable energy	3,92	12
Use of environmentally friendly products	3,89	13
Use of low-flow toilets and sinks	3,78	14
Change of bed sheets only upon request (option for multiple night guests)	3,70	15

Table 5 – Importance Raking between the Green Hotel Attributes

As we can see in Table 5, the initiative of “Active system to detect and repair water leakage in toilets, sinks, and showerheads” was the most highly regarded attribute, followed by the “Good sanitation practices (such as saving water)”. These first two attributes reveal how important hotel end-users see water management; despite the other water-related green initiative “Use of low-flow toilets and sinks” being at the bottom of the ranking (with a mean of 3,78). An “Active recycling program for materials in all the hotel’s sections”, the “Use of keycard to turn the power on and off in the guests’ rooms” and the “use of occupancy sensors to control lighting in the hotel” were also agreed as important for hotels to think about. In Table 5 we can also ascertain that none of the

attributes was, on average, disagreed by the respondents. The lowest valuations relate to the indifference level, showing that no green initiative was seen as not important.

4.1.1 Impact of the Role in the Hotel

In this study, the perceptions of 15 hotel eco-attributes by the hotel end-users were analyzed. These hotel end-users are represented by two groups: the hotel guests and the hotel staff. The hotel staff was also inquired about which department their job belongs, to examine if the different hotel positions look at the green attributes differently.

When analyzing the importance of the green hotel initiatives by the role in the hotel, it is possible to see how differently the hotel guests and hotel staff think (Table 6). The attributes “Use of refillable soaps/shampoo dispensers” and “Change of bedsheets only upon request” are evaluated as more importantly by the hotel staff than the guests, since these green measures can constitute uncomfortable characteristics for guests. Furthermore, the hotel staff opinion on the “Use of low-flow toilets, sinks and showerheads” diverges between “Strongly Agree” and “Agree”: the hotel guests and the hotel staff that work directly with the guest rooms’ toilets, sinks, and showerheads view this eco-initiative as less important than the maintenance department and the executives.

On the other hand, “Special containers/bins for various recyclable items” and the “Towel re-use program” attributes are better evaluated by the guests than by the hoteliers.

Green Hotel Initiative

Use of refillable soaps/shampoo dispensers	Guests (Median=4) and Hotel Staff – All (Median=5), p=0,019	$\chi^2 (5) = 17,717, p=0,003$
Special containers/bins for various recyclable items	Guests (Median=5) and Front Desk Services and Housekeeping (Median=4), p=0,000 Guests (Median=5) and Food & Beverage (Median=4), p=0,003	$\chi^2 (5) = 26,194, p=0,000$
Towel re-use program	Guests (Median=4) and Hotel Staff – Others (Median=2), p=0,023 Guests (Median=4) and Front Desk Services and Housekeeping (Median=4), p=0,047	$\chi^2 (5) = 16,896, p=0,005$
Change of bed sheets only upon request (option for multiple night guests)	Guests (Median=4) and Hotel Staff – Others (Median=5), p=0,041 Guests (Median=4) and Maintenance (Median=5), p=0,017 Guests (Median=4) and Executives (Median=5), p=0,002	$\chi^2 (5) = 32,200, p=0,000$
Use of low-flow toilets, sinks and shower heads	Guests (Median=4) and Front Desk Services and Housekeeping (Median=4), p=0,002 Guests (Median=4) and Maintenance (Median=5), p=0,003 Guests (Median=4) and Executives (Median=5), p=0,002	$\chi^2 (5) = 44,160, p=0,000$

Table 6 – Significant Results where groups of the position in the hotel rated the importance of factors differently

4.1.2 Impact of Gender

In the questionnaire, the question about the gender had three possible answers: “Female”, “Male” and “I’d rather not say”. The latter was considered as omissive, since there were only three answers within the whole population (0,8%), and it was not statistically significant for the data analysis.

How the green hotel initiatives are evaluated differs from females to males. Females tend to perceive as more important the attributes presented in Table 7. Most of the eco-initiatives highlighted by the females’ respondents, three out of five, are related to the energy management category.

The “Existence of special containers/bins for various recyclable items in the guest rooms and hotel lobby” was assessed by females as important, but the “Establishment of an active recycling program for materials in all section of the hotel” was equally seen as important for both males and females.

Green Hotel Initiative	
Special containers/bins for various recyclable items	U=21624 p=0,025
Use of keycards to turn the power on and off in the guest rooms	U=22207,5 p=0,003
Towel re-use program	U=24229,5 p=0,000
Change of bed sheets only upon request (option for multiple night guests)	U=22431,5 p=0,004
Active system to detect and repair water leakage in toilets, sinks and shower heads	U=21843 p=0,008

Table 7 – Significant results where male and female respondents rated the importance of factors differently

4.1.3 Impact of Academic Qualifications

Most of the hotel eco-initiatives are similarly evaluated by the hotel guests, regardless of their education level. Nevertheless, two attributes cause divergences, presented in Table 8.

The “Change of bedsheets only upon request (option for multiple night guests)” is negatively seen by hotel guests with the EQF 2, while the respondents with EQF 6 an EQF 7 perceive this initiative as important. Similarly, the “Towel re-use program” is seen as more important by guests with higher academic qualifications.

Green Hotel Initiative		
Towel re-use program	EQF 3 (Median=4) and EQF 6 (Median=5), p=0,002	$\chi^2 (5) = 20,974,$ p=0,001
	EQF 3 (Median=4) and EQF 7 (Median=5), p=0,001	
Change of bed sheets only upon request (option for multiple night guests)	EQF 2 (Median=2) and EQF 6 (Median=4), p=0,023	$\chi^2 (5) = 17,035,$ p=0,004
	EQF 2 (Median=2) and EQF 7 (Median=4), p=0,023	
	EQF 3 (Median=4) and EQF 6 (Median=4), p=0,010	
	EQF 3 (Median=4) and EQF 7 (Median=4), p=0,031	

Table 8 – Significant results where groups with different levels of education rated the importance of factors differently

4.1.4 Impact of Age

Overall, the evaluations of the respondent’s age groups were similar. The few differences reported in Table 9, relate to the attributes “Use of durable items rather than disposable products” and “Towel re-use program”. These green initiatives are perceived as more important by the respondents with the ages between 20 and 29 years, as they can see these eco-initiatives potentials.

Interestingly, the Kruskal-Wallis disclosed that the factors “Use of energy-saving light bulbs”, “Good sanitation practices” and an “Active system to detect and repair water leakage” have different distributions among the different age groups, while the Median test revealed that these three attributes have, on all age ranges, the same distribution, with a median of 5.

Green Hotel Initiative		
Use of durable items rather than disposable products	Between 20 and 29 years (Median=5) and others (Median=4)	$\chi^2 (3) = 11,517,$ p=0,009
Towel re-use program	Between 20 and 29 years (Median=5) and others (Median=4)	$\chi^2 (3) = 7,823,$ p=0,050

Table 9 – Significant results where age groups rated the importance of factors differently

4.1.5 Impact of Family Monthly Income

The level of family monthly income has no impact on how the respondents rate the importance of the green eco-initiatives. The statistical evidence says that, at the 5% significance level, we cannot reject the hypothesis that the green hotel initiatives distribution among the different income ranges is the same. In other words, there is no statistical evidence to see how the evaluation of the attributes varies amongst the different levels of family income. This can mean that the respondents' revenues do not change the way they feel about green programs. Whichever the income level, the hotel guests feel the same about the green attributes.

4.2 Building the House of Quality

Building the House of Quality has the goal of informing the prioritization of technical specifications for engineers, considering the end-users evaluations (Wood et al., 2016). The construction of the HOQ in this study seeks to reveal which green building features hoteliers should prioritize, during the design phase, by knowing which are the green hotel attributes that the hotel end-users most desire.

Cai and Yan (2016), based on the study done by Chan and Wu (2005), describe the various steps for the HOQ development. The first step is to identify customer needs and determine their degrees of importance. This data was gathered through the questionnaire and analyzed in the SPSS. The output was TABLE V (attributes mean), which reveals how the hotel guests feel about the fifteen green hotel attributes. Secondly, the technical requirements have to be established (Erdil & Arani, 2019). The fifteen eco-initiatives selected were drawn from a

Review of various International Green Building Designs (Tam et al., 2017), since there is no specific green building index in Portugal. These attributes are expressed in Table 1.

After assessing the customer needs and the technical requirements, the relationship between these two features needs is established. The relationship matrix, which forms the center of the HOQ, is a very important task performed carefully and collectively by technicians (Chan & Wu, 2005; Erdil & Arani, 2019). These relationships are represented by the following symbols (TABLE L) (Cai & Yan, 2016; Erdil & Arani, 2019). When there is no relationship between the variables, no symbol is used.

Relationship	Score	Symbol
Strong Relationship	9	●
Medium Relationship	3	○
Weak Relationship	1	Δ

Table 10 – Relationship Matrix Symbols

The HOQ ends with the importance ratings, calculated to identify which technical requirements should get the most attention by the technicians (Erdil & Arani, 2019). The importance ratings are the relative weights of each technical requirement based on the weight of each item in terms of satisfying the customer needs, calculated by the following expression (Erdil & Arani, 2019):

$$W_j = \sum_{i=1}^n d_i r_{ij}$$

The weight W_j is the weight of the j^{th} technical requirement, while d_i is the degree of importance of the i^{th} customer requirement and r_{ij} represents the relationship coefficient between the customer needs and the technical

requirements. The relative weight, Z_j , is then established by the equation (Erdil & Arani, 2019):

$$Z_j = W_j / \sum_{k=1}^n W_k$$

With the importance-weighting factor, the most crucial quality element can be identified based on the values provided along the bottom of the HOQ (Wood et al., 2016).

The aim of developing a HOQ is to determine what service properties are more important meeting the customer needs (Paryani et al., 2010). Practically, the HOQ helps to define the most important technical requirement that should be considered during the design process, by analyzing the relative importance (Wood et al., 2016).

Studying the House of Quality, represented in Figure 1, two building features excel. In the first place, the green building feature “Waste reuse and recycling”. This technical requirement is strongly related to all the green attributes inquired to the hotel end-users belonging to the waste reduction management initiative, plus it is also connected with the application of green products and materials. The customer needs, mostly regarding the waste reduction, can be fulfilled if the hotel integrates, since the design phase, a “Waste reuse and recycling” initiative. This green hotel attribute is, in general, positively evaluated by hotel end-users. Secondly, the green building feature “Use of energy efficiency techniques and technologies” also has high relative importance. Not all the energy-related customer needs were appraised as very important, however, almost all of them have a strong relationship with this green building feature. This relationship shows that, by implementing energy efficiency techniques and technologies, upon the hotel design phase, the hotel can meet its customer’s needs.

Another relevant design requirement is “Water conservation”. By understanding the place, this green feature should be considered, as the green hotel initiatives associated are considered influential to the hotel end-users.

Green Hotel Attributes		Importance Ratio	Connecting with Nature	Understanding the Place		Understanding Natural Processes		Understanding the Environmental Impact		Understanding People
			Use of natural lighting	Efficient use of solar energy	Water conservation	Waste reuse and recycling	Waste sorting	Use of low volatile organic compound emission materials	Use of energy efficiency techniques and technologies	Internal Organizational Design
Application of green products and materials	Use of recycled materials	3,96				●		●		
	Use of environmentally friendly products	3,89				○		●		
Waste reduction management	Use of refillable soaps/shampoo dispensers	4,20				●				
	Special containers/bins for various recyclable items	4,16				●	●			
	Use of durable items rather than disposable products	4,10			Δ	●		Δ		
	Active recycling program for materials in all the hotel's sections	4,43				●	●	○		
Energy management	Use of occupancy sensors to control lighting in the hotel	4,37	○	Δ					●	○
	Use of keycards to turn the power on and off in the guest rooms	4,39							●	●
	Towel re-use program	3,96			○				●	
	Change of bed sheets only upon request	3,70			○				●	
	Use of energy saving light bulbs	4,35							●	
	Use of renewable energy	3,92	○	●					○	●
Water management	Use of low-flow toilets and sinks	3,78			●					
	Good sanitation practices	4,49			●		Δ			
	Active system to detect and repair water leakage in toilets, sinks and shower heads	4,55			●					
Absolute Importance			24,87	39,62	142,53	199,42	81,81	88,07	198,64	48,37
Relative Importance Rating (%)			3,02%	4,81%	17,31%	24,22%	9,94%	10,70%	24,13%	5,88%

Figure 1 - House of Quality

Additionally, by analyzing the HOQ, it's possible to see that the "Use of natural lighting" is the green building feature with the smallest relative importance rating. This does not mean that hotels should completely disregard this design characteristic; it suggests that there are other technical requirements that better answer the customer demands since this green feature only has two medium relationships with the customer requirements. The quality demand "Efficient use of solar energy" is similarly assessed as the "Use of natural lighting", however as a stronger relationship with the customer demand "Use of renewable energy".

Regarding the green building principles, "Understanding the environmental impact" and "Understanding the natural processes" are considered the green design values more desired by the hotel consumers. Conversely, "Connecting with nature" and "Understanding people" are not considered as a priority, by the hotel guests and staff.

Chapter 5

Discussion and Conclusions

Environmental concerns are global issues that affect all over the world, becoming one of the most critical topics (Yusof et al., 2017). Hence, hotels should be aware of this trend and adopt various green practices (Yi et al., 2018). Greening services and operations are becoming more widely embraced, while environmentally friendly attributes are considered as a basic measure of a hotel service (Robinot & Giannelloni, 2010). The main pressure to be eco-friendly arises from the customers' increasing demand (Han et al., 2010). The consumers growing attention towards environmental issues and sustainability fostered hoteliers to transform their business, implementing green practices in the hospitality industry (Dodds & Holmes, 2016).

"Being green" has become an effective strategic approach to differentiate and position companies' products and services, due to customer retention (Han & Yoon, 2015a). Therefore, an insight about the customer values, derived through green attributes, will help managers develop effective and appropriate strategies for designing a hotel's servicescape, with a special focus on those green elements that enhance trust (Gupta et al., 2019). However, a hotel green initiative not only affects the hotel guests but also has an impact on the hotel staff. Although little attention has been given to how hotel staff evaluates the green hotel attributes.

In order to know how the hotel end-users feel, Quality Function Deployment is a suitable tool for understanding the expectations of hotel customers (Sever,

2018). The QFD is a customer-driven process that integrates customer requirements into every aspect of the design and delivery of products and services (Masoudi et al., 2013). The interface between the customer demand and the design requirements is presented on the matrix called House of Quality (Zairi & Youssef, 1995). The HOQ analysis in every phase will lead to the identification of the design weaknesses and strengths, which must be dealt with as potential strength opportunities to improve the service (Paryani et al., 2010). The HOQ output will help hotel managers know how to implement green initiatives without sacrificing service quality (Yi et al., 2018).

5.1 Discussion

Interestingly, Millar and Baloglu (2008) found out that the use of refillable soap and shampoo dispensers was evaluated unfavorably. Hotel guests may have the perception that the dispensers are no sanitary or the reason why hotels have refillable dispensers may be unclear. Similarly, in the study developed by Verma and Chandra (2016), also analyzes that the green attribute of refillable dispensers was not received favorably. However, in this study, this eco-initiative is not seen so negatively as in these studies. This evaluation difference may be justified by the fact that nowadays hotel guests can be more educated on the advantages of this initiative. In addition, the three studies mentioned previously only inquired hotel guests, while this study also evaluated the hotel staff insights. Since hoteliers can more easily see the advantages of refillable dispensers, their assessment regarding this attribute is more favorable.

Conversely, the green attributes of low flow toilets, sinks and showerheads and the change of bedsheets only upon request are similarly evaluated as on the

studies performed by Verma and Chandra (2016) and Millar and Baloglu (2008). Low flow showerheads are not something hotel guests necessarily want in their rooms, which may be due to the lack of education regarding this initiative (Millar & Baloglu, 2008).

Regarding the respondents' age, there is only a significant difference between the different age groups concerning two attributes. In general, the rating importance distribution along the different age groups is the same, apart from the towel re-use program and the use of durable items rather than disposable products. In these two green hotel attributes, the younger respondents evaluate them as more important than the older respondents. Usually, younger participants appear to be more inclined in favor of green hotel attributes than the matured respondents (Millar & Baloglu, 2008; Verma & Chandra, 2016). In this study, the disparity between the age groups, especially between the younger and older respondents, is not so impressive. The gap between environmental concern with the different age groups constitutes not only an opportunity for the interest revealed by the younger generations, but it also represents a challenge when the older travelers are not so receptive to the implementing green initiatives. However, this study may expose that, nowadays, the age disparity as regards to environmental concern is smaller, since older hotel end-users evaluated the green hotel attributes likewise the younger respondents.

Concerning the education level, this study alike Verma and Chandra (2016), concludes that the most educated people are more inclined towards green practices in hotels.

5.2 Conclusions

Environmental subjects have been increasingly receiving more attention lately. As the population is becoming more environmentally aware, services must follow this trend. The hotel industry has been adapting to this global trend since the hotel guests are beginning to ask from hotels green thinking. Therefore, hotels feel pressured, by the progressive customer demand, to implement and apply green hotel initiatives. However, hoteliers need to know which green attributes to employ, without jeopardizing the guests' satisfaction.

This research pretends to study, within fifteen green hotel attributes, which ones are evaluated by hotel end-users as more important. Moreover, the aim is to provide hotels the green building features they should focus on, during the design phase, based on the hotel end-users importance assessment. This thesis pretends to analyze both hotel guests and hotel staff since the hoteliers' point of view regarding hotel eco-initiatives has not been studied.

In order to identify which eco-initiatives affect the hotel's end-users perception of hotel green design, a House of Quality was developed. The voice of the customer was gathered by a survey, and the responses obtained through the questionnaire were analyzed. Subsequently, the customer demands were disposed on a relationship matrix with the technical requirements. The HOQ goal is to provide the hotel with a direction when implementing the green attributes on the design phase. The literature lacks on the existence of a HOQ studying the hotel green attributes.

The results found revealed that the hotel end-users perceive as more important the green attributes related to water management, "Active system to detect and repair water leakage in toilets, sinks and showerheads" and "Good sanitation practices (such as saving water)", followed by the waste reduction initiative "Active recycling program for materials in all the hotel's sections". The

least favorably green attributes were the “Change of bedsheets only upon request (option for multiple night guests)” and “Use of low-flow toilets and sinks”.

More importantly, when analyzing the HOQ, hoteliers can find which green building features should be targeted, during the design phase, centered on the hotel end-users’ assessed importance. By examining the relative importance, the most crucial attribute is the “Waster reuse and recycling”, closely followed by the “Use of energy efficiency techniques and technologies”. Regarding the green building principles, hotel professionals should focus on understating the natural processes and the environmental impact.

When a hotel wants to become greener or desires to implement green initiatives, it should primarily focus on “Waste reuse and recycling” and the “Use of energy efficiency techniques and technologies”. By this study analysis, these green building features are strongly related to customer demands and will have a positive impact on customer satisfaction.

5.3 Limitations

The present study has limitations that future research may consider.

The methodology applied entails some weaknesses. The use of the survey involves a lack of control over the participants’ desire to respond the way they think they should, as opposed to responding with their true beliefs (Millar & Baloglu, 2008). Additionally, it has been noted that consumers may not be as ethically minded as commonly believed, so it is not guaranteed that there are no manipulated responses (J.-Y. Kim et al., 2016). It has been reported that certain issues, such as ethical buying or green consumption, are prone to a social desirability bias—that is, individuals’ tendency to answer survey questions in

ways that they consider socially desirable (Auger & Devinney, 2007). Additionally, all the respondents were chosen randomly, but most of the respondents belong to the age group between 20 and 29 years and more than 41 years old. Regarding the monthly family income, no differences between the different green hotel attributes were found, which could be the result of the wrong income levels.

The major limitation of the present research relates to the construct of the relationship matrix within the HOQ. These relationships are usually agreed in multifunctional teams, with different points of view. In this study, since the HOQ was developed without support from any marketing, manufacturing, engineering or designers' team, this matrix will be biased to one point of view. Also, the green building principles presented as technical requirements on the HOQ were obtained through a review of some international green building designs (Tam et al., 2017). The non-existence of Portuguese green building index may influence the results since there are no design principles adapted to the Portuguese reality.

5.4 Recommendations

Future studies could focus solely on the hotel staff satisfaction with the green hotel attributes. This study tried to involve their insights, however, there is still a lack of attention regarding the hotelier's green initiatives perception. Moreover, the HOQ constructed was not directly applied nor fully constructed (only one of four matrixes was developed). Since there are no applications of the HOQ on green hotel attributes it would be interesting to know the measurable impact the HOQ has on customer satisfaction.

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Appendix I – Hotel Guests Questionnaire

Atributos ecológicos nos Hotéis

Olá!

O meu nome é Inês Monteiro e estou a fazer uma investigação sobre como é que os consumidores vêem os atributos ecológicos nos hotéis. Esta investigação está a ser realizada no âmbito do meu Trabalho Final de Mestrado, na Católica Porto Business School.

Este questionário demora apenas cerca de 4 minutos, sendo que todas as perguntas são de resposta rápida e imediata. Todos os dados serão anónimos e tratados apenas para esta investigação.

***Obrigatório**



O que é que os Hóspedes pensam sobre os atributos ecológicos nos Hotéis?

1. Importância de Produtos e Materiais Sustentáveis *

De 1 a 5, quanto concordas com as seguintes afirmações?

Marcar apenas uma oval por linha.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel deve usar apenas materiais reciclados (como papel, plástico, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve oferecer apenas produtos amigos do ambiente (como por exemplo criados biologicamente, produtos orgânicos, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Importância de um programa de Gestão de Resíduos *

De 1 a 5, quanto concorda com as seguintes afirmações?

Marcar tudo o que for aplicável.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel deve usar apenas dispensadores recarregáveis de champô e gel de banho (em vez de sabonetes e embalagens individuais).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Um hotel deve usar sempre contentores especiais para os vários tipos de lixo no quarto de hotel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Um hotel apenas devia usar itens duráveis em vez de descartáveis (por exemplo uso de guardanapos de pano em vez de papel).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Um hotel devia estabelecer um programa ativo de reciclagem para todo o tipo de materiais em todo o hotel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Importância de um programa de Gestão de Energia *

De 1 a 5, quanto concorda com as seguintes afirmações?

Marcar apenas uma oval por linha.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel deve usar sempre sensores de ocupação para controlar a iluminação das várias áreas do hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve usar sempre cartões eletrónicos que ligam e desligam a eletricidade no quarto do hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve encorajar os hóspedes a reutilizar as toalhas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve mudar os lençóis apenas se os hóspedes pedirem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve utilizar apenas lâmpadas economizadores de energia nos quartos do hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve utilizar apenas energias renováveis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Importância de um programa de Gestão de Água *

De 1 a 5, quanto concorda com as seguintes afirmações?

Marcar apenas uma oval por linha.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel deve utilizar apenas lavatórios e sanitários com baixa pressão de água.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve ter boas práticas sanitárias de poupança de água.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel deve ter um sistema ativo inteligente de deteção e reparação de fugas de água em todo o hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Informações pessoais

5. Qual o teu género? *

Marcar apenas uma oval.

- Feminino
- Masculino
- Prefiro não dizer

6. Qual a tua idade? *

Marcar apenas uma oval.

- Menos de 20 anos
- Entre 20 e 29 anos
- Entre 30 e 40 anos
- Mais de 41 anos

7. Quais as tuas habilitações literárias? *

Marcar apenas uma oval.

- Ensino básico
- Ensino secundário
- Licenciatura
- Mestrado
- Doutoramento
- Curso Técnico-Profissional

8. Qual o rendimento mensal do agregado familiar? *

Marcar apenas uma oval.

- < 1500€
- 1500€ - 2999€
- 3000€ - 5000€
- > 5000€
- Prefiro não dizer

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Appendix II – Hotel Staff Questionnaire

Atributos ecológicos nos Hotéis

Olá!

O meu nome é Inês Monteiro e estou a fazer uma investigação sobre como é que os utilizadores (os hóspedes e os trabalhadores) vêem os atributos ecológicos nos hotéis. Esta investigação está a ser realizada no âmbito do meu Trabalho Final de Mestrado, na Católica Porto Business School.

Este questionário demora apenas cerca de 4 minutos, sendo que todas as perguntas são de resposta rápida e imediata. Todos os dados serão anónimos e tratados apenas para esta investigação.

Desde já, muito obrigada!

*Obrigatório



O que é que os Trabalhadores dos Hotéis pensam sobre os atributos ecológicos nos Hotéis?

1. **Importância de Produtos e Materiais Sustentáveis ***

De 1 a 5, quanto concorda com as seguintes afirmações?

Marcar apenas uma oval por linha.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel devia usar apenas materiais reciclados (como papel, plástico, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia oferecer apenas produtos amigos do ambiente (como por exemplo criados biologicamente, produtos orgânicos, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Importância de um programa de Gestão de Resíduos *

De 1 a 5, quanto concorda com as seguintes afirmações?

Marcar apenas uma oval por linha.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel deve usar apenas dispensadores recarregáveis de champô e gel de banho (em vez de sabonetes e embalagens individuais).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia ter sempre contentores especiais para os vários tipos de lixo em várias zonas do hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel apenas devia usar itens duráveis em vez de descartáveis (por exemplo uso de guardanapos de pano em vez de papel).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia estabelecer um programa ativo de reciclagem para todo o tipo de materiais em todo o hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Importância de um programa de Gestão de Energia *

De 1 a 5, quanto concorda com as seguintes afirmações?

Marcar apenas uma oval por linha.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel devia usar sempre sensores de ocupação para controlar a iluminação das várias áreas do hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia usar sempre cartões eletrónicos que ligam e desligam a eletricidade no quarto do hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia encorajar os hóspedes a reutilizar as toalhas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia mudar os lençóis apenas se os hóspedes pedirem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia utilizar apenas lâmpadas economizadores de energia nos quartos do hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia utilizar apenas energias renováveis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Importância de um programa de Gestão de Água *

De 1 a 5, quanto concorda com as seguintes afirmações?

Marcar apenas uma oval por linha.

	Discordo Totalmente	Discordo	É-me indiferente	Concordo	Concordo Totalmente
Um hotel devia utilizar apenas lavatórios e sanitários com baixa pressão de água.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia ter boas práticas sanitárias de poupança de água.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um hotel devia ter um sistema ativo inteligente de deteção e reparação de fugas de água em todo o hotel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Informações pessoais

5. Qual o seu género? *

Marcar apenas uma oval.

- Feminino
- Masculino
- Prefiro não dizer

6. Qual a sua idade? *

Marcar apenas uma oval.

- Menos de 20 anos
- Entre 21 e 29 anos
- Entre 30 e 40 anos
- Mais de 41 anos

7. Qual a sua posição no Hotel? *

Marcar apenas uma oval.

- Departamento de Quartos (Housekeeping e Recepção)
- Departamento de Food & Beverage
- Departamento de Manutenção e Engenharia
- Executivos
- Outra: _____

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