UNIVERSIDADE CATÓLICA PORTUGUESA

Environmental sustainability practices in the supply chain of hotels and the consumers' perception

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"Never let the things you can't do, stop you from doing what you can."

-Ronald Reagan

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Abstract

Environmental sustainability is a central subject in the last years, due to the damage that human activity has been doing to the planet ecosystem. The concern is mostly based on consequences that it will have on future generations' resources. The hotels' industry is among the industries that generate more pollution and therefore affects environmental, social and economic sustainability.

This dissertation evaluates the state of Portuguese hotels (on the cities of Porto, Lisbon and Algarve) regarding the presence of environmental sustainability practices on their supply chain, as well as the influence these practices may have on consumers. Through a survey two questionnaires were implemented: one to all the hotels (in Porto, Lisbon and Algarve) that were presented on the database of the national tourism association, and the other one to any consumer.

From the 28 hotels, 18 have a low level of implementation of environmental sustainability practices (0 to 30 practices) and 10 are at a medium level (30 to 60). From the perspective of 178 consumers we found that more consumers consider social sustainability aspects when choosing a hotel than energy and environmental aspects. Furthermore, consumers are more willing to pay extra costs to have social sustainability features than energy and environmental sustainability features. This study gives insights to hotels and interested third parties such as tourism associations, sustainability related organizations, the government, and consumers.

Keywords: Sustainability; Environmental Sustainability; Hotels; Hotel industry; Green Hotels; Supply Chain; Tourism; Green Tourism; Consumer Behaviour; Portugal.

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1. Introduction

1.1. Problem Situation

Nowadays, sustainability is no longer a necessity but a critical factor which deserves serious attention by the industry, the government and the society. It is necessary for a habitable world where there is more equitable access to resources. The current pace of resource consumption is a fragile position and there is a need to relook at how new businesses can adopt a radically different approach to designing green buildings. Sustainability is an interdisciplinary concept that embeds aspects of environment, economic and socio cultural aspects. The emerging economies should have a distinct approach to building their cities and designing their buildings and transportation. Even existing businesses need to look at green elements, which can make their businesses more profitable and sustainable. Tourism destinations have to consider how they will continue to attract consumers. The natural attractions like water bodies, reefs, mountains and ice caps have to be preserved so that consumers can continue visiting these places. The consumers across the globe now care for green practices as they are witnessing the consequences of the environmental damage in the form of changing disease patterns, global warming, emissions and also difficulty in access to natural resources. The businesses and respective marketers also have to figure out a way of creating awareness without taking away elements of consumer experience (Jauhari, 2014).

Modern management should address concerns of an audience that is fully aware regarding limits to be imposed on the use of natural/cultural resources and the negative impact of operations on the environment, society and individuals. This assumption is even more important in industries where the power of socio-

environmental, cultural and economic transformation is increasingly known, such as in the case of hotels (dos Santos, Méxas, & Meiriño, 2017).

The reasons mentioned above about the popularity of sustainability nowadays, combined together with the growth in Portuguese tourism in the last years and the present one, make this a pertinent subject of study.

In 2012 and 2014 Porto received the award of Best European Destination, from World Travel Awards.

In the beginning of 2017, Porto won Best European Destination for the third time. In September 2017, Portugal was awarded with Best European Destination, and later on that year, in December, was elected World Best Touristic Destination with Lisbon as World Best City Break, "Monte da Lua" Sintra's park as Best Example of Patrimony Recovery, Portuguese Tourism Association received Best Touristic Awareness Campaigns and World Best Tourism Organization. These were awards from the World Travel Awards.

Last year, 2018, Portugal won Best European Destination and World Best Touristic Destination, both for the second consecutive year, from the World Travel Awards. On that ceremony this country had a total of 36 prizes and among them Best European City Destination, Best City Break (for the second consecutive year) and Best European Cruise Port (for the third consecutive year) for Lisbon. It was the first time Lisbon got two world awards in the same year. Portugal was once again recognized as best European official tourism organization.

This year, 2019, Portugal was declared the best sustainable European destination. The award was from ITB Earth Awards in a ceremony that also included awards for Sintra and Cascais (Lisbon regions). The ITB Berlin is considered the worlds' biggest

tourism exposition and the organization characterized Portugal's awards by indicating its global leadership example and innovation in responsible and sustainable tourism. The ITB Earth Awards are a result of a partnership between the German exposition and Green Destinations (a non profit organization dedicated to sustainable tourism). According to Green Destinations, the decision of the prize was taken by a group of specialists who elected the winner after analysing "successful cases of sustainability" having had "good practices in destinations' touristic management" as criteria. The plan of the Portuguese government towards work acknowledgment and touristic strategy for 2027 has goals for national touristic industry (and green objectives).

Algarve was also awarded throughout the years. According to "Turismo do Algarve", in 2016 the city received 53 prizes from 20 different organizations, among them the World Travel Awards, from which it received 15 prizes (being Best Beach European Destination one of them). In 2017 Algarve got 38 prizes from 16 organizations. World Travel Awards is among them once again, and from the 12 prizes only from this organization it received Best Beach European Destination for the second consecutive year. In 2018 it had 23 awards from seven organizations, mainly on the areas of golf (Best Golf Destination in Continental Europe), marinas (Best Marina - Marina de Vilamoura), beaches and restaurants.

1.1.1. Motivation for choosing this subject

Choosing this subject to work on came from the strong believe that the scarcity of natural resources in our planet is the most serious issue we are dealing, as there is no possibility of trying to improve any other bad aspect if we cannot have our basic needs fulfilled (like healthy air and drinkable water).

Humankind consumes what nature has to offer and in return creates waste and depletes the earth's natural reserves. All our actions have an impact on the earth's ecosystems that are only able to renew themselves at lower paces than human consumption. For thousands of years, man's impact on the environment was too slight to be of importance. However, the industrial revolution changed all of this. We now consume more of the earth's resources than the earth can regenerate.

Along with that, tourism is an area I admire. I consider it a pleasant area to work in because we deal with our clients mostly during a time where they are enjoying vacation, and that creates a desirable work environment. Since the hotel industry (inside tourism industry) is one of the most consuming and polluting industries (Sloan et al., 2009), it seemed a great opportunity to join both interests and contribute to the development of the subjects.

A second motivation of the study is the finding of a research gap at the theoretical level, meaning there is not a lot of information about the extension of the adoption of green practices within the supply chains of hotels worldwide, and specifically in Portugal. The motivation to help the industry develop the know-how needed for effective and collaborative implementation of specific green practices at different elements of the hotel supply chain is also a factor. Therefore, scientific and practitioner contributions are intended. The scientific contribution is the proposition of a new model and the comparison of the model and respective results with previous studies. The practitioners' contribution is done by increasing the knowledge on theme to the practitioners and to the hotel owners, helping on the decision making regarding the implementation of sustainability measures on the buildings and all the activities inherent to the hotel's functioning.

1.2. Research Definition

This research is conducted with the final purpose of finding more about the sustainability in the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve, as well as the influence that the sustainability practices may have on the consumer. In order to achieve this purpose, objectives were established. The questions this study will answer to are "On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve? What is the influence these practices have on the consumers?"

1.2.1. Main Objectives

So, besides the research question, there are some concrete and more specific objectives, such as:

- Detect the presence of the main environmental sustainability practices on the supply chain of hotels
- Determine the influence that the presence of these practices may have on consumers when they are choosing the hotel
- Evaluate the degree of awareness that hospitality industry in Porto, Lisbon and Algarve have relating to environmental sustainability practices
- Assess the presence of environmental sustainability practices on the three Portuguese cities and compare it with a benchmarking analysis
- Analyse the existing differences on the sustainability practices implementation depending on the stars the hotels are rated on, their location, accommodation capacity and year they opened in.

1.3. Methodology

The methodology of the study can be divided in literature methodology, data collection methodology and data analysis methodology.

The literature research was done following keywords, mostly related to the research question's concepts. The search was done in seven databases that provided articles, books and certified information on the theme. After gathering the information, the literature review follows an organization based the relevant themes about sustainability on hotels and consumers, and then an exposition of practical cases similar to this dissertation, in order to have a comparison basis.

The data collection methodology consisted on publishing two questionnaires: one directed to the hotels and one directed to the consumers. To the hotels, a previously prepared questionnaire was emailed to 714 hotels of all the star categories, in Porto, Lisbon and Algarve that were on the "Turismo de Portugal" database. An also previously prepared questionnaire was presented to the consumers both online (through social media and in the same email of the hotels questionnaire, asking the hotels for the collaboration of their customers) and offline (approaching consumers on the street). The data collection was made during 54 and 45 days, respectively.

The data analysis methodology was based on empirical work that was done by interpreting the data results both as a whole and in detail. The hotels results were evaluated with a model that classifies the hotels in high, medium or low level of implementation of environmental sustainability practices. It also includes other variables such as the hotel's profile and implementation variables. As for the consumers' part, there is an empirical evaluation about the general response of the consumers regarding sustainability practices (the influence these can have on hotel

choice and their willingness to pay more for sustainability solutions of a specific area or in general).

1.4. Outline of the thesis

Regarding the organization of this document, it is divided in seven chapters. The first chapter is the introduction, in which we present the existing problem that led attention to this theme, the motivation for choosing this subject, and the methodology used generally described.

The second chapter is the literature review and there we present all the theory and previous studies in which we based to get to the research question. This theory has many subthemes, such as: tourism, sustainability, hotels' supply chains, sustainability in the hotels' supply chains, environmental sustainability in hotels' supply chains (site development, sustainable materials, water, waste, energy), building construction in eco-services (the principles of sustainable architectural design), influence of the sustainable practices on the social aspects of hotels (consumers, managers, suppliers), certifications, and benchmarking of sustainable hotel supply chains. The objectives of the literature review and the respective methodology are also presented in this chapter.

Chapter 3 explains in detail the methodology used to conduct the research of the dissertation. Here we clarify the research questions, as well as the objectives of the research methodology, the methodology used for the literature review, for collecting the data of the empirical part (and also the methodology for the questionnaires' design), and for analysing the data (of both the hotels' and the consumers' studies).

The forth chapter is the one where results are presented and discussed. That is done with the following order: presentation and analysis of the data from the hotels' questionnaire, comparison to the literature and analysis of the hypothesis' state; presentation and analysis of the data from the consumers' questionnaire, comparison to the literature and analysis of the hypothesis once more. This is the chapter where the research questions are answered.

Chapter 5 is the Conclusion, in which the main results from the previous chapter are presented, in conclusion mode, as well as the comparisons to the literature and the hypothesis' state. Detailed conclusions are taken from the results (both from the hotels' and consumers' parts) and general conclusions of the dissertation are made. Here is mentioned to whom the insights of the study might concern. This is also the chapter where indication of limitations and recommendations for future research is made.

The sixth and seventh chapters regard references and appendixes of the work, respectively.

2. Literature Review

2.1. Introduction

This chapter presents all the relevant existing theoretical information on sustainability (not only environmental but in all its length) as well as the correspondent information on the concept of sustainability applied to the hotels' industry. The following are the specific objectives of chapter 2:

-Determine the most usual environmental sustainability practices on the hospitality industry on a benchmarking analysis

-Discuss the role and involvement of consumers on the presence of environmental sustainability practices hotels may adopt

-Refer the consequences of adoption of ecological sustainability practices by the hospitality industry

-Identify the history of the hospitality industry in Porto, relating to environmental sustainability and possibly differentiating the hotels by star rating

-Explain the development of circular economy and its relation to environmental sustainability practices.

2.2. Methodology of Literature Review

All the information about sustainability was taken from documents searched on databases such as Web of Science, B-on, Science Direct, Scopus, Veritati (university's database), Google Scholar, Mendeley and some documents were provided by my mentors. The search on these databases was made with the following expressions: environmental sustainability hotels; environmental sustainability supply chains;

environmental sustainability supply chain hotels; natural resources hotels; natural resources supply chain hotels; sustainable tourism hotels; sustainable supply chains; sustainable supply chain hotels; carbon footprint hotels; carbon footprint supply chain hotels; qualitative models sustainable supply chain hotels.

2.3. Literature Body- concepts

2.3.1. Tourism

Since around the beginning of the second decade of 2000, tourism has become a strong a catalyst for economic development (Rodríguez-Antón et al., 2012). This is demonstrated on a global scale as the tourism industry is responsible for 15% of economically active jobs (Pérez & Rodríguez del Bosque, 2014); 30% of exportation on services, representing a global economic impact of US$ 1.5 trillion (corresponding to 1.3 trillion Euros) according to the World Tourism Organization ("UNWTO e World Tourism Organization, 2015"; Sloan et al., 2009).

In addition, when comparing with a multitude of industries, tourism is among the four largest world economic sectors, following fuels, chemicals and automobiles production (Aragon-Correa et al., 2015). Despite the economic crises that started in 2009, the predisposition to touristic consumption is such that, there is an expectation that international travel will make US$ 1.8 billion (1.6 billion Euros) in 2030, achieving an increasing average rate of 3.3% per year (from 2010 to 2030) ("UNWTO e World Tourism Organization, 2015"). For this reason, discussions regarding the direction of tourism consumption will happen (Jarvis et al., 2010; Prud'homme & Raymond, 2013; Galpin et al., 2015; Longoni & Cagliano, 2015) because the existing practices might result in many negative impacts such as increased energy, water and disposable products consumption, increased CO_2 production rates (Aragon-Correa et

al., 2015; Han & Yoon, 2015), reduced motivation and morale of collaborators (Sigala, 2014).

2.3.2. Services

Services can be divided into primary services and secondary services. Primary services do not offer a material component with the service, as secondary services contain a product component (product–service combination). These second category can be divided into services that are supplementary to the product (e.g. repair or maintenance services) and services that lead to a partial substitution of products by services. Tourism is classified as secondary service because it combines both tangible and intangible parts. Hotels in particular are too seen as a secondary service once it gives the consumer the possibility of enjoying all the hotel's facilities, as well as the chance to buy some products while doing it. Although, it is recognized that the development of green products and services are influenced by the interrelationship between four main actors, namely university, industry, government and consumers (Julião, J. et al., 2016).

2.3.3. Sustainability

The concept of sustainability is used since the 1970s, when attention was first directed to the environment and overexploitation. The most general definition was first used by the World Commission on Environment and Development in 1983 (Sloan et al., 2009). Although, it was in 1987 that a more official explanation was presented, on a report called Our Common Future[1] that established the concept of sustainability. The report defined it as development that meets the needs of the present without compromising the ability of future generations to meet their own

[1] posteriorly known as the Brundtland Report, after the former prime minister of Norway, Gro Harlem

needs. It also suggested that sustainability includes an obligation to future generations (Jauhari, 2014).

Agenda 21 was released in 1992- a document that added the economic and socio-cultural sides to the notion of sustainability (that focused only on the environment before). It came from the United Nations Conference on Environment and Development (UNCED) that took place from the 3rd to the 14th of June 1992, and was adopted by more than 178 governments. Individual businesses and the hospitality industry were encouraged to adopt codes of conduct, promoting sustainable travel and tourism best practices for the first time. Gradually examples of best practices were established in the industry followed by the introduction of eco-labels and certification procedures (Sloan et al., 2009).

The principles established on UNCED were reaffirmed on the World Summit on Sustainable Development (WSSD), in Johannesburg (South Africa), from the 26th of August to the 4th of September 2002. There are numerous definitions of the term that complete each other. Given the scale of poverty today, the challenge of meeting present needs is urgent and concern for future needs for environmental, human, social, and other resources is also compelling. On the same line of thought, the World Tourism Organization (UNWTO) defends that sustainability principles refer to the environmental, economic and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability (Sloan et al., 2009).

Sustainability is based on decreasing environmental impacts, closing the consumption cycle to eliminate wasteful outputs, and decreasing unnecessary inputs (Epstein, 2018). As businesses play a leading role in the global economy through the production of goods and services, their involvement to increase sustainability and to communicate its value if much (Horng et al., 2017).

In this case, sustainability is specifically referring to sustainability on services, which is referring to tourism, where we do an approach on the hospitality industry-hotels. So, joining sustainability with services, eco-services are those intangible service components that partially or completely substitute tangible components, resulting in a positive effect on the environment. Passing on to tourism, UNWTO defines sustainable tourism as tourism that takes full consideration for current and future impacts of economic, social and environmental nature, addressing the needs of visitors, the industry, the environment, host communities and its socio-cultural authenticity, in order to provide viable, long-term socioeconomic benefits to all (Jauhari, 2014).

At last, focusing on the hospitality industry and using the definition from "Our Common Future" as basis, a sustainable hospitality operation can be defined as a hospitality operation that manages its resources in such a way that economic, social and environmental benefits are maximized for the present and future generation needs (Sloan et al., 2009).

2.4. Hotels' supply chains

A supply chain is described as a network of critical stages that connects organizations (stakeholders and partners) together and links each organization's inputs to its outputs. Bowersox et al. (2002) defined it as "all those activities associated with the transformation and flow of goods and services, including money and information flows, from the sources of materials to end users." This is no longer exclusive to the manufacturing firms' supply chains. Service supply chains (e.g., hospitality, healthcare, finance, education, etc.) can be also viewed and analyzed in a similar way (Al-Aomar & Hussain, 2017).

The global reality that emerged from the economic crisis has called for supply chains to be more sustainable and cost-effective (Hussain et al., 2016). While the service supply chains, including in the hospitality sector, continue to grow, they are facing several challenges that may limit their potential. These challenges mainly include the growing cost of supply chain operations, the stricter environmental legislation, growing competition, and pressure of consumers and communities. Such challenges have forced service supply chains to minimize their wastes and improve their resources' efficacy in order to meet the requirements of environmental standards and regulations while remaining competitive and profitable (Al-Aomar & Hussain, 2017; Jauhari, 2014).

The hotel supply chain includes the typical elements of a service supply chain: Supplier Relationship Management (SRM), logistics, storage, organizational processes and service operations, and Customer Relationship Management (CRM). These services represent the core operations within the hotel supply chain by receiving inputs from suppliers and various service providers (Al-Aomar & Hussain, 2017).

2.5. Sustainability in hotels' supply chains

It is estimated that tourism accounts for approximately 5% of global carbon emissions ("UNWTO (2013a) Tourism and Climate Change"). Being one of the larger industries in the world, the hospitality industry is an important contributor to these problems (Sloan et al., 2009). Within the tourism industry, after aviation and car transport, which contribute with 40% and 32% respectively, the accommodation sector is estimated to contribute 21% of tourism's global greenhouse gas emissions (UNWTOUNEP Climate Change and Tourism, 2008; Hall et al., 2016). It has been

shown that hotels have the highest negative influence on the environment of all commercial buildings (Sloan et al., 2009).

Green Supply Chain Management (GSCM) has emerged as an important organizational strategy to minimize waste and improve ecological efficiency across supply chains (Li, 2011). It applies to both manufacturing and service supply chains including the supply chain of hotels.

Studies on environmental management have mainly focused on manufacturing firms (Sloan et al., 2009) due to their greater exposure to ecological issues in the form of inputs and outputs. However, while the processes that are necessary in the assembly of service products may be intangible, they often involve the support of a wide spectrum of physical components and reliance on natural resources. So, the investigation needs to extend to green issues in the services sector, which has often been described as destroying the environment 'silently' (Álvarez Gil et al., 2001; Carmona-Moreno et al., 2004; Thomas Foster et al., 2000; Sloan et al., 2009). A driving force in this sector is hospitality, which, with its unprecedented growth in recent decades, has been responsible for using excessive natural resources, consuming a great amount of energy, and damaging the biophysical environment (Rodríguez & del Mar Armas Cruz, 2007).

As the sustainability in tourism is not only environmentally concerned, when destinations are being developed, there are different aspects which need to be considered to maintain the destination and ensure that it continues to benefits the communities, enhance economic growth and also preserve the resources (Jauhari, 2014). The Triple Bottom Line (TBL) is an approach used "to capture the whole set of values, issues and processes that companies must address in order to minimize any harm resulting from their activities and to create economic, social and environmental values" (Elkington, 1997).

Business enterprises have discovered that the TBL: social equity, ecological integrity, and financial profitability facilitates consumer decision-making, and serve a marketing mechanism to differentiate products and services (Figure 1) (Buckley, 2002).

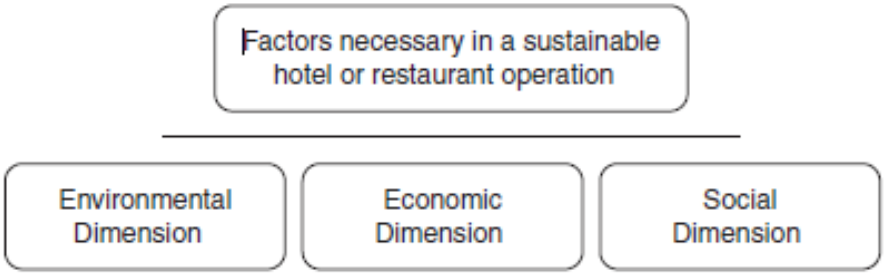

Figure 1. Triple Bottom Line of sustainability in the hospitality industry (Buckley, 2002)

While sustainability in the hospitality industry is applied to environmental, social and economic concerns, the environmental pillar has long been at the centre-stage of activities (Sloan et al., 2009), and that is going the be the focus of this literature review. There was a greater emphasis on environmental awareness after the Earth Summit in 1992 (Shanti, 2016).

2.6. Environmental Sustainability in hotels' supply chains

Companies in the hotel's industry are responding to the demands of environmentally conscious stakeholders and a planet in ecological crisis while attempting to maintain profitability and market growth. The environmental dimension focuses on an organization's impact on flora and fauna that make up the ecosystems. Avoiding short and long-term environmental damage and maintaining and promoting natural diversity are the main objectives of this dimension (Sloan et al., 2009).

Hotels generate environmental impacts that may contribute to global warming and the depletion of natural resources (Silva & Silva, 2017). It has been estimated that 75% of hotels' environmental impacts can be directly attributed to excessive consumption (Bohdanowicz, 2006). This is wasteful not only in terms of resources but also in terms of unnecessarily high operational costs (Kularatne et al., 2018), so environmental management has become a reality. One of the most important sustainability innovations in a resort's organizational structure is the adoption of an environmental strategy and management plan (Smerecnik & Andersen, 2011). Around 80% of European hoteliers are involved in some kind of activity oriented towards the environment (Sloan et al., 2009).

Leonidou et al. (2013) reveal that environmental strategy includes product-service (e.g., use environmental friendly supplies and consumable products), price (e.g., build environmental compliance costs into the service price), distribution (e.g., show a preference for suppliers and strategic partners that embrace environmental responsibility), and promotion (e.g., use ecological arguments in advertisements, promotional material and marketing campaigns) (Segarra-Oña et al., 2012; Hu, 2012; Boley & Uysal, 2013).

Larger hotels tend to implement more strategic environmental management practices (López-Gamero et al., 2008; Mensah, 2006), while in small hotel operations the personal values and beliefs of managers have been found to be the predictors of sustainability adoption (Tzschentke et al., 2008). A significant difference has been observed between chain-owned hotels and independent hotels; the second rely on managers to introduce sustainability, while the first have more financial capability (Sloan et al., 2009) and strategic environmental policies and values ("LIFE, 2001. Green Flag for Greener Hotels").

Nowadays, waste management is a key business function in most hotels at different star level. This includes the identification of different types of waste and the allocation of these wastes at different stages/elements of the hotel supply chain. For example, each hotel is expected to be able to identify wastes generated by suppliers, logistic systems, operations, services, and even guests. This is mainly due to the increased amount of tangible and intangible waste that is created by hotel services such as accommodation, dining, laundry, and hosted events. The focus here is on tangible/physical types of waste (and not the Japanese concept of waste "Muda" which includes other types of waste such as delays, errors, and lack of efficiency) across hotels supply chains that can be reduced through the deployment of green practices (Al-Aomar & Hussain, 2017).

The main categories of sustainable practices are solid waste, energy, water, emissions (Al-Aomar & Hussain, 2017), sustainable materials and purchasing, sustainable site development (Shanti, 2016), facility management (Mensah, 2006; Trung & Kumar, 2005).

There will now be presented environmental sustainable practices from the mentioned categories, specifically site development, sustainable materials, water, waste, and energy.

2.6.1. Site development

The United States Green Building Council (USGBC)-LEED attributed awards (called Platinum) to buildings with the best environmental features. The attribution was made in many categories. The site development category was distinguished for the following features:

- Alternative transportation: parking, shower and changing facilities for bicyclists, pool cars and charging facilities

- Stormwater management: rainwater rechargeable pits to ensure zero discharge into municipal drainage
- Heat island effect: 80% underground parking; more than 75% of the terrace has been insulated
- Light pollution reduction: minimum exterior lighting to limit night sky pollution (Jauhari, 2014).

2.6.2. Sustainable materials

This category consists on every material/object used for planning, constructing, hotel decoration, or for guest or staff utilization.

The USGBC mentioned the following practices:

- Storage and collection of recyclables: separate storage bins provided at each floor for recyclable materials such as glass, paper, cardboard, glass, plastic and metals
- More than 10% of the building materials are salvaged from other sites
- Recycled content: acoustic ceiling, glass, ceramic tiles
- Regional materials: more than 40% of the building materials are from within 800 km of the project site
- Rapidly renewable materials: such as medium density fibreboard
- Certified wood: new woods are certified (under the Forest Stewardship Council US) (Jauhari, 2014).

About fabrics, literature mentions cotton (recycled, natural or organic), is more sustainable than polyester. Polyester is produced from plastic and its transformation process is very pollutant as cotton requires less water to wash it and it is easier to iron. However, polyester is more used due to its price (either alone or mixed with

cotton), which is much more attractive than a natural resource's price (Van Der Velden et al., 2014).

The same author of the book from where the Platinum information prizes was taken (Jauhari, 2014), also did his own reflection about green materials, in a category he called Green Fuels and Green Materials, and concluded that the following are good forms of adopting sustainability throw materials:

- Use of Green Building Material
    - recycled wood/medium density fiberboard (MDF), in order to saves trees;
    - rubber wood: environmentally friendly as it makes use of trees that have already served a useful function.
    - particle board: engineered wood manufactured from wood chips, sawmill shavings or sawdust.
- AAC blocks- cement concrete blocks, offer several benefits including thermal efficiency (reduces the heating and cooling load in buildings; resource efficiency gives it lower environmental impact in all phases of its life cycle; lightweight increases chances of survival during seismic activity (Jauhari, 2014).

Jauhari (2014) referred noise pollution management practices that are similar to some sustainable material aspects because the measures are based on material change and might, consequently be indicated in this category:

- Double Glazed Vacuum Sealed Windows: reduces external noise level below 50 decibels
- Environmental Seals: prevents entry of noise and smoke (in case of fire) into the room
- Noiseless Generators: acoustically insulated, the sound level is dampened to a minimal level.

2.6.3. Water

A third of the world's population must deal with severe water shortage and many western countries are struggling with the reduction aquifers and increasing water needs due to modern lifestyles. It is not only the increasing world population that is raising demand but also our cravings for garden pools, consumer products and a richer diet of more meat, fish and milk (Sloan et al., 2009). The World Water Assessment Program (WWAP) considers that the worldwide use of water is 70% for irrigation, 20% for industry, and 10% for domestic use. The World Business Council For Sustainable Development (WBCSD) revealed that in 60% of European cities with more than 100,000 people, groundwater is being used at a faster rate than it can be replenished (Jauhari, 2014).

The hospitality industry and tourism, in general, present a number of challenges for the management of water supplies. The most popular tourist destinations are located in regions with warmer climates and low rainfall, especially during the peak tourist season. Mediterranean climates are the most badly affected in this respect. The annual influx of tourists increases the demand for water well beyond the normal requirements of residents and the possibilities of local water sources. On a per capita basis, hotel guests and tourist activities demand more water than local residents (Sloan et al., 2009). There is significant room for increasing efficiency and reducing cost of water consumption in hotels (water accounts for 10% of utility bills in many hotels, most of which pay for the water they consume twice, first in buying fresh water and by disposing of it as wastewater) (Jauhari, 2014).

Water conservation is perhaps not the first issue that crosses a hospitality manager's mind when making out the management agenda. Issues such as revenue management, marketing and personnel are prioritized. However, from the perspective of the guest, the use of water is a central part of his/her experience. Water

restrictions would result in unhappy guest stays and so maintaining adequate water comfort must be prioritize to all water management strategies (Sloan et al., 2009). Investing in green technology is economically beneficial, with profits from water sanitation and wastewater treatment having a return on investment (ROI) of one to three years (Jauhari, 2014).

The approach toward decreasing water consumption is to regularly train staff on how they can contribute with simple measures (Sloan et al., 2009). In contrast, water policies should not have a negative effect on a hotel's hygiene and cleanliness. The attention of all staff needs to be focused on water consumption, repairing small leaks that produce immediate gains (hundreds of liters of water can be lost each week in a toilet system that is not functioning properly) (Sloan et al., 2009).

So here are some practices hotels can adopt on their journey of becoming more environmentally friendly through water conservation:

- Water efficient landscaping: native plants with high-efficiency irrigation system and 100% recycled water for irrigation
- Sewage Treatment Plant (STP): recycles water used across the hotel. Approximately 30% of this recycled water is used in the garden and flush systems
- Guest engagement program: water saving poster placed in all rooms that quantifies the saving of water each guest can do by not getting their linen changed daily. Encourages them to do their small bit to save precious water when they are travelling (Jauhari, 2014)
- An efficiently designed and maintained plumbing system: a cold- and hot-water system delivering low-pressure water uses less water than a mains pressure hot-water system. Reducing the water pressure from 100 to 50 pounds per square inch can reduce water use by approximately one third.

Such a system might be practicable in lodges and guest houses situated in rural areas but large hotels guests are used to high-pressure showers

- Sinks and showers: conventional taps use around 41 per hand wash; water-efficient fixtures can reduce this to 21 or less; flow-controllers or low-flow fixtures can be installed in plumbing where water pressure is less important like in food preparation areas and public toilets. This technology can also be used in showerheads; further reductions can be achieved by implementing tap aerators. These spray devices create fine water jets that incorporate air and reduce water flow to 51 per minute; a novel way of encouraging guests to stay in the shower for less time is to place an egg timer in the shower with signage inviting guests to monitor their time spent; the latest generation of sink taps are equipped with infrared sensors that automatically turn off when a person walks away or when the established quantity per wash has been delivered
- Toilets and urinals, another water intense facility within hotel bedrooms. Conventional flush toilets are responsible for up to 40% of domestic water use: putting a displacement device or a tank restrictor in the cistern will reduce its capacity; fit a low flush toilet that uses less than 41 of water per flush, cutting water use in half (dual flush toilets, with a lower flush option for fluids and a standard flush level for solids); gravity toilets, that depend on gravity alone; and pressure assisted toilets that combine gravity with compressed air
- Laundry: front loading machines that consume less water and less detergent than top loading models. Front loaders also have improved spinning performance and extract more water, reducing drying times
- Swimming pools and spas: warmer water evaporates more quickly than cooler water. Keeping the pool cooler will slow evaporation. However, this measure could seriously affect guest comfort and satisfaction and should be instituted with care. Pool covers will also reduce evaporation and have the added advantage of reducing heat loss in cooler climates

- Gardens and water features. Water conservation is important in good garden maintenance. In an attempt to create a prestigious and luxuriant landscape around the property some owners, unfortunately, use plant varieties that require constant artificial watering: plant indigenous plant species where possible that are best adapted to the local climate and soil conditions. Such varieties will also save on fertilizers and pesticides. Grass is an example that in many areas requires much attention and is highly water and fertilizer intensive. Many properties over water simply because employees do not understand what the plants require; watering should take place either early in the morning or late in the day to reduce the possibility of evaporation in hot weather. Properties investing in fountains and water features should turn off appliances at night and consider the use of greywater (Sloan et al., 2009).

2.6.4. Waste

Most people are familiar with the traditional definition of waste management, which basically concentrates on the removal of rubbish from a private residence or business premises. In the hospitality industry, the scope of this definition continues to evolve as operators begin to embrace the three 'Rs' of reuse, recycling and reduce (Sloan et al., 2009).

Sustainable waste management has become a core function within GSCM due to the central role of wastes in various environmental concerns (Hussain et al., 2016). The hospitality industry can be active in the creation of recycling centres and programs, using environmentally friendly cleaning supplies and techniques, sourcing locally produced goods and services that reduce transportation expenses. As in other businesses, the top priority in the hotel industry is maintaining high guest satisfaction (Sloan et al., 2009).

Waste is classified as biodegradable (vegetal and animal matter) and non-biodegradable (inorganic matter: plastics, glass, and metal). In addition, hotels produce so-called biological wastes (human sewage). Hazardous wastes that are normally associated with heavy industry and manufacturing industries are also present in hotels and restaurants. They include the solvents used in paint and floor finishes, the chemicals used in some cleaning products and batteries that contain heavy metals such as mercury (Sloan et al., 2009).

The European Union produces 1.3 billion tons of waste each year, in other words, 3.5 tons of liquid or solid waste per European citizen. 40-45 million tons of these huge portions of waste are classified as hazardous- it can be persistent or non-biodegradable which remains dangerous for a long time (e.g. plastic bottles); bio-accumulative , which accumulates as it makes its way up the food chain (e.g. some chemical pesticides and herbicides); eco-toxic , which causes damage to the environment (e.g. improperly treated used engine oil); non biodegradable rubbish for future generations (releases the greenhouse gas methane into our atmosphere and damage the landscape); incinerated rubbish (can contribute to air pollution if incorrectly handled, likewise recycling and composting vegetable material) (Sloan et al., 2009).

Within the hospitality industry, food and beverage operations account for a substantial amount of waste. This waste can be defined as:

- Pre- and post-consumer food waste, packaging and operating supplies: pre-consumer waste such as spoiled food and other products from kitchens that end up in the garbage before the finished menu item makes it to the consumer; post-consumer waste, naturally, is any rubbish left once the customer has consumed the meal; packaging waste (especially in the form of plastic that cannot biodegrade naturally) as anything used to hold food coming into the kitchen and going out; operating supplies include every other

piece of material used that becomes wasted in a foodservice operation, such as cooking oil and light bulbs (Sloan et al., 2009).

Waste reduction management tactics should work with suppliers to procure products that promote waste prevention. Some suppliers may be able to change products and packaging to reduce the waste the hotel manages:

- Ask food service vendors if they can deliver items in reusable shipping containers
- Consider buying or leasing used or remanufactured furniture, fixtures and equipment. Typical remanufacturing operations performed by suppliers are replacement of worn parts, refinishing of metal or wooden surfaces, repairing of scratches and holes. Extending the life of furniture, fixtures and equipment through remanufacturing reduces the rate at which they are discarded
- Purchasing in bulk (goods that are not packaged in any type of container and are stored, transported, and sold in large quantities): cleaning materials, for example, can be purchased in concentrated form and mixed in the hotel
- Buying products with a longer lifetime will also lead to decreased waste
- Supply guests with liquid soaps and shampoos in refillable ceramic containers in the bathrooms
- Outsourcing can sometimes help hotels to reduce waste and cut costs.
- Using a local company could be more cost effective and result in less pollution (Sloan et al., 2009).

Reduce

We have all been in hotels where we are asked whether we would like to have our towels and sheets replaced daily, or if we wish to 'help the environment' by reusing them. Although many other ways have now been developed to 'help the environment', reducing laundry is still a worthy gesture. Besides saving water and

energy, reduced laundering will also cut down on the use of detergent and bleach. Cooking to order, rather than bulk food cooking can also reduce waste even though labour costs may increase. Often in canteens, food that is cooked in bulk and held for a period of time, such as soups, hot entrées, pastas and other foods are thrown away if not consumed. If culinary staff is trained to weigh food trimmings and other pre-consumer waste at the different food preparation stations in the kitchen, the food service manager is able to pinpoint where most of the food waste is coming from. Management can also introduce incentives for those staff members who produce the least waste (Sloan et al., 2009).

Reuse

The goal is to reuse as much as possible of the waste generated. Reusing differs from recycling thus recycling breaks down an item into its basic parts and makes a new product out of it, but reusing keeps the material in its original form and uses the item over and over again for the same or different purposes. There are many examples of reuse in the hospitality industry:

- Reusing textiles:
    - Convert damaged textiles such as uniforms and linens into useful items. For example, torn bed sheets, towels and banquet linens into reusable guest-room laundry bags, baby bibs, aprons and cleaning rags
    - Repair torn bed linen and reuse it on smaller cribs; dye-stained towels a darker colour for reuse at the pool or beach, or as cleaning cloths
    - Replace single-use items with reusable items such as napkins, tablecloths and hand towels. When they are worn, turn them into cleaning rags

    - Dye-stained towels a darker colour for reuse at the pool or beach, or as cleaning cloths; extend the useful life of curtains by rotating them to expose different portions to sunlight;
- Reusing containers- means that less material is needed to manufacture containers, and there will be less material requiring recycling and disposal:
    - Reuse of packaging can also save money for companies that either ship or receive products by reducing the cost of packaging, disposal and product damage due to shipping and handling. Companies report that they have generated additional long-term cost savings by implementing reusable container systems, including reduced freight, labour, and handling and storage costs;
- Reuse bottles and glasses – hotel and restaurant operators can choose from a wide variety of options when they purchase and dispense beverages:
    - Beer can be packaged in kegs, cans or bottles. Bottles are either intended to be reusable or to be used just once, after which they are disposed of or recycled. In some countries like Germany, using reusable bottles is a way of life. In other countries throw away plastic bottles and glasses are the norm. A bottle that is filled 20 times eliminates the need for making 19 more bottles, avoiding not only the need to dispose of those 19 containers but avoiding also the environmental effects of material extraction, processing, manufacturing, distribution and recycling;
- Reusable food:
    - Donate edible, unused food to local charities. Many hundreds of programs throughout the European Union and the US accept food-packaged, fresh, frozen or baked that restaurants and hotels can no longer use. Donor programs deliver food to soup kitchens, homeless shelters, senior citizens' programs, day-care centres and food

pantries. If possible, collect unusable food scraps and arrange to have them picked up by local pig farmers for use as animal feed

- Used deep fryer oil is now used successfully by motorists who have modified their car engines to run on this cheap fuel (Sloan et al., 2009).

Recycle

A recycled product describes a product that is made entirely or partly from secondary material recovered from consumer waste. Some products are reduced to their raw state and remanufactured into something resembling their original state. Recycling conserves natural resources, saves energy and reduces greenhouse gases and pollution that result when scrap materials are substituted for primary raw materials. Unfortunately, there is a threat to recycling in the form of declining commodity prices and in our market economy, the two are undeniably linked. However, in 2009 prices have begun to stabilize, even though, in the present economic climate markets are still fragile. Very few people now disagree with the idea of recycling and are happy to participate in these programs:

- In the case of recycled paper, the newspapers gathered from guest bedrooms and the used notepaper coming from the hotel copy shop can be reduced back to their raw state of paper pulp which is then used to produce more paper
- Extracting metals from ore, in particular, is extremely energy intensive especially aluminum extraction. Using recycled aluminum can reduce energy consumption by as much as 95%
- Some recyclables (like glass) have hardly been touched by the price reductions and the demand for glass remains strong. Using recycled glass saves 25% of the energy that would have been used to make a product from new materials (Sloan et al., 2009).

- Sewage Treatment (even if not for reusable purposes) prevents pollution (Jauhari, 2014).

2.6.5. Energy

Human quality of life and productivity relies on secure, affordable and sustainable energy. As economies expand and the world population continues to grow, energy demand is increasing worldwide. Currently, 80% of the world energy supply comes from fossil fuels (coal, petrol and natural gas), which emit greenhouse gases causing climate change and other negative environmental impacts. Fossil fuels are finite and non-renewable, and their reserves are decreasing faster than new ones are being formed. Hotels are among the top five types of buildings in the service sector for energy consumption, below food, sales and health care facilities. They are one of the most energy-intensive building types due to their multi-usage functions and around the clock operations (Huang et al., 2012). Consequently, reducing the energy consumption across the hotel supply chain often leads to less operational cost and lower environmental impacts (Al-Aomar & Hussain, 2017).

According to Hotel Energy Solutions (2013), there are great opportunities for the hotel sector to save on operational costs by taking advantage of the potential of energy efficiency and renewable energies (Jauhari, 2014). Three quarters of the energy is used for space heating; hot water production; air conditioning and ventilation; lighting (Jauhari, 2014; Sloan et al., 2009).

While issues surrounding the management of waste produced or water consumed in hotels are important features of any environmental management program, greenhouse gas emissions (GHGs), in particular carbon dioxide (CO_2) emissions (which is one of the many GHGs along with methane and nitrous oxide), have taken the centre stage in the mitigation of environmental impacts (Sloan et al., 2009). The

necessity of reducing CO_2 emissions "has come to occupy a prominent position in responsible-business agendas of most multinationals operating in the global economy" (Zientara & Bohdanowicz, 2010). The carbon footprint is a calculation of all the greenhouse gases we individually produce and is measured in tons or kilograms of carbon dioxide equivalent (Sloan et al., 2009). In the service industry, the recent partnership formed to develop Carbon Footprint Standards between the International Tourism Partnership (ITP), the World Travel and Tourism Council (WTTC) and large international hotel players is aimed to make carbon measurement in hospitality possible.

It is estimated that a non-vegetarian diet results in 8 kg of CO_2 per person per day without including the emissions involved in the food preparation itself (B. Kim & Neff, 2009).

Here are some adoptable practices to manage energy consumption and reduce it:

- Chilled water reset through building automation, to reduce power consumption required for cooling the building
- Heat pumps, for heat recovery, for heating domestic water
- LED lighting, consumes far less energy than traditional lighting
- Key Tag Energy Saver System, conserves energy in unoccupied rooms
- Natural/day lighting, reduces power consumption dramatically
- Double Glazed Vacuum Sealed Windows: conserves energy and reduces noise
- LT Voltage Stabilizer, is energy saving and prevents damage to equipment due to sudden power fluctuations (Jauhari, 2014)
- Auto Time Management (for lighting, air-conditioning and ventilation fans) through timers and motion sensors, helps conserve energy (Agarwal et al., 2010; Jauhari, 2014)
- Last generation electric equipments (A+++ class) (Kosalay & ILK, 2017).

If we are only talking about renewable energy measures, they fit in the following categories: wood or other biomass, wind energy, solar energy, and hydropower (Sloan et al., 2009).

Solar Power

Cooling and heating can be reduced considerably while creating a comfortable indoor atmosphere:

- Designing buildings to maximize the use of natural lighting can reduce energy consumption by 40-60% compared to conventional buildings
- Active solar energy produces limited quantities of electricity or heats water pipes for guest hot water and other applications. However, solar energy is not constant. Solar water heating is a sustainable source for hot water supply. Usually, the collector panels are installed on the roof in order to optimize exposure to sunlight
- Photovoltaic solar panels are the third way to use the energy from the sun. These panels contain solar cells that convert daylight into electricity and can be placed on roofs or can be integrated into the side of the building as sunscreens that can reduce the need for air-conditioning. The electricity produced can either be used directly in the building or in many cases sold to the local utilities company (Sloan et al., 2009).

Wind power

Wind turbines capture the energy stored in the wind and convert it into electricity:

- Wind farms are constructed normally where wind funnels through mountains or hills. Wind power is completely environmentally safe. However, it can be intermittent. Significant power generation requires a good deal of windmills in one farm, affecting scenery (Sloan et al., 2009).

Hydropower and wave power

Hydropower is electrical energy that is generated by using the flow of water through a turbine with a generator, usually derived from rivers or manmade installations. For hotel properties located on a coastline, wave power may be a future source of energy (Sloan et al., 2009).

Geothermal power

Geothermal power is energy that is gained by heat stored beneath the surface of the earth. Pumps bring heat from beneath our feet and it can be used directly to heat hotels or used as a source of power that drives steam turbines to produce electricity. In some places this heat source is close to the surface and can provide a cheap and efficient source of energy. However, in most surface areas, holes would have to be made to uneconomical depths to bring up the energy (Sloan et al., 2009).

Biomass

Biomass fuels are produced by converting plants or other biological material into electricity. Biogas is one of the many forms of bio-energy derived from biomass. Biogas is a mixture of methane and carbon dioxide produced by bacterial degradation of organic matter in anaerobic conditions which can be used as a fuel for production of electricity and heat. Organic matter usually comes from some other activity such as agriculture, urban waste, food processing industry, restaurants or any other activity that generates biodegradable organic matter. For hotels with a large number of vehicles, the bio fuel ethanol can be a viable alternative to petrol. Main sources of bio fuels are energy crops such as maize, crop residues such as rice husks or some kinds of biological waste. It can be used as a solid fuel or be converted into liquid or gaseous forms. Another source of biomass is wood: a hotel might

consider installing a convenient wood pellet burning which heats the system instead of using oil or gas (Sloan et al., 2009).

There is a widespread misconception in the hospitality industry that substantial reductions in energy used can only be achieved by installing advanced, high-maintenance and prohibitively expensive technologies. While this may be true in some contexts, in the majority of cases major energy savings can be achieved by adopting a common sense approach, requiring neither advanced expertise nor excessive investments (Sloan et al., 2009).

2.7. Building construction in eco-services

In all western nations, the construction industry is the main consumer of non-renewable resources. At the early stage, site development and construction influence the local ecology and landscape. The negative effects on the environment during the construction phase are caused by the excessive consumption of non-renewable resources e.g. water, electricity and fuel, as well as by emissions into the air, groundwater and soil. Another issue with the construction industry is habitat destruction which can have an immediate and disastrous effect on certain localized areas and species. It is, therefore, imperative that demand on such materials is radically reduced. This includes using less of these materials by building more simply, with more local and plentiful (i.e. sustainable and renewable) materials and with less waste (Sloan et al., 2009).

The introduction of sustainable building design measures can make an important contribution to minimize the impact on our recourses (Jauhari, 2014).

Not only does sustainable architectural design attempt to reduce negative effects on humans and on the environment but it also attempts to create more resource efficiency than the found in conventionally constructed buildings. Efficiency means that these buildings save costs in terms of energy, and water, while providing at least the same ambient quality. The first step is sustainable planning. This means that before construction, the planners and architects must consider all environmental and social impacts. Social impacts can be health, safety, comfort, productivity or quality of life (Sloan et al., 2009).

2.7.1. The principles of sustainable architectural design

The effect of the sun

A fundamental principle of solar design is that the warming effects of the sun's rays should be maximized in the winter and minimized in the summer. This can be achieved in three ways- glazing, orientation and thermal mass:

- Although glass allows 90% or more of the energy in the sun's rays to pass through it is a very poor insulator. Double glazing is twice as good because the small air gap between the sheets of glass is a good insulator. Even so, double glazing still only has the insulating power of a single layer of bricks
- Orientation: correct orientation of the building is crucial for determining the amount of sun it receives, because the direction and height of the sun in high northern latitudes and low southern latitudes changes dramatically throughout the year.
    - Only surfaces facing south receive sun all year round. For this reason, solar panels and windows that will capture solar warming in winter should face as close to south as possible.

- Surfaces facing north are in the shade all year round. So, solar design concentrates insulation and minimizes glazing on this side of a house.
- The winter sun is low, the summer sun is high. Vertical south facing windows work best for maximizing solar heating in the winter as they capture the low winter sun.
- The high summer sun makes it easy to design shading for vertical windows. Only a small overhang is needed to completely shade a vertical south facing windows in summer (Sloan et al., 2009).

Thermal mass

The way in which a building can store and regulate internal heat is known as thermal mass. Buildings with a high-thermal mass take a long time to heat up but also take a long time to cool down. As a result they have a very steady internal temperature. Buildings with a low-thermal mass are very responsive to changes in internal temperature – they heat up very quickly but they also cool down quickly:

- Brick, concrete and stone have a high-thermal mass capacity and are the main contributors to the thermal mass of a building
- Water has a very high thermal capacity, so it is well suited to central heating systems
- Sustainable buildings are designed to have a high-thermal mass for several reasons:
    - To hold over daytime solar gain for night time heating.
    - To keep houses cool during the day in summer.
    - To increase the efficiency of central heating system. A small boiler working at maximum efficiency will slowly and steadily raise the temperature of the building with high-thermal mass then turning itself off for a long period. Buildings with a low-thermal mass tend

to have much wider fluctuations in temperature, and the boiler is constantly switching on and off to compensate. The positioning of exterior wall insulation can affect the thermal capacity of a house significantly (Sloan et al., 2009).

Stack effect

Air expands and rises when it warms, in a process called convection. In this way, heat moves around rooms and entire buildings. Ventilation with fresh air is vital and convection plays a leading role in natural ventilation. Hot air rises and escapes through small gaps in the building fabric at the top of the house. Escaping warm air draws in new cold air through similar gaps at the bottom of the house, this is called the stack effect, or sometimes the chimney effect because it is the same process that draws smoke up a chimney. Badly controlled, the stack effect can produce unwanted cold drafts. However, when carefully controlled, it can produce a low and effective level of natural ventilation. The stack effect is by far the most effective way of keeping a building ventilated in summer. Over the past 10 years sustainable architecture has paid increasing attention to generating stack effect to create natural ventilation, especially in large buildings like hotels (Sloan et al., 2009).

2.8. Influence of the sustainable practices on the social aspects of hotels

The "green" hotel business is a growing niche because not only do these establishments differentiate themselves from the similar non-green hotels, but they also fulfil a need in the market for less environmentally damaging hotels. This is mainly realized with decreases in costs achieved by the reduction of resource

consumption and decreases in expenses and expected future expenses. There are many other benefits realized from the introduction of more environmentally friendly practices such as accompanying improvements in customer trust and public image ("Hotel Energy Solutions (2013)").

For many hospitality managers, the daily agenda still focuses on priorities thought more important than sustainable business management, including cost control, profit maximization and shareholder value (Sloan et al., 2009). The importance of addressing environmental issues is well-understood as a form of fulfilling customer needs and social responsibility or business ethics (Shieh, 2012). Experience shows that even though hotels' sustainability efforts are essential to allow for cost reduction, these are currently more focused on lowering operations energy and resource consumption (Julião et al., 2019). However, hotel managers need to be convinced that eco-friendly or green practices will be a cost effective, performance-improving exercise in the long run (Kularatne et al., 2018), equally associated with customer expectations (Chan, 2013), corporate image (Penny, 2007; Chen et al. 2018) and the willingness to pay a premium for green hotels (Kang et al., 2012; Laroche et al., 2001).

Empirical evidence shows that investments in a sustainable supply chain management can improve economic-based performance. Research found a positive link between sustainable supply chain management (SSCM) and economic performance (Ageron et al., 2012; Golicic & Smith, 2013; Reuter et al., 2010). Moreover, considering that company-consumer interrelations are mainly market driven, it has been shown that environmental thinking can stimulate green consumption and sustainable practices by the companies (Gaspar et al., 2017).

Also, business ethics, corporate citizenship and corporate accountability, are a factor. Corporate Social Responsibility (CSR), is a concept by which companies

integrate the interests and needs of customers, employees, suppliers, shareholders, communities and the planet into corporate strategies (Palazzi & Starcher, 2000). Companies have experienced a range of bottom-line benefits, measured on both quantitative and qualitative data. CSR is synonymous to business success. These are some of the benefits of CSR at the business level: improved financial performance; reducing operating costs; enhanced brand image and reputation; responsible consumerism and customer loyalty; increased productivity and quality; increased ability to attract and retain employees; improved relations with regulators; access to capital (Sloan et al., 2009).

Given the sectors' growing contribution to resource consumption and waste, there is research on sustainable accommodation attitudes and practices that is centred on investigating the perspectives of consumers and managers (Hall et al., 2016).

2.8.1. Consumers

It is observed that in every part of the world, business enterprises start to adopt some sort of environmentally sensitive activities while managing their business operations (Gast et al., 2017; Sari & Yanginlar, 2015; Sharma et al., 2017). This is partly a result of the fact that much of the individual and business customers consider environmental performance of an enterprise while making their purchasing decisions (Guyader et al., 2017; Moser, 2015).

Consumer focussed research examines the perceptions and behaviours of tourists towards the sustainable practices of accommodation providers, consumer practices, support for green accommodation product, and the impacts of government. (Hall et al., 2016). Hotel guests also play a major role in the green effort where most hotel guests are nowadays aware of green initiatives and can practice them during their

stay especially for saving water and energy. The concept of "green customer" is relevant in this regard (Al-Aomar & Hussain, 2017).

Xu and Gursoy (2015) identify the impact of the environmental, social and economic dimensions of sustainable hospitality supply chain management actions on customers' attitudes and behaviours including satisfaction, loyalty and willingness to pay a premium for sustainable hospitality goods and services utilizing data collected from U.S. consumers who frequently stay at hotels.

So, green practices are important for almost all service businesses today, but maybe more important for a hotel's supply chain because they lead not only to a reduction in costs but to as a higher reputation in the customer's perspective (Sari & Suslu, 2018).

Manaktola and Jauhari (2007) remark that becoming a green hotel can be the foundation for a great marketing strategy, and the first step in marketing is providing consumers with what they want or need. Some hotels use the label "green hotel" to attract their potential customers (Pizam, 2009), as such an image is believed to play a critical role in customers' decision-making processes and behavioural intentions (Prendergast & Man, 2002).

The hospitality industry is currently undergoing persistent demands from customers for environmentally friendly practices. This is particularly so for hotels located in destinations which primarily attract tourists for their environmental diversity. In these cases, guests typically have strong preferences for green consumption alternatives (Han & Hyun, 2018). This preference for 'green' hotels which address environmental concerns is born out by a number of studies (Bohdanowicz, 2006; Chan & Wong, 2006; Han & Yoon, 2015; Hathroubi et al., 2014). Studies conducted by the International Hotels Environment Initiative (IHEI) reveal

that 90% of hotel guests prefer to stay in a hotel that cares for the environment. Therefore, in the long run, investment in environmentally green practices by hotels can be cost effective, and improve their competitiveness by attracting environmentally concerned consumers. Moreover, research also suggests that in such cases, clients are willing to pay a premium and are more likely to pay a repeat visit (Laroche et al., 2001; Szuchnicki, 2009). However other studies indicated that the perception of some hotels guests is that hotels may just be using green practices as a marketing tool or to gain financial benefits (Yi et al., 2018).

An effective way to educate the customer is to bring out the message of sustainability in the overall atmosphere of the hospitality operation. While the decoration, furniture and landscaping around the buildings can be used to enhance the idea of sustainability, offering extended tours of the 'backof- the-house' operations will contribute to the guests' general understanding of the critical issues (Sloan et al., 2009).

Besides positively affecting the preservation of the environment, business according to sustainable development principles could provide better services for customers based on employees' higher job satisfaction and job commitment (Skopje, 2016). It is becoming more evident that hotel businesses must be more attentive to these discussions by proposing an inclusion of sustainable practices in managerial and operation strategies, observing: the interests of employees (e.g., social benefits and volunteering), customers (physical accessibility, healthy commercial offer, etc.), suppliers (e.g., Code of Conduct and responsible purchasing) and so on. Similarly, companies will also have to design the best environmental and economic practices according to the specific concerns of each of their stakeholders (Pérez & Rodríguez del Bosque, 2014).

2.8.2. Managers

Rational individual-level attitudes, experiences, and preferences about the importance of sustainability have been shown to vary greatly across managers (Kaufmann et al., 2009; Pagell et al., 2013). Decisions about SSCM (Sustainable Supply Chain Management) practices are ambitious in ideology, but in reality, may be a lower priority or impractical in the minds of many managers (Bowen et al., 2006).

2.8.3. Suppliers

A firm is vulnerable to the weakest link in its supply chain. Like-minded companies can form profitable long-term business relationships by improving standards, and thereby reducing risks. Larger hospitality firms can stimulate smaller firms with whom they do business to implement a Corporate Social Responsibility (CSR) approach. From a supply side perspective, the tourism industry regularly face issues related to environmental degradation (Halkos & Matsiori, 2018; Ndebele & Forgie, 2017).

2.9. Certifications

Like many areas, sustainability also has certifications to acknowledge institutions based on some sustainability standards they may comply. In the hotel industry, these certifications may be attributed not only to hotels but also to suppliers. ISO 14011 and OHSAS 18001 are the most dignified certifications of the area. The management can enforce green initiatives and standards (e.g., ISO 14001) at received inputs, hotel operations, and hotel services, and the hotel can require suppliers to implement green standards (e.g., OHSAS 18001) and technology and adopt eco-friendly

practices. The concept of "green supplier" was common in the industry. Green practices at the supplier end often reflect positively on the hotel in terms of green products, waste reduction, and more recycling (Al-Aomar & Hussain, 2017). Certifications can be organized into area and object of evaluation. Sustainability and environment are the two areas, as buildings and companies are two objects of evaluation (Coelho & Llera, 2013) that can be inserted on the context of this dissertation. So, among some of the most popular certifications of hotels there are Eco-Certification Program (STEP) (Hansen, 2008), and Green Key (companies of the object level and sustainability on the area level); Eco-Hotel (Coelho & Llera, 2013) (companies/environment); BREEAM- Building Research Establishment Environmental Assessment Method (Giama & Papadopoulos, 2012) (buildings/environment). If we look at sustainability certifications on the Portuguese panorama, research indicated "Certificação LiderA" (buildings/environment) as the leader certification on the hotel level (Coelho & Llera, 2013).

2.10. Benchmarking of sustainable hotel supply chains

Given the high level of competition in the hotel industry, there is considerable pressure to upgrade their efficiency relative to competitors. This creates a particular need for a benchmarking analysis that can identify the best practices. This is particularly so at the hotel industry, once it is becoming increasingly sensitive to the changing tastes and preferences of tourists seeking accommodation (Assaf & Agbola, 2011).

Benchmarking can be understood as a tool incorporated by businesses to compare and evaluate their performance in relation to other organization with similar

practices, portfolio or structure (Sloan et al., 2009). Environmental benchmarking has become an important and accepted management tool already incorporated in many businesses (Chan, 2013).

Many leading hotel chains have developed their own environmental programs and policies (Butler, 2008; Zhang et al., 2012). Additionally, there seems to be a general agreement regarding the role that chain affiliated hotels play in the development of environmental management initiatives and the responsibility they have to influence the sustainability agenda on the entire hospitality industry (Claver-Cortés et al., 2007; Butler, 2008; Bohdanowicz & Zientara, 2009; Bohdanowicz et al., 2011). Table 1 presents hotel chain environmental programs implemented by hotels who were selected based on their popularity among different researchers (Bohdanowicz et al., 2005; Zhang et al., 2012).

Hotel Company ***Number of hotels***	**Name of environmental/CSR program and features**	**Name of internal tool and features**
Accor (Accor, 2013) *3516 hotels (worldwide; luxury brands)*	Accor's Planet 21: encourages customers to contribute to the hotels' actions and achievements with 7 pillars (health, nature, carbon, innovation, local, employment and dialogue); 21 commitments all hotels are expected to meet by 2015	OPEN: an environmental management tool which is a self-developed tool based on what each hotel reports (number of actions they implement from the Environment Charter; Water and energy consumptions; Results on the Plant for Planet project; Quantity and cost of produced waste)
Fairmount (Fairmount Hotels and Resorts, 2013) *69 hotels worldwide; luxury hotels and resorts*	Fairmount's Green Partnership program: commitment to minimize the organization's impact on the planet; the focus is on improving waste management, sustainability and energy conservation at all properties	Energy and Carbon management program (20% reduction from 2006 to 2013) measured through audits and external consultant. Collaboration with Energy Star Program and Green Key Eco Rating Program
Hilton (Hilton International, 2013) *3900 hotels and resorts worldwide; luxury hotels*	Hilton's Light Stay: property sustainability measurement system and contributed for hotels' performance and profitability while increasing the company's overall impact. The goals from 2009-2013 are to reduce	Hilton has the ISO 14001 environmental management certification and their own developed Environmental Management Systems (EMS). Light Stay analyzes performance across

	energy consumption, CO_2 emissions, waste output and water consumption by 20% each	200 operational practices in all hotels, with four steps: measuring, reporting (using a third party verification system), learning (using best practices) and improving
Hyatt (Hyatt International Corp., 2013) *492 hotels and resorts worldwide from midscale to luxury full-service premises*	Hyatt Thrive: a Corporate Social Responsibility program designed turn communities into places where associates are proud to work, where guests want to visit, neighbours want to live and owners want to invest. Includes four areas of focus: environmental sustainability (Hyatt Earth), economic development and investment, education and personal advancement, and health and wellness	Hyatt EcoTrack: a web-based tracking tool that gathers monthly data from the properties to help benchmarking the performance and drive improvements. Goals for reductions have been established to achieve by 2015, compared to the 2006 baseline: 25% energy, 20% water, 25% greenhouse gases, 25% waste sent to land-fills. Over 100 Hyatt hotels are certified by the external Green-Key Eco rating program
IHG (InterContinental Hotels Group, 2013) *Over 4500 hotels worldwide; luxury properties*	IHG has a Corporate Responsibility program which is set to: drive environmental sustainability, have a positive impact on the local community and drive economic opportunity, embed and strengthen Corporate Responsibility elements into the brands, engage stakeholders to champion and protect IHG's trusted reputation and deliver against public affairs	Green Engage: a comprehensive online sustainability system. 1700 IHG hotels are enrolled in the program. It's a point-based metric system and is used to provide ongoing tracking reporting and analysis
NH (NH Hotels, 2013) *384 hotels worldwide; mainly up-scale hotels*	NH Hotels has a Corporate Social Responsibility program that focus on: employees, customers, suppliers, society, environment and shareholders. The aims are to give all of the actions in the area of Corporate Social Responsibility a global and transversal quality; globally promote the Social Action that the NH Hotels' brand carries out as "Social Innovator"; make a commitment to Corporate Volunteering as a vehicle for social action and internal reputation; have sustainable innovation as a key of brand differentiation and reputation strengthening; reinforce responsible and sustainable NH communication with employees, customers and society	The environmental management system used is certified by ISO 14001. Their Green Certification Project aims to install an EMS in all hotels. The overall reduction goals from 2008 to 2012 were 20% in each of the following: energy consumption, waste generation, water consumption, and CO_2

Table 1. Hotel chain environmental programs (Jauhari, 2014)

If a benchmark analysis would be done comparing continents, Europe would register a far more elevated consumption rate as it has the world's largest hotel stock with approximately 5.45 million hotel rooms—nearly half of the world's total (Jauhari, 2014).

To conclude the theoretical part of the literature review, it is relevant to say that the goals of sustainable practices is to reduce the dependence on fossil fuels, reduction of water consumption (Shanti, 2016), energy saving, recycling, noise reduction, preserve biodiversity (Kassinis & Soteriou, 2009; Smerecnik & Andersen, 2011), reduce waste and cost, minimize pollution, conserve natural resources, and reduce carbon emissions (Al-Aomar & Hussain, 2017). The integration of green with Supply Chain Management (SCM), (i.e., GSCM), aims to reduce wastes and harmful environmental impacts across the supply chain while maintaining effectiveness and profitability (Hussain & Malik, 2016). The ultimate goal is to support the green supply chain management and the overall sustainability of the hotel (Al-Aomar & Hussain, 2017).

Empirical evidence is also a factor when reaching conclusions about a subject. Previous studies similar to this dissertation and the correspondent information (methodology, data and conclusion) of those studies are an influence and comparison point.

In 2017 Al-Aomar and Hussain developed an assessment framework of green practices across hotels supply chains. The proposed framework was derived from the theory of "value creation" with a focus on three aspects of green management (awareness, know-how, and implementation) that were reached through the key elements of the proposed analysis framework, which include: supply chain for hotels (structure and relationships), waste analysis (identification and allocation), green practices (assessment and adoption). To collect empirical data, a survey-based

explorative study was conducted in selected UAE hotels. A Supplier-Input-Process-Output-Customer (SIPOC) structure of the hotel supply chain was used as a platform for the analysis of green practices. The survey has targeted only the 3, 4, and 5-star rated hotels and 30 surveys were considered. The reason for focusing on 5-star hotels and getting better response was due to the fact that they have well-established systems and standards (including green and environmental). As the sustainability concept is relatively new to the hotel industry, those with less experience were found to be in many cases more familiar with green practices. The results about the familiarity and knowledge of the surveyed UAE hotels in green practices were low experience 8 (27%), medium experience 14 (46%) and high experience 8 (27%). This shows that the awareness of green practices was common in UAE hotels where the majority (63%) have medium to high experience in adopting such practices. As to techniques to reduce waste across the supply chain, green technology to conserve energy and water were most recommended. Examples include the use of LED lights, motion sensors, smart cards, tab sensors, solar panels, and so on. The majority have also emphasized "waste prevention" as a key green practice. Some hotels were able to set an action plan for hotel waste reduction. When requested to list the key challenges of green adoption, meaning, challenges that limit, or in some cases, prevent the hotels from adopting certain green practices across the supply chains, the hotels listed the following: investing in these practices needs management understanding and approval; the associated cost and training required for implementing these technique; some green practices have a long duration for their return on investment and thus they lose attention; culture is a major factor for green practices (e.g., you might buy desk-side recycling bins, however, it is up to the staff to utilize them correctly); lack of awareness, training, and skills essential for implementing sustainability practices; complexity of hotel procedures and operations (often involve customers and guests); additional responsibilities in relation to green practices on employees would affect their original jobs; the managers in the hospitality industry do not see the need to analyze the root causes of the reported

problems; sustainability needs a long commitment and participation from all work levels; delays in implementing approved green techniques; lack of specialist in green techniques; the waste management option in some cases difficult to implement; it is costly to apply the techniques and technologies; it will be complex for the newcomers to be part of sustainability practices; lack of suppliers' cooperation; lack of hotel guests' awareness of green practices; the need for prioritization is key so every year initiatives are budgeted accordingly. Results have also confirmed the need to extend green practices to the suppliers, logistic partners, and customers of the hotel. Although the majority of green practices were allocated to the I-P-O (Input-Process-Output) core of the supply chain, several green practices were allocated to the supplier front as well as to the customer end.

Sari and Suslu's (2018) study was focused on the green practices performed in hotel supply chains, specifically by creating a framework. The framework has two stages along design and implementation. In the first stage, evaluation criteria for the green performance and their relative importance weights are determined (Sari, 2017). To do this, an extensive review of literature was performed. Later, verbal evaluations of 20 hotel managers in Turkey were taken into consideration. In the second stage, it was combined with a Multi-Criteria Decision Making (MCDM) method. A MCDM method made it possible to get a green score and a ranking for hotels (Triantaphyllou, 2000). Among others, TOPSIS method is chosen as a MCDM method (Özceylan et al., 2016; Sari, 2013; Uygun & Dede, 2016; Wang & Chang, 2007). TOPSIS is chosen for evaluating green performance of hotel supply chains (Sari & Suslu, 2018). 15 criteria were proposed to evaluate the green practices for a hotel supply chain. These criteria were then classified in two groups as basic green practices and advanced green practices. Once these 15 criteria were reached, the next step was to determine a weighting factor for each of these criteria. At this point, these weights were obtained by adding the verbal evaluations of the hotel managers into the process (Sari & Suslu, 2018). The following are the basic and advanced criteria

suggested by Sari & Suslu (2018) for evaluating green performance of a hotel supply chain:

- Basic green practices:
    - C1 Providing employees with training on issues related to protecting the Environment (Álvarez Gil et al., 2001; Carmona-Moreno et al., 2004; Claver-Cortés et al., 2007; Hsiao et al., 2014; Manaktola & Jauhari, 2007; Molina-Azorín et al., 2009; Tarí et al., 2010)
    - C2 Conducting studies for energy and water saving (Álvarez Gil et al., 2001; Berezan et al., 2013; Carmona-Moreno et al., 2004; Claver-Cortés et al., 2007; Hsiao et al., 2014; Manaktola & Jauhari, 2007; Molina-Azorín et al., 2009; Tarí et al., 2010)
    - C3 Cooperating with customers at the point of conservation of the environment (Álvarez Gil et al., 2001; Berezan et al., 2013; Carmona-Moreno et al., 2004; Hsiao et al., 2014; Manaktola & Jauhari, 2007)
    - C4 Disclosure of the environmental awareness and policies to all customers and suppliers (Hsiao et al., 2014; Manaktola & Jauhari, 2007; Oreja-Rodríguez & Armas-Cruz, 2012)
    - C5 Proper disposal of waste and environment pollutants (Álvarez Gil et al., 2001; Hsiao et al., 2014; Manaktola & Jauhari, 2007)
    - C6 Working to reduce the emergence of waste and environment pollutants (Hsiao et al., 2014; Oreja-Rodríguez & Armas-Cruz, 2012; Carmona-Moreno et al., 2004)
    - C7 Reducing the health risk of customers and employees by identifying limited smoking areas, managing noise and serving healthy food (Oreja-Rodríguez & Armas-Cruz, 2012)
- Advanced green practices:
    - C8 Regularly measuring costs and benefits of activities performed for protecting the environment (Álvarez Gil et al., 2001; Carmona-

Moreno et al., 2004; Claver-Cortés et al., 2007; Molina-Azorín et al., 2009; Tarí et al., 2010)

- C9 The use of ecological product (reusable or recyclable) purchasing policies (Álvarez Gil et al., 2001; Berezan et al., 2013; Carmona-Moreno et al., 2004; Claver-Cortés et al., 2007; Hsiao et al., 2014; Manaktola & Jauhari, 2007; Molina-Azorín et al., 2009; Tarí et al., 2010)
- C10 Using ecological arguments in marketing campaigns (Álvarez Gil et al., 2001; Carmona-Moreno et al., 2004; Claver-Cortés et al., 2007; Hsiao et al., 2014; Molina-Azorín et al., 2009; Tarí et al., 2010)
- C11 Contributing to the elimination of ecological problems in the region (Oreja-Rodríguez & Armas-Cruz, 2012)
- C12 Working with suppliers who are sensitive to the environment (Manaktola & Jauhari, 2007; Oreja-Rodríguez & Armas-Cruz, 2012)
- C13 Contributing to the socio-economic development of the region, using local products and providing employment opportunities (Berezan et al., 2013; Oreja-Rodríguez & Armas-Cruz, 2012)
- C14 Contributing to the preservation of local cultures and traditions by knowing and spreading the value of the region, its historical and cultural heritage (Oreja-Rodríguez & Armas-Cruz, 2012)
- C15 Awarding employees who submit proposals for environmentally sensitive activities and who are accepted as such (Carmona-Moreno et al., 2004; Molina-Azorín et al., 2009; Tarí et al., 2010).

The results of the study indicated that the basic green practices are regarded as more important by the managers than the advanced ones. This is because the basic green practices are more visible to the people around the hotel than the advanced ones. The basic green practices are embraced by many hotels, including hotels with

little emphasis on the environment, while the advanced green practices are mostly used by hotels with a strategic look on environmental management. There is also an indication that there is no single strategy to improve a hotel's green performance, but each hotel should analyze its own situation and then determine the most effective strategy accordingly (Sari & Suslu, 2018).

3. Research Methodology

3.1. Introduction

In order to perform a research, it is necessary to define what exactly it is being researched and what we preview it will be the answers to the study, based on the information already exists on the subject (found on the literature review). As mentioned on a previous chapter, my investigation is lead on the questions: On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve? What is the influence these practices have on the consumers?

Environmental sustainability practices are the main concept of the Research Question (RQ) to which all the other ones are associated. Environmental sustainability practices are all the actions that can be done in order to make human impact on earth as little as possible. Sustainability consists in living in a way that will allow our future generations to live in healthy and comfortable way (Jauhari, 2014). A supply chain of a hotel consists of all the activities that turn a hotel's inputs in outputs. Basically, it is the activities that are based on the transformation of goods and services (Bowersox et al., 2002). Research has shown a connection between higher rated hotels and environmental sustainability practices and it has associated the implementation of sustainability measures with the improvement of economic performance (Chen et al., 2018; Ageron et al., 2012; Golicic & Smith, 2013; Reuter et al., 2010) because, consequently, the presence of sustainability practices attracts consumers (Bohdanowicz, 2006; Chan & Wong, 2006; Han & Yoon, 2015; Hathroubi et al., 2014). So, the level of environmental sustainability practices on supply chains evaluates the existing quantity of goods and services as less polluter/resource

destructor as possible. A high quantity is a positive evaluation and a low quantity is not as positive as it could be. A high or a low evaluation is given according to the totality of practices named on the literature review. The term influence refers to the consequences the practices may have on consumers. In this case, the consequences will be evaluated on many standards (asked to the consumers). Consumers are all the individuals that live in society, independently of their age, gender, nationality, education, working area, income, knowledge about the hospitality industry and of the frequency with which they stay in hotels.

At the same time, to ensure the study is done on the right path, as well as to direct the result's discussion to the intended subjects, is it imperative the elaboration of the hypothesis of answers for the previous questions. To the question "On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve?" some of the possible answers are:

- 4 and 5 star hotels have a higher level of environmental sustainability practices' presence than 1, 2 and 3 star hotels
- The majority of the inquired hotels can relate economic improvement with the presence of sustainability measures
- The majority of the inquired hotels consider sustainability practices very important to differentiation and competitive advantage
- The majority of the inquired hotels consider sustainability practices to have a lot of influence on the social responsibility of the hotel as a corporation
- The majority of the inquired hotels think about sustainability practices as a not crucial aspect when it comes to existing customer's loyalty
- The majority of the inquired hotels think about sustainability practices as an important aspect when it comes to the retention of new customers
- The majority of hotel managers have some kind of obstacle in implementing environmental sustainability practices.

Following the same line of thought, it is also necessary to outline some hypothetic answers to the second research question, directed to the consumer's point of view. Therefore, to the question "What is the influence these practices have on the consumers?" some of the possible answers are:

- Most consumers are willing to change some of their habits/give up some comfort regarding energy, environmental and social sustainability in their hotel room for the same price
- Most consumers are more willing to have new features regarding social sustainability in their hotel room for a higher price than they are regarding energy and environmental sustainability
- Energy, environmental and social sustainability aspects do not influence the majority of the consumer's choice of hotel.
- When choosing a hotel, most consumers are more willing to pay more due to the social sustainability features the space offers than to pay more due to energy and environmental features
- On the overall price, the majority of consumers are not willing to more than 10 additional Euros over the base price they usually pay in hotels (depending on their rate), for sustainability practices.

The collected data is for analysing the reality of the theory (previously searched) on the geographic area (in this case) the study is being applied in. This data is then organized, analysed and compared in order to make some conclusions on the subject, either by similarity with the other study's results or by difference. The comparison is one of the tools that allows us to make richer conclusions, because besides affirmations based on the data, there is the possibility of affirmations acknowledging the evolution (positive or negative) of the topics over the years and across the globe. At the same tame, conclusions by comparison can result from information gathered at a benchmarking basis.

3.2. Research Methodology Adopted

This is a survey research about the presence of environmental sustainability practices in the supply chain of hotels and their influence on consumers. It is a qualitative research due to the nature of the study which is interpretative. The interpretative character derives from the fact that it is not being used any existing model but rather an empiric analysis of the collected data. All the existing studies were done with models that did not apply to both the presence of sustainability practices in hotels, and the consumers' dimension at the same time. It is also a study of exploratory nature as we try to find out what is the reality of a situation, reach new and updated conclusions and assess the overall stage of it. In this case, the goal is to find the reality of the hotels in Porto, Lisbon and Algarve regarding environmental sustainability practices and the consumers' reaction to those practices in 2018 (in the hotels' case) and 2019 (on the consumers' case). Therefore, we stand before a cross section data collection. Then, after evaluating the reality of these topics (the results) we will put them it in perspective with the world practices reality.

The methodology of this research was divided in three parts, them being the literature methodology, the data collection methodology and the data analysis methodology.

3.3. Literature methodology

After gathering all the documents with relevant information and analysis of that information, it started an organization of the main themes to approach on the literature review to have enough knowledge to proceed with the study. Those themes were Tourism, Services, Sustainability, Hotel's supply chains, Sustainability

in hotel's supply chains, Environmental sustainability in hotel's supply chains, Building construction in eco-services, Influence of sustainable practices on the social aspect of hotels, Benchmarking of sustainable hotel's supply chains. After the literature review, it was found the research gap of the presence of environmental sustainability practices on the supply chain of hotels joined at the same study with the influence of these practices on the consumers (and all of this specifically in Portugal). From there on, it was designed a methodology for the empirical part of the dissertation.

3.4. Data collection methodology

The data collection methodology was divided into two parts, each one according to one research question. The first part was directed to the hotels, to discovering what environmental sustainability practices they have and that is related to the first research question "On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve?" The second part was directed to the consumers, to discover the influence that the mentioned practices may have on them- related to the second research question "What is the influence these practices have on the consumers?"

The chosen hotels were all the hotels from the main Portuguese cities: Porto, Lisbon and Algarve. After Lisbon, Porto and Algarve are named as the second and third capitals of Portugal. These are the most urban and cosmopolitan cities, that attract more tourists in the continental area (meaning, excluding the islands Azores and Madeira). One of the objectives of this study, state in the Introduction chapter was analyse the existing differences on the sustainability practices implementation depending on the stars the hotels are rated on. Therefore, the study approached hotels with all the ratings, from 1 to 5 stars. So, respecting these criteria, the

contacted hotels were all the hotels from Porto, Lisbon and Algarve, regardless of the rating that were on the database of "Turismo de Portugal" (is the national touristic authority, inserted in the economy ministry of the Portuguese government).

Porto, Lisbon and Algarve were narrowed down to their metropolitan areas, in order to determine and segment exactly what the studied territory would be. The municipalities composing each metropolitan area were searched at the official website of each city. According to the Porto's metropolitan area's website ("Área Metropolitana do Porto (AMP)"), Porto's metropolitan area includes 17 municipalities, such as Arouca, Espinho, Gondomar, Maia, Matosinhos, Oliveira de Azeméis, Paredes, Porto, Póvoa de Varzim, Santa Maria da Feira, Santo Tirso, São João da Madeira, Trofa, Vale de Cambra, Valongo, Vila do Conde, and Vila Nova de Gaia. As for Lisbon, the metropolitan area was determined according to the information available at the Lisbon metropolitan area's website ("Área Metropolitana de Lisboa (AML)"), and the 18 municipalities are Alcochete, Almada, Amadora, Barreiro, Cascais, Lisboa, Loures, Mafra, Moita, Montijo, Odivelas, Oeiras, Palmela, Seixal, Sesimbra, Setúbal, Sintra, and Vila Franca de Xira. Last, Algarve's metropolitan area was defined from AMAL- Comunidade Intermunicipal do Algarve's website ("AMAL- Comunidade Intermunicipal do Algarve"), and the 16 municipalities are Albufeira, Alcoutim, Aljezur, Castro Marim, Faro, Lagoa, Lagos, Loulé, Monchique, Olhão, Portimão, São Brás de Alportel, Silves, Tavira, Vila do Bispo, and Vila Real de Santo António.

The database of "Turismo de Portugal", from where the hotel contacts were taken, has four searching possibilities: Tourist establishments, Tourist entertainment agents, Travel Agents and Tourism, and Local Accommodation. Inside the "Tourist establishments" section, there is the possibility of searching for municipality, and that is what was done do the final list of hotels that were going to be contacted. The results of the search present many types of establishments, such as: Hotel,

Apartment-hotel, Touristic apartment, Rural hotel, Camping park/Caravan, Lodge, Habitation touristic complex. The types of establishments chosen were all those including the term "hotel": Hotel, Apartment-hotel, and Rural hotel. So from all the criteria presented until now we can say that the chosen hotels were all the hotels, apartment-hotels or rural hotels from all the municipalities from Porto, Lisbon and Algarve that were present on the referred database.

The second part of the data collection methodology was concerning, as said, the consumers. The designed plan was to evaluate the influence that environmental sustainability practices may have on the consumer's choice on hotels, consumer's choice of accommodation details and make a critical analysis of that information, also relating it with the social and demographic data of the consumers.

The target audience was every consumer, regardless of age, gender, nationality, education, occupation, income, knowledge of sustainability practices, and periodicity of staying in hotels. So, the respondents were randomly selected from across the tourist regions of Algarve, Lisbon, and Porto, and included tourists in general, both national and international.

3.4.1. Criteria for the Selection of Research Strategies

For both parts of the study, a survey was developed in questionnaires. As mentioned, this thesis is a survey of exploratory nature, looking for qualitative information.

It is a survey because the investigation focused on how, what, when and where:

- How is the reality of sustainability practices in Portuguese hotels? How is the implementation of the practices? How is the acceptance of hotels to those practices? How is the importance given to these practices on the hotel's daily

basis? How the consumer's choice of hotel is influence by environmental and social sustainability aspects?

- What is the level of implementation of these practices on Portuguese hotels? What is the influence that sustainability practices have on consumers, what are the hotels with better level of implementation (depending on the demographic variables)? What hotels can relate economic improvement with the presence of environmental sustainability measures? What hotels consider sustainability practices very important to differentiation and competitive advantage? What hotels consider sustainability practices to have a lot of influence on the social responsibility of the hotel as a corporation? What hotels think about sustainability practices as a crucial aspect when it comes to customer loyalty? What are the hotels that have obstacles in implementing environmental sustainability practices? What are the obstacles? What consumers (depending on their age, gender, nationality, education, occupation, income, knowledge of sustainability practices, and periodicity of staying in hotels) are willing to change some of their habits/give up some comfort regarding energy, environmental and social sustainability in their hotel room for the same price? What consumers (depending on their age, gender, nationality, education, occupation, income, knowledge of sustainability practices, and periodicity of staying in hotels) are willing to have new features regarding social sustainability in their hotel room for a higher price than they are regarding energy and environmental sustainability? What consumers (depending on their age, gender, nationality, education, occupation, income, knowledge of sustainability practices, and periodicity of staying in hotels) are influence by energy, environmental and social sustainability aspects when choosing their hotel, what consumers (depending on their age, gender, nationality, education, occupation, income, knowledge of sustainability practices, and periodicity of staying in hotels) are more willing to pay more due to the social sustainability features the space offers than to

pay more due to energy and environmental features? What consumers (depending on their age, gender, nationality, education, occupation, income, knowledge of sustainability practices, and periodicity of staying in hotels) are willing to pay more than 10 additional Euros over the base price they usually pay in hotels (depending on their rate), for sustainability practices?

- When did Portuguese hotels started to adopt environmental sustainability practices?
- Where are located the hotels with better level of environmental sustainability practices implementation? Where are located the hotels that can relate economic improvement with the presence of environmental sustainability measures? Where are located the hotels which consider sustainability practices very important to differentiation and competitive advantage? Where are located the hotels that consider sustainability practices to have a lot of influence on the social responsibility of the hotel as a corporation? Where are located the hotels which think about sustainability practices as a crucial aspect when it comes to customer loyalty? Where are located the hotels that have obstacles in implementing environmental sustainability practices?

The exploratory nature is justified by the fact that we intend to find out about the present reality of environmental sustainability practices in hotels and if/how the consumers may be influenced by that, ask questions about it a assess that precise phenomena in the light of the Portuguese context (using Porto, Lisbon and Algarve for that).

The questionnaire was the data collection method selected due to the nature of the information pretended, that is, have knowledge about the presence of environmental sustainability practices in hotels and the influence of those practices on consumers, from what people report (in this case from what hotel managers and consumers report).

3.4.2. Research Strategy Adopted

There were two implemented questionnaires, one sent to the hotels (whose answers are information to the first research question) and one sent to the consumers (whose answers are information to the second research question). Both questionnaires had a part of implementation which was online. The use of an Internet-based survey to collect data is considered an immediate and effective means of response (Sheehan, 2006), and has been used by many researchers (e.g. (Han, Hsu, & Lee, 2009; W. Kim & Ok, 2009).

The distribution of the hotels' questionnaire was made online- by email (Appendix 1) to all the contacts presented on the "Turismo de Portugal" database ("National Tourism Registration- Turismo de Portugal database"), belonging to the hotels selected according to the referred criteria. The implementation started on the 9th of January of 2019 and ended on the 3rd of March of 2019. The implementation of the questionnaires for the hotels had two phases. The first phases consisted on the sending of the questionnaires to the hotels.

In Porto, the questionnaire was sent to 157 hotels in 15 of the 17 municipalities of Porto: Three hotels in Arouca, five in Espinho, seven in Maia, 15 in Matosinhos, two in Oliveira de Azeméis, four in Paredes, 89 out of 90 in Porto due to unavailable contact, 10 in Póvoa de Varzim, four in Santa Maria da Feira, five in Santo Tirso, two in São João da Madeira, two in Vale de Cambra, three in Valongo, three in Vila do Conde, and three in Vila Nova de Gaia. Gondomar and Trofa were not studied regions because for the first region, the one hotel did not have any valid contact available, and the database did not show any hotel on the second region. From this group of hotels, there are 12 of 5 stars, 52 with 4 stars, 41 rated with 3 stars, 49 of 2 stars and three with 1 star. Also, from the 157 effectively contacted establishments, 149 are hotels, five are apartment-hotels and three are rural hotels.

Lisbon counted with 306 hotels where 16 of the 18 municiplalities were contacted: one of two hotels in Alcochete because one is no longer open to public, seven hotels in Almada, three in Amadora, one in Barreiro, 33 of 35 in Cascais as one hotel did not have a valid contact and the other one closed, 206 of the 208 existent in Lisbon due to invalid emails, two in Loures, five of six hotels in Mafra also because of a closure, Moita did not present any hotel on the database, four in Montijo, none in Odivelas, nine in Oeiras, one in Palmela, one in Seixal, five in Sesimbra, 13 out of 15 in Setúbal due to both invalid contacts and hotel closing, 15 in Sintra, none in Vila Franca de Xira derived of a closure. In the 306 hotels the rating is distributed as the following: 49 hotels with 5 stars, 121 with 4 stars, 74 rated with 3 stars, 47 with 2 stars and 15 with 1 star. Also, two are rural hotels and 20 are apartment-hotels, while the other 284 are hotels.

As for Algarve, 251 were the contacted hotels, which are distributed by x of the x locations of Algarve: 79 of the 80 in Albufeira derived from an invalid email, one in Alcoutim, three in Aljezur, three in Castro Marim, 15 in Faro, 17 of the 18 in Lagoa due to invalid contacts, 23 of the 24 in Lagos because of an invalid email, 36 in Loulé, six in Monchique, four in Olhão, 25 out of 26 in Portimão also due to an invalid email, one in São Brás de Alportel, four in Silves, seven in Tavira, eight in Vila do Bispo, and 19 in Vila Real de Santo António. The rating at this city is 39 hotels with 5 stars, 118 with 4 stars, 65 with 3, 27 with 2, two with 1 star, and the establishment classification is the following: seven rural hotels, 78 apartment-hotels and the rest 166 are hotels.

In general, regardless of location, were contacted a total of 714 hotels, in which 100 are 5 stars, 291 are 4 stars, 180 of 3 stars, 123 with 2 stars, 20 with 1 star; and where 599 are hotels, 103 are apartment-hotels and 12 are rural hotels. From these 714 hotels, 28 answered.

The second phase consisted in sending a second email as a reminder for the hotels to answer the questionnaire. This reminder was sent nearly a week after the sending of the first email.

Regarding the objectives, the questionnaire directed to the hotels has the specific objectives of evaluating the presence of environmental sustainability practices on hotels, on the areas of sustainable materials, building/planning and sustainable design, conservation and water treatment, reduction and waste treatment, energy (general), solar power, wind power, hydropower and wave power, geothermal power, biomass, other general environmental sustainability practices, general internal tools of environmental sustainability management, environmental management certifications. To evaluate all of these aspects and then provide a critic view of it, the questionnaire also inquires about hotel profile like star rating, location, capacity, opening year, number of years that has been open to public, knowledge of sustainability practices, year of implementation of the first practices or upgrades and in which area, hotel environment, and obstacles of implementation (Appendix 2).

Most of the collected information is of qualitative character. However, there is also quantitative data. Even though the majority of the questions are of closed answer, there are many optional questions depending on the answer given to the previous question, and that requires a qualitative management.

Regarding the other section of the thesis, the implementation of the consumers' questionnaire was made both digitally and in person. The digital implementation was a self administered questionnaire on social media and also sent to the hotels in the same email the hotel's questionnaire went, asking the hotels collaboration in distributing the questionnaire by its consumers. Using the convenience sampling method, the target audience here was any consumer, regardless of their social and demographic characteristics. It started on the 18th of January of 2019 and ended on

the 3rd of March of 2019. The on-site implementation consisted on two non consecutive days in downtown Porto where an approach was made to the citizens that were willing to contribute, answering the same questionnaire that was launched online.

Unlike the hotel's study, where only environmental sustainability practices were evaluated, the consumers' study includes other dimension of the Triple Bottom Line (TBL), the social dimension. The questionnaire evaluates the influence that environmental, energetic and social sustainability practices may have on consumers. Considering that the application of green practices by companies is market driven, i.e. is influenced by consumer behaviour, it is important to characterize the perception of consumers towards sustainable services. Consumers' recommendations must be taken into account to identify the practices that play an essential role in the sustainability increase of the hospitality industry. Therefore, the focus of this questionnaire is to explore current consumers´ perceptions and recommendations towards sustainability practices, for the hospitality industry. Specifically, the objectives of the questionnaire are: knowing the consumers' willingness to change some features of their stay for the same or higher price, and the consumers' consideration of sustainability practices on the moment of choosing accommodation. Both objectives were processed through questions on the three mentioned sections: environmental, energetic and social. There was also made a social and demographic evaluation to the consumers in order to segment the answers and relate them to consumers' profiles (Appendix 3). After removing incomplete and unusable responses, a total of 188 usable questionnaires were kept.

3.4.3. Design Methodology

The questionnaire methodology was chosen over the interview's methodology due to the nature of the needed information. The majority of the information

concerned is obtained through questions with closed answers. Therefore, the questionnaire was the most suitable method.

Questionnaire Design- Hotels

The survey questionnaire to collect data for this research was structured as follows: the first about the hotel profile, the second focus environmental sustainability practices present on the hotel, and the third touches aspects directly related/that influence the implementation and presence of the practices.

The first section presents questions about the hotel profile, such as city of location; year of opening; star rating; accommodation capacity; position the respondent has on the hotel; importance given to environmental sustainability practices on the economic performance of the hotel, on differentiation and competitiveness of the hotel in the sector, on the corporate social responsibility (CSR) of the hotel, on existing customer's loyalty, and on new customer's retention. This section has 10 questions and the majority is of closed answer: eight of multiple choice where five are a Likert scale, and then two with open answer where one can only be a number.

On the second section we can find very objective and clear questions about the presence of environmental sustainability practices on the hotels. There are 14 questions, all of them are of checkbox's answers (meaning the respondent can check more than one box per question), and the questions are about the following sub areas of the environment: site development, sustainable materials, building (sustainable design planning), conservation and water treatment, reduction and waste treatment, energy (general), solar power, wind power, hydropower and wave power, geothermal power, biomass, other environmental sustainability practices, general internal tools of environmental sustainability management, and environmental management certifications. The average number of choices per question is 8 and all

of the questions have both a "none" and an "other" option as a checkbox to enable the acquirement of more information.

The third and last section has 23 questions, where 11 are multiple choice questions, nine are opened questions, and the rest are checkboxes. The section consists on acknowledging some details that change from hotel to hotel/details that influence the implementation and presence of the practices and, therefore, make a difference when analysing the answers to the previous section. The details, on its turn, can be divided in three subsections. On the "functioning years" section where the details are if the hotel was always opened to public from the moment of its inauguration, in case of temporary closing or the if that was related to the implementation of environmental sustainability practices (and if so, in what areas). Then there is the "practices' implementation and hotel atmosphere" approximate year of implementation of the first practices, areas of the first practices and which practices, upgrades on the existing practices or on the implementation of new ones, areas of the upgrades and which upgrades, if the consumer can identify and environmental-friendly atmosphere on the hotel in general/decoration/furniture/surrounding landscape, barriers to the implementation of new environmental sustainability practices and which. The third subsection covers the "environmental sustainability knowledge of the hotel", namely if this questionnaire contributed to the hotel's environmental awareness and to the possible implementation of new practices (and which ones), and if they had knowledge about the majority of the presented practices and in what areas.

Overall all, the questionnaire is extensive, with a total of 47 questions but the length was necessary to evaluate the state of the hotel regarding every relevant environmental sustainability subarea. It was designed taking into consideration the interpretation the participant would do to it depending on the order of the questions.

These questions were written on an interrogation basis and directed to the hotel (and not to a person, meaning, not on a first person model) (Appendix 2).

Questionnaire Design- Consumers

The questionnaire directed to the consumers has a similar organization compared to the hotels questionnaire because it can also be divided in sections, in this case four. A first section focusing on the socio-demographic information of the respondents and the other three sections focusing on the respondents' perceptions related to three main dimensions of sustainability associated to green hotels (energy sustainability, environmental sustainability and social sustainability). In contrast to what was presented in the literature review section (in which the energy was one of the areas within the environment dimension), here there is an energy section and an environmental section. This division is justified by two reasons. First, the fact that energy is the biggest area (in terms of content) inside of the environment sustainability practices. Second, the fact that is the area where sustainability practices are most dependable of the consumer's decisions. After the implementation of the physical mechanisms of energy's sustainability practices, it is the decision of the consumer to whether use it or not, e.g., leave the air conditioning on while out or during the night, use the fridge, turn on all the lights in the room.

So, the first consumers' questionnaire section is where respondents are asked about their personal information. It has eight questions about their age, gender, country, education, area of occupation, income, sustainability knowledge, and periodicity of staying in hotels, where six are multiple choice, one is a Likert scale question, and the other is an open question.

The second, third and fourth sections ask what the consumer would be willing to give up for the same price, what he/she would be willing to pay more for, if the

sustainability features are a factor when choosing accommodation, and whether or not they would be willing to pay more in general for sustainability solutions the hotel offers. All of these questions, with a total of 12, are made on the second, third and fourth sections of the questionnaire, where the changing item are the answering options, according to the sustainability area (energy, environment or social). In each of these sections there are four questions where two can be answered by multiple choice and the other two obey to a Likert scale. The average number of choices per multiple choice question on the three sections is six and all of this type of questions have an "other" option as a checkbox to enable the acquirement of more information. It is relevant to mention that the multiple choice question are not checkboxes because even though it made sense for the participant to choose more than one option, we want to know what option the customer prefers, in order to, consequently, give insights to the hotels on what sustainability practices to adopt). For that reason, the question statement says "(...) I would be more willing to:" instead of "I would be willing to". At the end of the three sustainability areas' sections, there is a final question that is not related to any sustainability area, however, it is not considered a fifth section on its own. That question inquires about the added value the consumers would be willing to pay on the final price to stay in a hotel with practices on energetic, environmental and social areas (starting from the base price they usually pay in hotels, depending on their rate: 1 to 5 stars).

This questionnaire can be taken in Portuguese or in English because, like mentioned before, the target audience is any consumer. It is a less than half shorter questionnaire than the hotels', with 21 questions and its length was necessary to know the consumers' perspective not only about practices on the three areas but also about general aspects of hotel accommodation. It was also written on an interrogation basis (like the hotel's questionnaire), but the questions are directed to the consumer in the first person. This type of addressing was chosen to make it easier to the consumer to imagine himself/herself on the described situation (Appendix 3).

3.5. Data analysis methodology

3.5.1. Evaluation method of hotel's study

The goal is to answer to the question "On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve?" Like explained on the introduction of the research methodology chapter, the level of environmental sustainability practices on supply chains evaluates the existing quantity of goods and services that are as less polluter/resource destructor as possible. A high quantity is a positive evaluation and a low quantity is not as positive as it could be. A high or a low evaluation is given according to the totality of practices named on the literature review. So, this evaluation is going to be executed by an empirical model created for this study and not by an existing model due to the fact that previous models were applied to studies of the hospitality industry with different characteristics. Also, it was not found a study that gathered both hotel's sustainability practices and the consumers' point of view. For those reasons an empirical path was chosen.

As presented in the body of the literature review and in design methodology of the research methodology, the areas where the hotels are inquired are site development, sustainable materials, building (sustainable design planning), conservation and water treatment, reduction and waste treatment, energy (general), solar power, wind power, hydropower and wave power, geothermal power, biomass, other environmental sustainability practices, general internal tools of environmental sustainability management, and environmental management certifications. The site development theme presents five environmental sustainability practices, sustainable materials eight questions, sustainable building has eight, conservation and water treatment has 11, reduction and waste treatment has 22,

energy in general has six, solar power has two, wind power has one, hydropower and wave power has one, geothermal power has one, biomass has four, other environmental sustainability practices has five, general internal tools of environmental sustainability management has nine, and environmental management certifications has seven. Based on these numbers there is a total of 90 environmental sustainability practices. If the level of presence of environmental sustainability practices on the supply chain of 1, 2, 3, 4 and 5 star hotels in Porto, Lisbon and Algarve is divided in three, then we can say that an hotel that comprehends between zero and 29 practices has a low level, a hotel that has between 30 and 59 implemented practices has a medium level, and a hotel that presents between 60 and 90 functioning practices has a high level of presence. This model was partly based on the study of Al-Aomar & Hussain because this last one is very similar to the one being conducted on this dissertation as well as the way the results are presented (in view of how we pictured them) (Al-Aomar & Hussain, 2017).

The rest of the evaluation of the hotel's questionnaire's results is based on the answers to the questions present on the other sections of the questionnaire, first and third. This section does not have the main information but has secondary information to enrich the conclusions. Through the hotel's profile we can reach fair conclusions depending on the hotel's age, location, rating and its occupation capacity (first section) and, at the same time, details about the implementation of practices allows us to go further on the knowledge obtained with the research (third section). Also, having an insight about the importance hotels give to environmental sustainability practices on many aspects (like economic performance, differentiation and competitiveness of the hotel in the sector, corporate social responsibility (CSR), existing customer's loyalty, and new customer's retention) enlarges our contextualization and, therefore, the chance of better analysis. All of these aspects are additional data that complements the study and leads us to more reliable and fair

conclusions when added and crossed with the main data (the environmental sustainability practices present on the hotels).

All the data was analysed in Microsoft Office 2007, and presentation and discussion model is the following: the data is presented and analysed first in absolute values (numbers) and then in percentage; when the data involves rating scales we present 4, 3, 2, 5 and 1 star hotels, for this order thus is in sample representation order (4 star hotels are the most represented and 1 star hotels are the ones with the lower number); regarding discussion the data of each questioned is analysed and when suitable, the data of various questions are analysed between them, as well as with some demographic variables of the hotels.

3.5.2. Evaluation method of consumer's study

The evaluation of the consumers' data will respond to the question "What is the influence these practices have on the consumers?" and will also be done by empirical work, in similarity to the hotel's questionnaire and for the same reasons. As said, "Influence" refers to the consequences sustainability practices may have on consumers, and that consideration will be done by a general analysis of the data collected from the consumers.

Both questionnaires (hotel's and consumer's questionnaire) present environmental sustainability practices (and the consumer's questionnaire also presents social practices). However, there are some practices that appear in the consumer's questionnaire that do not appear on the hotel's questionnaire. That is justified by the fact that among all the environmental sustainability practices, these ones were not the most relevant from the hotel implementation point of view but were relevant from the point of view of the consumer and the consumer's choice.

4. Presentation and discussion of results

4.1. Introduction

This chapter presents the data collected from the implemented questionnaires. Therefore, it presents the data collected from the hotels regarding the presence of environmental sustainability practices on their supply chains, and the influence of sustainability practices on the consumers as well. The data is properly organized, by theme/research question, and according to the previously explained evaluation methods in order to facilitate the line of thought of the discussion and conclusions' chapter. It also takes place the discussion of the results facing the presented literature. The discussion of the results is done along the presentation of the results, so it is easier to associate the conclusions to the exposed data and to the respective figures/tables.

4.2. Results' presentation and discussion

4.2.1. Hotels' questionnaire

Starting on the results obtained from the questionnaires directed to the hotels, we can say that from a total of 714 hotels that received the email with the questionnaire, there were a total of 28 answers.

First section- Hotels' profile

From these 28 answers, five were from hotels in Porto, 14 hotels in Lisbon and nine hotels in Algarve (Figure 2), so the major hotel sample representation is located in Lisbon (50%), and then Algarve (32%), and then Porto (18%).

All the 28 hotels have an opening year comprehended between 1956 and 2018, in which two are from 1989, two from 1999, two from 2000, two from 2017 and four from 2009. The other years register one hotel each. Here, the year with more openings is 2009 with a two hotel difference to the other years with more hotel openings which are 1989, 1999, 2000 and 2017 (with two each). The years 1956, 1962, 1967, 1970, 1977, 1991, 1995, 1998, 2005, 2007, 2008, 2011, 2012, 2013, 2016, 2018 only have one opening per year.

The hotel rating (until the end of 2018) of the sample is one hotel with 1 star, five hotels with 2 stars, six hotels with 3 stars, 12 hotels with 4 stars and four hotels with 5 stars (Figure 3). The analyzed hotels are mostly 4 star hotels (43%), followed by 3 star hotels (21%), 2 star hotels (18%), 5 star (14%), and 1 star hotels (4%).

The accommodation capacity of the hotels was revealed to be very distributed for the following values: no hotel chose the option less than 10 people, two hotels with capacity to accommodate between 10 and 30 people, four hotels have capacity for 31 to 50 people, three hotels have facilities for 51 to 70 people, one hotels accommodates between 71 and 90 people, another hotels can have between 91 and 110 customers at the same time, another hotel accommodates more than 110 people, four hotels have room for more than 200 people and 12 hotels can accommodate more than 300 customers at once (Figure 4). This reveals almost half of the inquired hotels have an accommodation capacity of over 300 people. 14% of the hotels accommodate more than 200 people, other 14% have capacity for 31 to 50 people, 11% can check in

between 51 and 70 people at the same time, and the other five capacity groups have an expression of less than 10%, being 10 to 30 people (7%), more than 110 people (4%), 91 to 110 people (4%), 71 to 90 (3%), and less than 10 people (0%).

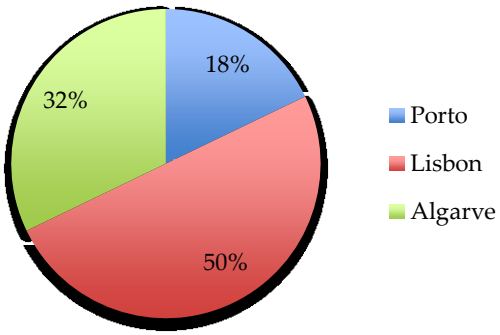

Figure 2. Hotels' location

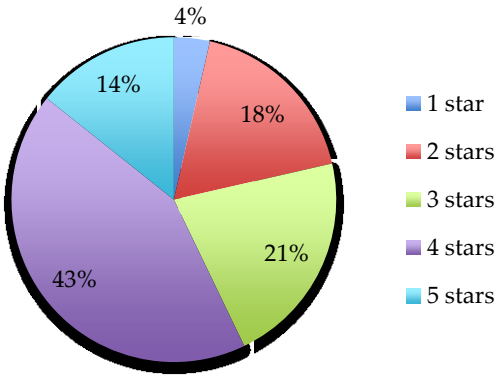

Figure 3. Hotels' star categories

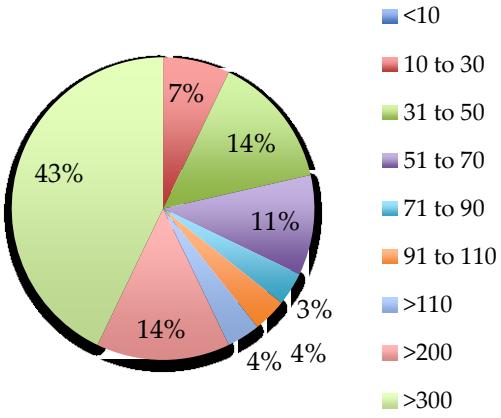

Figure 4. Accommodation capacity-number of people

The question of what role the respondent has on its hotel was an opened question so there are diversified answers like Administration Assistant (five people), Administration (eight people), Receptionist (three people), Reception Manager (two people), Commercial (one person), Quality, Environment and Safety Manager (two people), General Director (five people), Human Resources Manager (one person), Hazard Analysis and Critical Control Point - HACCP (one person). The frequency of

each one of these roles may be seen in Appendix 4. We can see that the respondent category with more answers is the Administration (28.6%), followed by Administration Assistant (17.9%) and General Director (17.9%). The other categories have a number of answers comprehended between three and one, namely Receptionist (10.7%), Reception Manager (7.1%), Quality, Environment and Safety Manager (7.1%), Commercial (one), Human Resources Manager (one), and HACCP (one).

We can now establish a relation between the demographic data of the respondent hotels. Regarding location and hotel rating, we can say that the 4 star hotels (which represent 43% of the sample) are mainly localized in Algarve (five hotels), then Lisbon (four) and Porto (three). The next rating with most representation is 3 stars (21%) with four hotels in Lisbon, one in Algarve and no hotel in Porto. 18% of the hotels are 2 star hotels and unlike the hotels with the previous rating, there are no 2 star hotels in Algarve, there are three in Lisbon and two in Porto. 5 star hotels, with a representation of 14% are again mainly present in Algarve (three hotels) and then Lisbon (one) and Porto (zero). There is only one hotel with a rating of 1 star and is located in Lisbon. When analysing by geographic location we can say Porto has three 4 star hotels, two 2 star hotels and no hotel with 1, 3 and 5 stars. Lisbon has five hotels with a 5 star rating, four hotels with 4 stars, three hotels with 2 stars, one hotel of 5 stars and one hotel of 1 star. Algarve, on its turn, has five 4 star hotels, three 5 star hotels, one with 3 stars and no hotel with either 1 or 2 stars.

Regarding rating and capacity, the predominant capacity in 5 stars hotels is more than 300 people (three hotels) and one hotel with "31 to 50 people". The 4 star hotels also have mainly hotels with more than 300 people (seven hotels), followed by two hotels with more than 200 people, two hotels with 51 to 70 people and one hotel with 91 to 110 people. About 3 star hotels we can say the capacity distribution is balanced as there are two hotels with more than 300 people and the other capacity ranges have

one hotel each, namely more than 200, more than 110, 71 to 90 and 31 to 50 people. The same is presented on 2 star hotels: two hotels with 31 to 50 people, one with more than 200 people, one with 51 to 70 and one with 10 to 30 people. As mentioned previously there is only one hotel with 1 star and it has the capacity of 10 to 30 people. With this analysis we can see that 58.33% of the 4 star hotels are also hotels in the category of more than 300 people and the other percentages (16.7%, 16.7% and 8.3%) are divided by "more than 200 people", "51 to 70 people" and "91 to 110 people" respectively; 33.3% of the 3 star hotels are "more than 300 people" hotels as the remaining 66.67% are equally distributed by "more than 200", "more than 110", "71 to 90" and "31 to 50" with one hotel each; 40% of the 2 star hotels accommodate between 31 and 50 people as the other 60% is equally distributed by "more than 200", "51 to 70" and "10 to 30" with one hotel each; 75% of 5 star hotels are hotels with room for more than 300 people and the other 25% are represented by a hotel with 31 to 50 people. This relation between the variables of rating and capacity allows us to associate high star rating to high accommodation capacity because the large majority of hotels which accommodate more than 300 people are 4 and 5 star hotels and all the hotels that have capacity for more than 300 people are 3, 4 and 5 star hotels.

Once hotels location and capacity have been separately analyzed, we can now relate them. Within the respondent hotels, Porto's hotels accommodate mainly between 31 and 50 people (two hotels) and the other ranges present in Porto are more than 300 people (one hotel), 91 to 110 people (one), and 51 to 70 people (one). Lisbon has predominance to hotels with more than 200 people (four hotels), leaving the ranges of more than 300 people, 51 to 70, 31 to 50, 10 to 30 with two hotels each, and more than 110 people and 71 to 90 people with one hotel each. On its turn, Algarve has only hotels to more than 300 people, specifically nine. Therefore, 40% of Porto's hotels accommodate between 31 and 50 people and the other 60% of the hotels are either "more than 300 people", "91 to 110" and "51 to 70 people" (one hotel each); 28.6% of Lisbon hotels have room for more than 200 people, 14.3% is the

percentage of the hotels on some categories (more than 300 people, 51 to 70 people, 31 to 50 people and 10 to 30 people) and 7.1% correspond to the percentage attributed to "more than 110" and "71 to 90 people"; and 100% of the hotels in Algarve are hotels for more than 300 people. With this analysis we can say there is a connection between location and capacity, specifically that hotels' capacity increases as more south the hotel is located. The group capacity with more registered hotels in Porto is 31 to 50 people, in Lisbon is more than 200 people and in Algarve only exists the "more than 300 people" category.

All of these respondents (Appendix 4) have different considerations relating to the importance of environmental sustainability practices to the economic performance of the hotel, to the differentiation and competitiveness, to the corporative social responsibility (CSR), to the existing customer's loyalty, and to the new customer's retention of the hotel. These considerations were evaluated on a Likert scale of one to five where one represents "Not important at all", two- "Little bit important", three- "Important", four- "Very Important" and five means "Crucial" (Boone Jr. & Boone, 2012).

On the importance of environmental sustainability practices to the economic performance of the hotel, one hotel chose one, no respondent chose two, two hotels chose three, nine hotels chose four, and 16 respondents, chose five, "Crucial" (Figure 5). So 57.1% of the hotels chose option five, 32.1% chose option four, 7.1% opted for option three and 3.6% chose option one. This means that it is clear more than half of the hotels (16 hotels) consider environmental sustainability practices a crucial aspect on the economic performance of the hotel and only a small portion of hotels (three) chose the downer options of the scale.

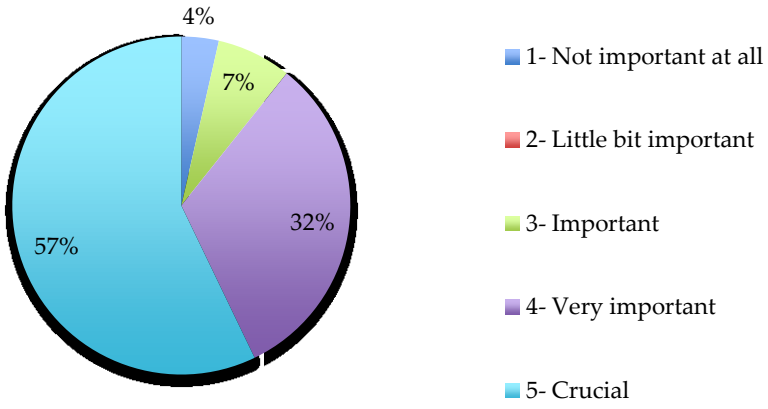

Figure 5. Environmental sustainability practices on economic performance of the hotel

Relating the answers on Figure 5 to hotel rating, the majority of 4 star hotels (eight) chose option five and the other four chose option four. The majority of 3 star hotels (four) chose option five and the other two hotels chose options four and one. 2 star hotels have their voting divided mostly between options five (two hotels), three (two hotels) and four (one hotel). The majority of 5 star hotels (three) chose option four and the other hotel chose option five. The one star hotel chose option five. So, 66.7% of 4 star hotels chose option five and the other 33.3% chose option four, 66.7% of 3 star hotels chose option five, 80% of 2 star hotels have their voted divided by options five and three, 75% of 5 star hotels chose option four and the other 25% opted for option five. We can see that within each star rating, the majority of the hotels chose the two higher options on the scale (four and five), except for the 2 star hotels. So, here we cannot establish a direct relation between high rated hotels and awareness of the importance of environmental sustainability practices on the economic performance of the hotel. We can say the hotels that are aware of that subject do not belong to any specific rating.

When relating the answers on Figure 5 to the location we can see that the majority of all location hotels chose option five: four of Porto hotels (and the other one chose option three), seven of Lisbon hotels (and the other seven are distributed by the other scale options that had votes, namely five hotels in option four, one in option

three and one in option one); six of Algarve hotels (and the other four chose option four) This means that the choice for option five of the Likert scale was adopted by 80% of Porto hotels, 50% of Lisbon hotels and 66.7% of Algarve's. With this analysis we can conclude that environmental awareness regarding economic performance does not vary exponentially with location.

Regarding capacity, if we analyse the groups of capacity accommodation with more expression on the general picture, which are the groups of more than 300 people (43%), more than 200 people (14%), 31 to 50 people (14%), 51 to 70 people (11%) and 10 to 30 people (7%), we can see that seven of the hotels that can accommodate more than 300 people chose option five and the other five chose option four; three of the hotels with more than 200 people chose option four and the other one chose option five; the category of 31 to 50 had four votes of different rates (on the Likert scale), namely one, three, four and five; the three hotels with a "51 to 70" capacity chose option five; and the two hotels that can accommodate between 10 and 30 people chose options three and five. So, 58.3% of "more than 300 people" hotels chose option five and rest (41.7%) chose option four; 75% of the "more than 200 people" hotels chose option four and the remaining 25% chose four; and 100% of the "51 to 70" hotels chose option five. Like on the two previously analysed variables, it is not possible to establish a direct relation between hotels' capacity and awareness of the importance of environmental sustainability practices on the economic performance of the hotel because the majority of the hotels chose the highest options on the scale (four and five) regardless of their accommodation capacity.

If we also relate the information of Figure 5 to the opening years of the hotels, mentioning only years where more than one hotel opened: hotels opening in 2009 (four hotels) chose mostly option five; hotels that opened in 1989 (two) chose options four and five; the two hotels opening in 1999 chose three and five; the 2000's hotels both chose five; and the two hotels opening on 2017 chose options four and five.

From the 12 hotels mentioned above 66.7% of them chose option five of the scale, 25% of them chose option four and the remaining hotel (8.3%) chose option three. So, all the choices (that happen to reveal a high level of awareness regarding the influence of environmental sustainability practices on the economic performance) are not centred in any opening year, meaning that awareness of the hotels on this subject the does not vary with opening years.

About the importance of environmental sustainability practices to the differentiation and competitiveness of the hotel in the sector, one hotel answered one, one hotel chose option two, three hotels chose option three, 10 chose four, and 13 chose environmental sustainability practices as crucial do hotel differentiation and competitiveness. (Figure 6). This means 46.4% hotels consider environmental sustainability practices a very important aspect on the competitiveness of the hotel, 35.7% still consider it important but not crucial (option four), 10.7% chose the middle option, 3.6% chose option two and also 3.6% consider environmental sustainability practices as not important at all to hotel competitiveness. As we can see, the raising of the number of votes increases along the scale meaning the big majority of the hotels, 26 in 28 (which is 92.9%) recognize the importance of this theme (had having vote in options between three and five) on hotel differentiation and competitiveness.

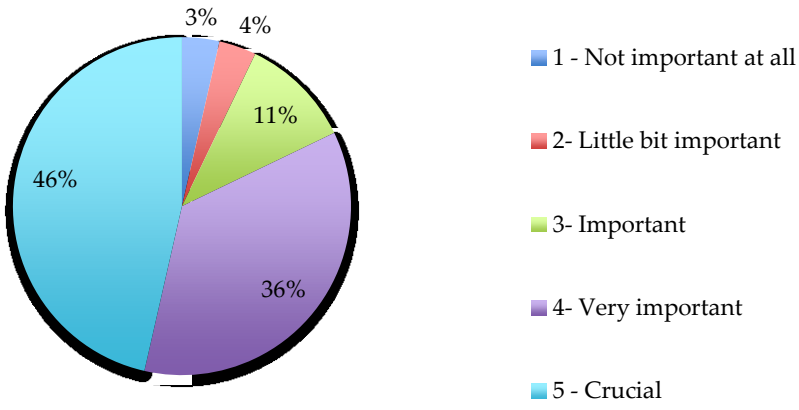

Figure 6. Environmental sustainability practices on hotel competitiveness

Comparing the previous answers to the demographic data of the hotels, is it suitable to compare them to the four variables (hotel rating, location, accommodation capacity, opening years).

Relating the answers on Figure 6 to hotel rating, the majority of 4 star hotels (seven) chose option five and the other five chose option four. The choices 3 star hotels were mostly divided between options five (two) and three (two), and then options one and four (one each). 2 star hotels had two choices on option five and then one in each one of the following options of the scale: two, three and four. The majority of 5 star hotels (three) chose option four and the other hotel chose option five. The one star hotel chose option five. So, 58.3% of 4 star hotels chose option five and the other 41.7% chose option four; 33.3% of 3 star hotels chose option five, other 33.3% chose option three and the remaining 33.4% were distributed by options one and four; 40% of 2 star hotels chose option five and other 60% have their voted divided by options two, three and four; 75% of 5 star hotels chose option four and the other 25% opted for option five. Similarly, as in Figure 5, we can see that within each star rating, the options that are more concentrated are the three higher options on the scale (three, four and five). So, here we cannot establish a direct relation between high rated hotels and awareness of the importance of environmental sustainability practices on hotel differentiation and competitiveness. We can say that the hotels that have awareness on the subject have it regardless of their rate.

When relating the answers on Figure 6 to the location we can see that the majority of Porto and Algarve hotels chose option five: three of Porto hotels (and the other two chose options three and four) and five of Algarve hotels (and the other four chose option four). As for Lisbon hotels, there is a more heterogeneous option distribution: five hotels chose option five, five chose option four, two chose three, one chose two and one chose one. This means that 60% of Porto hotels and 55.6% of Algarve hotels chose option five, and that 35.7% of Lisbon hotels chose option five

and other 35.7% chose option four (while the other 28.6% opted for options three, two and one). With this analysis we can conclude that environmental awareness regarding hotel differentiation and competitiveness does not vary exponentially with location.

Regarding capacity, like on the analysis of Figure 5, we will make considerations about the groups of capacity accommodation with more expression on the general picture. We can see that six of the hotels that can accommodate more than 300 people chose option five and the other six chose option four; two of the hotels with more than 200 people chose option four and the other two chose options two and five; the category of 31 to 50 had four votes of different rates (on the Likert scale), namely one, three, four and five; the three hotels with a "51 to 70" capacity chose option five; and the two hotels that can accommodate between 10 and 30 people chose options four and five. So, 50% of "more than 300 people" hotels chose option five as the other 50% chose option four; 50% of the "more than 200 people" hotels chose option four and the remaining 50% chose options two and five; 100% of the "51 to 70" hotels chose option five; and the hotels of "10 to 30 people" have 50% on option four and 50% on option five. Like on the analysis to the same variable on the previous figure (5) it is not possible to establish a direct relation between hotels' capacity and the awareness on the importance of environmental sustainability practices on the hotel differentiation and competitiveness because the majority of the hotels chose the highest options on the scale (four and five), regardless of their accommodation capacity.

If we also relate the information of Figure 6 to the opening years of the hotels, mentioning only years where more than one hotel opened: from the four hotels opening in 2009 two hotels chose option five and the other two voted for options three and four; the hotels that opened in 1989 (two) chose options four and five; the two hotels opening in 1999 chose three and four; the 2000's hotels both chose five;

and the two hotels opening on 2017 chose options four and five. From the 12 hotels mentioned above, 50% of them chose option five of the scale, 33.3% of them chose option four and 16.7%% chose option three. The average of the choices are not centred in any opening year so the awareness of the hotels on this subject the does not vary with opening years.

Regarding the importance of environmental sustainability practices on the CSR, no respondent chose the option one or two, one 3.6% of the respondents chose three, eight chose four, and 19 chose five (Figure 7). So 67.9%of the hotels consider environmental sustainability practices a crucial aspect on the CSR, 28.6% consider it important, 3.6% chose the middle option, and 0% chose the lower options, meaning no hotel thinks environmental sustainability practices do not have any impact on the CSR. Like the analysis of Figure 6 on this variable, the raising of the number of votes increases along the scale. However, on this case 100% of the hotels recognize the importance of this theme (had having vote in options between three and five) on the CSR.

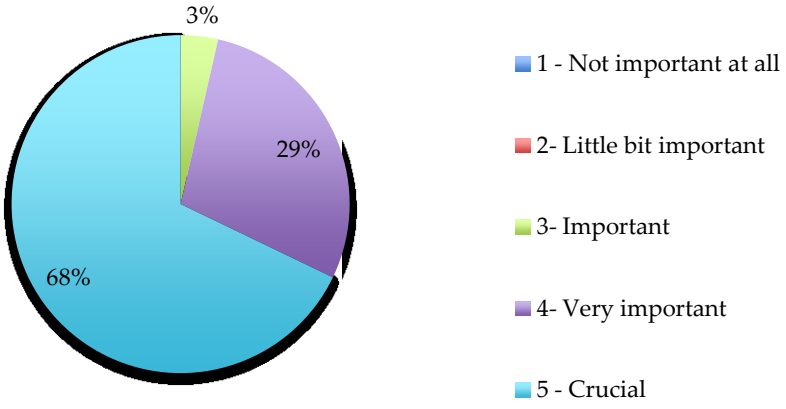

Figure 7. Environmental sustainability practices on the CSR of the hotel

Comparing the previous answers to hotel rating, the majority of 4 star hotels (seven) chose option five and the other five chose option four. Five in six 3 star hotels chose option five and the other one chose four. 2 star hotels had three choices on option five and then one in option three and other one in option four. The majority of

5 star hotels (three) chose option five and the other hotel chose option four. The one star hotel chose option five. So, 58.3% of 4 star hotels chose option five and the other 41.7% chose option four; 83.3% of 3 star hotels chose option five and 16.7% chose four; 60% of 2 star hotels chose option five and other 40% have their voted divided by options three and four; 75% of 5 star hotels chose option five and the other 25% opted for option four. Similarly, as in Figure 6, we can see that within each star rating the options that are more concentrated are the higher options on the scale only this time are just options four and five (as there was only one choice for three and no choices for the two lower options). So, here we cannot establish a direct relation between high rated hotels and awareness of the importance of environmental sustainability practices on the CSR.

When relating the answers on Figure 7 to the location we can see that unlikely the analysis made of the this variable with the information available on Figure 6 the locations whose the majority of the hotels chose option five are not Porto and Algarve but Lisbon and Algarve. 12 of Lisbon hotels opted for option five and the other two chose option four, while five of Algarve hotels chose option five and the other four chose option four. As for Porto hotels, there is a more heterogeneous option distribution: two hotels chose option five, two chose option four and the other one chose three. This means that 85.7% of Lisbon hotels and 55.6% of Algarve hotels chose option five, and that 40% of Porto hotels chose option five and other 40% chose option four (while the other 20% opted for option three). With this analysis, we can conclude once more that environmental awareness regarding CSR does not vary with location.

Regarding capacity, like on the analysis of Figures 5 and 6, we will make considerations about the groups of capacity accommodation with more expression on the general picture. We can see that eight of the hotels that can accommodate more than 300 people chose option five and the other four chose option four; two of

the hotels with more than 200 people chose option five and the other two chose four; the category of 31 to 50 had four votes in option five and one in three; two of the three hotels with a "51 to 70" capacity chose option five and other opted for four; and the two hotels that can accommodate between 10 and 30 people both chose option five. So, 66.7% of "more than 300 people" hotels chose option five as the other 33.3% chose option four; 50% of the "more than 200 people" hotels chose option five and the remaining 50% chose option four; 75% of "31 to 50" hotels voted for five and the other 25% stayed on three; 66.7% of the "51 to 70" hotels chose option five and the rest (33.3%) voted option four; and the hotels of "10 to 30 people" have 100% of the voted on option five. Like on the analysis to the same variable on the previous figure (6) it is not possible to establish a direct relation between hotels' capacity and the awareness on the importance of environmental sustainability practices on CSR because the choice distribution is regardless of their accommodation capacity.

If we also relate the information of Figure 7 to the opening years of the hotels (and following the same method used on analysis of this variable on Figures 5 and 6), from the four hotels opening in 2009 three hotels chose option five and the other voted four; the hotels that opened in 1989 both chose five; the two hotels opening in 1999 chose three and five; the 2000's hotels (two) opted for options four and five; and the two hotels opening on 2017 chose only option five. From the 12 hotels mentioned above, 75% of them chose option five of the scale, 16.7% of them chose option four and 8.3%% chose option three. This means that awareness of the hotels on the importance of environmental sustainability practices on CSR does not vary with opening years.

Before moving for the analysis of the next figure, we can say that in general, hotels (regardless of their rating, location, capacity or opening year) consider that environmental sustainability practices are more important in CSR than in economic performance or in hotel differentiation and competitiveness. This conclusion is

possible due to the nonexistence of choices on options two and one (from the Likert scale) on the analysis of all the variables in comparison to the information on CSR (Figure 7), unlike the previous figures (5 an 6) about economic performance and hotel differentiation and competitiveness.

The considerations of the respondents about the importance of environmental sustainability practices on the existing customer's loyalty were the following: no respondent considered it not important, one chose option two, seven chose three, 12 chose four, and eight chose five, meaning they considered it a crucial aspect (Figure 8). So for the first time since Figure 5 option four (42.9%) has more votes than five (28.6%), followed by option three with 25% and two with 3.6%. The majority of the hotels consider environmental sustainability practices important on an existing customer's loyalty but not crucial.

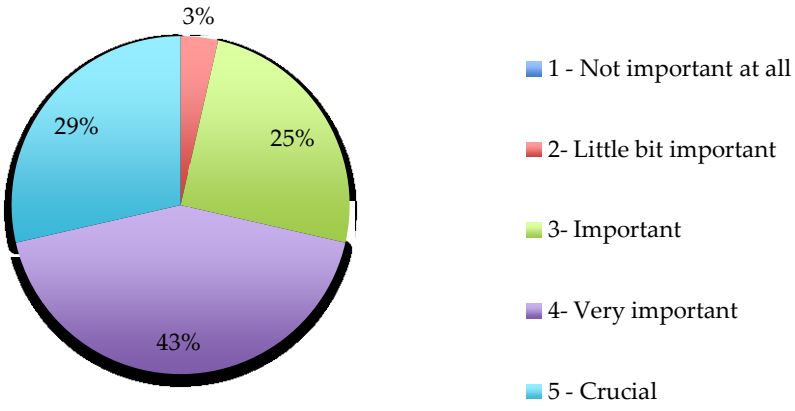

Figure 8. Environmental sustainability practices on existing customer's loyalty

If we do a more extensive analysis, that consideration (stated on the previous paragraph, before the figure) might vary with the demographic variables.

Comparing the answers of Figure 8 to hotel rating, the majority of 4 star hotels (seven) chose option four and the other five chose options three and five. Four in six 3 star hotels chose option four and the other two chose options two and three. 2 star hotels had three choices on option five and the other two in option three. Half of 5

star hotels (two) chose option three and the other half voted for options four and five. The one star hotel chose option five. So, 58.3% of 4 star hotels chose option four, 25% opted for option five and the other 16.7% chose option three; 66.7% of 3 star hotels chose option four and the rest (33.3%) chose options two and three; 60% of 2 star hotels chose option five and other 40% went for three; 50% of 5 star hotels chose option three and the other 50% varied between options four and five. We can see that within each star rating the options that are more concentrated are three, four and five, and they do not vary with the rating but randomly regardless the rating. So, here we cannot establish a direct relation between high rated hotels and awareness of the importance of environmental sustainability practices on the loyalty of existing customers. We can say all the hotels, regardless of their rate, have awareness on that subject.

When relating the answers on Figure 8 to the location we can see that unlikely the analysis made on this variable with the information available on Figures 5, 6 and 7 the only location whom the majority of the hotels chose option five is Porto: three of the five hotels (and the other two chose options three and four). Five of Lisbon hotels opted for option four, four hotels chose option five and also four hotels chose option three, while six of Algarve hotels chose option four and the other three chose options three and five. So 60% of Porto hotels chose option five and the remaining 40% are divided between options three and four; 35.7% of Lisbon hotels chose option four, 28.6% chose five, 28.6% chose option three and 7.1% chose option two. Algarve hotels chose mostly option four (66.7%), 33.3% chose option three and 16.7% voted for five. With this analysis, we can conclude that the hotels that consider environmental sustainability practices important on the loyalty of existing customers (which are the majority) do not vary with location.

Regarding capacity, like on the previous analysis of this variable, we will make considerations about the groups of capacity accommodation with more expression

on the general picture. We can see that nine of the hotels that can accommodate more than 300 people chose option four and the other three chose options three and five; two of the hotels with more than 200 people chose option four and the other two chose options three and five; the category of 31 to 50 had two votes in option five and other two votes in options three and four; all the three hotels with a "51 to 70" capacity chose option five; and the two hotels that can accommodate between 10 and 30 people chose option three and five. So, 75% of "more than 300 people" hotels chose option four, 16.7% chose option three and 8.3% voted for option five; 50% of the "more than 200 people" hotels chose option four and the remaining 50% chose options three and five; 50% of "31 to 50" hotels voted for five and the other 50% stayed on three and four; 100% of the "51 to 70" hotels chose option five; and the hotels of "10 to 30 people" have 50% on option three and 50% on option five. Like on the analysis to the same variable on the previous figures it is not possible to establish a direct relation between hotels' capacity and the awareness on the importance of environmental sustainability practices on existing customer's loyalty because the choice distribution is regardless of their accommodation capacity.

If we also relate the information of Figure 8 to the opening years of the hotels (and following the same method used on analysis of this variable on the last figures), from the four hotels opening in 2009 two hotels chose option four and the other two voted on options two and three; the hotels that opened in 1989 both chose four; the two hotels opening in 1999 chose four and five; the 2000's hotels (two) opted for options four and five; and the two hotels opening on 2017 chose options three and five. From the 12 hotels mentioned above, 50% chose option four of the scale, 25% of them chose option five, 16.7% chose option three and 8.3% chose option two. This means that awareness of the hotels on the importance of environmental sustainability practices on existing customer's loyalty the does not vary with opening years.

As stated on the paragraph where the Figure 8 data was presented, the general picture reveals a lower average than the previous figures (the majority of the variables do not show the biggest choice concentration on option five but on option four and many options "three"). After the analysis of all the variables, although there are no choices in option one and only two choices for option two (one on a 3 star hotel- rating variable, and the other in Lisbon- location variable). This indicates that the respondents attribute less importance to environmental sustainability practices on existing customer's loyalty than in CSR (and slightly less importance to environmental sustainability practices on economic performance and hotel differentiation and competitiveness).

And the last topic in which the respondent's opinion is evaluated is about the importance of environmental sustainability measures on the new customer's retention. Here, one hotel chose option one and another one chose option two, six hotels chose three, 14 chose four, and six chose five (Figure 9). This means 50% of the hotels chose option four, 21.4% chose option three, the same percentage chose option five, 3.6% chose option one and the also the same percentage chose option two. As in Figure 8 and unlike the figures before- 5, 6 and 7, the majority of the hotels consider environmental sustainability practices important on the retention of new customers but not crucial.

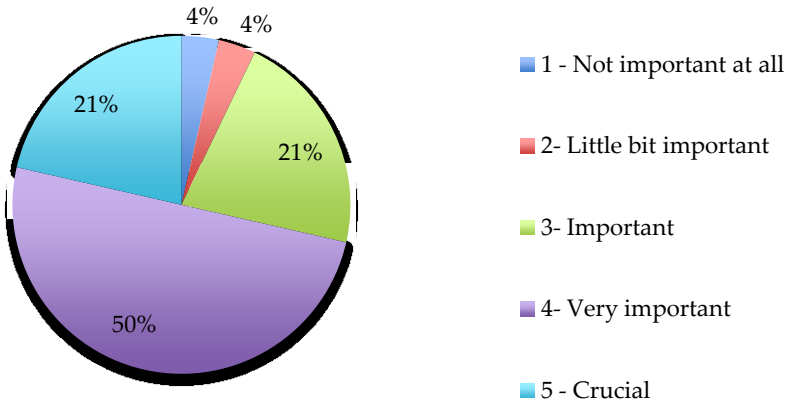

Figure 9. Environmental sustainability practices on the retention of new customers

Comparing the answers of Figure 9 to hotel rating, the majority of 4 star hotels (nine) chose option four, two hotels chose option five and the other one chose three. Three in six 3 star hotels chose option four, two chose option three and the other one chose two. 2 star hotels had two choices on option five and the other three in options one, three and four. Half of 5 star hotels (two) chose option three and the other half voted for options four and five. The one star hotel chose option five. So, 75% of 4 star hotels chose option four, 16.7% opted for option five and the other 8.3% chose option three; 50% of 3 star hotels chose option four, 33.3% chose option three and the rest (16.7%) chose option two; 40% of 2 star hotels chose option five and other 40% went for options one, three and four; 50% of 5 star hotels chose option three and the other 50% varied between options four and five. We can see that within each star rating the options that are more concentrated are three, four and five, and they do not vary with the rating but randomly regardless the rating. So, here we cannot establish a direct relation between high rated hotels and awareness of the importance of environmental sustainability practices on the retention of new customers. We can say all the hotels, regardless of their rate, have awareness on that subject.

When relating the answers on Figure 9 to the location we can see that unlikely the analysis made on this variable with the information available on Figures 5, 6, 7 and 8 there are no locations whom the majority of the hotels have chosen option five but there are two locations in which the favourite option was four- Porto and Algarve. Three of the five hotels in Porto chose option four (and the other two chose options three and five). Six of the nine hotels in Algarve opted for option four (two opted for option three and one for option five), while in Lisbon there are five hotels which chose option four, four that chose five, two that chose three, one going for option two and another one for one. So 60% of Porto hotels chose option four and the remaining 40% are divided between options three and four; 66.7% of Algarve hotels chose option four, 22.2% chose three and 11.1% chose option five; Lisbon hotels have a very dispersed picture, having 35.7% of the hotels on option four, 28.6% on option five,

21.4% on three, 7.1% on two and 7.1% on option one. With this analysis, we can conclude that the hotels that consider environmental sustainability practices important on the retention of new customers (which are the majority) do not vary with location.

Regarding capacity, like on the previous analysis of this variable, we will make considerations about the groups of capacity accommodation with more expression on the general picture. We can see that nine of the hotels that can accommodate more than 300 people chose option four, two chose three and one chose five; two of the hotels with more than 200 people chose option four and the other two chose options one and five; the category of 31 to 50 had two votes in option four and other two votes in options three and five; two of the three hotels with a "51 to 70" capacity chose option five and the other one option four; and the two hotels that can accommodate between 10 and 30 people chose options three and five. So, 75% of "more than 300 people" hotels chose option four, 16.7% chose option three and 8.3% voted for option five; 50% of the "more than 200 people" hotels chose option four and the remaining 50% chose options one and five; 50% of "31 to 50" hotels voted for four and the other 50% stayed on three and five; 66.7% of the "51 to 70" hotels chose option five and 33.3% on option four; and the hotels of "10 to 30 people" have 50% on option three and 50% on option five. Like on the analysis to the same variable on the previous figures it is not possible to establish a direct relation between hotels' capacity and the awareness of the importance of environmental sustainability practices on the retention of new customers because the choice distribution is regardless of their accommodation capacity.

If we also relate the information of Figure 9 to the opening years of the hotels (and following the same method used on analysis of this variable on the last figures), from the four hotels opening in 2009 three chose option four and the other voted two; the hotels that opened in 1989 chose options three and four; the two hotels opening in

1999 both chose four; the 2000's hotels (two) opted for options four and five; and the two hotels opening on 2017 chose options three and five. From the 12 hotels mentioned above, 58.3% chose option four of the scale, 16.7% chose option three, other 16.7% chose five and 8.3% chose option two. This means that awareness of the hotels on the importance of environmental sustainability practices on the retention of new customers does not vary with opening years.

The comparison of the data from the respondents with the information gathered in the literature review will be done according to the order of exposure of the data.

The fact that the concept of sustainability includes economic and socio-cultural aspects besides the environmental one (Sloan et al., 2009) when representing meeting the needs of the present without compromising the needs of future generations (Jauhari, 2014) is the reason why the hotels' questionnaire had this first section that was just analysed. Besides the demographic information (rating, location, capacity, opening year and respondents' job), the social information (the opinion of the hotels regarding the importance of environmental sustainability practices on the economic performance, differentiation and competitiveness, CSR, existing customer's loyalty, and retention of new customers) was asked due to the importance that the socio-cultural area has on sustainability. The first section of the hotels questionnaire is also justified by the fact that is relevant to evaluate the importance that sustainability may have on services. That is why the respondents are asked about the importance of environmental sustainability practices on many areas of services that a hotel provides: "a sustainable hospitality operation can be defined as a hospitality operation that manages its resources in such a way that economic, social and environmental benefits are maximized for the present and future generation needs (Sloan et al., 2009). Taking this definition, the whole value chain and life cycle of an operation has to be analysed when identifying critical aspects that impact on sustainability. From construction to furnishing, food and beverage sourcing,

production and waste management, to all the everyday operations that have to be in harmony with the environment, with the society and with operational profitability (economic scope)" (Sloan et al., 2009).

The literature review done on chapter 2 indicates the year of 2009 has the year where the economic started ("UNWTO e World Tourism Organization, 2015") and, therefore, it could possibility affect the hotel industry. However, as we can see on the data provided by the respondents, 2009 was the year with more hotel openings- four hotels, comparing to the years of 1989, 1999, 2000 and 2017 which registered two hotel openings each, and the other years with one opening each.

There is no record on the literature review that relates any of the five demographic variables between them (rating, location, capacity, opening year and respondents' job). Therefore, we will proceed to analyse the rest of the data collected from the first part of the hotels' questionnaire (the social data) regarding the literature review chapter "Influence of the sustainable practices on the social aspects of hotels". After analysed, the collected data showed that more than half of the hotels (16 hotels) consider environmental sustainability practices a crucial aspect on the economic performance of the hotel and only a small portion of hotels (three) chose the lower options of the scale; the raising of the number of votes increases along the scale meaning the big majority of the hotels, 26 in 28 (which is 92.9%) recognize the importance of this theme (had having vote in options between three and five) on hotel differentiation and competitiveness; 100% of the hotels recognize the importance of this theme (had having vote in options between three and five) on the CSR; the majority of the hotels consider environmental sustainability practices important on an existing customer's loyalty but not crucial; the majority of the hotels consider environmental sustainability practices important on the retention of new customers but not crucial. So, all the answers (opinion of respondents on the social variables) showed they consider environmental sustainability practices important to

the variables. On the Likert scale, used as question model for the referred questions, no average per question was below three (which means "Important").

The conclusion reached on the previous paragraph is according to the literature review because regarding competitiveness and differentiation of the hotels in the sector, literature indicates that severe competition among hotel supply chains have forced the operations managers in hotels to take advantage of reducing, reusing, and recycling practices and to adopt green management as a sustainable competitive strategy (Anton et al., 2004), and also that the sustainability element helps the hotel companies to build on their "brand equity" to differentiate among the several brands (Sloan et al., 2009). The document Hotel Energy Solutions (2013) mentions that the "green" hotel business is a growing niche because establishments differentiate themselves from the similar non-green hotels and that this is mainly realized with decreases in costs achieved by the reduction of resource consumption and decreases in expenses and expected future expenses (empathizing the economic performance aspect). Initial moves to use green practices in international hotel management were centred on cost saving initiatives by reducing waste, energy usage and government regulation (Shieh, 2012). Empirical evidence shows that investments in a sustainable supply chain management can improve economic-based performance. Research found a positive link between sustainable supply chain management (SSCM) and economic performance (Ageron et al., 2012; Golicic & Smith, 2013; Reuter et al., 2010). As a result, hotels managers started to believe that long-term economic sustainability and growth depend upon the effective adoption of green practices (Chan, 2008). The benchmarking analysis done on chapter 2 shows a program applied to the Hilton International hotel chain (with 3900 hotels and resorts worldwide) in 2013 whose goals were to measure property sustainability and to contribute for hotel's performance and profitability while increasing the company's overall impact (Jauhari, 2014), confirming our data about hotels giving importance to environmental sustainability on the theme of economic performance.

Regarding customer loyalty, literature shows that customer trust is one of the benefits of the introduction of more environmental friendly practices ("Hotel Energy Solutions (2013)"; Xu & Gursoy, 2015). It is observed that in every part of the world, business enterprises start to adopt some sort of environmentally sensitive activities while managing their business operations (Gast et al., 2017; Sari & Yanginlar, 2015; Sharma et al., 2017), partly as a result of the fact that much of the individual and business customers consider environmental performance of an enterprise while making their purchasing decisions (Guyader et al., 2017; Moser, 2015). Also, hotel guests play a major role in the green effort because most hotel guests (that are nowadays aware of green initiatives) can practice them during their stay especially for saving water and energy (Al-Aomar & Hussain, 2017). Manaktola and Jauhari (2007) remark that becoming a green hotel can be the foundation for a great marketing strategy, and the first step in marketing is providing consumers with what they want or need (Manaktola & Jauhari, 2007). Some hotels use the label "green hotel" to attract their potential customers (Pizam, 2009), as such an image is believed to play a critical and positive role in customers' decision-making processes, behavioural intentions (Prendergast & Man, 2002), customer's perceptions (Kasim, 2004; Lee et al., 2010), and increases their revisit intention for a future stay (Lee et al., 2010; Shanti, 2016). As stated by Kang, Lee, and Huh, tourists are nowadays willing to pay more for environmental friendly products and services such as hotel accommodation (Kang et al., 2010; Xu & Gursoy, 2015). So, green practices are important for almost all service businesses today, but maybe more important for a hotel's supply chain because they lead not only to a reduction in costs but to as a higher reputation in the customer's perspective (Sari & Suslu, 2018), which reveals to be according to the analysis of the collected data.

About CSR, literature proves regulatory requirements of governments and social responsibility requirements are factors that enforce the enterprises to perform green practices (Govindan et al., 2015; Hsu et al., 2013; Diabat & Govindan, 2011). Sloan et.

al (2009) mentions the importance that larger hospitality firms can have on smaller firms with whom they do business to implement a Corporate Social Responsibility (CSR) approach (e.g. some large hospitality companies require their food suppliers to comply with worker codes and standards), showing the reality of hotels caring about CSR, has our data also indicates.

When relating CSR and customer loyalty themes, literature considers that the importance of addressing environmental issues is well-understood both as a form of fulfilling customer needs and social responsibility or business (Shieh, 2012). According to the table present on the benchmarking analysis, 384 hotels from the hotel chain NH Hotels adopted the CSR program made by the mother company that focus on: employees, customers, suppliers, society, environment and shareholders. The aims are to give all of the actions in the area of CSR a global and transversal quality; globally promote the Social Action that the NH Hotels' brand carries out as "Social Innovator"; make a commitment to Corporate Volunteering as a vehicle for social action and internal reputation; have sustainable innovation as a key of brand differentiation and reputation strengthening; and reinforce responsible and sustainable NH communication with employees, customers and society in general (Jauhari, 2014).

Furthermore, when joining the variables of CSR and economic performance, the benchmarking analysis also revealed a Corporate Social Responsibility program designed by Hyatt Hotels (Hyatt International Corporation, 2013) for their 492 hotels, to turn communities into places where associates are proud to work, where guests want to visit, neighbours want to live and owners want to invest; it includes four areas of focus: environmental sustainability (Hyatt Earth), economic development and investment, education and personal advancement, and health and wellness. IHG (InterContinental Hotels Group, 2013) joined the environmental program creation as well by developing a Corporate Responsibility program to 1700 of their more than

4500 hotels worldwide. This program is set to drive environmental sustainability, have a positive impact on the local community and drive economic opportunity, embed and strengthen Corporate Responsibility elements into the brands, engage stakeholders to champion and protect IHG's trusted reputation and deliver against public affairs.

As for economic performance and customer loyalty (retention), Chen et al. (2018) identified that green management in a hotel helps not only in terms of profitability and customer retention but also demonstrates improved social responsibility and good reputations.

Regarding competitiveness and differentiation, and economic performance, the literature adds that a growing number of companies consider sustainable mechanisms capable of providing a competitive advantage (Longoni & Cagliano, 2015). The following data verifies this fact: in a study by The Economist (2008), it was observed that fewer than 4% of the managers queried among 1.122 participants considered sustainability as a waste of time and money. Moreover, in a sample of more than 2.600 managers, executives and organizational leaders around the world, almost 50% changed their management model as a result of opportunities created by sustainability, and 37% reported to have a considerable profit margin after implementing more sustainable practices in their organizational culture (N.M.P., 2015).

Last on the comparison between social data collected on the first section of the hotels' questionnaires and the literature, there are the subjects of customer loyalty, economic performance and competitiveness and differentiation. Preference for 'green' hotels, which address environmental concerns, is born out by a number of studies (Bohdanowicz, 2006; Chan & Wong, 2006; Han & Yoon, 2015; Hathroubi et al., 2014). Conducted by the International Hotels Environment Initiative (IHEI), these

reveal that 90% of hotel guests prefer to stay in a hotel that cares for the environment. Therefore, in the long run, investment in environmentally green practices by hotels can be cost effective, and improve their competitiveness by attracting environmentally concerned consumers. Moreover, research also suggests that in such cases, clients are willing to pay a premium and are more likely to pay a repeat visit (Laroche et al., 2001; Szuchnicki, 2009).

From all the hypothesis elaborated on chapter 3 as possible answers to the first research question ("On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve?"), there are four hypothesis related to the first section of the hotels questionnaire and according the previous analysis, these are the status of each one:

- The majority of the inquired hotels can relate economic improvement with the presence of sustainability measures- confirmed.
- The majority of the inquired hotels consider sustainability practices very important to differentiation and competitive advantage- confirmed.
- The majority of the inquired hotels consider sustainability practices to have a lot of influence on the social responsibility of the hotel as a corporation- confirmed.
- The majority of the inquired hotels think about sustainability practices as a not crucial aspect when it comes to customer's loyalty- not confirmed.
- The majority of the inquired hotels think about sustainability practices as an important aspect when it comes to the retention of new customers- confirmed.

Second section- Environmental sustainability practices on hotels

Entering the second section of the hotels' questionnaire, we will present the data correspondent to the presence of environmental sustainability practices on the following areas: site development, sustainable materials, building (sustainable design

planning), conservation and water treatment, reduction and waste treatment, energy (general), solar power, wind power, hydropower and wave power, geothermal power, biomass, other environmental sustainability practices, general internal tools of environmental sustainability management, and environmental management certifications.

To the question "What environmental sustainability practices do you see around the hotel?" (site development area), 12 hotels (42.9%) checked light pollution reduction: minimum exterior lighting to limit night sky pollution; 10 hotels (35.7%) have charging facilities for electric vehicles around them; nine hotels (32.1%) said they do not identify any environmental sustainability practice on the surroundings of the hotel; seven hotels (25%) chose the pool car option as one of the existing eco-practices around them; five hotels (17.9%) see parking, shower and changing facilities for bicyclists on their site; four hotels (14.3%) checked the heat island effect: 80% underground parking; more than 75% of the terrace has been insulated; and last, one hotel indicated the European project Urban Waste in the "other" option (Figure 10).

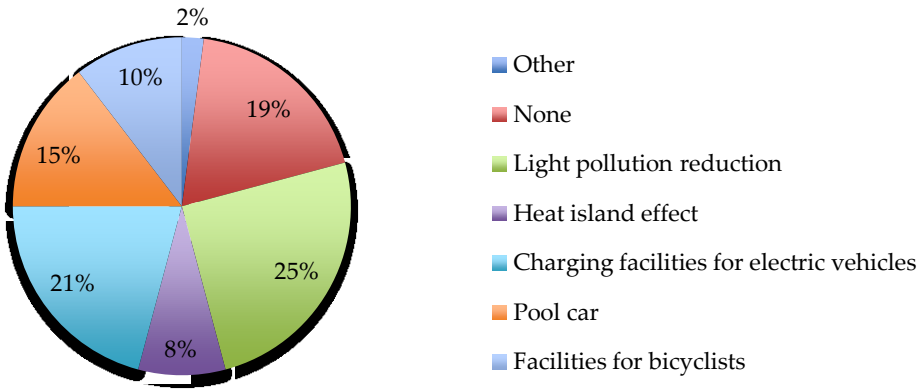

Figure 10. Environmental sustainability practices around the hotel

To the question "What environmental sustainability practices do you have implemented on the area of sustainable materials (of construction and daily use)?", 12 hotels (42.9%) answered base structures (walls, doors, ceilings) acoustically

insulated; 11 hotels (39.3%) checked regional materials: more than 40% of the building materials are from within 500 miles of the project site; eight hotels (28.6%) said they have certified or recycled wood, or MDF boards; also eight hotels (28.6%) indicated to have home textiles made of recycled/organic/natural 100% cotton; six hotels (21.4%) have environmental seals: seal divisions to prevent entry of noise and smoke; six hotels (21.4%) do not have any environmental sustainability practice implemented at the sustainable materials' level; five hotels (17.9%) checked recycled construction materials (glass, ceramic tiles, metals); four hotels (14.3%) have more than 10% of the building materials salvaged from other sites; three hotels (10.7%) have AAC blocks- cement concrete blocks. This area did not register any additional information on the "other" option (Figure 11).

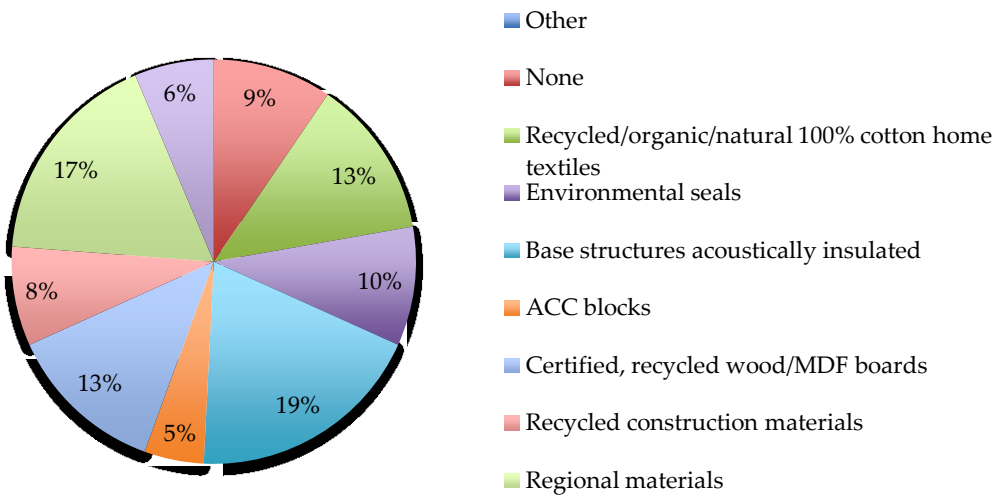

Figure 11. Sustainable materials' practices

To the question "What environmental sustainability practices do you have implemented on the area of buildings' construction (sustainable design planning)?", 22 hotels (78.6%) answered double glazing on doors and windows; nine hotels (32.1%) have water using in central heating systems; eight hotels (28.6%) checked building orientation according to the latitude in order to maximize the sun light (more in the Winter and less in the Summer); seven hotels (25%) chose vertical south facing windows for maximizing solar heating in the winter as they capture the low winter sun; also seven hotels said they used brick, concrete and stone as the main construction materials because they have a high-thermal mass capacity and are the

main contributors to the thermal mass of a building; six hotels (21.4%) have glass windows/doors/walls faced south and small presence of glass facing north; also six hotels have covering for south facing windows during Summer; five hotels (17.9 %) said not having any of the presented environmental sustainability practices on the buildings' construction level; two hotels (7.1%) checked small gaps in the building fabric at the top of the house to improve natural ventilation; and there was no additional information coming from the "other" option (Figure 12).

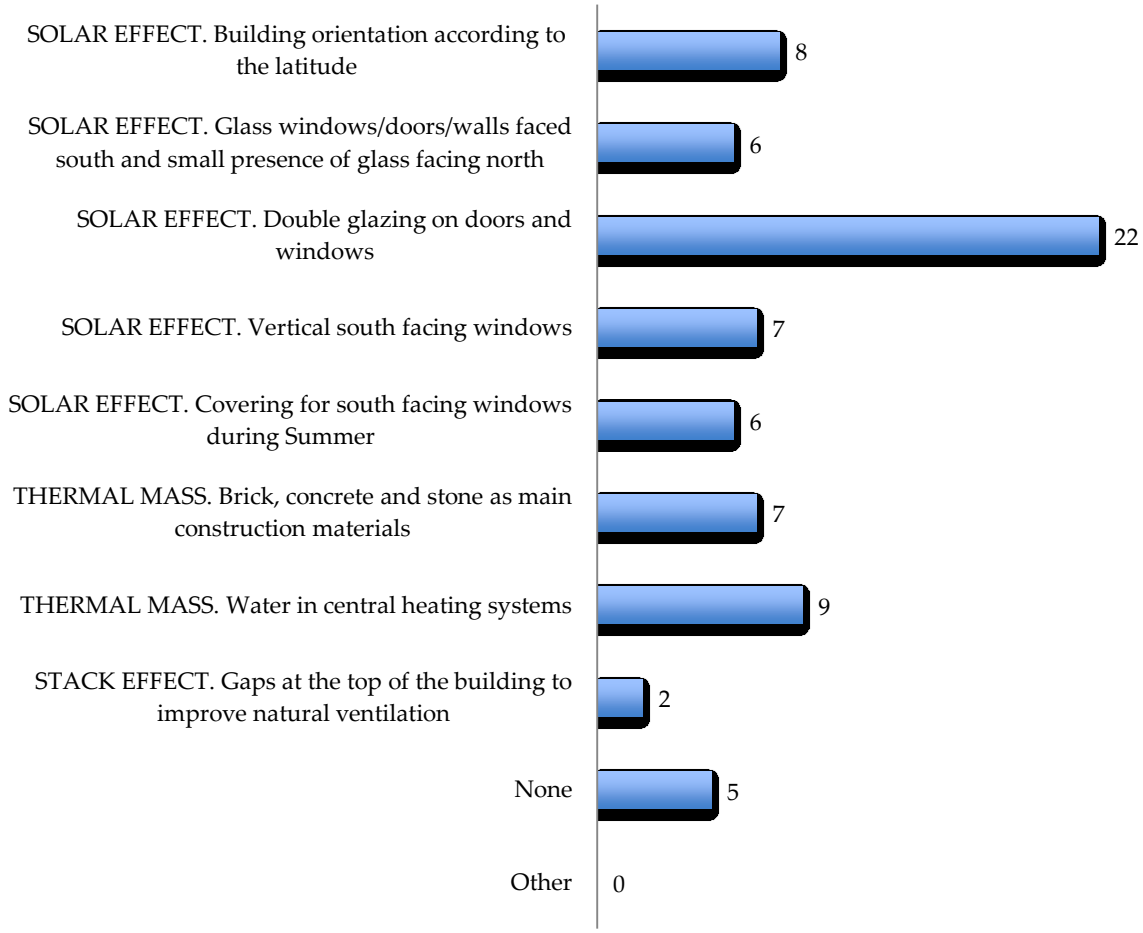

Figure 12. Buildings' construction's practices (sustainable design planning)

To the question "What environmental sustainability practices do you have implemented on the area of water conservation and water treatment?", 13 hotels (46.4%) have front loading machines for laundry; also 13 hotels water their gardens early in the morning or late in the day; 12 hotels (42.9%), checked water-efficient fixtures, flow-controllers or tap aerators in sinks and showers; 12 hotels use a

displacement device or a tank restrictor in the cistern, a low flush toilet, gravity or pressure assisted toilets/urinals; 11 hotels (39.3%) have efficient plumbing system: a cold- and hot-water system delivering low-pressure and not a pressure hot-water system; 11 hotels keep pools and spas cooler or have covers; 10 hotels (35.7%) answered infrared sensors in taps that automatically turn off when a person walks away or when the established quantity per wash has been delivered; six hotels (21.4%) recycle water used across the hotel; four hotels (14.3%) plant indigenous plants instead of a variety of plants or grass; three hotels (10.7%) revealed not having implemented any of the presented environmental sustainability practices; one hotel (3.6%) has an egg timer in the shower, inviting guests to monitor their time spent; no hotel has fountains and water features that turn off at night and use greywater; and there was "other" information as well. (Figure 13).

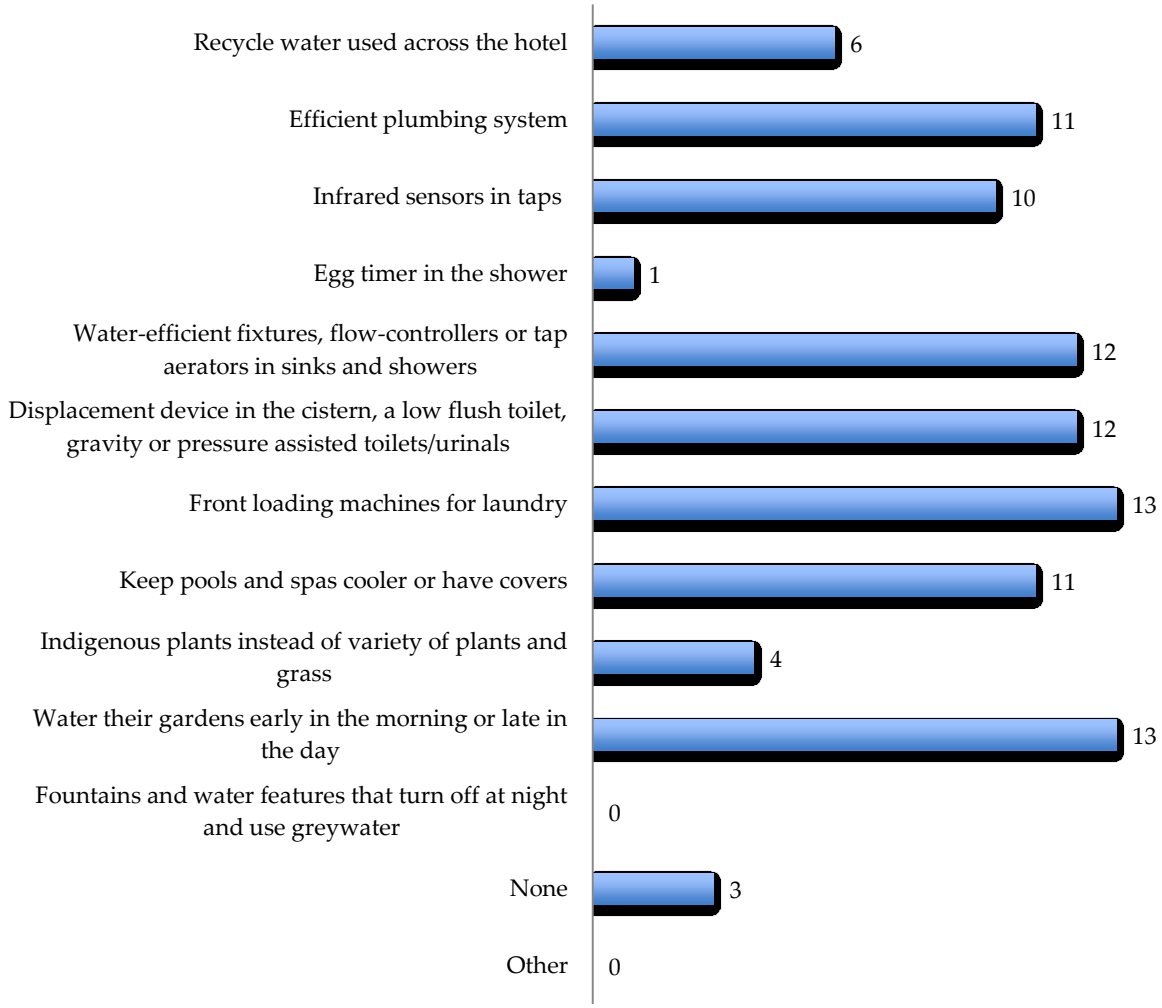

Figure 13. Water conservation and water treatment's practices

To the question "What environmental sustainability practices do you have implemented on the area of reduction and waste treatment?", 15 hotels (53.6%) checked the option shopping on local shops; 12 hotels (42.9%) cook to order rather than cooking in bulk; 12 hotels reuse old textiles and convert them in other items; 12 hotels use reusable bottles, preferentially glass bottles; 11 hotels (39.3%) have recycling locations in every floor; 11 hotels do paper recycling (paper pulp and all the posterior process); 10 hotels (35.7%) pack food in paper or glass recipients at the kitchen; 10 hotels buy their raw materials in big quantities so they do not come in many small plastic containers; nine hotels (32.1%) have soaps and shampoos on ceramic reusable containers in the bathrooms; eight hotels (28.6%) donate non-used food (fresh, cooked, frozen or leftover) to local charity associations, supporting homeless programs, daycare centres, and animal farms; seven hotels (25%) buy products with a longer expiration date; seven hotels replace one-time utilization materials for reusable materials on their restaurants and bars (napkins, tablecloths, hand towels); six hotels (21.4%) give incentives to employers that produce less waste at the kitchen; five hotels (17.9%) have a pre-consumer food weighing system to determine where most food waste comes from in the kitchen; five hotels rotate their curtains to vary the sun exposure side; five hotels treat waste that comes from domestic activities; four hotels (14.3%) have food suppliers handing them products in reusable containers; four hotels dye their spotted towels and use them for other purposes (like pool/spa/beach or cleaning towels); three hotels (10.7%) have informative signs for guest to know how much they can save in water, energy and detergent by not asking for towel replacement every day; three hotels donate used food oil to drivers whose vehicle has a fuel adapted mechanism; two hotels (7.1%) do some of the supply chain activities in outsourcing; two hotels contributed with opened answers on the "other" answering option with the following information: plastic caps recycling; plastic, paper and glass recycling; one hotel (3.6%) chose the "none" option; also no hotel chose the option of acquisition or rental of furniture or remanufactured equipment (Figures 14, 15 and 16).

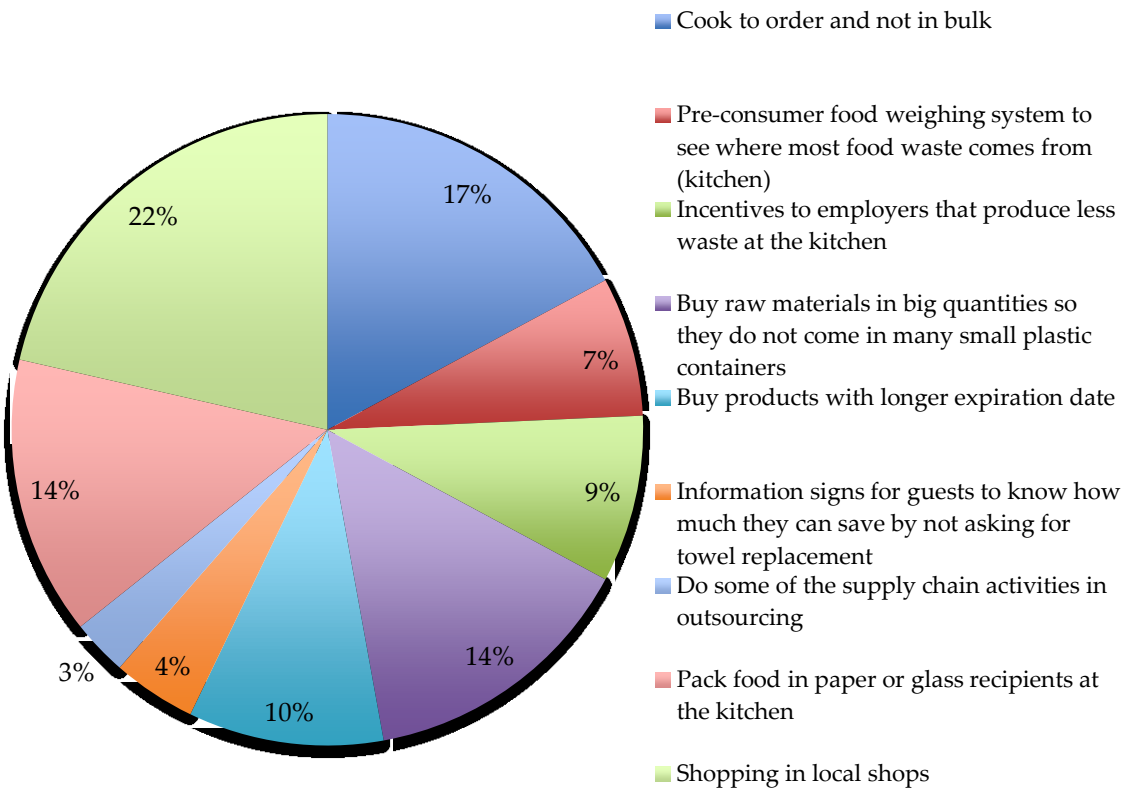

Figure 14. Reduction and waste treatment's practices- sub category of reducing

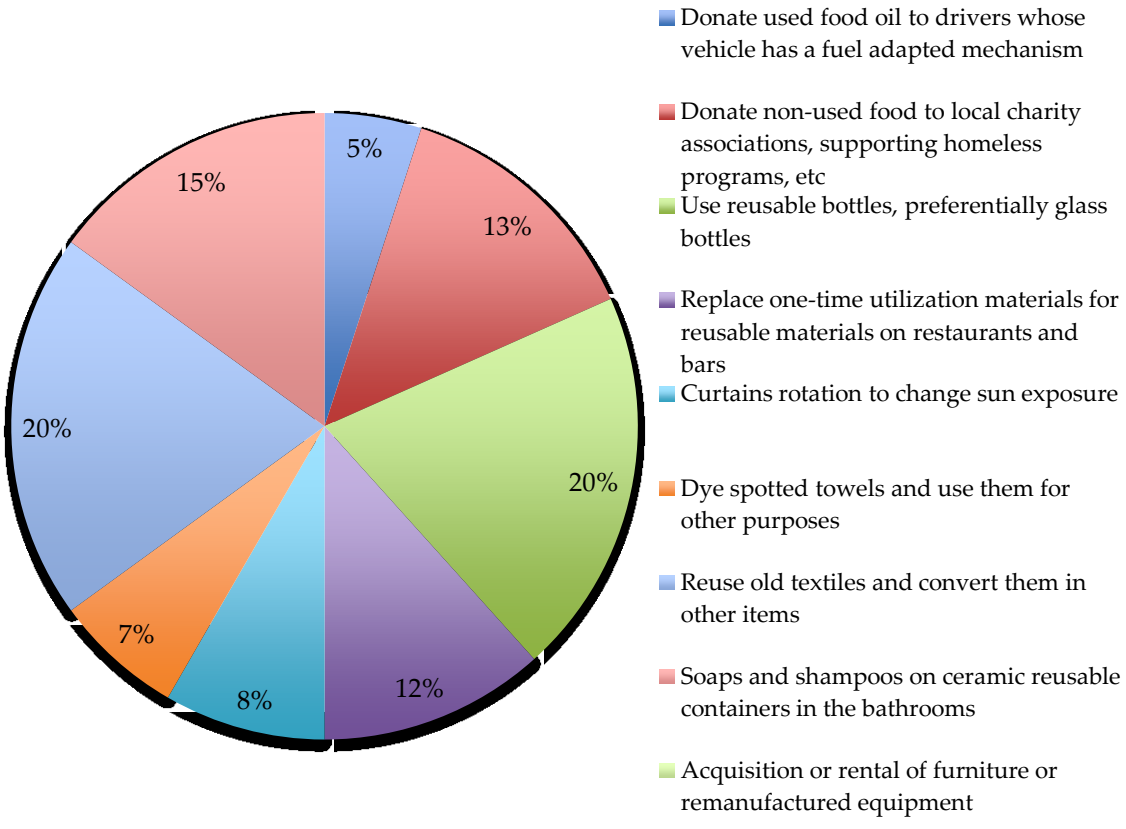

Figure 15. Reduction and waste treatment's practices- sub category of reusin

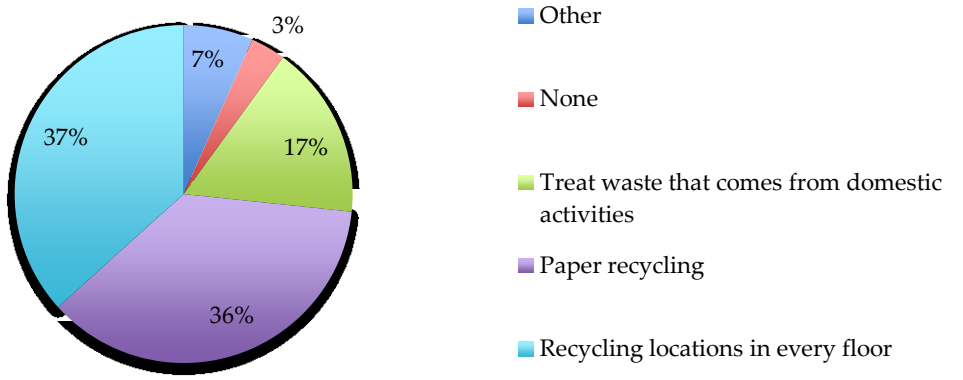

Figure 16. Reduction and waste treatment's practices- sub category of recycling

To the question "What environmental sustainability practices do you have implemented on the area of general energy?", 27 hotels (96.4%) answered LED lighting; 19 hotels (67.9%) chose Key Tag Energy Saver System, that conserves energy in unoccupied rooms; 11 hotels (39.3%) said they have many meatless dishes in restaurants and bars; eight hotels (28.6%) have LT Voltage Stabilizer, which saves energy and prevents damage to equipment due to sudden power fluctuations; seven hotels (25%) have heat pumps, for heat recovery, for heating domestic water; four hotels (14.3%) chill water reset through building automation, to reduce power consumption required for cooling building; one hotel (3.6%) add the practices of motion sensors; and no hotel clicked the "none" option (Figure 17).

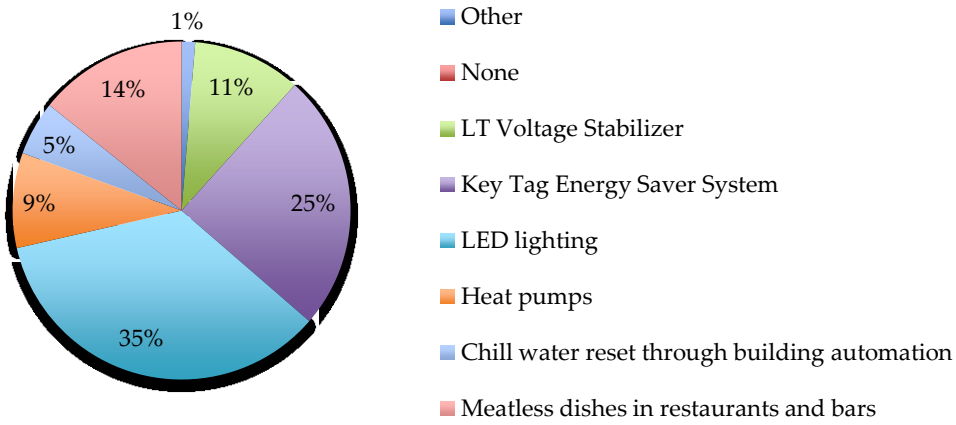

Figure 17. Practices on the area of general energy

To the question "What environmental sustainability practices do you have implemented on the area of solar power?", 18 hotels (64.3%) do not have any

environmental sustainability practice on solar power level; 10 hotels (35.7%) have solar panels on the roof (south oriented) for water heating; two hotels (7.1%) have photovoltaic panels for converting solar power into energy and placed on the side of the building as sunscreens that can reduce the need for air-conditioning; and no hotel wrote further information on "other" (Appendix 5).

To the question "What environmental sustainability practices do you have implemented on the area of wind power?", all the 28 hotels answered "none"; no hotel checked wind turbines that capture the energy stored in the wind and convert it into electricity; and no hotel added other information as well.

To the question "What environmental sustainability practices do you have implemented on the area of hydropower?", all the 28 hotels revealed not having any implemented practice on this area; no hotel chose turbines with generators that turn water flow into electric energy; and no hotel indicated additional information on "other".

To the question "What environmental sustainability practices do you have implemented on the area of geothermal power?", like the previous two questions, all the hotels (28) said not having any practice on the geothermal power level; no hotel chose the option pumps that bring heat from beneath our feet to be used directly to heat hotels and other buildings or as a source of power that drives steam turbines to produce electricity; and no hotel wrote anything at the "other" option.

To the question "What environmental sustainability practices do you have implemented on the area of biomass?", 27 hotels (96.4%) answered not having any practice on this area, one hotel (3.6%) buys electricity created through biomass; no hotels do biogas creation through bacterial degradation of organic matter for electricity and heat production; nor purchase or creation of bio fuels for hotel's

vehicles; nor having a wood pellet burning which heats the system instead of using oil or gas; also, no other gave any "other" information (Appendix 6).

To the question "What other environmental sustainability practices do you have implemented?", 18 hotels (64.3%) chose indentified areas: for smokers and non smokers, and for noise and no noise; 17 hotels (60.7%) give their staff training regarding environmental sustainability; 10 hotels (35.7%) invest in sustainability awareness and environmental sustainability practices' promotion to consumers and suppliers; eight hotels (28.6%) encourage their staff to submit activities proposals of environmental nature (and reward them for that); seven hotels (25%) use ecological related facts in marketing campaigns; six hotels (21.4%) did not chose any of the presented options; no hotel gave any additional information, possibly inserted in "other" (Figure 18).

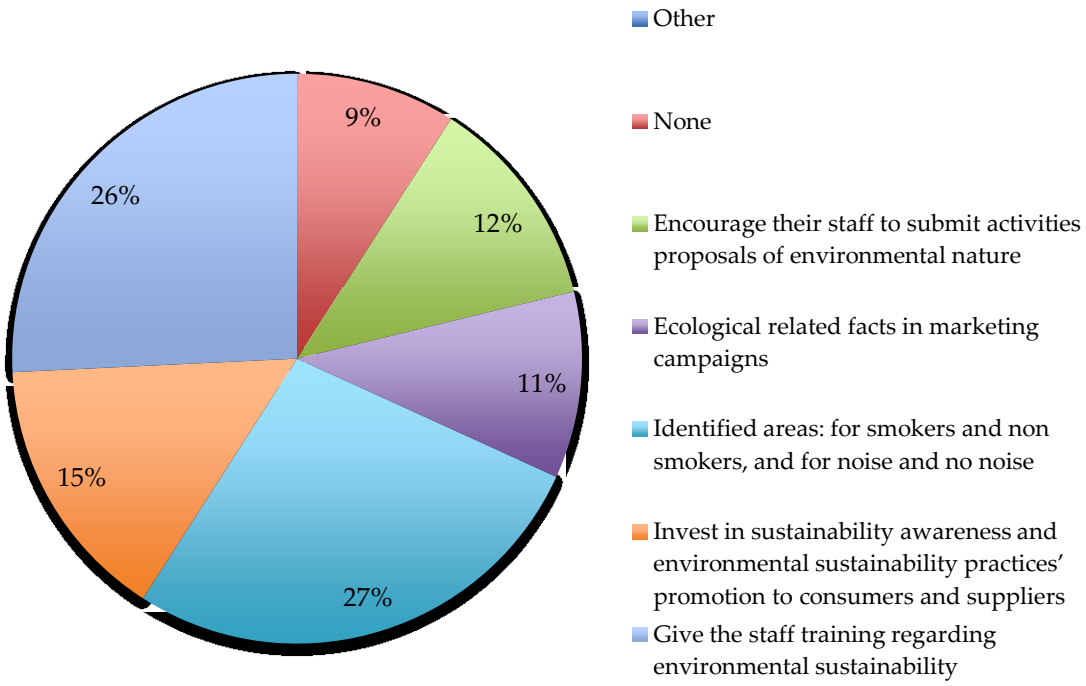

Figure 18. Other environmental sustainability practices

To the question "What general internal tools of environmental sustainability management do you have implemented?", 20 hotels (71.4%) said they have the mentioned tools in the area of energy and water consumption; 11 hotels (39.3%) have tools on quantity and cost of produced waste; 10 hotels (35.7%) have analysis, report

(by a third part liability), learning and improvement (of all the hotel operations) tools; eight hotels (28.6%) do a regular analysis of the benefits and costs of environmental protection activities done; eight hotels short, medium and long term goals of aspects to improve at the environmental level (less energy, water, CO_2, waste); seven hotels (25%) have collaboration with environmental certification programs (ex: Green-Key Eco rating program); seven hotel do not have any of the presented internal tools of environmental sustainability management; six hotels (21.4%) manage energy and carbon through audits and external consultants; six hotels have partnership with external environmental sustainability programs; four hotels (14.3%) have a tool to report the number of implemented practices; and no there was not additional information registered (Figure 19).

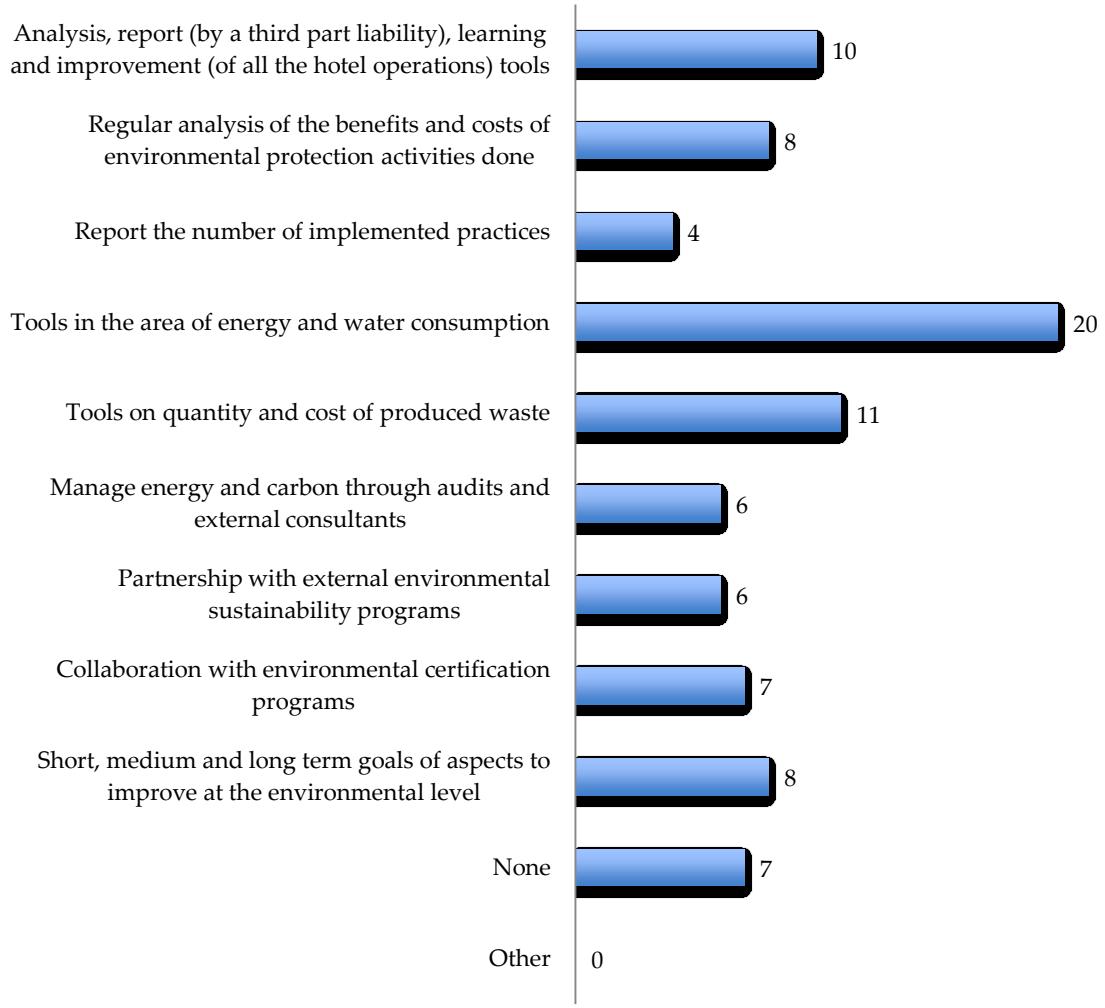

Figure 19. General internal tools of environmental sustainability management's practices

To the question "What environmental management certifications do you have?", 17 hotels (60.7%) said they do not have any; six hotels (21.4%) have the hotel environmental management certification "Chave Verde"; three hotels (10.7%) have the hotel certification ISO 140001; three hotels gave additional information at the opened answer place, where, one hotel has the TravelLife certification, another one has the "Selo We Care AHP" certification, and the other one added "I don't know"; two hotels (7.1%) have the hotel certification Eco-Hotel; one hotel (3.6%) has the hotel certification "Certificação LiderA" (sustainability evaluation Portuguese system); no hotels have any of the following certifications: hotel certification BREEAM, hotel certification Eco Certification STEP (Sustainable Tourism Certification Program), and supplier environmental management certification OHSAS 18001, and there is a non-valid answer on the "other" option (Figure 20).

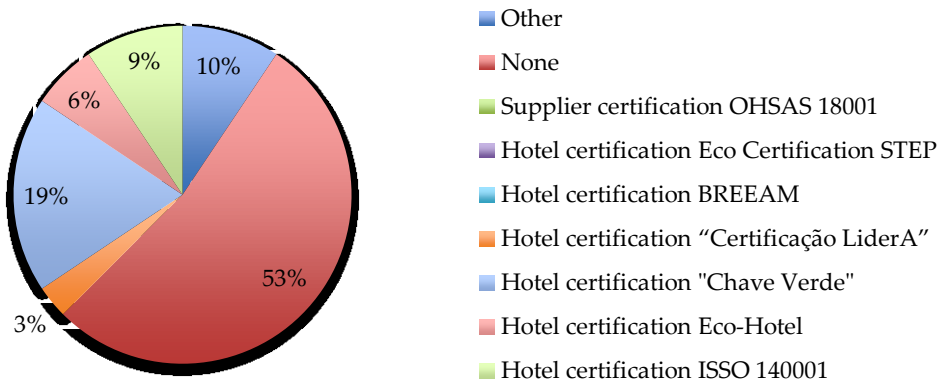

Figure 20. Environmental management certifications

After analysing each area of environmental sustainability practices, we will now apply the evaluation method exposed on chapter 3, the empirical model that consists in evaluating the level of presence of environmental sustainability practices on the supply chain of 1, 2, 3, 4 and 5 star hotels in Porto, Lisbon and Algarve, which can be low, medium or high. Since there is a total of 90 environmental sustainability practices along 14 areas, an hotel that comprehends between zero and 29 practices has a low level, a hotel that has between 30 and 59 implemented practices has a medium level, and a hotel that presents between 60 and 90 functioning practices has

a high level of presence. The counting of this values includes all the available choices on the questionnaire except for the option "none".

Within the 28 respondents, there are 18 hotels with a low level of implementation of environmental sustainability practices, 10 hotels with a medium level and no hotel with high level (Table 2).

Level of implementation	Number of hotels	Scores for level classification
Low	18	29, 13, 11, 19, 19, 23, 7, 5, 11, 19, 17, 14, 9, 5, 19, 18, 16, 1
Medium	10	42, 32, 38, 34, 47, 36, 37, 43, 46, 43
High	0	-

Table 2. Hotels' level of implementation of environmental sustainability practices and respective scores

If we analyse the number of chosen practices by area (in absolute number), waste treatment and reduction is the environmental sustainability with the biggest number of choices (with 163), followed by the area of water conservation and treatment (93 choices), general internal tools of environmental sustainability management (80), energy- general (77), buildings' construction (67), other environmental sustainability practices (60), sustainable materials (57), site development (39), environmental certifications (14), solar power (12), biomass (1), and wind power, hydropower and biomass with no choices. The sum of the choices on each area are superior to the total number of respondents because it is not multiple choices but checkboxes, so each respondent could chose as many boxes as it was applicable to the correspondent hotel as long as at least one was chosen.

On the other hand, if we analyse the most chosen options, regardless of area, we conclude that "LED lighting" is the most chosen option (from the area of energy in general) with 27 choices, followed by "Solar effect- double glazing on doors and windows" (buildings' construction area) with 22 votes, "tools in the area of energy and water consumption" (general internal tools area) with 20 votes, "Key Tag Energy

Saver System" with 19 votes (energy- general), "identified areas: for smokers and non smokers and for noise and no noise" with 18 votes (area of other environmental sustainability practices), and "give the staff training regarding environmental sustainability" with 17 votes (also on the area of other environmental sustainability practices). The values below 17 started in 13 (and decreasing) and were repeated in more than one option. We can see that the six options with more choices belong to four specific environmental sustainability areas (energy-general, buildings' construction, general internal tools, and other environmental sustainability practices) and two of the areas have more than one of the most chosen options- being energy-general, and other environmental sustainability practices.

We will now relate the implemented environmental sustainability practices with the four demographic variables- rating, locations, accommodation capacity and opening years. Regarding rating, we can see that 50% of the 4 star hotels are low level and the other 50% are medium, 83.3% of 3 star hotels are low level and 16.7% medium level, 100% of 2 star hotels have a low level of implementation, 75% of 5 star hotels have a medium level of implementation and the other 25% a low level, and the one star hotel have a low level of implementation. The only ratings with medium level hotels (regarding the implementation of environmental sustainability practices) are 3, 4 and 5 stars. About location, we can observe that 60% of Porto hotels have a low level of implementation and 40% a medium level, 78.6% of Lisbon hotels have a low level and 21.4% are medium level, 55.6% of Algarve Hotels have a medium level of environmental sustainability practices presence and 44.4% have a low level. From the three cities, Algarve is the only one where the majority of its hotels have a medium level of practices' presence rather than a low level. When relating the level of implementation with accommodation capacity, 50% of the hotels that accommodate more than 300 people have a low level of implementation as the other 50% have a medium level, 75% of the "more than 200 people" have a low level, 100% of the "31 to 50 people" have a low level of practices' presence, 66.7% of the "51 to 70

people" have a medium level, and 100% of "10 to 30 people" hotels have a low level of implementation. On this variable, the category of 51 to 70 people is the only one with a majority of medium level hotels and the "more than 300 people" has half of its hotels at the medium level as well. And last, regarding opening years, 75% of the hotels that opened in 2009 are at a low level, as well as 100% of the hotels that opened in 1989 and in 1999. The hotels that opened in 2000 and 2017 have 50% of medium level hotels each. Here we can see there is no category with medium level hotels as the majority, only two categories where 50% of the hotels are at medium level and the other categories are either mostly low level or completely low level.

If we chose to make the analysis by the level's point of view instead of the demographic variables when comparing the two, we conclude the majority of the hotels classified as medium level are 3, 4 or 5 star hotels, in Algarve, with a capacity for 51 to 70 and more than 300 people, and that are not the oldest hotels (opening year starting at 2000).

Comparing the previous data with some studies on the subject, even though the literature information regarding site development was based on buildings that got awards on that behalf (Jauhari, 2014), every option had votes an there was even hotels that chose more than one option, as if we exclude the nine hotels that did not have any practice implemented on this area we have 38 votes (in a total of 28 respondents) and one hotel that added a different option besides the ones there.

Jauhari (2014) says water conservation is perhaps not the first issue that crosses a hospitality manager's mind when making out the management agenda. Unlike what the author says, our data shows that the category of water conservation and treatment is the second category with more votes from the respondents.

On the waste reduction and treatment, our analysis is in agreement with Hussain et al. (2016): "Sustainable waste management has become a core function within GSCM due to the central role of wastes in various environmental concerns (Hussain et al., 2016)". Following our conclusions, this category is the one with more votes (163), from all the 14 categories.

Sloan et al. (2009) informs that larger hospitality firms can stimulate smaller firms with whom they do business to implement a Corporate Social Responsibility (CSR) approach. For example, some large hospitality companies require their food suppliers to comply with worker codes and standards. However, few hotels that answered the questionnaire have that habit. Inside the waste category, the option of requiring suppliers with sustainability awareness (e.g. on the area of reusable containers) is one of the less voted (four votes).

Some authors consider that sustainability innovations consist in actions included in various subjects and that one of them is resource conservation (e.g., recycling) (De Los Salmones, Crespo, & Del Bosque, 2005; Smerecnik & Andersen, 2011). Our questionnaire options related to recycling are actually some of the most voted within the waste category.

Rodríguez & del Mar Armas Cruz (2007) affirms hospitality is a driving force on the sector of green issues. Due to its unprecedented growth in recent decades, has been responsible for using excessive natural resources, consuming a great amount of energy. At the same time, Al-Aomar & Hussain (2017) indicates GSCM is taking on an important strategic role in the hospitality industry and the growing awareness for green products and services amongst hotels guests and across the sector. So, that is in accordance with the fact that the energy category is the one that had its choices most voted, from of all the choices of all the categories.

The category dedicated to general options of energy (meaning, not directed to any area of renewable energy) was the fourth more voted one which might be related to Jauhari (2014) statement that says that because of the increases in electricity, gas and oil prices, improving energy efficiency and gaining energy independence has become an important goal for many hoteliers in regards to investments for greater sustainability.

Zientara & Bohdanowicz (2010) say the necessity of reducing CO_2 emissions "has come to occupy a prominent position in responsible-business agendas of most multinationals operating in the global economy". However, the categories of solar power, wind power, hydropower, geothermal power and biomass (as the representing categories of renewable energies- that do not require CO_2) are the ones with lower score in voting. From the five, only solar power and biomass had options chosen (one each), meaning in general, even though the population is thought to be informed about it, the topic does not demonstrate much adhesion when it comes to practical measures in Portugal. Still about the little awareness that the respondents have about CO_2 production, B. Kim & Neff (2009) estimates that a non-vegetarian diet results in 8 kg of CO_2 per person per day without including the emissions involved in the food preparation itself. Only less than half of our respondents chose the option related to meat-free food on hotels menus making the previous statement applicable on our country.

In all western nations, the construction industry is the main consumer of non-renewable resources, as well as a huge consumer of renewable resources that means that it must take responsibility and become more sustainable. It is, therefore, imperative that demand on such materials is radically reduced. This includes using less of these materials by building more simply, with more local and plentiful (i.e. sustainable and renewable) materials and with less waste (Sloan et al., 2009). The sustainable materials figure indicates that only six hotels do not satisfy the sentence's

goal and in total, of all the eight practices and the 63 hotels, there are 63 implementations. If we assume the 63 implementations are equally divided by all the hotels that is an average of 2.3 practices per hotel. "Regional materials" is the eco-friendly option with more votes (11).

On "other environmental sustainability practices", most options approach the theme of dealing with staff, suppliers and customers in a green-directed way, independently of their different roles on the hotel ecosystem (employees, stakeholders and consumers, respectively). Leonidou et al. (2013) support that approach and reveal that environmental strategy includes promotion (e.g., use ecological arguments in advertisements, promotional material and marketing campaigns) (Leonidou et al., 2013; Segarra-Oña et al., 2012; Hu, 2012; Boley & Uysal, 2013).

Even though having implemented practices in every environmental sustainability area is positive, there is no positive progress without managing the performance of these practices. For that reason, Smerecnik & Andersen (2011) says one of the most important sustainability innovations in a resort's organizational structure is the adoption of an environmental strategy and management plan. That is a topic where the hotels that represent our sample as well positioned: is it the third category with more votes and in it has the fifth and sixth more voted options of all the options in all the categories. Furthermore, we found that the hotels with the biggest accommodation capacities are also the ones with more general internal tools of environmental sustainability management, proving the veracity of the findings of many authors: larger hotels tend to implement more strategic environmental management practices (López-Gamero et al., 2008; Mensah, 2006), while in small hotel operations the personal values and beliefs of managers have been found to be the predictors of sustainability adoption (Tzschentke et al., 2008).

When looking at results of Sloan's study (2009) presented on the benchmarking section it is possible to observe that 27% of the 30 surveyed hotels in United Arab Emirates (UAE) have low familiarity and knowledge about green practices, 46% have medium and 27% have high experience, meaning the majority (63%) have medium to high experience in adopting such practices (Al-Aomar & Hussain, 2017). If we comparing this values with the ones taken from the analysis to our data, we easily see a big difference in the sense that our results do not have any hotel with high experience in green practices and also, our biggest percentage lays on the low level and not on the medium (unlike the UAE hotels). Nevertheless, if we compare our reality to the European average where 80% of hoteliers are involved in some kind of activity oriented towards the environment (Sloan et al., 2009), we are more developed due to the fact that 100% of the surveyed hotels had at least one environmental sustainability practice implemented.

Also in the benchmarking section, Sari and Suslu's (2018) study indicated that the basic green practices are regarded as more important by the managers than the advanced ones and that it is because the basic green practices are more visible to the people around the hotel than the advanced ones. The basic green practices are embraced by many hotels, including hotels with little emphasis on the environment, while the advanced green practices are mostly used by hotels with a strategic look on environmental management (Sari & Suslu, 2018). Even though our analysis model did not include a classification of the practices into basic and advanced, it is possible to say that the practices that are more difficult to implement are the ones related to renewable energy (solar power, wind power, hydropower, geothermal, and biomass), and that are exactly the practices with lower implementation percentage. Therefore, our results confirm the premise of Saru and Suslu's study that says the basic green practices are regarded as more important by the managers than the advanced ones. In addition, from our 11 hotels that have implemented some of the practices considered difficult, only five of them have a medium level regarding the

presence of environmental sustainability practices. This means that, on the other hand, our results do not confirm completely Sari and Suslu's premise about advanced green practices being mostly used by hotels with a strategic look on environmental management.

Al-Aomar & Hussain, in their study of 2017, focused on 5 star hotels due to the fact that they have well-established systems and standards (including green and environmental). According to our results, that statement is confirmed, as 5 star is the rating with highest percentage of medium level hotels (75%), followed by 4 star hotels (50%), 3 star hotels (16.7%), 2 stars (0%) and 1 star also with 0% of medium level hotels.

Regarding the opening years of the hotels, the same authors believe that as the sustainability concept is relatively new to the hotel industry, those with less experience were found to be in many cases more familiar with green practices (Al-Aomar & Hussain, 2017). Although the literature reviewed indicates that the term of environmental sustainability started being a public issue in 1983 (Sloan et al., 2009), we will consider "new" every hotel that opened between the years of 2000 and 2018 (also having in consideration the importance that the Johannesburg's Summit of Sustainable Development in 2002 had for the sustainability movement). So, from our 28 respondents, 12 hotels opened before 2000 and 16 hotels opened after that year. The low and medium level's distribution is the following: 60% of the medium level hotels belong to the "new" hotels and the other 40% are hotels opened before 2000. This confirms Al-Aomar & Hussain's affirmation about the hotels with less experience being more familiar with green practices.

From all the hypothesis elaborated on chapter 3 as possible answers to the first research question ("On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and

Algarve?"), "4 and 5 star hotels have a higher level of environmental sustainability practices' presence than 1, 2 and 3 star hotels" is the hypothesis related to the second section of the hotels questionnaire and according to the analysis presented, it is confirmed.

Third section- Aspects that influence the implementation and presence of the practices

The data that will be presented next concerns the third section of the hotel's questionnaire, which reveals data regarding the different forms of implementation on the various hotels by asking about implementation variables such as functioning years of the hotel, practices' implementation and hotel atmosphere, and environmental sustainability knowledge of the hotel. These variables make the evaluation to the results of the previous questionnaire's section more complete and trustable.

The first question of this section was "Was the hotel functioning uninterruptedly?" with the possible answers "yes" and "no", to which 22 hotels (78.6%) answered yes, and six hotels (21.4%) answered no (Table 3). The six hotels that were not functioning uninterruptedly were closed during some months, a few days per year, three months per year, in 2015, in 2017, and in 2018, respectively. Also none of these closing moments was related to innovations' implementation at the environmental sustainability level. Nevertheless, when talking about the reopening of the hotels, one of them (16.7%) presented environmental sustainability innovations, namely LED lighting, motion sensors and water reduction features.

To the question "In what year were the first environmental sustainability practices implemented?", nine hotels (32.1%) answered between 2011 and 2018; eight hotels (28.6%) said between 2001 and 2010; eight hotels revealed not having any

environmental sustainability practice implemented (which contradicts the previous answers given to the second section of the questionnaire); two hotels (7.1%) answered between 1991 and 2000; one hotel (3.6%) implemented its first practices between 1971 and 1980; and no hotels chose the following options: before 1950, 1950-1960, 1961-1970, 1981-1990 (Figure 21). This shows that Portuguese hotels had a recent environmental sustainability awareness and.

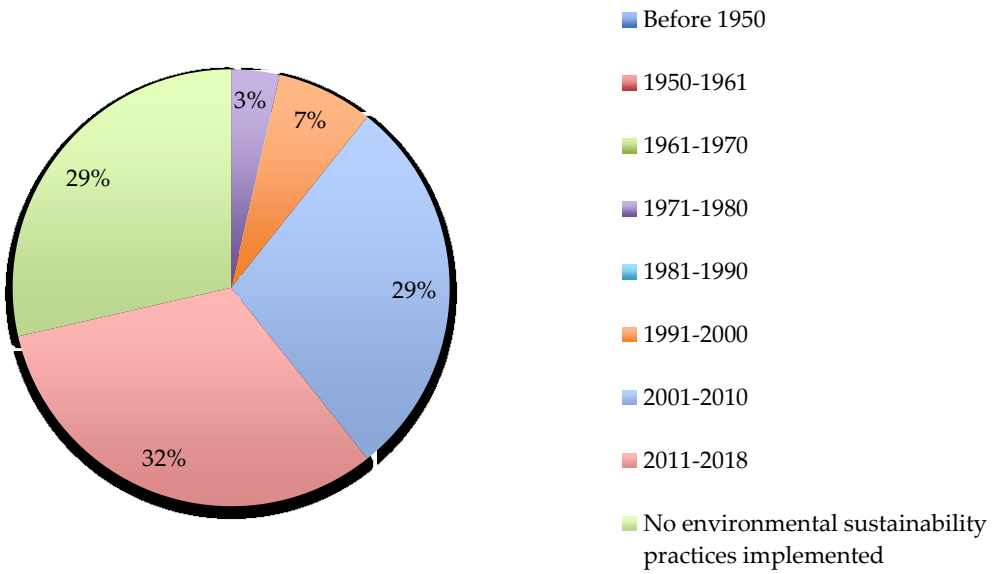

Figure 21. Years of hotel's implementation of the first environmental sustainability practices

If we relate the information on Figure 21 to the opening years of the hotels, from the hotels that chose a period of time we can see that the big majority of the practices were implemented between 2001 and 2018, regardless of the year in which the hotel opened. So, there is no connection between the opening year and the year of implementation of the first practices. Here we can also observe that regardless of the number of practices each hotel had implemented until the end of 2018, almost all of them started in 2001, meaning a recent general awareness of the subject on Portuguese hotels.

From the hotels that mentioned the first implemented practices on the previous figure, eight hotels (40%) implemented them on the area of energy (general); eight hotels noticed them in the area of site development; seven hotels (35%) implemented the first practices on the buildings' construction area; six hotels (30%) adopted the

practices on reduction and waste treatment; five hotels (25%) on the area of sustainable materials; five hotels on conservation and water treatment; four hotels (20%) on solar power; three hotels (15%) implemented the first practices on other areas of environmental sustainability; and no hotel had any of the first implemented practices on the areas of wind power, hydropower, geothermal power, and energy generated through biomass (Figure 22).

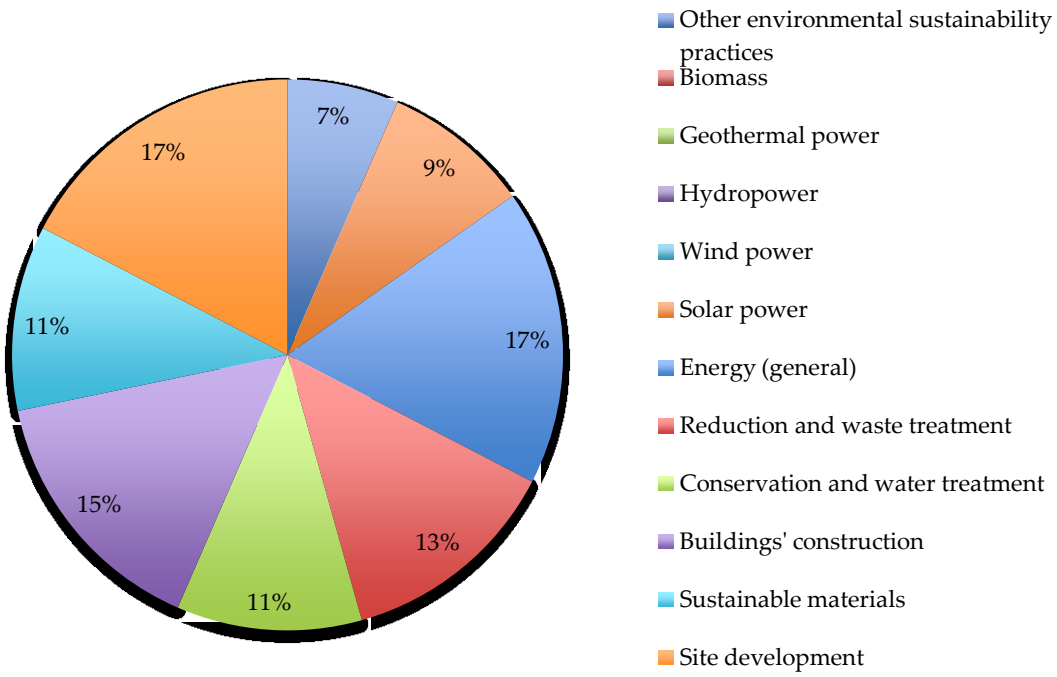

Figure 22. Areas of implementation of first practices

The values presented on the last figure are different from the values mentioned on the analysis of the previous section of the questionnaire regarding the most voted areas. So, we can conclude that the areas where the majority of the first practices were implemented are not the areas in which most practices are implemented nowadays. For instance, the areas where most practices are now implemented are waste reduction and treatment, water conservation and treatment, and general internal tools of environmental sustainability management, and as we can see those are not the most voted areas on Figure 22. This means that these three referred areas gained public awareness with time, which lead to its implementation on hotel through specific practices. However, the areas with less implemented practices nowadays are the same as the areas with less first implemented practices, meaning

the areas of wind power, hydropower, geothermal power and biomass did not gain public awareness with time.

The next question was "Which practices (by area, if applicable)?", to which five of the hotels that answered to the previous one said: on buildings' construction area- reusable materials and exclusive use of LED lighting, on site development- reconstruction of the building, on solar power energy- use of solar panels; improvement of equipment efficiency and implementation of selective collection of waste; recycling, awareness for food waste; general do the hotel; recycling and water treatment (purification).

To the question "Were there any upgrades in practice implementation or through the inclusion of new practices?", from the 19 hotels that answered this optional question, 12 hotels (63.2%) answered yes and seven hotels (36.8%) answered no (Table 3).

In addition, from all the medium level hotels, only one of them answered no so we can make a correlation between hotels that implemented upgrades to older practices or implemented new practices with the hotels with the highest scores regarding the general presence of environmental sustainability practices.

Within the mentioned upgrades, from the 11 hotels that answered this optional question, four hotels mentioned that until the end of 2018 there were four, 18, one, and three upgrades correspondently. And these upgrades were on the following areas: seven hotels (63.6%) made upgrades on energy (general); six hotels (54.5%) on water conservation and water treatment; six hotels on waste reduction and waste treatment; four hotels (36.4%) on the category of other environmental sustainability practices; four hotels on internal tools of environmental sustainability management; four hotels on the certifications' category; three hotels (27.3%) on site development;

two hotels (18.2%) on sustainable materials; two hotels on buildings' construction; one hotel (9.1%) on solar power; and no hotels had upgrades implemented on the areas of wind power, hydropower, geothermal power, and biomass. Surprisingly, the five areas where most upgrades/new practices were implemented (waste reduction and treatment, water conservation and treatment, general internal tools, energy-general, other environmental sustainability practices) are exactly five of the six more voted areas on the previous section of the questionnaire, meaning they are the areas with the highest percentage of implemented practices (number one- 163 votes, two- 93, three- 80, four- 77, and six- 60, respectively).

From the hotels that mentioned the adoption of practices' upgrades, three of them mentioned the specific upgrades, namely the implementation of the Stay Green program- water and energy reduction through diminishing of cleaning days and towels change on by customer's request.

To the question "Can the consumer be aware of the presence of environmental favourable measures through the hotel atmosphere/decoration/furniture/surrounding landscape?", from the 13 answering hotels, 10 hotels (76.9%) answered yes, and three hotels (23.1%) answered no (Table 3).

From all the medium level hotels, two of them did not answer yes (one did not answer and the other answered no) so we can make an interconnection between hotels that have an eco-friendly environment with the hotels with the highest scores regarding the general presence of environmental sustainability practices.

To the mandatory question "Does the hotel feel barriers regarding the implementation of new environmental sustainability practices?", 17 hotels (60.7%) answered yes, and 11 hotels (39.3%) answered no (Table 3).

From the 10 medium level hotels, seven answered yes regarding finding barriers on the implementation of new environmental sustainability practices, meaning that the hotels with more practices implemented also found barriers in the implementation phase and implementation barriers are not a reality of low level hotels only.

The barriers of the hotels that answered yes on the last question are financial barriers (12 hotels- 66.7%); difficulties on the implementation process (nine hotels- 50%); low acceptance from the staff (five hotels- 27.8%); low acceptance from the customers (five hotels); low knowledge of practices (five hotels); barriers related to the building's age (one hotel in "other" option- 5.6%); bureaucratic problems on the location and structural problems due to an historic building (one hotel in the "other" option); low acceptance from the employer (one hotel on the "other" option). This question had a total of 18 answers.

When asked if the questionnaire had influence on the environmental sustainability awareness 20 hotels (71.4%) answered yes and eight hotels (28.6%) said no (Table 3).

13 of the 20 hotels that answered yes are low level hotels, meaning this questionnaire had a positive impact on the hotels that can still make a big improvement on their environmental performance.

To the question "Were you aware of the existence of the majority of the mentioned practices?", 17 hotels (60.7%) answered yes and 11 hotels (39.3%) said no (Table 3).

Only one of the medium level hotels answered no, meaning we can relate knowledge of the majority of the sustainability practices with the level of presence of environmental sustainability practices in a hotel.

The areas in which there was more knowledge were energy (general) (seven hotels); energy and water (two hotels); energy and waste (one hotel); solar power (two hotels); renewable energies in general (one hotel); waste management (one hotel); recyclable materials (one hotel); practices on rooms and bathrooms (one hotel); reuse materials (one hotel); textiles (one hotel); energy, water, food and recycling (one hotel); solar panels, buy on local shops and recycling (one hotel); quality, environment, energy and waste (one hotel); and seven hotels gave non-valid answers (Figure 23).

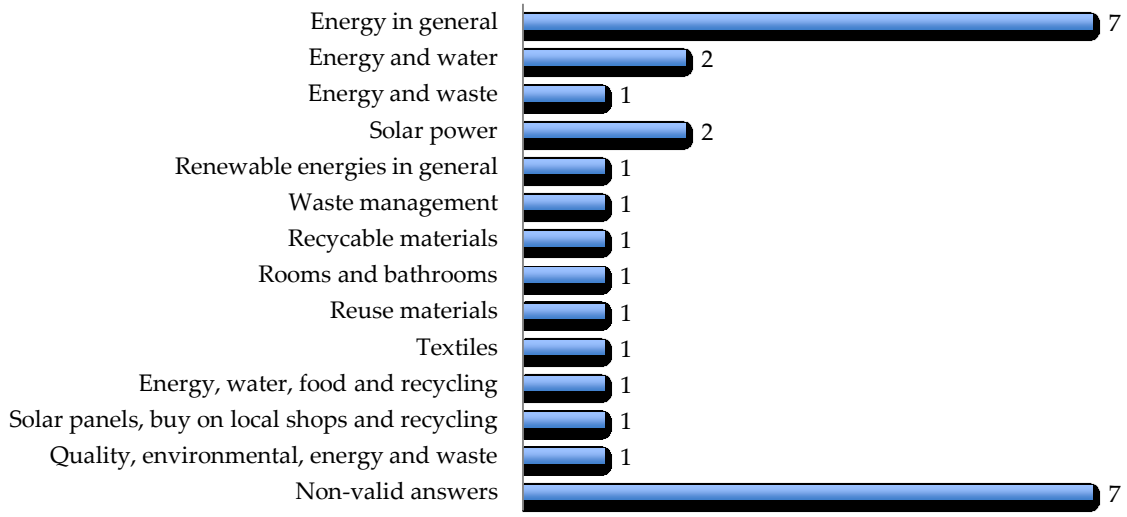

Figure 23. Areas of environmental sustainability practices the hotels had more knowledge in

Two of the areas with more votes on the previous figure (energy- general, and water) are also two of the most voted areas on the second and previous section of the hotels questionnaire, meaning there can be a connection between the areas the hotels have most knowledge in and the areas in which more practices' options were chosen. However, the other area with more votes on Figure 23, solar power, is one of the less voted areas on the second section, so we cannot establish a connection between knowledge and implementation regarding specific areas. We can only establish a connection between general environmental awareness and practices implementation, as we already did previously.

Regarding the areas on which the hotels had less knowledge, they are biomass (two hotels); buildings construction (five hotels); stakeholder's certification, e.g. suppliers (one hotel); kitchen (one hotel); site development (one hotel); wind power (one hotel); hydropower (one hotel); materials (one hotel); other energy sources (two hotel); structure/construction material (one hotel); CO_2, water (one hotel); water (one hotel); and 10 hotels gave non-valid answers. (Figure 24).

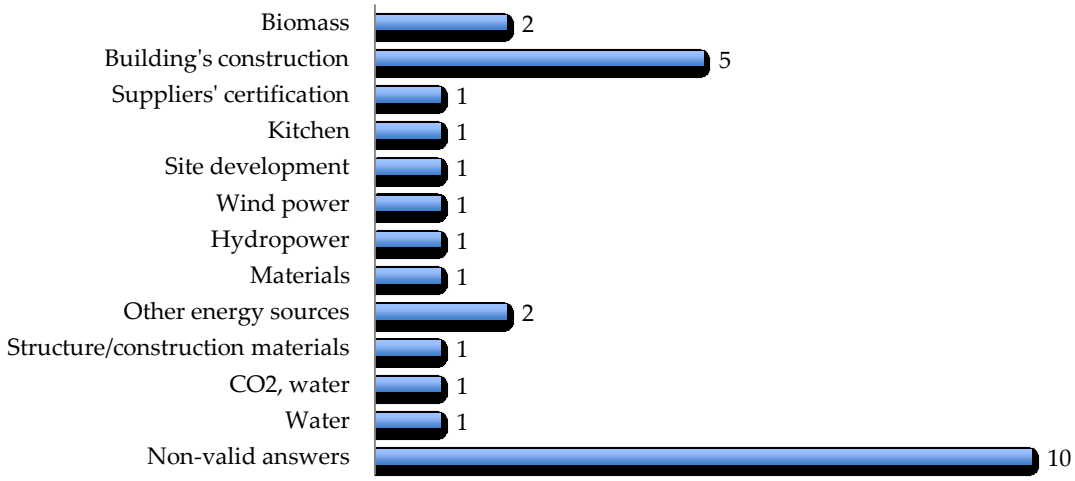

Figure 24. Areas of environmental sustainability practices the hotels had less knowledge in

The three most chosen areas in Figure 24 lead three different relations regarding the less popular areas of practice implementation. Building's construction (with five votes about knowledge) is actually the fifth most voted area on practice implementation; biomass, with two votes on knowledge, is also one of the less voted on practice implementation; other energy sources is not one actual category of the pre-defined environmental sustainability areas so there is no comparison pattern.

To the question "After answering this questionnaire, do you think about implementing some of the environmental sustainability practices you were not aware exist?", eight hotels (28.6%) said yes and 20 hotels (71.4%) answered no (Table 3).

The eight hotels that answered yes on the previous question, revealed the following practices: materials; kitchen practices; solar panels; water reusing system; reusing spotted towels; and three hotels gave non-valid answers.

To the question "After answering this questionnaire, do you think about implementing some of the environmental sustainability practices you were aware exist but were not implemented?", 18 hotels (64.3%) said no and 10 hotels (35.7%) answered yes (Table 3).

Seven of the 10 hotels that answered yes on the previous question, indicated the following environmental sustainability practices they were aware of and are considering implementing now: water, materials, energy; training to raise environmental awareness and improve the results of the already implemented practices; solar panels; energy efficiency measures; Green Key certification. Two of the answers were invalid.

Observing the last two rows of Table 3, there is a highest percentage of practices to be implemented from the ones that hotels already knew but did not have implemented than from the ones hotels were not aware of. This means the questionnaire did not have much influence on making hotels consider about implemented practices they were introduced to here.

	Yes	No
Was the hotel functioning uninterruptedly?	22	6
Were there any upgrades in practice implementation or through the inclusion of new practices?	12	7
Can the consumer be aware of the presence of environmental favourable measures through the hotel atmosphere/decoration/furniture/surrounding landscape?	10	3
Does the hotel feel barriers regarding the implementation of new environmental sustainability practices?	17	11
Did the questionnaire had influence on the environmental sustainability awareness?	20	8
Were you aware of the existence of the majority of the mentioned practices?	17	11
Answering this questionnaire, do you think about implementing some of the environmental sustainability practices you were not aware exist?	8	20
After answering this questionnaire, do you think about implementing some of the environmental sustainability practices you were aware exist but were not implemented?	10	18

Table 3. Answers to yes/no questions

Using the conclusions of this part of this section of the hotel's questionnaire to confirm or disconfirm the information gathered on the reviewed literature, the majority of our respondents agree with many authors regarding hotel environment. These say that an effective way to educate the customer is to bring out the message of sustainability in the overall atmosphere of the hospitality operation. While the decoration, furniture and landscaping around the buildings can be used to enhance the idea of sustainability, offering extended tours of the 'backof- the-house' operations will contribute to the guests' general understanding of the critical issues (Sloan et al., 2009; De Los Salmones et al., 2005; Smerecnik & Andersen, 2011).

The barriers hotels consider as difficulties for implementing green practices are also supported by studies that indicate many possible financial barriers that they

found on studies of their own such as associated cost and training required for implementing a technique, some green practices have a long duration for their return on investment and thus they lose attention, it is costly to apply the techniques and technologies; implementation barriers- complexity of hotel procedures and operations (often involve customers and guests), additional responsibilities in relation to green practices on employees would affect their original jobs, sustainability needs a long commitment and participation from all work levels, delay in implementing approved green techniques, the need for prioritization so every year initiatives are budgeted accordingly; low acceptance from the staff- work culture (e.g., you might buy desk-side recycling bins, however, it is up to the staff to utilize them correctly); low acceptance from the customers- some hotel guests have the perception that hotels may just be using green practices as a marketing tool or to gain financial benefits (Yi et al., 2018); low knowledge of practices- lack of hotel guests' awareness of green practices; low acceptance from the employer- the managers in the hospitality industry do not see the need to analyze the root causes of the reported problems (Al-Aomar & Hussain, 2017), rational individual-level attitudes, experiences, and preferences about the importance of sustainability have been shown to vary greatly across managers (Kaufmann et al., 2009); (Pagell et al., 2013), decisions about SSCM (Sustainable Supply Chain Management) practices are ambitious in ideology, but in reality, may be a lower priority or impractical in the minds of many managers (Bowen et al., 2006), managers operating in firms without exemplary sustainable supply chain management practices face immense hurdles in developing a business case for implementing sustainability initiatives, for many hospitality managers, the daily agenda still focuses on priorities thought more important than sustainable business management, including cost control, profit maximization and shareholder value (Sloan et al., 2009).

Like 61% of the respondents showed knowing the majority of the mentioned practices, literature indicates a growing awareness of adopting green practices in the

service sector in general and in the hospitality industry in particular (Al-Aomar & Hussain, 2017).

On the field of implementing new practices after responding to the questionnaire, unlike the majority of our respondents who declare they will not implement new environmental sustainability practices (regardless already knowing the practices or not), most of the hotels surveyed by Al-Aomar & Hussain confirmed the need to adopt green practices to reduce the many types of waste in the hotel supply chain (Al-Aomar & Hussain, 2017).

From all the hypothesis elaborated on chapter 3 as possible answers to the first research question ("On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve?"), "The majority of hotel managers have some kind of obstacle in implementing environmental sustainability practices" is the hypothesis related to the third section of the hotels questionnaire and according to the analysis presented, it is confirmed.

4.2.2. Consumers' questionnaire

Passing to the results obtained from the questionnaires directed to the consumers, we will now present the data related to the second research question "What is the influence these practices have on the consumers?"

First section- respondents' socio-demographic information

From the total of 188 usable questionnaires (171 collected online and 17 on site), 94.7% are respondents that live in Portugal. So, due to the low representation of respondents from other countries, we will only analyse the questionnaires from

Portuguese inhabitants (178), transforming our target audience in Portuguese tourists. This means the conclusions taken out of this part of the dissertation will verse about the Portuguese population only and not about tourists in general regardless their nationality.

Starting on the socio-demographic information, regarding gender, 61.8% are female answers and 38.2% male.

The age class more represented is the 18-25 with 126 respondents (70.8%), 31 (17.4%) are between 26 and 40 years old, 20 (11.2%) between 41 and 65, and one (0.6%) of the respondents are over 65 years old (Figure 25). We have a mostly young sample meaning we can do a relation with sustainability concern.

The academic qualifications (complete or current) of our sample are mainly distributed between Undergraduate Degree with 83 respondents (46.6%) and Master's Degree with 58 (32.6%). The other academic degrees have a less significant representation thus 23 (12.9%) participants studied until High School, seven (3.9%) have a Bachelor's Degree, six (3.4%) have a Post-Graduate Diploma, one (0.6%) has a PhD, and no respond chose the option Primary School (Figure 26). The big majority of the sample (155) has a college degree meaning only 12.9% does not have higher education. We wrote the percentages with more than one decimal case so the rounding of the number did not make a total of more than 100% (this reason is applicable to the entire document).

The most popular sectors of occupation are Arts and Social Sciences (16.854%), Health and social protection (13.483%), and other areas (Not specified) that represent 12.36%. The positions after that come are ordered as follow: Technology, Media, Communications (9.551%), Education, Research (7.303%), Other engineering (6.742%), Banking, Finance, Insurance (5.056%), Manufacturing (heavy industry,

machines, equipment, construction, energy) and Network Marketing also with 5.056% each, Other services (4.494%), Hotel business, Tourism, Leisure (3.371%), Textile, clothing, footwear (2.809%), Retail (2.247%), Consuming goods (1.685%), Installation and constructing services (1.685%), Transports and logistics (1.124%), Agriculture, fishing, food industry (0.562%), and Student until High School (0.562%). No respondent work on the area of Real Estate (Appendix 7).

Individual net income per month varies per all the income categories. 80 people (44.9%) do not have any income, 43 (24.2%) earns between 600 and 1000€ a month, 23 (12.9%) makes less than 600€ a month, 16 (9%) have an income between 1000€ and 1400€ a month, nine consumers (5.1%) are in the 1400€-1800€ category, and only seven respondents (3.9%) have a liquid monthly income of more than 1800€ (Figure 27). 83.7% of the consumers has a income inferior to 1000€ meaning the sample represents national middle class and not the class with most purchase power.

When asking about how the respondents rate their knowledge on sustainability practices (on a Likert scale answer), 65 (36.52%) have a moderate level of knowledge, 62 (34.83%) name it a current subject, 28 (15.73%) know a lot about it, 18 (10.11%) have little information, and five (2.81%) do not know anything about it (Figure 28). 87% of the respondents chose options three, four and five, meaning the big majority of the consumers are aware of sustainability practices.

48 consumers (27%) stay in hotels just in vacation, 46 (25.8%) use the service less than once a year, 41 respondents (23%) go to hotels 3 to 4 times a year, 34 (19.1%) visit hotels less than 3 times a year, four people (2.3%) go every two months, three (1.7%) twice a month, and two (1.1%) once a month (Figure 29). Almost all the sample (94.94%) goes to hotels less than 3 to 4 four times a year.

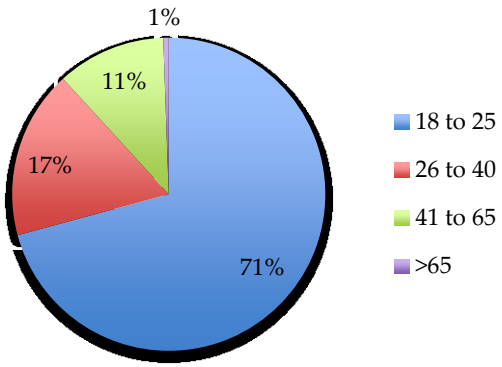

Figure 25. Consumers' age

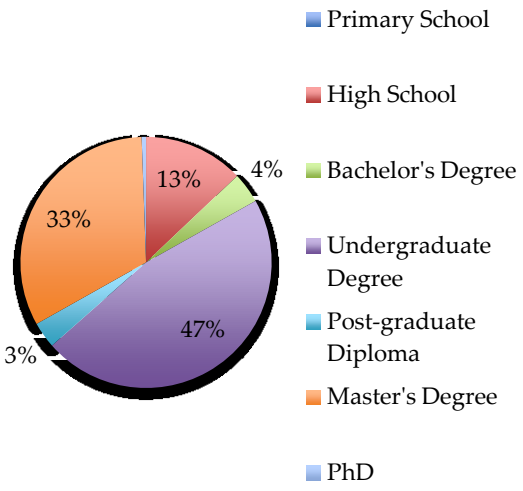

Figure 26. Consumers' academic qualifications

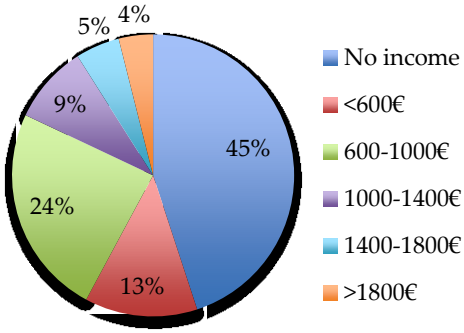

Figure 27. Consumers' monthly net income

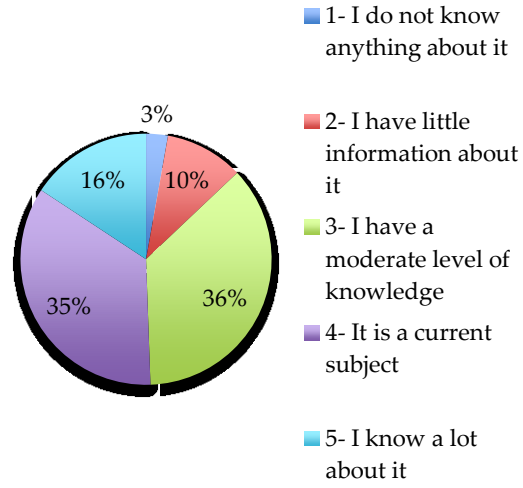

Figure 28. Consumers' knowledge on sustainability practices

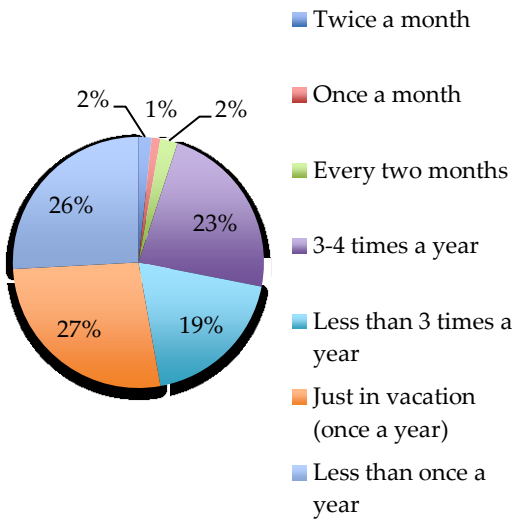

Figure 29. Frequency with which consumers stay in hotels

We will now present and discuss the data related to the second, third and fourth sections of the consumers' questionnaires, starting by the energy area.

Second section- energy sustainability

Regarding the influence of energy sustainability practices on hotel choice, 54 consumers neither agree nor disagree with the fact that the practices have influence on their action of choosing a hotel, 39 agree, 38 respondents strongly disagree, 31 disagree and 16 strongly agree. About being willing to pay more in order to benefit from energy sustainability solutions in a hotel, 68 respondents neither agree nor disagree, 46 disagree, 32 agree, 24 strongly disagree and eight strongly agree. Table 4 present the influence that energy sustainability has on consumers. The first row shows the level of agreement of the respondents to energetic sustainability aspects affecting their hotel choice while in the lower row presents the respondents' points of view about their willingness to pay more for energetic sustainable solutions.

When I choose a hotel to stay, energy sustainability aspects have a positive influence on my choice (without price alteration).				
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
21.348%	17.416%	30.337%	21.910%	8.989%
When I choose a hotel to stay, I am willing to pay more due to the energy sustainability solutions it offers.				
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
13.5%	25.8%	38.2%	18.0%	4.5%

Table 4. Energy sustainability practices and its impact on hotel selection

We can see that less than 35% of the respondents have energy sustainability solutions in consideration when choosing a hotel, and that less than 25% would pay more to use services implemented with energy sustainability offered by the hotel. In addition, only half of those that strongly agree with energy sustainable features affecting their choice of hotel were willing to pay a higher price for those features.

When asked about preferences for sustainable energy solutions (without any impact on hotel cost) over half 96 (53.93%) stated their preference for using an intelligent temperature management system that depends on room presence, 27 (15.17%) chose turning off the air conditioner when going to sleep and 21 (11.80%). Also 11.80% of the consumers chose the option of having less electrical equipments in the bedroom (e.g. fridge, dryer, television, etc.), and 12 (6.74%) people chose to have less illumination points in the room. 0.6% stated not being willing to select any energy sustainability solution in their hotel bedroom (Figure 30).

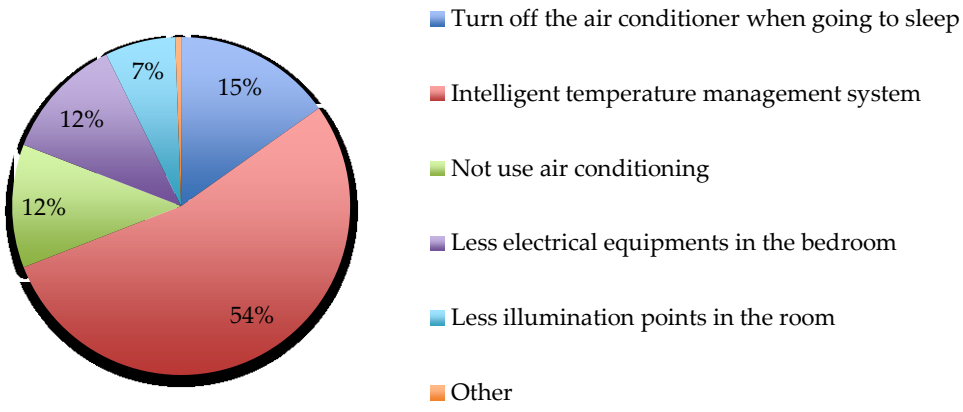

Figure 30. Consumers' preferences for sustainable energy solutions, for the same price

On the other hand, relating to features consumers would be willing to pay more to have access to, 67 (37.64%) would incur extra costs to have bigger windows/spaces with glass to the outside (have more natural light), 49 (27.53%) preferred an intelligent home automation system (integration of automatic mechanisms in a space) which optimizes the energy management of the room, 33 (18.53%) consumers chose to have a thermic isolation that minimizes the use of climatization systems, 14 (7.87%) chose to have only LED illumination, 11 (6.18%) respondents are willing to pay more for having only last generation electric equipments (A+++ class). On the "other" option, two consumers (1.12%) were not willing to have a higher cost for any of the previous options, one (0.56%) claimed to chose all of the above and another one (0.56%) mentioned that the price was the key to any of the choices (Figure 31).

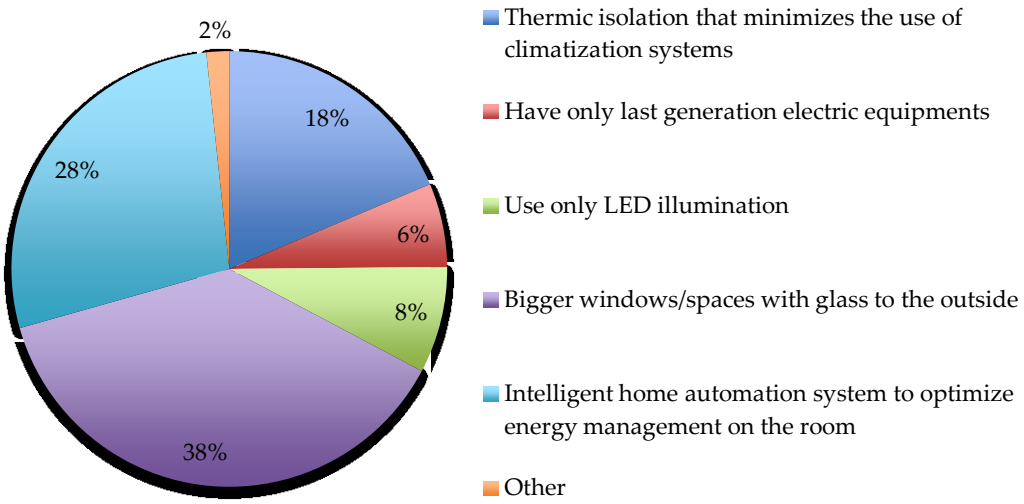

Figure 31. Consumers' preferences for sustainable energy solutions, for a higher price

Third section- environmental sustainability

The third section of the consumers' questionnaire is, as said, about environmental sustainability practices. 20 respondents strongly disagree with the premise that environmental sustainability aspects have influence on hotel choice, other 20 disagree, 61 neither agree nor disagree, 55 agree and 22 strongly agree. Besides that, 22 consumers' strongly disagree with being willing to pay extra to benefit from environmental sustainability solutions, 35 disagree, 74 neither agree nor disagree, 36 agree and 11 strongly agree. The answers about the impact of environmental sustainability in hotel choice are shown in Table 5.

When I choose a hotel to stay, environmental sustainability aspects have a positive influence on my choice (without price alteration)				
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
11.2%	11.2%	34.3%	30.9%	12.4%
When I choose a hotel to stay, I am willing to pay more due to the environmental sustainability solutions it offers				
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
12.3596%	19.6629%	41.5730%	20.2247%	6.1798%

Table 5. Environmental sustainability practices and its impact on hotel selection

We can observe that almost 45% of the respondents conclude that environmental sustainability aspects have an influence on their hotel choice, and that less than 30% would accept extra costs for those solutions. Like on the previous table, only half of the consumers who strongly agree with choosing their hotel partly based on environmental sustainability solutions would pay extra for them.

The environmental sustainability practice consumers chose more to have in their room without additional payment was to use the same bath towels and bed sheets for more than a day (66 respondents- 37.079%), followed by the option of having all the information in digital support instead of paper (45 respondents- 25.281%). The other practices had less than 20 votes each, namely "have toilets with flow-controller systems" (19 consumers- 10.674%), "Have less amenities in the room" (17 consumers- 9.551%), "Less electric equipments in the bedroom (e.g. fridge, dryer, television, etc.)" (13- 7.303%), "Have recycled/remanufactured furniture" (other 13 consumers- 7.303%), "Reduce the frequency of room cleaning" (four- 2.247%), and "All of the above" (one consumer- 0.562%) on the "Other" option (Figure 32).

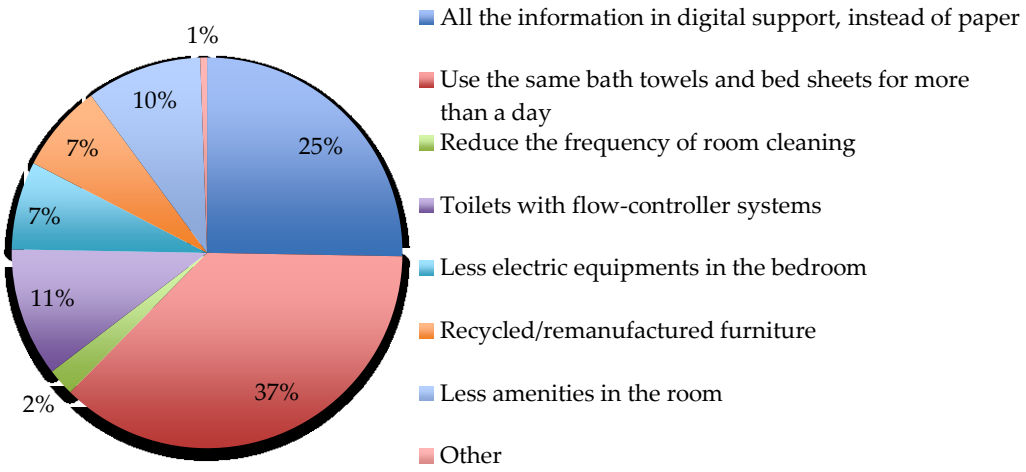

Figure 32. Consumers' preferences for sustainable environmental solutions, for the same price

Regarding having a higher cost to benefit from environmental sustainability solutions, having textiles (sheets, towels, curtains, etc.) manufactured with ecological materials and having only cleaning products with low environmental impact being

used are the two most preferred solutions with 42 votes each one (23.5955%). Then 39 consumers (21.9101%) claimed having more interest in having only local or nearby products for breakfast while 38 (21.3483%) preferred biological products or products from a controlled origin for breakfast. At last, 12 respondents (6.74157%) had their choice on having furniture manufactured with local materials, and five respondents (2.80899%) wrote on option "Other", being divided in three types of answers: two consumers said not choosing any of the above, one would choose all of the above and the other one mentioned the price was the key to any of the choices (Figure 33).

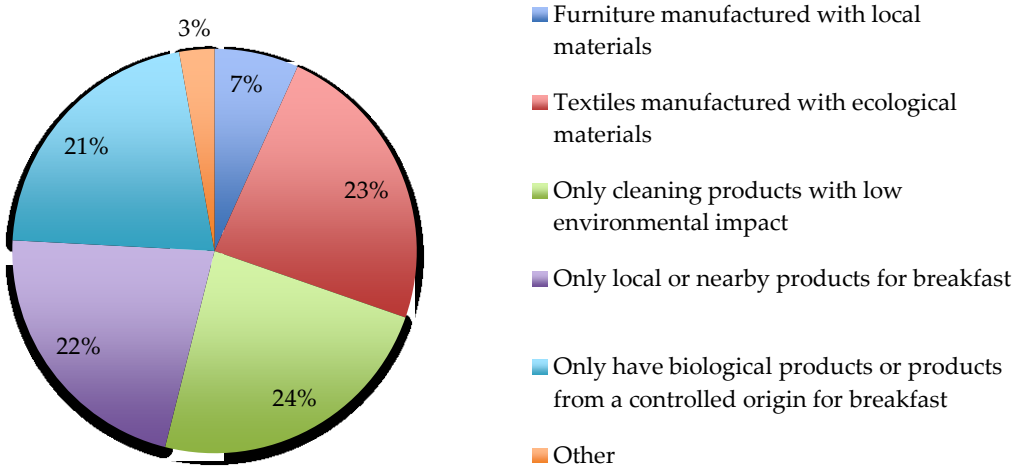

Figure 33. Consumers' preferences for sustainable environmental solutions, for a higher price

Fourth section- social sustainability

Now presenting the data relate to the fourth and last section of the consumers' questionnaire, we will start (as in the last two sections) by the consumers' opinion about the influence of social sustainability practices on hotel staying. 23 respondents strongly disagree that social sustainability aspect influence their hotel choice, 22 disagree, 52 neither agree nor disagree, 61 agree and 20 strongly agree. As for being willing to pay extra to use social solutions the hotel has to offer, 18 consumers strongly disagree with paying more for the mentioned purpose, 30 disagree, 76 neither agree nor disagree, 43 agree and 11 strongly agree. With regard to social sustainability issues and their impact on the choice of hotel, consider Table 6.

When I choose a hotel to stay, social sustainability aspects have a positive influence on my choice (without price alteration)				
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
12.9%	12.4%	29.2%	34.3%	11.2%
When I choose a hotel to stay, I am willing to pay more due to the social sustainability solutions it offers				
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
10.11%	16.85%	42.70%	24.16%	6.18%

Table 6. Social sustainability practices and its impact on hotel selection

Almost 50% of the respondents find social sustainability practices to be one of the aspects they consider while looking for hotel accommodation. It is the highest percentage of agreement on this question from the three areas (energy, environmental and social). It is also the area where the option "Neither agree nor disagree" is not the one with the highest percentage on the upper row of the table. More than 30% of the consumers are willing to have extra costs to use the social sustainability solutions to be offered by the hotel. Once more, it is the highest percentage of agreement on this question from the three areas. The percentage of consumers willing to pay more for social sustainability solutions is more than half of the percentage of consumers who strongly agree with having social sustainability aspects in consideration when choosing a hotel.

The social sustainability practices with more support from the consumers (without price alteration), by order are the following: all the suppliers being local or from nearby (39 participants- 21.9%), having an app with a local experience's guidebook (36- 20.2%), having a local guide that monitors and shows local experiences to enjoy during the stay (29- 16.3%), all the staff being local or from nearby (26- 14.6%), reducing the frequency of room cleaning (25- 14%), having only a digital doorman from a certain time at night on (22- 12.4%) and one consumer (0.6%) wrote "All of the above" on the "Other" option (Figure 34).

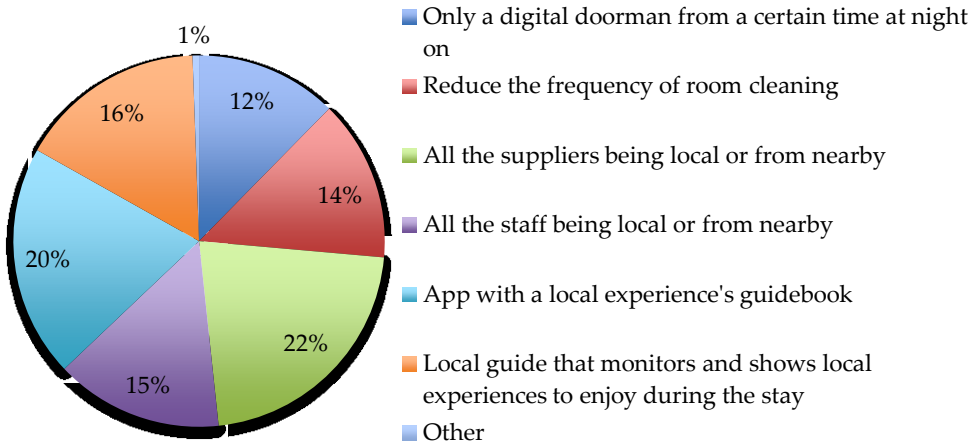

Figure 34. Consumers' preferences for sustainable social solutions, for the same price

If the consumers pay extra for social sustainability solutions offered by the hotel, the staff having social benefits (health insurance, daycare, incentives for training, etc.) it is their choice of election with 74 votes (41.573%). Then, having a local guide that monitors and shows local experiences to enjoy during the stay it is the next most chosen option (32 consumers- 17.9775%), having a personalized guidebook with local experiences to enjoy during the stay (27-15.1685%), all the suppliers being local or from nearby (25- 14.0449%), all the staff being local or from nearby (17- 9.55056%), and three consumers (1.68539%) chose "Other" and wrote the following answers: "None", "All of the above" and "The price is the key to any of the choices" (Figure 35).

Figure 35. Consumers' preferences for sustainable social solutions, for a higher price

To the question "What added value I would be willing to pay on the final price to stay in a hotel with practices on energetic, environmental and social areas (starting from the base price I usually pay in hotels, depending on their rate: 1 to 5 stars)?", 88 consumers (49.4%) would pay less than 10€, 73 (41%) would accept extra costs between 10 and 30€, 15 (8.4%) would go until 50€ more, one respondent (0.6%) would pay more than 51 additional Euros, and another consumer (0.6%) would incur on extra costs of more than 80€ to benefit from sustainability solutions (Figure 36). These results are in line with the answers to the socio-demographic question relating the monthly net income of the consumers. Thus, 45% of the respondents do not have any income and 49% would pay less than 10 addition Euros to benefit from sustainability solutions.

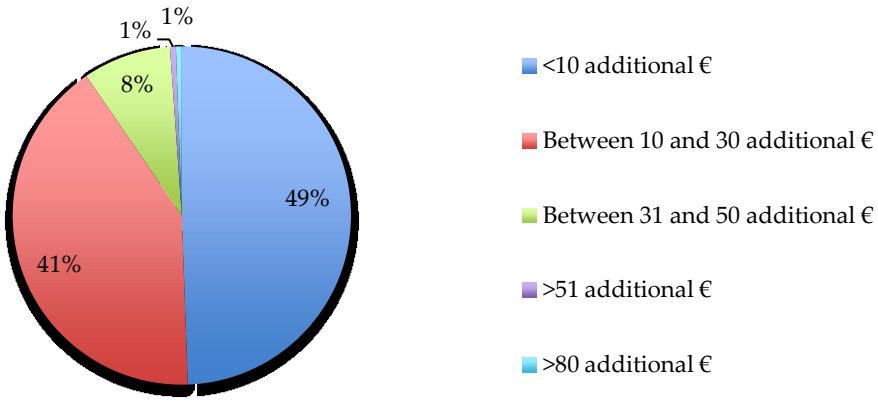

Figure 36. Consumers' willingness to pay an extra cost on the final price

Comparing the results from all the three sustainability areas, the environmental area has higher percentages than the energy area regarding the options three, four and five exposed on the tables. However, the social area has the biggest acceptance from the consumers, as mentioned on the analysis of that area. More consumers consider social sustainability aspects when choosing a hotel than energy and environmental aspects. In addition, more consumers are willing to pay extra costs to have social sustainability features than energy and environmental sustainability features.

If we consider the option three as irrelevant when analysing the percentage of consumers who consider or do not consider sustainability aspects when choosing and hotel, we can conclude that the energy area is the only where the majority of the consumers do not include such practices on their list of characteristics the hotel needs to have. Likewise, both in environmental and social area the majority of the consumers (excluding those who chose "neither agree nor disagree") believe sustainability aspects on these areas as relevant for hotel choosing.

Furthermore, comparing the answers of the respondents about the sustainability areas with their socio-demographic data, it is possible to say that consumers who are willing to pay more are the ones with more sustainability knowledge. Analysing the data, on the energy area we can establish the referred relation because the consumers who are willing to pay extra costs for energy sustainability features are the ones with more awareness on the subject. From the 32 consumers who agreed on the premise of paying more for energy sustainability solutions, 93.8% has knowledge on the area, and from the eight consumers that strongly agreed on the same premise, the percentage of knowledge is 87.5%. Regarding the consumers who neither agree nor disagree, disagree, or strongly disagree, these percentages are lower (86.8%, 87%, and 75%, respectively). On the environmental scope, from the respondents that agree and strongly agree with paying more, 91.7% and 100% of them (respectively), have knowledge on the subject, while with that ones that neither agree nor disagree, disagree, or strongly disagree this percentages decrease for 89.2%, 82.9% and 72.7% (respectively). The last area, social sustainability, is the only one where the percentage of sustainability knowledge associated with people who disagree with paying more is higher than the percentage of knowledge related with people who agree with having extra costs. The percentage distribution is the following: 100% of the consumers who strongly agree with incurring on extra costs, 90.7% of the consumers who agree, 82.9% of the people who neither agree nor disagree, 93.3% of

the people who disagree, and 77.8% of the respondents who strongly disagree have knowledge on social sustainability aspects.

As mentioned, the social area had the most acceptance from the consumers. The social sustainability practice of giving the staff social benefits (health insurance, daycare, incentives for training, etc.) was the most voted (42%) from all the social sustainability options (either with or without extra costs). It was also the second most voted in all the questionnaire's sustainability practices (in all the areas, regardless price increasing). This is according previous findings that says that besides positively affecting the preservation of the environment, business according to sustainable development principles could provide better services for customers based on employees' higher job satisfaction and job commitment (Skopje, 2016); and that it is becoming more evident that hotel businesses must be more attentive to these discussions by proposing an inclusion of sustainable practices in managerial and operation strategies such as the interests of employees (e.g., social benefits and volunteering) (Pérez & Rodríguez del Bosque, 2014).

Even though the majority of the consumers are not willing to pay a higher price, some (half of the ones who claimed to strongly agree that sustainability practices of any area are a factor when choosing a hotel) are, being in line with (Kang et al., 2010), Kang et al. (2012), Laroche et al., (2001), and Xu & Gursoy (2015). On the other hand, by the results shown we can also affirm some consumers are willing to sacrifice their comfort for sustainability reasons, which is also in line with authors Kang et al., (2010) and Rahman & Reynolds (2016).

As stated previously, it is possible to establish a relationship between consumers who are willing to pay extra for sustainability features in a hotel and consumers who have knowledge on the sustainability affair. Drozdenko et al. (2011) agree with it by expressing that "consumers who are not aware of sustainability issues tend to be

unwilling to pay a premium price for circular products or services offering the same quality as the conventional products, because price sensitivity is related to the perception of value added". This conclusion was also taken as we can see in the results' analysis made previously to the literature comparison.

The fact that the majority of the respondents would have environmental and social aspects in consideration when choosing an hotel is in line with the findings that indicate that a green hotel image has been found to positively affect customers' perceptions (Lee et al., 2010; Shanti, 2016; Kasim, 2004); that much of the individual and business customers consider environmental performance of an enterprise while making their purchasing decisions (Guyader et al., 2017; Moser, 2015); that there are many benefits from the introduction of more environmentally friendly practices besides reduction of natural resources consumption such as accompanying improvements in customer trust and public image ("Hotel Energy Solutions (2013)"); and that green practices are important for almost all service businesses today, but maybe more important for a hotel's supply chain because they lead not only to a reduction in costs but to as a higher reputation in the customer's perspective (Sari & Suslu, 2018). However, our findings go against the studies conducted by the International Hotels Environment Initiative (IHEI) that reveal 90% of hotel guests prefer to stay in a hotel that cares for the environment.

There were five hypothesis elaborated on chapter 3 as possible answers to the second research question ("What is the influence these practices have on the consumers?"), and according the previous analysis, these are the status of each one:

- Most consumers are willing to change some of their habits/give up some comfort regarding energy, environmental and social sustainability in their hotel room for the same price- confirmed.

- Most consumers are more willing to have new features regarding social sustainability in their hotel room for a higher price than they are regarding energy and environmental sustainability- confirmed.
- Energy, environmental and social sustainability aspects do not influence the majority of the consumer's choice of hotel- partially confirmed, as it is confirmed for energy sustainability practices but it is not confirmed for environmental and social areas.
- When choosing a hotel, most consumers are more willing to pay more due to the social sustainability features the space offers than to pay more due to energy and environmental features- confirmed.
- On the overall price, the majority of consumers are not willing to more than 10 additional Euros over the base price they usually pay in hotels (depending on their rate), for sustainability practices- confirmed.

5. Conclusion

5.1. Introduction

This chapter has the objective o presenting the conclusions drawn from the discussion of the results, which, on its turn, had the goal of answering to the research questions and hypothesis formulated before all the investigation. The conclusion part will be divided in three parts which will regard the conclusions taken from the hotels' questionnaire, the consumers' questionnaire and third a general conclusion including the main both parts of the study and study contributions.

We will then state limitations of this study and indicate possible future research on the subject.

5.2. Research Conclusions

This study was conducted in order to address the research gap of knowing the state of environmental sustainability practices in hotels and make an extension of the work- and relate it with consumers' insights, about the influence of the practices on their hotel choice, about their willingness to pay more in order to allow a hotel to implement sustainable friendly practices, about the practices they would better accept during their stay. In this case, the goal was to fill in this gap on the Portuguese context, having chosen the three main cities of the country for that purpose. To this end, the study has developed a simple model to assess the level of environmental sustainability practices' implementation of hotels and empirical work to assess the consumers' variables previously mentioned on this paragraph. The survey results

provided answers to the study research questions and the study findings provided guidance and insight for to the referred objectives.

Starting by the hotels questionnaire, in terms of results of the first part, no average per question was below three (which is labelled "Important") so the hotels considered environmental sustainability practices important in all the social variables (economic performance, differentiation and hotel competitiveness, CRS, existing customer's loyalty, retention of new customers). On the first, second and third, the majority of the hotels considered it not only important but crucial (and on the second and third social themes, these percentages were 92.9% and 100%, respectively). On the fourth and fifth themes hotels considered it important but not crucial. Furthermore, it is not possible to establish a relationship between any of the social themes and the demographic variables (rating, location, capacity, opening years). The agreement of the hotels with the importance that environmental sustainability practices has on all the social aspects they were inquired about is a helpful finding because it is in line with qualitative assessments made by hotels' subject matter experts , increasing the credibility of the collected information.

The study found the majority of the hotels (64.3%) have a low level of environmental sustainability practices' implementation (which responds to the first research question "On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve?"), in contrast with the study in which we most based on and compared results to, where the majority (63%) had medium to high experience in adopting such practices (Al-Aomar & Hussain, 2017).

Waste treatment and reduction, water conservation and treatment, and general internal tools of environmental sustainability management are the areas where hotels have more environmental practices implemented. Hussain et al., (2016) sustain that

waste management has become a core function within GSCM due to the central role of wastes in various environmental concerns. Likewise, Smerecnik & Andersen (2011) says one of the most important sustainability innovations in a resort's organizational structure is the adoption of an environmental strategy and management plan .

By practice, "LED lighting" is the most implemented practice by the hotels followed by "Solar effect- double glazing on doors and windows" and "General internal environmental sustainability management tool "tools in the area of energy and water consumption". The first two most voted choices are on the energy area, and are justified by Rodríguez & del Mar Armas Cruz (2007) who say that due to the unprecedented growth of the hospitality industry in recent decades, it has been responsible for using excessive natural resources, consuming a great amount of energy. If energy is what is most consumed, it makes sense that the simplest practice to implement on the area is the most voted (meaning, the most implemented).

The only star ratings with medium level hotels are 3, 4 and 5, and only star ratings with the majority (or half) of medium level hotels are 5 and 4 (respectively). All the other ratings have a majority of low level hotels. Al-Aomar & Hussain (2017), focused on 5 star hotels because the authors also understood that these hotels have better well-established systems and standards (including green and environmental). In our study the distribution of hotel classification facing rate was the following: 5 star is the rating with highest percentage of medium level hotels (75%), followed by 4 star hotels (50%), 3 star hotels (16.7%), 2 stars (0%) and 1 star also with 0% of medium level hotels.

Every local has medium level hotels but the only location with a majority of medium level hotels is Algarve. Regarding capacity, on the categories evaluated, "more than 300", "more than 200" and "51 to 70" people are the categories with

medium level hotels. From those, the last one is the only one with a majority of medium level hotels and the first one has half. The hotels with medium level of environmental sustainability practices implementation are maximum 19 years old (opened in 2000, 2009 and 2017), meaning they belong to the category of "new" hotels. The only opening years where hotels with more environmental sustainability practices implemented opened were 2000 and 2017 (with not majority but half of the hotels at a medium level implementation). This is in accordance with Al-Aomar & Hussain (2017) about sustainability concept being relatively new to the hotel industry, so those with less experience were found to be in many cases more familiar with green practices.

So, repeating the sum up made in chapter 4, the majority of the hotels classified as medium level are 3, 4 or 5 star hotels, in Algarve, with a capacity for 51 to 70 and more than 300 people, and that are not the oldest hotels (opening year starting at 2000).

From the third part of the hotels questionnaire we conclude that Portuguese hotels that closed temporarily did not do it for innovations on environmental sustainability and that the year of implementation of the first practices is not related the opening year of each hotel but years where environmental sustainability started gaining public attention. These first practices were more implemented on these three areas: energy (general), site development, and buildings' construction. Nonetheless, these are not the areas with the highest implementation percentage nowadays, meaning that meanwhile, public awareness increased on other environmental sustainability areas (namely the three most implemented now and mentioned on the conclusions of the second part of the hotels' questionnaire on this chapter). On the other hand, the areas with less adhesion on the implementation of the first practices (wind power, hydropower, geothermal power and biomass) are still the same these days, meaning those areas did not gain public awareness with time.

We concluded there is a correlation between hotels that implemented upgrades to older practices or implemented new practices with the hotels with the highest scores regarding the general presence of environmental sustainability practices. The five areas where most upgrades/new practices were implemented (waste reduction and treatment, water conservation and treatment, general internal tools, energy- general, other environmental sustainability practices) are exactly five of the six more voted areas on the previous section of the questionnaire (areas with the highest percentage of implemented practices).

It was also possible to establish a relation between hotels that have an eco-friendly environment with the hotels with the highest scores regarding the general presence of environmental sustainability practices. The majority of the hotels found barriers on the implementation of practices, even hotels with medium level of implementation (seven of 10 medium hotels that answered yes to founding barriers), so implementation barriers are not a reality of low level hotels only. The main barriers are of financial nature, implementation difficulties, and low acceptance from the staff. These are supported by studies that indicate many possible financial barriers that they found on studies of their own (Yi et al., 2018).

Even though the majority of the hotels were already aware of the majority of the environmental sustainability practices mentioned [as corroborated by Al-Aomar & Hussain (2017), a growing awareness of adopting green practices in the service sector in general and in the hospitality industry in particular], the questionnaire still had a positive influence on the respondents' environmental sustainability awareness. With this data we could also relate knowledge of the majority of the sustainability practices with the level of presence of environmental sustainability practices in a hotel. Two of the areas hotels had more knowledge in (energy- general, and water) are also two of the area where respondents claimed to have more practices implemented in (meaning there can be a connection between the areas the hotels

have most knowledge in and the areas in which more practices' options were chosen), but the other area hotels had more knowledge in, solar power, is one of the less voted areas on the second section, so we cannot establish a connection between knowledge and implementation regarding specific areas. We can only establish a connection between general environmental awareness and practices implementation. The majority of the hotels will neither implement practices they were not aware exist nor practices they were aware existed but were not implemented, so despite the fact that the questionnaire was helpful to increase the hotels environmental sustainability awareness, it did not have much influence on making hotels considering to implemented practices they were introduced to here.

The conclusions made from the data that came from the hotels' questionnaire answered the first research question and also confirmed six of the seven hypothesis associated to it. The confirmed hypotheses are:

- The majority of the inquired hotels can relate economic improvement with the presence of sustainability measures
- The majority of the inquired hotels consider sustainability practices very important to differentiation and competitive advantage
- The majority of the inquired hotels consider sustainability practices to have a lot of influence on the social responsibility of the hotel as a corporation
- The majority of the inquired hotels think about sustainability practices as an important aspect when it comes to the retention of new customers
- 4 and 5 star hotels have a higher level of environmental sustainability practices' presence than 1, 2 and 3 star hotels
- The majority of hotel managers have some kind of obstacle in implementing environmental sustainability practices.

From the part of the dissertation directed for the consumers' questionnaire, answering the second research question "What is the influence these practices have

on the consumers?", we found that Portuguese tourists (mostly female, between 18 and 25 years old, with an undergraduate degree, whose sectors are arts and social sciences or health and social protection, with no income or monthly income below 1000€), are aware of sustainability practices (87.1% of the respondents have a moderate level of knowledge, name it a current subject, or know a lot about it), and stay in hotels from less than once a year to 3-4 times a year.

The majority of the consumers (excluding those who chose "neither agree nor disagree") have environmental and social aspects in consideration when choosing a hotel, but not energy aspects. In spite of not having the majority in all the three areas, there were consumers agreeing with the statement in every area, proving the findings of various studies from many authors and enterprises on the theme (Lee et al., 2010; Shanti, 2016; Kasim, 2004; Guyader et al., 2017; Moser, 2015 ; "Hotel Energy Solutions (2013)" ; Sari & Suslu, 2018; International Hotels Environment Initiative-IHEI), like explained on the previous chapter.

On the other hand, the majority of the consumers are not up to paying more to have sustainability solutions in any of the areas, which is not similar to the information found on the literature. Nevertheless, half of the respondents who strongly agree with the first premise strongly agree with the second (related to a higher payment) in every area and we can say this part of the consumers can corroborate the studies of the experts Kang et al. (2010), Kang et al. (2012), Laroche et al., (2001), and Xu & Gursoy (2015).

Comparing three sustainability areas, more consumers agree and strongly agree with having environmental sustainability aspects in consideration and paying more for it than in the energy area. However, the social area has the biggest acceptance from the consumers. More consumers consider social sustainability aspects when choosing a hotel than energy and environmental aspects. Furthermore, more

consumers are willing to pay extra costs to have social sustainability features than energy and environmental sustainability features.

The most popular sustainability practices among consumers are using an intelligent temperature management system that depends on room presence (energy area), using the same bath towels and bed sheets for more than a day (environmental area), and all the suppliers being local or from nearby (social area). The sustainability practices consumers are most willing to pay extra costs for are having bigger windows/spaces with glass to the outside- more natural light (energy area), having textiles (sheets, towels, curtains, etc.) manufactured with ecological materials and having only cleaning products with low environmental impact being used (environmental area), and the staff having social benefits- health insurance, daycare, incentives for training, etc. (social area). The fact that this last practice was the most voted (42%) from all the social sustainability options (either with or without extra costs), and the second most voted in all the questionnaire's sustainability practices (in all the areas, regardless price increasing) confirms previous findings of many experts as mentioned on chapter 4.

Although the social area is the one with more acceptance from the consumer, only on the other two areas is possible to do a relation between consumers who are willing to pay more and the ones with more sustainability knowledge, agreeing with Drozdenko, Jensen, & Coelho (2011): "consumers who are not aware of sustainability issues tend to be unwilling to pay a premium price for circular products or services offering the same quality as the conventional products, because price sensitivity is related to the perception of value added."

From the hypothesis stated as a complement of the research question associated with the consumers' questionnaire, almost all were totally confirmed. The confirmed hypotheses are:

- Most consumers are willing to change some of their habits/give up some comfort regarding energy, environmental and social sustainability in their hotel room for the same price
- Most consumers are more willing to have new features regarding social sustainability in their hotel room for a higher price than they are regarding energy and environmental sustainability
- When choosing a hotel, most consumers are more willing to pay more due to the social sustainability features the space offers than to pay more due to energy and environmental features
- On the overall price, the majority of consumers are not willing to more than 10 additional Euros over the base price they usually pay in hotels (depending on their rate), for sustainability practices.

The hypothesis "Energy, environmental and social sustainability aspects do not influence the majority of the consumer's choice of hotel" was partially confirmed because it is confirmed for energy sustainability practices but it is not confirmed for environmental and social areas.

To sum up, it was possible to answer the questions "On what level are environmental sustainability practices present on the supply chain of hotels from all the star categories in Porto, Lisbon and Algarve? What is the influence these practices have on the consumers?", as well as to confirm almost all the hypothesis related to them. The majority of hotels from Porto, Lisbon and Algarve have a low level of environmental sustainability practices' implementation, some hotels have a medium level and no hotel was classified with a high level of implementation. The majority of the inquired hotels consider environmental sustainability practices important to economic performance, differentiation and competitive advantage, corporation social responsibility, retention of new customers. 4 and 5 star hotels have a higher level of environmental sustainability practices' presence than 1, 2 and 3 star hotels, and the

majority of hotel managers have some kind of obstacle in implementing environmental sustainability practices. Sustainability practices were verified to have influence on consumers. Most consumers are willing to give up some comfort regarding energy, environmental and social sustainability in their hotel room for the same price, and are more willing to have new features regarding social sustainability in their hotel room for a higher price than they are regarding energy and environmental sustainability. When choosing a hotel, most consumers are more willing to pay extra costs due to the social sustainability features the space offers than to pay more due to energy and environmental features, and on the overall price, the majority of consumers are not willing to more than 10 additional Euros over the base price they usually pay in hotels (depending on their rate), for sustainability practices. Energy aspects do not influence the majority of the consumer's choice of hotel.

These conclusions give insights to hotels and interested parties (tourism associations, sustainability related organizations, government) and consumers. The contributions for hotels are based on awareness from the questionnaire filling and possible consequent implementation but mainly based on the analysis and conclusions made from the consumers' questionnaire. This last questionnaire provides the hotels with the opinion of consumers regarding what they would value more and pay for in hotels on the scope of sustainability (by the resume of the main conclusions of the study that the hotels will receive). That will enable a better understanding of the green concepts and supply chain managers of hotels to effectively manage resource consumption at different supply chain elements and become proactive in implementing green practices. These two contributions together allow the hotels to get to know all the sustainability practices and then consider the consumers' preferences when balancing all the aspects. Tourism associations and sustainability related organizations may use the tourists' profiles to adapt the marketing strategies in awareness-raising campaigns and even to choose specific

practices that are not so known to invest those campaigns on. The government may have insights into the nature of competitive advantage of hotels which can assist them with strategic decision making to improve the technical and environmental management of hotels and consequently national tourism. The consumers may benefit from the questionnaire by getting to know the sustainability practices or remind them – basically use the questionnaire as an awareness tool.

5.3. Limitations and recommendations for future research

Although we reached the goals we were purposed to, there are some aspects that can be improved or added on related future research. It is possible to implement the models of both parts of this study in different locations (other countries). It is also possible to extend this work by evaluating the social aspect of hotels (managers, staff, stakeholders), and not only the environmental one. The research continuity of this theme may focus on the consequences of practices' implementation, meaning, focus on the evaluation of hotel performance after practices implementation- energy and water consumption reduction, waste reduction and treatment. This last analysis could be done on the group of practices that more hotels have implemented. Also, future research may include a study where hotels evaluate customers' satisfaction regarding new sustainability solutions. This evaluation could be done twice: immediately after implementing all the chosen practices, and in the long run (some time after the implementation) to access customer opinion on it.

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7. Appendixes

Boa tarde,

O meu nome é Clarisse Alemão e frequento o 2º ano do Mestrado em Gestão de Serviços na Católica Porto Business School. Estou, neste momento, a desenvolver a minha dissertação de mestrado sobre o tema Práticas de Sustentabilidade Ambiental na Cadeia de Abastecimento de Hotéis, sendo o estudo de caso os Hotéis das Áreas Metropolitanas do Porto, Lisboa e Algarve.

Neste sentido, gostaria de solicitar a vossa colaboração através do preenchimento do seguinte questionário: https://goo.gl/forms/0HFN29TwwuXPW9J73

Uma vez que estou também a avaliar a influência das práticas de sustentabilidade nos consumidores, peço também a vossa colaboração no envio/disponibilização do link do seguinte questionário aos vossos
clientes: https://goo.gl/forms/414FZDVIyt5Faiyt2

Como é mencionado no início do questionário, a recolha, tratamento e publicação dos dados será feita de forma anónima e apenas com fins académicos.

No fim do estudo, agradecendo a participação do vosso hotel, ser-vos-á enviada uma síntese geral das conclusões obtidas acerca da presença de práticas de sustentabilidade ambiental no universo de hotéis sediados nas três regiões, assim como os benefícios que estas podem ter na angariação e fidelização de clientes.

A vossa ajuda seria certamente bastante útil para o aumento de conhecimento e desenvolvimento positivo do turismo nacional e regional.

Para qualquer questão não hesite em contactar.

Com os melhores cumprimentos,
Clarisse Alemão

Appendix 1. Collaboration email sent to the hotels

Práticas de sustentabilidade ambiental no setor hoteleiro do Porto, Lisboa e Algarve

O questionário que se segue é feito com a finalidade de avaliar a presença de práticas de sustentabilidade ambiental nos hotéis sediados na Área Metropolitana do Porto, no âmbito da minha dissertação no Mestrado em Gestão de Serviços, na Universidade Católica Portuguesa - Católica Porto Business School.

Agradecendo a participação, informo que a recolha e análise dos dados e a publicação das respetivas conclusões será feita de forma anónima, com fins meramente académicos, no sentido de compreender o nível de desenvolvimento do panorama turístico do Porto, Lisboa e Algarve no que refere a esta área de estudo.

* Required

Nota: Se receber este questionário num endereço de email geral ao qual estejam afetos vários hotéis, por favor responda a um questionário por cada hotel.

1. Em que cidade o hotel está sediado? *

Mark only one oval.

- ◯ Porto
- ◯ Lisboa
- ◯ Algarve

2. Em que ano abriu o hotel? *

3. Como está classificado o hotel (até ao final de 2018)? *

Mark only one oval.

- ◯ 1 estrela
- ◯ 2 estrelas
- ◯ 3 estrelas
- ◯ 4 estrelas
- ◯ 5 estrelas

4. Capacidade de alojamento do hotel (até ao final de 2018) *

Mark only one oval.

- <10 pessoas
- 10-30 pessoas
- 31-50 pessoas
- 51-70 pessoas
- 71-90 pessoas
- 91-110 pessoas
- >110 pessoas
- >200 pessoas
- >300 pessoas

5. Que função desempenha no hotel sobre o qual vai responder? *

6. Quão importante considera as práticas de sustentabilidade ambiental na performance económica do seu hotel? *

Mark only one oval.

	1	2	3	4	5	
Muito pouco importante						Crucial

7. Quão importante considera as práticas de sustentabilidade ambiental na diferenciação e competitividade do hotel dentro do setor? *

Mark only one oval.

	1	2	3	4	5	
Muito pouco importante						Crucial

8. Quão importante considera as práticas de sustentabilidade ambiental em hotéis para a sua responsabilidade social enquanto corporação? *

Mark only one oval.

	1	2	3	4	5	
Muito pouco importante						Crucial

9. **Quão importante considera as práticas de sustentabilidade ambiental na fidelização de atuais clientes?** *

Mark only one oval.

	1	2	3	4	5	
Muito pouco importante	◯	◯	◯	◯	◯	Crucial

10. **Quão importante considera as práticas de sustentabilidade ambiental na fidelização de novos clientes?**

Mark only one oval.

	1	2	3	4	5	
Muito pouco importante	◯	◯	◯	◯	◯	Crucial

11. **Que práticas de sustentabilidade ambiental nota nas redondezas do hotel?** *

Check all that apply.

- [ ] Estacionamento, chuveiros e balneários para ciclistas
- [ ] "Pool car": carro do hotel para ser usado por vários colaboradores Postos de carregamento para veículos elétricos e híbridos
- [ ] Efeito ilha de calor: pelo menos 80% do estacionamento para veículos motorizados é subterrâneo e os terraços têm 75% de isolamento
- [ ] Redução de poluição de luz: iluminação exterior mínima para evitar poluição noturna no céu
- [ ] Nenhuma
- [ ] Other: _____

12. **Que práticas de sustentabilidade ambiental tem implementadas na área de materiais sustentáveis (de construção e de utilização diária)?** *

Check all that apply.

- [ ] Mais de 10% de todos os materiais usados são aproveitados de outros locais com desperdício de materiais
- [ ] Materiais regionais: mais de 40% dos materiais de construção foram provenientes de um raio de 800km do local do projeto
- [ ] Materiais de construção reciclados: vidro, azulejos de cerâmica, alumínio
- [ ] Madeira certificada, madeira reciclada ou placas de MDF (Medium Density Fiberboard)
- [ ] Blocos de cimento
- [ ] Estrutura base (paredes, portas, tetos) com isolamento acústico
- [ ] Celos ambientais: celar divisões para prevenção da entrada de barulho e de fumo
- [ ] Têxteis (para quarto, banho, cozinha e decoração) em 100% algodão (reciclado, orgânico ou natural)
- [ ] Nenhuma
- [ ] Other: _____

13. **Que práticas de sustentabilidade ambiental tem implementadas na área de construção (planeamento de design sustentável)?** *

Check all that apply.

- [ ] EFEITO SOLAR. Orientação do edifício de acordo com a latitude de forma a maximizar a luz natural (mais no Inverno e menos no Verão)
- [ ] EFEITO SOLAR. Colocação de janelas ou portas e paredes de vidro a sul e de minimizar a presença de vidro a norte
- [ ] EFEITO SOLAR. Portas/janelas com vidro duplo
- [ ] EFEITO SOLAR. Janelas verticais na direção sul a fim de apanhar o sol baixo do Inverno
- [ ] EFEITO SOLAR. Coberturas para colocar nas janelas direcionadas a sul durante o Verão
- [ ] MASSA TÉRMICA. Utilização de tijolo, cimento e pedra como principais materiais (pois são os que têm maior capacidade de contribuir para a massa térmica de um edifício)
- [ ] MASSA TÉRMICA. Utilização de água no caso de sistemas de aquecimento central
- [ ] EFEITO CHAMINÉ. Criação de pequenos orifícios no topo do edifícios para incentivar a ventilação natural (local por onde sai o ar quente quando sobe é o mesmo local por onde entra ar fresco e renovado)
- [ ] Nenhuma
- [ ] Other: _____

14. Que práticas de sustentabilidade ambiental tem implementadas na área de conservação e tratamento de água? *

Check all that apply.

- [ ] Reciclagem da água proveninte de várias atividades da cadeia de funcionamento do hotel
- [ ] Sistema de canalização eficiente: sistema de água fria e quente com média ou baixa pressão, em vez de sistema de água quente com alta pressão
- [ ] Torneiras: sensores de movimento que controlam a saída e o fecho da água de acordo com a presença ou falta de movimento, ou de acordo com a quantidade de água estipulada para cada lavagem
- [ ] Chuveiros: ovo temporizador que indica ao cliente quanto tempo gasta no banho
- [ ] Torneiras e chuveiros: aparelhos controladores do fluxo de água (onde a pressão da água é menos importante como na cozinha e casas de banho públicas), fluxo de água com ar (jatos de água com ar incorporado)
- [ ] Sanitas e urinóis: aparelho/objeto na cisterna para reduzir a sua capacidade (e assim encher com menos água), dupla descarga (opção de pequena ou grande descarga), descarga de gravidade ou descarga com pressão assistida (combina gravidade com ar comprimido)
- [ ] Lavagem de roupa: máquinas com entrada frontal para a roupa em vez de no topo
- [ ] Piscinas e spas: temperatura da água baixa (dentro do que é possível para manter o conforto dos clientes) e/ou coberturas de piscinas
- [ ] Jardinagem: plantação de plantas indígenas em vez de variedade de espécies e predominância de relva
- [ ] Jardinagem: rega das plantas de manhã bem cedo ou ao final do dia
- [ ] Fontes e outras estruturas com gastos de água: utilização de água cinza e manter desligado durante a noite
- [ ] Nenhuma
- [ ] Other: _____

15. Que práticas de sustentabilidade ambiental tem implementadas na área de diminuição e tratamento de desperdício? *

Check all that apply.

- [ ] REDUZIR. Cozinha: embalamento em recipientes de papel ou de vidro
- [ ] REDUZIR. Cozinha: cozinhar por pedido e não em avanço
- [ ] REDUZIR. Cozinha: sistema de pesagem de desperdícios alimentares pré-consumidor nos várias fases de preparação, para identificar de onde vem o maior desperdício
- [ ] REDUZIR. Cozinha: incentivos para colaboradores que produzem menos desperdício
- [ ] REDUZIR. Compras em grande quantidade, que não vêm embaladas em vários pequenos recipientes (ex: produtos de limpeza, alimentos)
- [ ] REDUZIR. Compra de produtos com maior prazo de validade
- [ ] REDUZIR. Placas com indicações sobre quanto é que cada cliente pode poupar em desperdício de água, energia e detergente/branqueador ao não pedir mudança de toalhas diariamente
- [ ] REDUZIR. Desempenho de algumas atividades da cadeia de abastecimento em outsourcing
- [ ] REDUZIR. Compras em empresas locais
- [ ] REUTILIZAR. Fornecedores de alimentação: pedido para entrega de bens ser em recipientes reutilizáveis
- [ ] REUTILIZAR. Compra ou arrendamento de mobília e equipamento remanufaturado
- [ ] REUTILIZAR. Casas de banho: sabonetes e shampoos líquidos em recipientes de cerâmica recarregáveis
- [ ] REUTILIZAR. Aproveitamento de têxteis estragados (ex: uniformes, toalhas ou roupa de cama) noutros items (ex: sacos reutilizáveis para a roupa suja, materiais de limpeza)
- [ ] REUTILIZAR. Tingimento de toalhas com manchas e reutilização como toalhas para piscina/spa/praia/limpeza
- [ ] REUTILIZAR: Rotação de cortinas para variar o local exposição ao sol
- [ ] REUTILIZAR. Restaurante e bars: substituição de materiais de uma única utilização por materiais reutilizáveis (ex: guardanapos, toalhas de mesa, toalha para limpar as mãos)
- [ ] REUTILIZAR. Bebidas: garrafas reutilizáveis (preferencialmente de vidro)
- [ ] REUTILIZAR. Comida: doação de comida não usada (alimentos frescos, cozinhados, congelados ou desperdícios) às instituições de caridade locais, programas de apoio a sem abrigos, centros de dia, quintas para alimentação de animais
- [ ] REUTILIZAR. Doação de óleo alimentar para condutores com mecanismo de combustível adaptado no seu veículo
- [ ] RECICLAR. Pontos de reciclagem em todos os pisos
- [ ] RECICLAR. Recliclagem de papel (criação de pasta de papel e de todo o processo posterior)
- [ ] RECICLAR. Tratamento de desperdícios provenientes de atividades domésticas
- [ ] Nenhuma
- [ ] Other: _____

16. **Que práticas de sustentabilidade ambiental tem implementadas na área de energia (em geral)?** *

Check all that apply.

- [ ] Restaurante e bars: inclusão de vários pratos sem carne
- [ ] Sistema automático do edifício de restabelecer água arrefecida para reduzir o consumo de energia requirido para arrefecer o hotel
- [ ] Sistema de bombas de calor para recuperação do calor e para aquecimento de água para fins domésticos
- [ ] Lâmpadas LED
- [ ] Sistema de poupança de energia nos quartos (desliga aparelhos elétricos não necessários quando o cliente sai do quarto)
- [ ] Aparelho estabilizador de voltagem (previne estragos de equipamento causados por flutuação de energia repentina)
- [ ] Nenhuma
- [ ] Other: _____

17. **Que práticas de sustentabilidade ambiental tem implementadas na área de energia solar?** *

Check all that apply.

- [ ] Uso de painéis solares no telhado (orientados para sul) para aquecimento da água
- [ ] Uso de painéis fotovoltáicos para conversão da luz solar em energia e colocados nas laterais do edifício (orientados para sul) como filtros solares, reduzindo a necessidade de ar condicionado
- [ ] Nenhuma
- [ ] Other: _____

18. **Que práticas de sustentabilidade ambiental tem implementadas na área de energia aeólica?** *

Check all that apply.

- [ ] Turbinas de vento que capturam a energia armazenada no vento e a converte em eletricidade
- [ ] Nenhuma
- [ ] Other: _____

19. **Que práticas de sustentabilidade ambiental tem implementadas na área de energia hidroelétrica?** *

Check all that apply.

- [ ] Turbinas com geradores que transformam a corrente da água em energia elétrica
- [ ] Nenhuma
- [ ] Other: _____

20. Que práticas de sustentabilidade ambiental tem implementadas na área de energia geotérmica? *

Check all that apply.

- [ ] Bombas que retiram calor do subsolo para ser utilizado diretamente no aquecimento do hotel (ou de outros edifícios) ou como fonte de energia que leva turbinas a gerar eletricidade
- [ ] Nenhuma
- [ ] Other: _____

21. Que práticas de sustentabilidade ambiental tem implementadas na área de energia produzida através de biomassa? *

Check all that apply.

- [ ] Criação de biogás (uma das várias formas de bioenergia através de biomassa), através da degradação bacteriana de matéria orgânica, para produção de eletricidade e calor
- [ ] Compra de eletricidade criada através de biomassa
- [ ] Compra ou criação de biocombustíveis para veículos do hotel
- [ ] Aquecimento do sistema através do processo de queimar madeira e não através de petróleo ou gás
- [ ] Nenhuma
- [ ] Other: _____

22. Que outras práticas de sustentabilidade ambiental tem implementadas? *

Check all that apply.

- [ ] Providenciar formação ao staff sobre assuntos relacionados com a proteção do ambiente
- [ ] Divulgação da consciencialização e políticas ambientais a todos os consumidores e fornecedores
- [ ] Identificação áreas: para fumadores e não fumadores; onde se pode fazer ruído e de silêncio
- [ ] Uso de argumentos ecológicos em campanhas de marketing
- [ ] Incentivar colaboradores a submeter propostas de atividades de cariz ambiental (e recompensá-los por isso)
- [ ] Nenhuma
- [ ] Other: _____

23. Que ferramentas gerais internas tem implementadas para a gestão da sustentabilidade ambiental? *

Check all that apply.

- [ ] Ferramenta de análise, relato (por terceiros), aprendizagem, melhoria (em todas as operações do hotel)
- [ ] Análise regular de custos e benefícios das atividades levadas a cabo para proteção do ambiente
- [ ] Ferramenta através da qual os hotéis reportam o número de medidas implementadas
- [ ] Consumo de água e energia
- [ ] Quantidade e custo de desperdício produzido
- [ ] Gestão de energia e carbono medida através de auditorias e consultores externos
- [ ] Colaboração com programas de sustentabilidade ambiental externos
- [ ] Colaboração com programas de certificação ambiental (ex: Green-Key Eco rating program)
- [ ] Metas a curto, médio e longo prazo de aspetos a melhorar a nível ambiental (menos energia, água, CO_2, desperdício descarregado)
- [ ] Nenhuma
- [ ] Other: _____

24. Que certificações de gestão ambiental tem? *

Check all that apply.

- [ ] Do hotel: ISO 140001
- [ ] Do hotel: Eco-Hotel
- [ ] Do hotel: Chave Verde
- [ ] Do hotel: Certificação LiderA (Sistema Português de Avaliação da Sustentabilidade)
- [ ] Do hotel: BREEAM
- [ ] Do hotel: Eco Certification STEP (Sustainable Tourism Certification Program)
- [ ] De fornecedores: OHSAS 18001
- [ ] Nenhuma
- [ ] Other: _____

25. O hotel esteve em funcionamento ininterruptamente? *

Mark only one oval.

- ◯ Sim *Skip to question 30.*
- ◯ Não *Skip to question 26.*

26. Em que ano/s esteve fechado para o público?

_____

27. **O fecho esteve relacionado com a implementação de inovações ao nível da sustentabilidade ambiental?**
Mark only one oval.

- ◯ Sim
- ◯ Não

28. **A reabertura apresentou inovações ao nível da sustentabilidade ambiental?**
Mark only one oval.

- ◯ Sim
- ◯ Não

29. **Se respondeu "sim" na última questão, quais?**

_____

_____

_____

_____

_____

30. **Em que ano foi/foram implementada(s) a(s) primeira(s) prática(s)?** *
Mark only one oval.

- ◯ Antes de 1950
- ◯ 1950-1960
- ◯ 1961-1970
- ◯ 1971-1980
- ◯ 1981-1990
- ◯ 1991-2000
- ◯ 2001-2010
- ◯ 2011-2018
- ◯ O hotel não tem práticas de sustentabilidade ambiental implementadas *Skip to question 38.*

31. Em que área(s) foi/foram implementada(s) a(s) primeira(s) prática(s)?

Check all that apply.

- [ ] Meio envolvente do hotel
- [ ] Materiais sustentáveis
- [ ] Construção
- [ ] Conservação e tratamento de água
- [ ] Diminuição e tratamento de desperdício
- [ ] Energia (geral)
- [ ] Energia solar
- [ ] Energia aeólica
- [ ] Energia hidroelétrica
- [ ] Energia geotérmica
- [ ] Energia de biomassa
- [ ] Outras práticas de sustentabilidade ambiental

32. Quais as práticas (por área, se aplicável)?

_____

_____

_____

_____

_____

33. Houve upgrades nas práticas implementadas ou através da inserção de novas práticas?

Mark only one oval.

- ◯ Sim *Skip to question 34.*
- ◯ Não *Skip to question 38.*

34. Quantos upgrades se registaram desde a abertura do hotel até ao final do ano de 2018?

_____

35. Em que áreas foram esses upgrades?

Check all that apply.

- [ ] Meio envolvente do hotel
- [ ] Materiais sustentáveis
- [ ] Construção
- [ ] Conservação e tratamento de água
- [ ] Diminuição e tratamento de desperdício
- [ ] Energia (geral)
- [ ] Energia solar
- [ ] Energia aeólica
- [ ] Energia hidroelétrica
- [ ] Energia geotérmica
- [ ] Energia de biomassa
- [ ] Outras práticas de sustentabilidade ambiental
- [ ] Ferramentas internas de gestão da sustentabilidade ambiental
- [ ] Certificações

36. Quais os upgrades (por área, se aplicável)?

_____

_____

_____

_____

_____

37. O consumidor consegue aperceber-se da presença de medidas favoráveis para o ambiente através da atmosfera geral do hotel/decoração/mobília/paisagem envolvente?

Mark only one oval.

- ◯ Sim
- ◯ Não

38. O hotel sente entraves relativamente à implementação de novas práticas de sustentabilidade ambiental? *

Mark only one oval.

- ◯ Sim
- ◯ Não

39. Se respondeu "sim" na última questão, quais?

Check all that apply.

- [ ] Entraves financeiros
- [ ] Pouca aceitação por parte dos colaboradores
- [ ] Pouca aceitação por parte dos clientes
- [ ] Falta de conhecimento de práticas
- [ ] Dificuldade no processo de implementação
- [ ] Other: _____

40. Considera que este questionário teve influência na consciencialização para a questão da sustentabilidade ambiental? *

Mark only one oval.

- ◯ Sim
- ◯ Não

41. Tinha conhecimento da existência da maioria das práticas mencionadas? *

Mark only one oval.

- ◯ Sim
- ◯ Não

42. Em que área tinha mais conhecimento? *

_____

43. Em que área tinha menos conhecimento? *

_____

44. Após responder a este questionário, considera implementar algumas das práticas de que não tinha conhecimento? *

Mark only one oval.

- ◯ Sim
- ◯ Não

45. Se respondeu "sim" na última questão, quais?

_____

_____

_____

_____

_____

46. **Após responder a este questionário, considera implementar algumas das práticas de que já tinha conhecimento mas que não estão ainda implementadas?** *

Mark only one oval.

- ◯ Sim
- ◯ Não

47. **Se respondeu "sim" na última questão, quais?**

_____

_____

_____

_____

_____

Appendix 2. Hotels questionnaire

Energy, Environmental and Social Sustainability

The following survey aims to understand the impact of environmental sustainability practices implemented by hotels on the consumer, as well as the influence of these practices on consumer's choice of hotel. The study will be included in my master's dissertation for the completion of the MSc in Services' Management at Católica Porto Business School. Thank you for taking part in this survey which I hope will positively contribute for the analysis of the Oporto's tourism and hospitality sector. The collection, analysis, and publication of the data will be done anonymously and used for academic purposes only.

* Required

Demographic Characteristics

1. **Age** *

Mark only one oval.

- ◯ <18
- ◯ 18-25
- ◯ 26-40
- ◯ 41-65
- ◯ >65

2. **Gender** *

Mark only one oval.

- ◯ Female
- ◯ Male

3. **Country that you live in** *

_____

4. **Academic qualifications (completed or current)**

Mark only one oval.

- ◯ Primary School
- ◯ Secondary School
- ◯ High School
- ◯ Bachelor's Degree
- ◯ Undergraduate Degree
- ◯ Post-graduate Diploma
- ◯ Master's Degree
- ◯ PhD
- ◯ Other: _____

5. **Sector/Industry** *

Mark only one oval.

- ◯ Student (until High School)
- ◯ Education, Research
- ◯ Hotel business, Tourism, Leisure
- ◯ Installation and constructing services
- ◯ Consuming goods
- ◯ Health and social protection
- ◯ Transports and logistics
- ◯ Banking, Finance, Insurance
- ◯ Arts, Social Sciences
- ◯ Other services
- ◯ Textile, clothing, footwear
- ◯ Technology, Media, Communications
- ◯ Manufacturing (heavy industry, machines, equipment, construction, energy)
- ◯ Agriculture, fishing, food industry
- ◯ Real Estate
- ◯ Retail
- ◯ Network Marketing
- ◯ Other engeneering
- ◯ Not specified

6. **Net income per month** *
Mark only one oval.

- ◯ No income
- ◯ Less than 600€
- ◯ 600€-1000€
- ◯ 1000€-1400€
- ◯ 1400€-1800€
- ◯ More than 1800€

7. **How I would rate my knowledge about sustainability practices (energetic, environmental or social)?** *
Mark only one oval.

	1	2	3	4	5	
I do not know anything about the subject	◯	◯	◯	◯	◯	It is a recurrent subject/ I know a lot

8. **How often I stay in hotels (1 to 5 stars).** *
Mark only one oval.

- ◯ Twice a month or more
- ◯ Once a month
- ◯ Every two months
- ◯ 3-4 times a year
- ◯ Less than 3 times a year
- ◯ Just in vacation (once a year)
- ◯ Less than once a year
- ◯ Other: _____

Energy Sustainability

9. **In order to promote the improvement of energy sustainability, during my stay, in my hotel room, for the same price, I would be more willing to:** *
Mark only one oval.

- ◯ Turn off the air conditioner when going to sleep
- ◯ Use an intelligent temperature management system that depends on room presence
- ◯ Not use air conditioning
- ◯ Have less electrical equipments in the bedroom (e.g. fridge, dryer, television, etc.)
- ◯ Have less illumination points in the room
- ◯ Other: _____

10. **When I choose a hotel to stay, energy sustainability aspects have a positive influence on my choice (without price alteration).** *
Mark only one oval.

	1	2	3	4	5	
They do not have any influence	◯	◯	◯	◯	◯	They are a crucial aspect

11. **In order to promote the improvement of energy sustainability, during my stay, in my hotel room, for a higher price, I would be more willing to:** *
Mark only one oval.

- ◯ Have thermic isolation that minimizes the use of climatization systems
- ◯ Have only last generation electric equipments (A+++ class)
- ◯ Use only LED illumination
- ◯ Haver bigger windows/spaces with glass to the outside (have more natural light)
- ◯ Have an intelligent home automation system (integration of automatic mechanisms in a space) which optimizes the energy management of the room
- ◯ Other: _____

12. **When I choose a hotel to stay, I am willing to pay more due to the energy sustainability solutions it offers.** *
Mark only one oval.

	1	2	3	4	5	
Not willing at all	◯	◯	◯	◯	◯	Very willing

Environmental Sustainability

13. **In order to promote the improvement of environmental sustainability, during my stay, in my hotel room, for the same price, I would be more willing to:** *
Mark only one oval.

- ◯ Have all the information in digital support, instead of paper
- ◯ Use the same bath towels and bed sheets for more than a day
- ◯ Reduce bedroom cleaning frequency
- ◯ Have toilets with flow-controller systems
- ◯ Have less electric equipments in the bedroom (e.g. fridge, dryer, television, etc.)
- ◯ Have recycled/remanufactured furniture
- ◯ Have less amenities in the room
- ◯ Other: _____

14. **When I choose a hotel to stay, environmental sustainability aspects have a positive influence on my choice (without price alteration).** *

Mark only one oval.

	1	2	3	4	5	
They do not have any influence	◯	◯	◯	◯	◯	They are a crucial aspect

15. **In order to promote the improvement of environmental sustainability, during my stay, in my hotel room, for a higher price, I would be more willing to:** *

Mark only one oval.

- ◯ Have furniture manufactured with local materials
- ◯ Have textiles (sheets, towels, curtains, etc.) manufactured with ecological materials
- ◯ Only cleaning products with low environmental impact being used
- ◯ Only local or nearby products being used for breakfast
- ◯ Only have biological products or products from a controlled origin for breakfast
- ◯ Other: _____

16. **When I choose a hotel to stay, I am willing to pay more due to the environmental sustainability solutions it offers.** *

Mark only one oval.

	1	2	3	4	5	
Not willing at all	◯	◯	◯	◯	◯	Very willing

Social Sustainability

17. **In order to promote the improvement of social sustainability, during my stay, in my hotel room, for the same price, I would be more willing to:** *

Mark only one oval.

- ◯ Have only a digital doorman from a certain time at night on
- ◯ Reduce the frequency of room cleaning
- ◯ All the suppliers being local or from nearby
- ◯ All the staff being local or from nearby
- ◯ Have an app with a local experience's guidebook
- ◯ Have a local guide that monitors and shows local experiences to enjoy during the stay
- ◯ Other: _____

18. **When I choose a hotel to stay, social sustainability aspects have a positive influence on my choice (without price alteration).** *

Mark only one oval.

	1	2	3	4	5	
They do not have any influence	◯	◯	◯	◯	◯	They are a crucial aspect

19. **In order to promote the improvement of social sustainability, during my stay, in my hotel room, for a higher price, I would be more willing to:** *

Mark only one oval.

- ◯ All the suppliers being local or from nearby
- ◯ All the staff being local or from nearby
- ◯ The staff having social benefits (health insurance, daycare, incentives for training, etc.)
- ◯ Have a personalized guidebook with local experiences to enjoy during the stay
- ◯ Have a local guide that monitors and shows local experiences to enjoy during the stay
- ◯ Other: _____

20. **When I choose a hotel to stay, I am willing to pay more due to the social sustainability solutions it offers.** *

Mark only one oval.

	1	2	3	4	5	
Not willing at all	◯	◯	◯	◯	◯	Very willing

21. **What added value I would be willing to pay on the final price to stay in a hotel with practices on energetic, environmental and social areas (starting from the base price I usually pay in hotels, depending on their rate: 1 to 5 stars)?** *

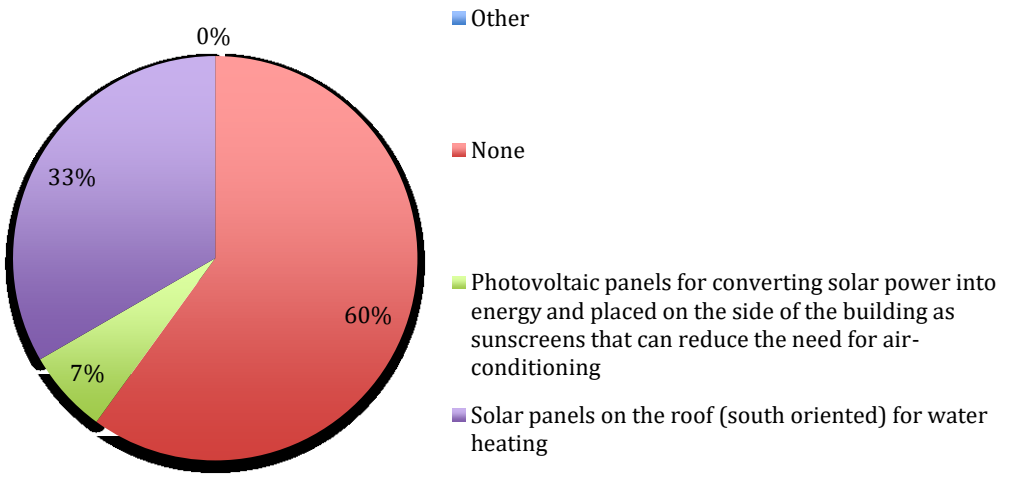
Mark only one oval.

- ◯ <10 additional €
- ◯ Between 10 and 30 additional €
- ◯ Between 31 and 50 additional €
- ◯ >51 additional €
- ◯ >80 additional €

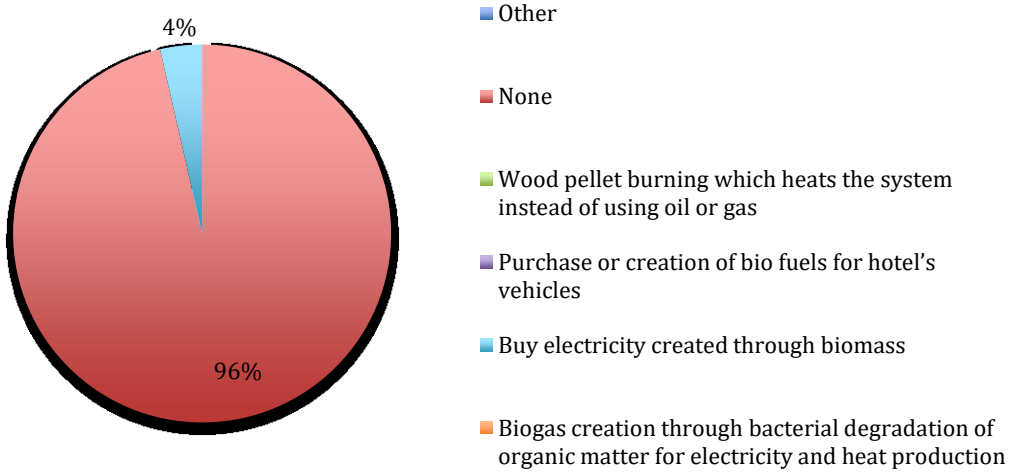
Appendix 3. Consumers' questionnaire

Commercial	1
Human Resources Manager	1
HACCP	1
Quality, Environment and Safety Manager	2
Reception Manager	2
Receptionist	3
Administration Assistant	5
General Director	5
Administration	8

Appendix 4. Respondents' role on the hotel



Appendix 5. Solar power practices



Appendix 6. Biomass practices

Sector/Industry	Nº
Real Estate	0
Agriculture, fishing, food industry	1
Student (until High School)	1
Transports and logistics	2
Consuming goods	3
Installation and constructing services	3
Retail	4
Textile, clothing, footwear	5
Hotel business, Tourism, Leisure	6
Other Services	8
Banking, Finance, Insurance	9
Manufacturing	9
Network Marketing	9
Other engineering	12
Education, Research	13
Technology, Media, Communications	17
Not specified	22
Health and social protection	24
Arts and Social Sciences	30

Appendix 7. Consumers' sector/industry