Environmentally Sustainable Hotel Operations: The Case of the Shangri-La Group

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Abstract

This study used a qualitative instrumnental case study research design to examine how a major hotel chain manages its operations in an environmentally sustainable manner. The Shangri-La Group was selected as the case company. The study period was from 2010 to 2018. The qualitative data gathered for the study was examined by document analysis. The study found that despite the increase in the number of properties in the Shangri-La Group portfolio, the Group's annual Scope 1 and Scope 2 emissions, the Group's annual energy and water consumption have all exhibited a downward trend from 2010 to 2018. Over the study period, the Group implemented a range of energy and water saving measures. The Group has also implemented sustainable waste management policies and procedures to mitigate wastes generation and aims to handle wastes in the most environmentally friendly manner. Throughout the study period, there was a consistent increase in the number of properties that were awarded ISO14001 certification.

Keywords: case study, environmentally sustainable hotels, hotel energy management, hotel waste management, hotel water management, Shangri-La Group

Introduction

Hotels are one of the tourism industry major sectors (Vatan & Yilmaz, 2020). Like many other industries, sustainability has become a vital issue in the global hotel industry (Jones, Hillier & Comfort, 2014). Consequently, due to calls for more sustainable tourism practices, environmental management has been embraced by managers of most hotels located all around the world (Mensah, 2007). A growing number of hotels have proactively altered their operations to include more environmentally friendly practices (Choi, Jang & Kandampully, 2015). Furthermore, confronting the rise of environmental awareness and carbon reduction trends, green hotels have increasingly developed into an important business direction for the

hospitality industry (Lee & Cheng, 2018). The adoption of "green" practices is viewed as being most beneficial for the hotel and the tourism industry more generally (Chou, 2014). Indeed, green or sustainable development has become an especially important concept and an effective means to sustainably develop the tourism industry (Chengcai, Qianqian, Nana, Yan, Shushu & Ling, 2017). Furthermore, green management has quite quickly become a strategic tool that can be used to enhance a hotel's competitive advantage (Lee, Hsu, Han & Kim, 2010).

Many of the world's major hotel chains are now identifying ways to integrate "green" into their hotels (Peršić-Živadinov, 2009). Since the early 1990s, tourism firms, primarily hotel facilities, have undertaken different voluntary initiatives to demonstrate their commitment to sustainable tourism. Among the voluntary tools used in the hotel industry, the most common are codes of conduct, best environmental practices, eco-labels, environmental management systems (EMSs) and the environmental performance indicators (Ayuso, 2006).

The primary objective of the study is to examine how a major hotel chain manages its operations in an environmentally sustainable manner. A second objective is to examine the annual trends in the hotel's carbon dioxide (CO_2) emissions, energy usage, and water consumption. A further objective is to identify the energy saving and waste management initiatives that have been implemented and underpin its ability to deliver environmentally sustainable services to its customers. The Shangri-La Group was selected as the case company as they have a long history of managing their operations and facilities in an environmentally sustainable manner. Also, the availability of a publicly available dataset covering the period 2010 to 2018 was a further factor in the selection of the Shangri-La Hotels and Resorts Group as the case company.

The remainder of the paper is organized as follows: Section 2 sets the context of the case study by providing a review of the literature on the environmental management hotels. The research method that underpinned the study is outlined in Section 3. The Shangri-La Group case study is presented in Section 4. Section 5 presents the findings of the study.

Literature review

Environmental impact of hotels.

The hotel industry has a range of environmental impacts. When taken together, hotels consume large amounts of resources. Hotels and other forms of accommodation contribute 2% of the 5% annual global CO_2 emissions by the tourism sector. It has been estimated that around 75% of hotels' environmental impacts can be directly associated with the excessive consumption of resources. The principal areas of environmental impact are energy, water, emissions (Bohdanowicz, Zientara, & Novotna, 2011), congestion and noise (Florido, Jacob &

Payeras, 2019), and waste (Parambil, 2020). At destinations that do not possess the necessary infrastructure and systems to manage these environmental impacts, severe degradation of the environment can result (Parambil, 2020). Gössling, Peters, Ceron, Dubois, Patterson and Richardson (2005) have observed that a hotel emits an average 20.6 kg of carbon dioxide (CO_2) per night.

In operating a hotel, the hotel's environmental impact comes principally from the energy, water, food and other resources that are consumed in operating the hotel, by the solid and liquid wastes that are produced, by the way its grounds are managed, as well as by the direct impacts of its guests. In addition, the regular renovation and replacement of furniture, appliances and facilities can also result in adverse environmental impacts through purchasing decisions and increased waste generation. At the closure stage, a hotel's environmental impacts come from the disposal of materials which are removed from the hotel to refurbish it, convert it for other uses, or through the demolition, and from the work performed during these activities (International Union for Conservation of Nature and Natural Resources, 2012; Parambil, 2020). Also, there potentially could be some toxic materials. In this case, the chemicals could require careful handling and management (Parambil, 2020).

Sustainable buildings and hotels have an important role to play in reducing their negative impact on the environment since they use significant amounts of energy and water, generate waste and materials and use land much more efficiently than buildings simply built to a building code (Peršić-Živadinov & Blažević, 2010). Sustainable hotels are designed, constructed, and operated on a sustainable basis. They use water, energy, materials and land more efficiently and effectively than hotel buildings that are constructed in accordance with a building code (Peršić-Živadinov, 2009). These design, construction, and operational practices help to preserve the environment (Ahn & Pearce, 2013).

Environmental management in hotels

Many hotels are now taking environmental issues seriously and have therefore introduced a range of environmental related measures such as recycling, water and energy conservation, environmental education, waste management and afforestation (the planting of trees). This increasing environmental consciousness in the hotel industry can be attributed to government regulation, changing consumer demand and preferences, advocacy and initiatives by Non-governmental Organizations (NGOs) and ethics by professional associations. Environmental management in hotels also reflects a paradigm shift in the industry from that of mass tourism to one of sustainable tourism. Environmental management is a continuous process adopted through management decisions, through which a firm's activities are monitored and appropriate programmes devised to reduce the negative environmental impacts (Mensah, 2007).

Hotel carbon footprint

Carbon footprint is becoming a widely used measure of assessing a firm's contribution to climate change (De Grosbois & Fennell, 2011). Both climate change and carbon footprints are now amongst the most urgent concerns confronting society and are key issues of corporate responsibility (Hrasky, 2012). The carbon footprint is a measure of the impact of the activities of a firm has on the environment and on climate change. The carbon footprint is a calculation of all the firm's greenhouse gases that are produced, and these emissions are measured in tonnes or kilograms of carbon dioxide (CO_2) (Legrand, Sloan & Chen, 2017). It is important to note that a firm's carbon footprint is an exclusive measure of the carbon dioxide (CO_2) emissions that are both directly and indirectly caused by an activity (Wiedmann & Minx, 2007). The word carbon is used because CO_2 is the predominant greenhouse gas being emitted from human's actions (Franchetti & Apul, 2013).

The Greenhouse Gas Protocol has established comprehensive global standardized frameworks to measure and manage greenhouse gas (GHG) emissions from both the private and public sectors, through value chains, and mitigation actions (Greenhouse Gas Protocol, 2020). The Greenhouse Gas Protocol categorises greenhouse gases into both direct and indirect emissions and further categorises them into Scope 1, Scope 2, and Scope 3 emissions (Jones, 2009, p. 161). Scope 1, direct emissions, includes those emissions from sources that are owned or controlled by the firm (Girella, 2018; Vásquez, Iriarte, Almeida & Villalobos, 2015). Scope 2, indirect emissions, come from the purchase of electricity, heat, steam or cooling. Scope 3 are all the other indirect emissions that arise from the consequences of the various activities undertaken by a firm but occur from sources that are not owned nor controlled by that firm (Mazhar, Bull, Lemon & Bin Saleem Ahmad, 2019).

Hotel energy intensity

Hotel buildings can be one of the most energy intensive building categories (Alkhalaf & Yan, 2017; Pieri, Tzouvadakis & Santamouris, 2015; Xuchao, Priyadarsini & Eang, 2010). Hotels normally use more energy per visitor than do residents, this is because hotels have energy intense facilities, for example, restaurants, and pools, and have more spacious rooms (Oleskow-Szlapka, Stachowiak & Golinska, 2011).

All parties associated with hotels can gain benefits from the hotel having planned energy management. The hotel owners and managers obtain a benefit because an efficiently run building requires less staff and results in reduced operating costs. The lower costs can be used to improve or expand the hotels facilities. There is also a benefit to the environment. A reduction in the use of non-renewable energy resources helps to conserve the energy supply and reduces some of the negative impacts associated with the use of fossil fuels, for example, air pollution (Kirk, 2011).

Hotel water management

Hotels similar with other hospitality facilities consume large amounts of water. Water is used by hotels in guest room bathrooms and for sanitary purposes. A hotel's food and beverage department use water in food preparation, cooking and for some cleaning purposes. The laundry operations of a hotel consume large amounts of water. A hotel's swimming pool(s) require a significant amount of water when filled and there is also an ongoing supply of water required to replace water lost to evaporation and from other losses. In addition, a hotel's grounds and landscaping can consume a significant amount of water. A hotel's cooling towers can evaporate very large volumes of water in their operation (Holt, 2010).

The water usage in a hotel can vary quite substantially. An economy-type property averages around 40,000 gallons (181, 843 litres) per room per year. A more upscale property may use 80,000 gallons (363, 687 litres) per room per year, whilst resorts can use up to 150,000 gallons (681,914 litres) per room per year (Holt, 2010).

Hotel waste management

Waste management together with the greening of hotels have resulted in waste management becoming a critical issue for the hotel industry (Ball & Taleb, 2011). Indeed, solid waste management has become a key aspect of hotel's environmental management (Pirani & Arafat, 2014). This is because the generation of food waste (FW) from hotel operations has a significant negative impact on the environment (Kasavan, Mohamed & Halim, 2019).

The hotel industry can be active in establishing recycling centres and programs, using environmentally friendly cleaning supplies and techniques, and sourcing locally produced goods and services that reduce transportation costs. Furthermore, improved waste management in the hotel industry not only mitigates degradation of the environment, it often enriches the attractiveness of destinations as well. Costs can be reduced, and the "green" image is also favourable for the business as well (Sloan, Legrand & Chen, 2013).

Waste is categorized as biodegradable, for example, organic and non-biodegradable (Borah & Sood, 2020; Sloan, Legrand & Chen, 2013). Biodegradable wastes can be broken down into simpler, non-toxic substances through the action of microorganisms. Non-biodegradable wastes are those wastes that are unable to be broken down into non-toxic substances through the actions of biological agents (Mishra, 2008). Non-biodegradable waste can be further categorised into recyclable and non-recyclable solid waste (Borah & Sood, 2020). Hotels generate both biodegradable and non-biodegradable wastes (Sloan, Legrand & Chen, 2013). The types of wastes generated in a hotel include food and organics, cardboard and paper, and different container wastes, for example, glass, plastic and metal (Dasgupta, 2009). Furthermore, hotels generate biological wastes (human sewage) as well as ashes if

the use an incineration system in their establishment. Hazardous wastes, for example, solvents and chemicals, are also present at hotels (Sloan, Legrand & Chen, 2013).

A hotel's food and beverage operation account for a large volume of waste. These wastes can be defined as:

• Pre-and-post food consumer food waste, packaging and operating supplies: pre-consumer waste is defined as being of all the trimmings, spoiled food, and other products originating from a kitchen prior to the finished menu item reaching the consumer.

• Post-consumer waste is the waste that is left over once a consumer has consumed the meal; and

• Packaging waste: is anything used in the kitchen, for example, plastic, to hold food coming into and leaving the kitchen. Operating supplies comprise all other pieces of material(s) that becomes waste in a food service operation, for example, cooking oil (Sloan, Legrand & Chen, 2013, p. 73).

There are a range of strategies available to hotels to help reduce their wastes. Hotel management should collaborate closely with suppliers to purchase products that promote waste prevention. The procurement of items in bulk, using recycled products and purchasing them from suppliers who an environmental policy in place, are measures that help to reduce the volume of wastes generated. Furthermore, purchasing products with a longer life cycle will also result in decreased waste volumes. The creation of less waste or the elimination of waste before it is produced means the hotel will produce less pollution and will be saving natural resources. This can be achieved through the hotel working closely together with suppliers and encouraging them to reduce their packaging, reuse packaging or alternatively change to reusable packaging wherever possible. In some instances, outsourcing cam help reduce wastes. (Sloan, Legrand & Chen, 2013).

ISO14001 environmental management system

In 1993 the first efforts for a standardized environmental protection system was accomplished by the International Organization for Standardization (ISO). In 1996, ISO 14001 was launched and was subsequently republished as a new, improved version in 2004 (Bartik, Hoeltl & Brandtweiner, 2013).

ISO 14001 requires that a firm develops an environment management system (EMS) that addresses its environment objectives and targets and describes how each of these will be achieved. An EMS must include a specific plan that describes the actions that are required to satisfy each objective and target. The EMS should also contain a detailed time scale of when each target is due to be achieved (Arvanitoyannis, 2008, p. 51).

Methodology

Research approach

This study used an instrumental case study approach. An instrumental case study is the study of a case, for instance, a firm, that offers insights into a specific issue, redraws generalizations, or builds theory (Baxter; 2019; Stake, 1995, 2005). The goal of the case study approach is to expand and build theories rather than perform statistical analysis to test a study's specific hypothesis (Rahim & Baksh, 2003). The present study was also designed around the established theory of sustainable hotel management (Cavagnaro, 2018; Kirk, 2011; Lockyer, 2010; Peršić-Živadinov, 2009; Singh & Rai, 2014; Sloan, Legrand & Chen, 2013).

Data collection

Data for the study was obtained from a range of documents: Shangri-La Group annual Responsible Business Reports, Shangri-La Group annual reports, and company materials available on the internet. These documents provided the sources of the study's case evidence. An exhaustive source of the leading hotel and tourism-related journals was also conducted. The study included a search of the SCOPUS and Google Scholar databases.

The key words used in the database searches included "Shangri-La Group sustainability policy", "Shangri-La Group ISO 14001 environmental management system implementation", "Shangri-La Group annual energy consumption", "Shangri-La Group annual water consumption", "Shangri-La Group energy saving measures", "Shangri-La Group water saving measures", "Shangri-La Group waste management and waste reduction measures", and "Shangri-La Group annual carbon footprint".

The study therefore used secondary data. The three principles of data collection as recommended by Yin (2018) were followed: the use of multiple sources of case evidence, creation of a database on the subject and the establishment of a chain of evidence.

Data analysis

The empirical data collected for the case studies was examined using document analysis. Document analysis is often employed in case studies (Grant, 2019; Monios, 2016) and focuses on the information and data from formal documents and company records that have been gathered by the researcher(s) (Baxter, 2019; Ramon Gil-Garcia, 2012). The documents gathered for the study were examined and assessed by four key criteria: authenticity, credibility, representativeness and meaning (Fulcher & Scott, 2011; Scott, 1990, 2014).

Before beginning the formal analysis of the documents that were gathered for the study, the context in which the documents were created was established and the authenticity of the documents was assessed (Scott, 2014). According to Chester (2016, p. 677), authenticity "refers to whether a document is genuine, complete, and reliable as well as being of unquestioned authorship". Authorship of documents relates to such issues as

collective or institutional authorship. In this study the source of the case study documents was the Shangri-La Group. The credibility criterion concerns the accuracy and sincerity of a document (Fulcher & Scott, 2011; Scott & Marshall, 2009). In the present study, the case study documentary evidence and data were corroborated using various kinds of documents (Love, 2003), for example, the Shangri-La Group annual reports, the Shangri-La Group Shangri-La Group responsible business reports, and the company's websites. The representativeness criterion involved an assessment of the availability and survival of the documents gathered. There were no major difficulties in obtaining documents for the study as all the relevant documents could be readily accessed in the public domain. The fourth criterion, meaning, occurs at two levels in document analysis. The first is the literal understanding of a document, by which is meant its physical readability, the language used and whether it can be read, and secondly, the date of the document (Fulcher & Scott, 2011; Scott & Marshall, 2009). When conducting document analysis in a study, it is important to interpret the understanding and the context within which the document was produced. This enables the researcher to interpret the meaning of the document. The evidence found in the documents collected and used for the present study were all clear and comprehensible (Baxter, 2019; van Schoor, 2017).

The document analysis was undertaken in six distinct stages:

• Phase 1: The first phase involved planning the types and required documentation and their availability for the study.

• Phase 2: The data collection phase involved sourcing the documents and developing and implementing a scheme for the document management.

• Phase 3: The collected Documents were examined to assess their authenticity, credibility and to identify any potential bias.

• Phase 4: The content of the collected documents was carefully examined, and the key themes and issues were identified.

• Phase 5: This phase involved the deliberation and refinement to identify any difficulties associated with the documents, reviewing sources, as well as exploring the documents content.

• Phase 6: In this phase the analysis of the data was completed (O'Leary, 2004, p.179).

Following the recommendation of Yin (2018), all the collected documents were downloaded and stored in a case study database. The documents gathered for the study were all in English. Each document was carefully read, and key themes were coded and recorded (Baxter, 2019).

Across the Shangri-La Group portfolio, all hotels that have been wholly operational for two years or more must meet intensity reduction targets for greenhouse gas emissions, energy, and water consumption. The Group uses intensity metrics that reflect a measure of

the number of customers staying overnight and other guests in each hotel throughout the year, these are known as a business unit (BU) (Shangri-La Group, 2018, 2019c). Thus, the data used in the qualitative analysis was based on the annual metrics as published in the Shangri-La Group's Annual Reports and the annual Responsible Business reports.

Results

A brief overview of the Shangri-La Group

The Shangri-La Group is one of the world's leading hotel developers, owners and operators of hotel properties. The Group's primary activities are in hotel properties, hotel management services, investment properties and property development for sale. The Group also develops, owns and operates investment properties, which include office properties, commercial properties, and serviced apartments/residences. At the time of the present study, the Group owned and/or managed 102 hotels globally in 75 destinations under the Shangri-La, Kerry, Hotel Jen and Trader brands (Shangri-La Group, 2019c).

Figure 1 presents the number of properties in the Shangri-La Group portfolio and the year-on-year change (%) from 2010 to 2018. As can be observed in Figure 1, there has been a steady increase in the group's annual properties portfolio, rising from 66 in 2010 to 102 in 2018. There was increase in each year of the study period except for 2012 when the number of properties remained the same as in 2011. The largest single annual increase occurred in 2013, when the total annual number of properties increased by 12.5% on the previous year levels.

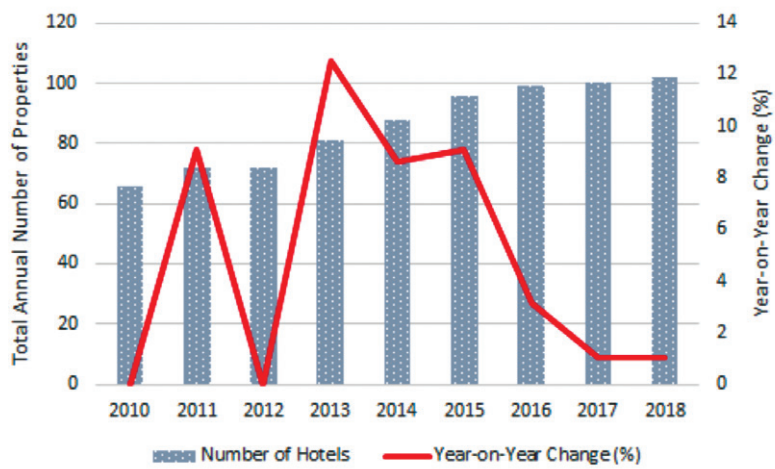

Figure 1. The Shangri-La Group's total annual properties and year-on-year change (%): 2010 to 2018. Source: Shangri-La Group (2016b, 2017a, 2018, 2019c).

Shangri-La Group environmental management policy and principles

The Shangri-La Group aims to optimize its energy and water use, carefully manage the company's overall carbon footprint and waste as well as restoring natural surroundings and habitats (Shangri-La Group, 2020c). Since 2011, Shangri-La Asia Limited has been awarded an 'A' rating and is a member of the Hang Seng (Mainland China and Hong Kong SAR) Corporate Sustainability Index. At the time of the present study, Shangri-La Asia Limited was listed in the Dow Jones Sustainability Indices (DJSI) and was the only Asia/Pacific-based hotel group included in the index (Shangri-La Group, 2020b).

In 2011, the Shangri-La Group joined the United Nations Global Compact and the company has integrated the ten principles of the UN Compact into its business. These principles provide a reference framework for sustainable operations across the Group (Shangri-La Group, 2019c). The Shangri-La Group environmental management is underpinned by the Group's commitment to the UN Global Compact environmental policies:

Principle 7: Businesses should support a precautionary approach to environmental challenges.

Principle 8: Businesses should undertake initiatives to promote greater environmental responsibility.

Principle 9: Businesses should encourage the development and diffusion of environmentally friendly technologies (United Nations Global Compact, 2020).

The Shangri-La Group aims to mitigate its impact on the environment by ensuring that all day-to-day operations promote and employ responsible environmentally friendly practices as well as continual improvement. The Group's Corporate Engineering Division conducts regular environmental audits. These audits are conducted to ensure that there is compliance with the Group's environmental policies and procedures (Shangri-La Group, 2015c, 2019c). In addition, environmental protection is cited in the Shangri-La Group guiding principles and in its Code of Conduct and Ethics. The Group expects every employee to play their part in reducing waste, reducing energy use and conserving water (Shangri-La Group, 2017a).

The Shangri-La Group also invests in "green buildings" by integrating sustainable design features, construction techniques and operational processes in the development of its hotels (Shangri-La Group, 2016a, 2020a). An important aspect of "green buildings" is that such buildings should protect natural resources and improve the built environment so that the planet's eco-systems, people, businesses, and communities can live a healthier and more prosperous life (Kubba, 2012).

Furthermore, Cole (2010, p. 274) has observed that, "building environmental assessment methods evaluate performance across a range of resource use, ecological

loadings, and indoor environmental quality criteria". Most importantly, building environmental assessment methods are managed by and operate within known organizational contexts, such as Building Research Establishment Environmental Assessment Method (BREEAM) (Cole, 2010). In 2018, 17 of the Shangri-La Group's hotels achieved "Leadership in Energy and Environmental Design" (LEED) certification from the United States Green Building Council. This is the most widely used green building rating system worldwide. A further 18 hotels were certified under schemes such as the China Hotel Association's China Green Hotel rating system, the National Australian Built Environment Rating System (NABERS), Green Mark in Singapore, and the Building Research Establishment Environmental Assessment Method (BREEAM) in the United Kingdom (Shangri-La Group, 2020a, p. 56).

Shangri-La Group annual carbon footprint

Scope 1 emissions includes all direct emissions from stationary fuel combustion at each hotel (for example, hot water boilers, fuel stoves and electricity generators) together with emissions from mobile fuel combustion (such as from vehicles that are owned and operated by the hotels). Scope 2 includes all emissions associated with electricity that is purchased by hotels from the local grid. It is important to note that the calculation of the emissions data does not include emissions associated with solid and liquid waste and with the consumption of energy from renewable sources or "cogeneration" (for instance, city heating as a by-product of energy production). Accordingly, in order to determine the volume of greenhouse gas emissions in tonnes of carbon dioxide equivalent (tCO_2e) for each hotel, "EarthCheck" uses emissions factors that are compliant with the Intergovernmental Panel on Climate Change (IPCC), the Greenhouse Gas Emissions Protocol and the International Organization for Standardization (ISO) (Shangri-La Group, 2013). Carbon dioxide equivalent is a measure that is used to compare the emissions from various greenhouse gases (GHGs) based upon their global warming potential (Organisation for Economic Co- operation and Development, 2013).

Figure 2 presents the annual trends in the Shangri-La Group average Scope 1 and Scope 2 emissions and the year-on-year change (%) for the period 2010 to 2018. As can be observed in Figure 2, there has been a pronounced downward trend in the Group's annual average Scope 1 and Scope 2 emissions, with a decrease being recorded in every year except for 2017, when a small increase of 0.26% was recorded. The Shangri-La Group average Scope 1 and Scope 2 emissions have declined from a high of 55.78 kilograms of CO_2e per Business Unit in 2010 to a low of 39.97 kilograms of CO_2e per Business Unit in 2018. This is a very favorable result given the growth in the number of the company's properties and the associated increase in the number of hotel guests staying at the company's properties.

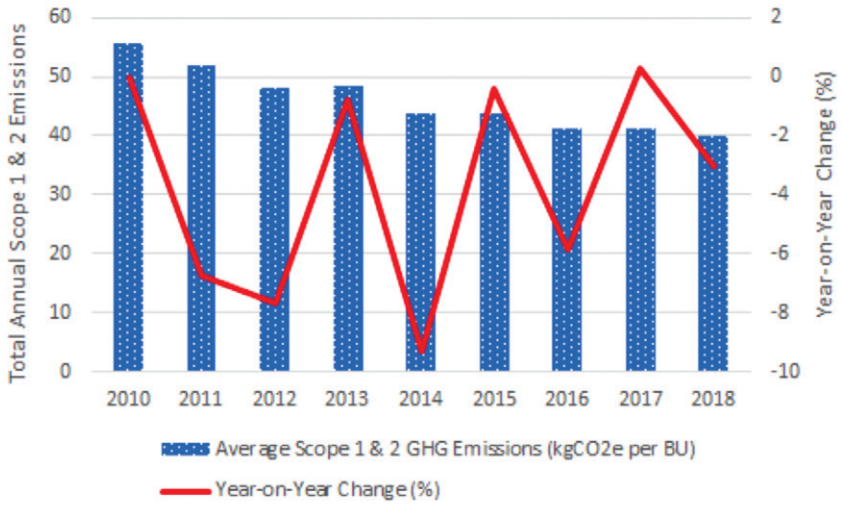

Figure 2. The Shangri-La Group's annual average Scope 1 and Scope 2 emissions and year-on-year change (%): 2010 to 2018.
Source: Shangri-La Group (2016b, 2017b, 2019b).

Shangri-La Group annual energy consumption

The primary driver of energy consumption and greenhouse gas (GHG) emissions across the Shangri-La Group hotel and resort portfolio is purchased electricity that is used for lighting, air-conditioning and other general purposes in the company's hotels (Shangri-La Group, 2019a). Figure 3 presents the Shangri-La Groups annual average annual energy consumption per Business Unit from 2010 to 2018. As can be observed in Figure 3, the annual average energy consumption decreased in each year of the study, with the only exception to this trend occurring in 2013, when the average annual consumption increased by 0.39% on the previous year levels. Figure 3 also shows that the average energy consumption per Business Unit declined from a high of 111.81 KWh per BU to a low of 74 KWh per BU in 2018. The largest single decrease occurred in 2012, when the annual average energy consumption decreased by -8.74% on the 2011 levels (Figure 3). Because hotels and resorts are extremely energy intensive, the predominantly downward trend in the Shangri-La Group's annual average energy consumption is very favorable especially given the growth in the number of properties and guests. As discussed below, this favorable trend has been positively influenced by a range of energy saving measures implemented by the Shangri-La Group over the study period.

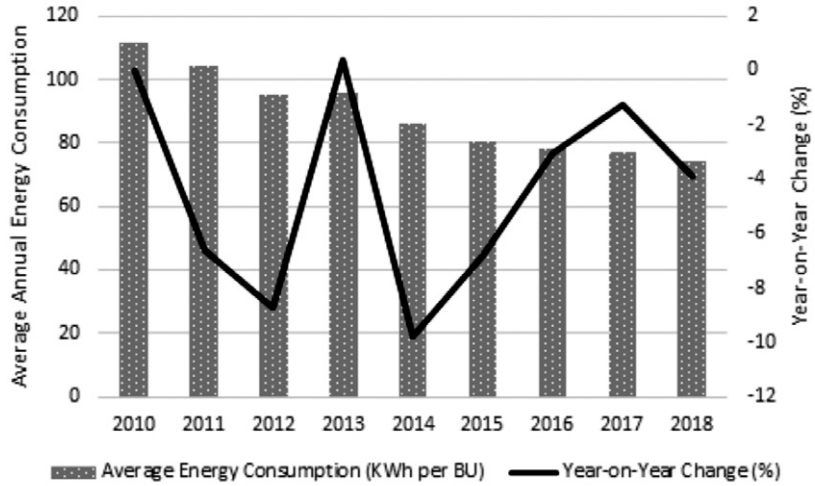

Figure 3. The Shangri-La Group's annual average energy consumption per business unit and year-on-year change (%): 2010 to 2018.
Source: Shangri-La Group (2016b, 2017b, 2019b).

Shangri-La Group annual water consumption

The water consumed by the Shangri-La Group properties is most comprised of fresh water sourced from municipal supplies and is used for drinking, cooking, cleaning, irrigation, and for recreational amenities (Shangri-La Group, 2019b). Like the annual trends in average Scope 1 and Scope 2 emissions, and annual average energy consumption, the Shangri-La Group water management has seen an overall decrease in the average water consumed from a high of 0.98 m^3/business unit in 2010 to 0.68 m^3/business unit in 2018 (Figure 4). Figure 4 shows that the largest single annual decrease occurred in 2011, when the average annual water consumption decreased by 10.2% on the previous year levels. During the study period, there was only one increase in the annual average water consumption recorded, when in 2017, the annual average water consumption increased by 2.98% on the 2016 levels. The predominant downward trend in Shangri-La Group's annual average water consumption is also positive, and, as a result of their water management efforts, the company has been able to help save a diminishing resource. As discussed below, this favorable trend in water consumption has been assisted by a number of waters saving initiatives that have been implemented across the Shangri-La Group's properties.

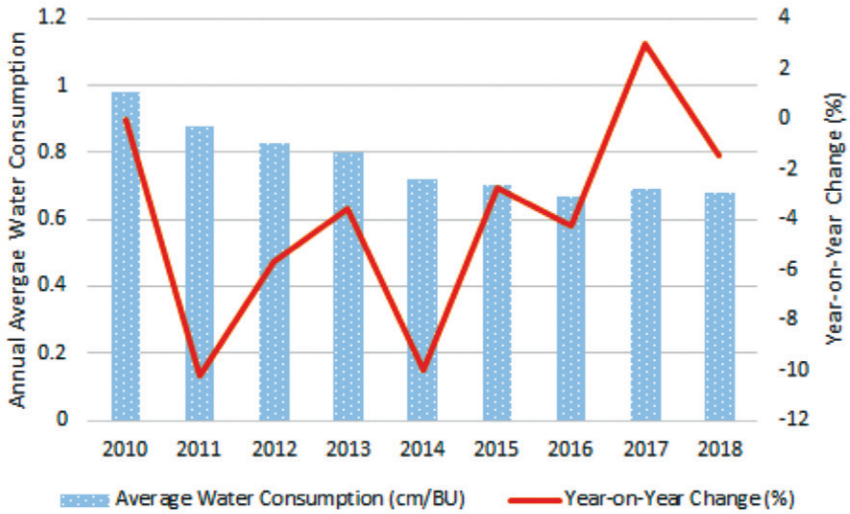

Figure 4. The Shangri-La Group's annual average water consumption and year-on-year change (%): 2010 to 2018.
Source: Shangri-La Group (2016b, 2017b, 2019b).

Shangri-La Group carbon emission trading projects

Carbon trading is a market mechanism and is viewed as being a key instrument in the mitigation of climate change (Liu, Chen, Zhao & Zhao, 2015). China introduced a carbon trading scheme in 2013 (Kahn, 2017; Zhao, 2019). During 2014, five of the Shangri-La Group's hotels in Beijing and Shanghai were either directly covered by a regional carbon market, or indirectly involved through the property complex in which they are located (Shangri-La Group, 2015a, 2015c). During 2015, the Group's participating hotels continued to comply with the annual carbon emissions targets set by the local Chinese authorities. The Shangri-La Hotel Beijing exceeded its reduction target by 11% (Shangri-La Group, 2016b). In 2016, a total of six Shangri-La Group Hotels were participating in Chinese regional emission carbon trading scheme pilot pro jects. During 2016, these hotels purchased carbon offset credits equaling 5,510.45 tonnes. These purchases were in accordance with the Group's participating hotels obligations under the carbon offset schemes (Shangri-La Group, 2017c).

Shangri-La Group implementation of ISO14001 environmental management system

During the period 2010 to 2018, the Shangri-La Group increased the number of its ISO 14001 certified properties in each year of the study period, with the exception being in 2018, when the number of ISO14001 certified properties decreased by 6.55%. Figure 5 shows that the company increased the number of ISO 14001 certified properties from 35 in 2010 to a

high of 61 in 2016. In 2018, there were 51 ISO 14001 certified properties in the Shangri-La Group's property portfolio. Figure 5 shows that there were three sharp pronounced spikes in the number of properties achieving ISO 14001 certification. These occurred in 2011 (+14.28%), 2014 (+10.86%), and 2016 (+15.09%), respectively.

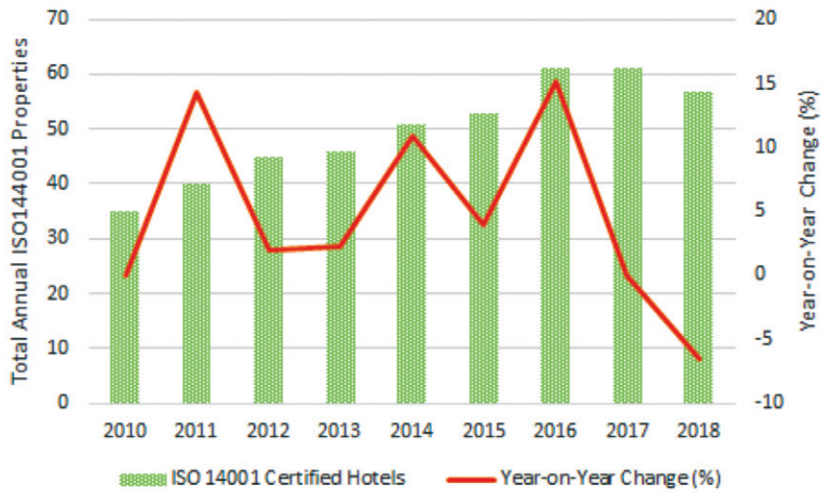

Figure 5. The Shangri-La Group's annual number of ISO 14001 certified properties and year-on-year change (%): 2010 to 2018.
Source: Shangri-La Group (2015b, 2016b, 2017b, 2020a, 2020c).

Shangri-La Group sustainable waste management

The objective of the Shangri-La Group is to reduce material usage and waste, including food wastes, and to increase the use of recycling of wastes where possible (Shangri-La Group, 2017c). A key aspect of the Shangri-La environmental policy is the Group endeavors to reduce the volume of waste arising from its operations that is disposed by landfill (Shangri-La Group, 2019c). This is because waste disposed by landfill is regarded as the least preferred waste disposal method (Townsend, Powell, Jain, Xu, Tolaymat & Reinhart, 2015). Wastes disposed by landfill undergo biological, chemical and physical transformations that result in changes in solid, liquid (leachate), and gas phases. Around 90% of the carbon that is released during the decomposition of wastes disposed by landfill migrates to landfill gas in the form of methane (CH_4), carbon dioxide (CO_2), and various hydrocarbons, although only 10% enters the leachate (Pawlowska, 2014). To avoid the disposal of wastes to landfill, the Shangri-La Group engages licensed contractors to recycle such wastes (Shangri-La Group, 2019c). The recycling of wastes enables waste materials to be used for a beneficial purpose

(Lanzillotti Jnr, 2000). In addition, recycling of wastes saves energy. This is because producing goods from recycled materials typically requires less energy than making goods from virgin materials. Less energy is required to extract, transport, and process raw materials and to manufacture products when people reuse things or when products are produced with less material. Consequently, when energy demand decreases, fewer fossil fuels are burned, and as a result less carbon dioxide (CO_2) is emitted into the atmosphere (Environmental Protection Agency, 2016).

During the study period, the Shangri-La Group had implemented a number of waste reduction measures. The Group has introduced paperless check-in for its guests, which has significantly reduced the amount of paper waste produced. The Group's hotels also donate excess food to third parties, for example, not-for-profit organizations, who then redistribute the food to the needy. The Group's hotels also collect used cooking oil for resale to reputable service providers. Hotel wastes are also upcycled, including the conversion by composting for subsequent use in the hotel gardens as well as providing it to authorized agents for conversion into energy or animal fodder (Shangri-La Group, 2019c).

The Shangri-La Group is also collaborating closely through partnerships to foster waste reduction and increase recycling of wastes. In August 2015, the Shangri-La Group Purchasing Division worked closely with Shangri-La's amenities supplier to design a new paper box package for bathroom amenities. The new packaging was 11% lighter than the previous packaging, and this weight reduction equated to annual saving of up to 4,500kg of paper (Shangri-La Group, 2015a). In 2016, the Shangri-La Group launched an initiative with Sealed Air, whereby the *"Linen for Life"* program provided training and resources for local communities to repurpose waste linens such as towels and sheets into useable household items. This initiative resulted in a significant diversion of materials that would have been disposed by landfill. Through the *"Soap for Hope"* project conducted in 2017, the Group's hotels collaborated with suppliers and other external partners to turn discarded soaps from hotel guest rooms into new soap bars. These sanitized soap bars were subsequently distributed to under-privileged communities in order to promote hygiene. By 2017, the Shangri-La Group had saved in excess of 192 tonnes of soap being disposed to landfill through its *"Soap for Hope"* project (Shangri-La Group, 2016b, 2017c).

During 2018, the Shangri-La Group conducted a group wide survey to identify its plastic consumption baseline. The survey aimed to identify the Top 10 Single Use Plastic (SUP) items by usage. In 2019, the Shangri-La Group implemented a group wide policy to eliminate SUP straws and stirrers, as well as to reduce the consumption of SUP bottles in hotel rooms and banquet areas (Shangri-La Group, 2019c).

Shangri-La Group operates its own water bottling plants at its resorts located in the

Maldives, Mauritius, Kota Kinabalu, Penang, Cebu and Boracay (Philippines) to help reduce the number of SUP bottles consumed and subsequently disposed. In 2018, the Group refilled in excess of 1.3 million bottles of water from these plants, thereby reducing the consumption of SUP bottles by an equivalent amount (Shangri-La Group, 2019b, p. 57).

In 2019, the company implemented a groupwide ban on single-use plastic straws and stirrers, changed to glass bottled water for more venues and outlets, and also introduced greener packaging for in-room slippers for use by guests as part of its plastic reduction roadmap (Shangri-La Group, 2020a).

The Shangri-La Group produces small amounts of hazardous waste, for instance, cleaning chemicals, retired light fittings and electrical equipment, which are handled responsibly in accordance with locally applicable regulations and procedures (Shangri-La Group, 2018, 2019c).

An audit that was undertaken in 2014 identified food waste as the Group's most significant source of waste by weight. In order to address this, the Group has been focusing on the minimization of food waste by targeting three principal areas: food preparation, spoilage, and food provisioning/serving. As part of this waste reduction focus, each hotel is required to measure the amount of food waste that is discarded, devise and implement a plan for waste reduction, and subsequently measure its success and make amendments to its plan as necessary (Shangri-La Group, 2017c). By 2020, the Shangri-La Group plans to establish targets for its hotels to eliminate the over production, especially buffet waste (Shangri-La Group, 2019c).

Shangri-La Group energy saving measures

The use of renewable energy sources, such as solar power, can assist hotels to reduce their environmental impact (Walmsley, 2011). The Shangri-La Group has installed solar power photovoltaic systems at eleven hotels. The solar power photovoltaic systems are used to convert sunlight into hot water or electricity, all of which is consumed within the hotels. During 2018, these systems produced 2.29GWh of renewable energy (Shangri-La Group, 2019b, 2019c).

During 2012, LED lighting was installed in back house areas of the Group's hotels as well as in guest rooms. In public areas of the Group's hotels, where incandescent lamps are used, dimming controls were installed to vary and reduce energy use. A further energy saving measure introduced in 2012 involved building management systems and timer controls shutting off the building façade, garden and landscape lighting automatically at hotels at predetermined times. The Shangri-La Group hotel guest room key passes automatically switch off all lighting, set the room fan speed to the lowest setting and set the thermostat to the energy saving mode when guests remove their key card from the key card system slot

(Shangri-La Group, 2012). Also, in 2012, the Shangri-La Group switched to the use of Diversey's low temperature laundry systems (Shangri-La Group, 2013).

The Shangri La Group has reduced the temperature at which laundry is washed. This measure can considerably reduce energy usage. Implemented in 2016, the Group's low temperature laundry program was adopted by 56 hotel laundries (Shangri-La Group, 2017a). This measure has a considerable impact on the annual energy use (Shangri-La Group, 2019b).

In 2018, the Shangri-La Group introduced various energy saving technologies such as centralized heat pumps that are three times more efficient at transferring energy than utilizing boilers or heaters to generate. The Shangri-La Group also introduced vacuum boilers that are between 15 and 30% more efficient as compared to the conventional stream and hot water boiler systems. In 2018, these energy saving initiatives enabled the Shangri-La Group to achieve estimated energy savings of 39.69GWh per annum. Also, in 2018, the Shangri-La Group improved the efficiency of chillers that provide cooling energy in its hotels air conditioning systems. A further energy saving initiative involved the upgrading of older lighting systems with LEDs which are around 80% more efficient. In 2019, the Shangri-La Group planned to initiate chiller optimization projects at the Group's top 20 hotels ranked by total energy consumption, and to undertake comprehensive LED lighting replacement in 42 hotels (Shangri-La Group, 2019b).

Shangri-La Group water saving measures

The Shangri-La Group has incentivized its hotels to make concerted efforts to achieve the company's 2020 water reduction target. During 2018, the Shangri-La Group completed tests on new water saving showerheads that provide water consumption savings of between 15 to 40%. During 2019, the Shangri-La Group planned to progressively rollout a Group-wide showerhead replacement program (Shangri-La Group, 2019b).

Shangri-La operates sewage treatment plants (STPs) at some of its hotels to provide recycled water for toilet flushing and irrigation (Shangri-La Group, 2013).

Conclusions

In conclusion, this study has investigated the measures that can be defined and implemented for a major hotel chain to manage its operations in an environmentally sustainable manner. To achieve the objectives of the study, the Shangri-La Hotel Group was selected as the case company. The research was undertaken using an in-depth qualitative instrumental case study research approach. All the data collected for the study was examined using document analysis. The study was underpinned by a case study research framework that followed the recommendations of Yin (2018).

The case study revealed that the Shangri-La Group has been able to reduce its

annual Scope 1 and Scope 2 emissions throughout the study period. The annual Scope 1 and Scope 2 emissions declined from a high of 55.78 ($kgCO_2e$ per business unit) in 2010 to a low of 39.97 ($kgCO_2e$ per business unit) in 2018. This was a very favorable result given the increase in the Group's hotel property and resort portfolio. The case study also revealed that throughout the study period there was only one increase recorded in the annual Scope 1 and Scope 2 emissions in 2017, when these emissions levels increased by 0.26%.

The annual energy consumption of the Shangri-La Group also declined over the study period. The highest recorded energy consumption occurred in 2010 (111.81KWh per business unit), and the lowest annual energy consumption was recorded in 2018 (74 KWh per business unit). Over the period 2010 to 2018, there was only one annual increase in energy consumption, which occurred in 2013 when there was a small increase of 0.39% on the previous year's levels. This was a favorable result given the increase in the Group's hotels and resorts over the study period.

The Shangri-La Group annual water consumption exhibited a downward trend with decreases being recorded each year except for 2017, when there was an increase of 2.98% on the previous year's water consumption. The largest decrease in water consumption occurred in 2011, when the total water consumption declined by 10.2% on the 2010 levels. This too was a very favorable result given the increase in the Group's hotels and resorts over the study period.

The Shangri-La Group has integrated the ISO 14001 Environmental Management System into its environmental management and throughout its operations. The case study showed that the number of properties that were ISO14001 certified increased from 35 in 2010 to a high of 61 in 2016. In 2018, there were 57 properties that were ISO14001 certified. The largest single increase in the number of properties achieving ISO14001 certification occurred in 2016, when there was a 15.09% increase on the previous year's levels.

As noted earlier, hotels are extremely energy intensive. Throughout the study period, the Shangri-La Group implemented a wide range of energy saving measures. These include the use of photovoltaic solar power systems at some of its hotels, the extensive use of LED lighting, reducing the temperature at which laundry is washed, the use of centralized heat pumps, the use of vacuum boilers, and improving the efficiency of chillers that provide cooling energy.

The Shangri-La Group has also focused on reducing its wastes, and, as a result, the Group implemented a range of waste reduction and waste management measures throughout the study period. These measures include paperless check-in of all guests, the donation of excess food to not-for-profit organizations, the sale of used cooking oil to reputable service providers, the composting of wastes for subsequent reuse, reductions in the weight

of packaging of guest amenities, the recycling of waste soaps, the elimination of single user plastic (SUP) straws and stirrers across the Group, and the minimization of food wastes. The Shangri-La Group also operates water bottling plants at some of its hotels and resorts and these facilities have successfully refilled water bottles, resulting in a decrease in wastewater bottles.

Finally, the case study found that the Shangri-La Group has also focused on mitigating the consumption of water throughout its portfolio of properties. In this regard, the Group has implemented a guest room showerhead replacement program that will deliver water savings from between 15-40%.

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