Impacts of quality management principles in supporting sustainable development in the Mauritian hospitality sector

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Abstract: The notion of sustainability has greatly evolved since the 1960s. As the global population is increasing along with the consumption rate, it is becoming urgent to alleviate the negative impacts of this growth while in parallel allowing for continuous enhancements in environmental quality and overall living standards. This is where the need for sustainability becomes apparent. This research focuses on the hospitality industry, one of the top pillars of the Mauritian economy which has expanded drastically during the last decades. The study aims at assessing sustainability practices through the investigation of the different sustainable practices adopted by the hospitality industry. A survey was conducted with the main stakeholders of the hotel industry. The outcome of the survey including an overview of the gaps faced by the hotels during their sustainability system implementation or maintenance contributed to designing a framework linking quality and sustainability. The survey revealed that most hotels possess a sustainability certification. It was noted that more than 80% of the respondents calculate/estimates their CO₂ emissions and that around the same percentage of interviewees use the LCA technique. Further, this study depicts that hotels in Mauritius have started their sustainability journey, which is a positive sign. To help the industry to overcome barriers in Sustainable Development (SD), it is recommended to use and includes quality management as a tool, to support and enhance overall efficiency.

Keywords: sustainability; sustainable practices; hospitality industry; quality management principles; Mauritius

1. Introduction

The concept of sustainability was devised explicitly to indicate that it was feasible to attain economic growth and industrialization without damaging the environment [1]. The population has grown fast since then, and productivity has progressed. The preservation of the world’s life support systems has become increasingly challenging because of the quick and continual environmental changes produced by humans [2]. The tourism sector in Mauritius contributes significantly to economic growth and act as a vital driver in the country’s overall development [3].

However, due to COVID-19 and the implementation of several containment measures like travel bans, closed borders, and quarantine periods; the tourism industry has been the most negatively impacted. Mauritius was no exception. Before the lockdown, the island was already showing signs of the pandemic’s damaging effects on tourism. The virus forced several hotels, travel companies, and guesthouses to close for a prolonged period in addition to lowering travel moods throughout the world. The situation worsened during the initial Mauritius shutdown in 2020. According to Statistics Mauritius, overall visitor arrivals plummeted by 68.6% in 2020 compared to the same time in the previous year; those arriving by air decreased...
by 70.9%, while those arriving by water increased by 16.2%. Revitalizing the industry will need coordination and coordinated measures throughout the whole travel and tourism ecosystem [4]. Sustainability was characterized in the Brundtland Report as the ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ [1]. The approach to business sustainability emphasizes the need of considering economics, environment, and equity when making company choices [5].

Companies are thus making substantial changes in how they create, produce, and distribute products and services to their consumers as there is an increase in expectations for change [5]. To allow the tourist sector to recover and reimagine the prospect of tourism in a new post-COVID-19 climate, policymakers must begin focusing on an action plan and a long-term strategy [4]. Uncontrolled tourism expansion can result in major consequences such as cultural and environmental deterioration, destruction of vulnerable ecosystems and pollution, to name a few [6].

Studies have outlined the effects of adopting management strategies linked to the Quality Management (QM) paradigm and their potential benefits for company sustainability and environmental management. The goal of quality development is to meet and exceed customer requirements while also improving efficiency, i.e., how to provide more customer value with less resources. Sustainability might be addressed in a practical way by incorporating the information and approach used in high quality work into sustainability initiatives [7].

The aim of this study is to identify and analyse the various sustainable practices adopted by 3 to 5 stars’ hotels in Mauritius and recommending a framework using quality management principles to help the organisations overcome the obstacles they are facing in developing sustainability and in achieving customer satisfaction. The objectives are as follows:

1) Investigate the different sustainable practices adopted by the hospitality industry with regards to the three dimensions of the sustainability aspects namely, social, economic, and environmental.
2) Assessing the context in which the sustainability practices benefit the hotels in Mauritius.
3) Identifying gaps or issues faced by the hotels that can prevent them from attaining their sustainability goals.
4) Designing a framework using quality management principles and dimensions of sustainability to help the hotels in enhancing their sustainability objectives.

2. Literature review

2.1. Three dimensions of sustainability

Governments modifying legislation and regulations, businesses engaging in voluntary social responsibility initiatives based on conscious consumption, and consumers being educated to change their consumption patterns are all instances of a growth in the need for sustainability initiatives [8]. The challenge for current and future generations is to avoid or alleviate the negative impacts of this increase while simultaneously allowing for continuous improvements in environmental quality, human health protection, and overall living standards [5]. The three-pillar concept of
sustainability has gained widespread acceptance. This concept is generally represented as three intersecting rings with overall sustainability in the centre as shown in Figure 1 below. ‘Sustainability’ is still a fluid notion with many different interpretations and meanings depending on the situation [9].

![Figure 1. The 3 pillars of Sustainability illustrated [9].](image)

2.2. Business sustainability

The triple bottom line concept is commonly used by businesses, governments, and NGOs to address sustainability challenges. Sustainability will have an impact on context, creativity, process, and the ability to persist [10]. Further, CSR is a rising idea in the larger framework of general business. Some argue that it is the business sector’s means of combining the economic, environmental, and social priorities of their operations, like the triple bottom line notion. The economy of this emerging century will be marked by a decline in the energy and material content of items and a rise in their intellectual content. Governments and businesses will have a challenge in ensuring that economic growth is both environmentally and socially sustainable [5].

2.3. Sustainability in the hospitality industry

Tourism is one of the world’s largest, fastest growing, and most promising industries, contributing to economic growth, job creation, and poverty reduction [3]. Notwithstanding the worldwide efforts aimed at managing the COVID-19 pandemic, a number of sectors, such as the hotel and tourism industries, have begun to regain their vibrancy. In fact, there is a growing and thriving demand for reservations and hospitality services [11]. The tourist industry, on the other hand, is now facing a variety of difficulties [3]. As per Chummun and Mathithibane [12], several studies have looked at the economic and social consequences of tourism in recent years, and it has gotten a lot of attention from academics. This is because tourism is one of the largest and fastest-growing sectors in the world, contributing 10% to global GDP and fostering the expansion of both official and informal businesses. Tourism has a large income multiplier impact in Small Island Developing States (SIDS), producing economic activity and income in linked tourism-oriented hospitality, recreational, and transportation sectors.
The behaviour of customers and decision-makers is now significantly influenced by the sustainability of the hospitality and hotel industries. Due to rising supply chain operating costs, state environmental restrictions, community pressure, and customer knowledge and demand, hotels are under more pressure than ever to adopt green supply chain management. Energy use in the hotel sector of the tourism business is one of the highest. In addition, hotels use a lot of water. Hotels must therefore implement an environmental strategy more quickly than other firms in order to lessen or eliminate the negative effects of their operations on the environment [13].

Further, the previously mentioned author stated that a hotel that uses green techniques improves its standing, appeal, and value to guests more than other hotels do. Customers are more loyal, satisfied, and prepared to pay more. The tourism industry supports all 17 of the UN’s sustainable development goals; in particular, it directly supports goals 8, 12, and 14. Sustainable tourism is securely positioned to advance the UN’s post-2015 development ambitions, which ask for a defined implementation framework. Those growing concern about several key difficulties and problems confronting society, ecosystems, and economy at various geographical and temporal scales is reflected in a growing interest in sustainability. Continued population increase and urbanisation, as well as all the constraints; namely, natural resource use and food supply; climate change; rising levels of pollution; the loss of natural ecosystems; water stress and shortages resulted in an increase of consideration in the notion of sustainability which is being considered as a possible solution. Designing green hotels, reducing energy consumption, technology innovation, sustainable tourism, and sustainable human resource management practices may assist to contribute to sustainability [14].

Green customers are often characterized as those who engage in ecologically responsible consumer behaviours. Consumers may lessen their influence on the environment by cutting back on their consumption, using public transportation, recycling, buying products with fewer packaging, buying used goods, eating less meat, purchasing locally grown food, organic food, fair-trade goods, and other things [15].

Cingoski and Petrevska [16] stated that tourists have grown more conscious of and begun to think about novel, out-of-the-ordinary topics, such as environmental preservation, waste management, energy effectiveness, renewable energy, greenhouse gas emissions, etc. The management’s main goal is to concentrate its efforts on cutting operational costs by implementing new energy sources and preserving the environment by developing an eco-friendly institution. Reducing operating expenses, boosts revenue and enhances competition in the tourism industry. The adoption of energy-saving techniques enables improved visitor comfort, higher hotel aesthetic value, less maintenance system failures, and other benefits.

In the hospitality sector, the significance of providing high-quality service is widely acknowledged, as hotels cannot thrive in the fierce competition without meeting the needs of their customers. In order to provide high-quality services, a business must comprehend what the customers demand. Enhancing customer loyalty, growing market share, increasing returns to investors, cutting expenses, lessening
susceptibility to price competition, and creating a competitive edge are explained as the fundamentals of service quality [17].

In general, people have started looking for and willingly paying more for “green tourism” or “eco-friendly tourism” as opposed to simply choosing a straightforward, low-cost regular hotel that provides normal facilities. To effectively compete with the always expanding competition, this entails beginning with the education and training of the hotel staff, then implementing a series of measures step-by-step to improve services, and eventually acquiring green or eco-certificates for the company [16].

Tourism must embrace sustainable practices that serve as conservation instruments and, among other things, enable for the preservation of significant natural areas, wildlife, archaeological, and historical sites; more effective resource management; and enhanced community well-being through local investments [6]. As a powerful sector, the hotel industry must strike a balance between commercial interest and long-term viability. Second, they must overcome the threat of climate change, which they are extremely vulnerable to. Green Practice acts as a value-added business approach that helps hospitality businesses engage in environmental protection measures [15].

A challenging economic environment brought on by resource scarcity and population growth necessitates the incorporation of sustainability into all facets of the industry rather than treating it as a separate issue. The issues concerning climate change, global warming, air and water pollution, ozone depletion, deforestation, biodiversity loss, and global poverty must be thoroughly understood by every aspiring hospitality player [18].

Numerous large worldwide hotel chains are gradually highlighting their commitment to sustainability and incorporating it into their fundamental business strategy, even as they pursue further development that places a variety of demands on natural resources. Sustainability may be viewed as the objective or finish of a process known as sustainable development [18]. Tourism must advocate the protection and conservation of these resources, as well as educate tourists about their importance, indicating that they are unique and that their integrity must be preserved for future generations [6].

Destinations are pitching up to formulate brand-new rules to reconcile tourism and the environment through sustainable practices, which has also become a worldwide slogan, as the movement of sustainable development and environmental challenges becomes textbook reality [15].

2.4. Linking Quality Management (QM) to sustainability

To exist, the company must satisfy several actors who can cause the company to collapse. However, there may be a gap in global sustainability since not all actors that are impacted by organizational actions have the tools and authority to alter it [19]. A cursory review of the literature will show that the notion of Total quality management is dominated by two traditional ideologies. The first one is the operations-adherence perspective that is used to examine TQM. Further, the second method is the integration of dynamics, layouts, processes, and systems designed to
gain a competitive advantage [11]. Quality specialists may demonstrate how their improvement initiatives contribute to the organization’s long-term success by reducing material usage, saving energy, conserving water, and so on. It is the most effective technique to demonstrate that environmental stewardship is not an expense, but rather a potential for increased profit. Our environmental goal is to decrease the negative impact of the company’s operations on the environment. It also demonstrates to the company that quality procedures and tools can be used to improve sustainability as well as quality. Quality may help with this action-oriented, operational sustainability in a variety of ways, and it can begin to be built into the company’s management structure [20].

Quality is a wide, multi-interpretable, relative, and dynamic notion, like sustainability. The evolution of the quality approach reveals several elements that are pertinent considering the difficulties addressed [21]. TQM acknowledges leadership dedication to quality, customer orientation, and benchmarking. Additionally, the strategy acknowledges quality evaluation, product design visualization, employee training and development, and empowerment and involvement [11]. The goal of quality development is to meet and exceed customer requirements while also improving efficiency, i.e., how to provide more customer value with less resources. Sustainability might be addressed in a practical way by incorporating the information and approach used in high quality work into sustainability initiatives. Thus, the environment, social responsibility, and the economy are all [7]. Table 1 shows a list of hotel groups based in Mauritius and a brief of the sustainability initiative being taken by them.

Table 1. List of hotel groups and the sustainability initiatives being taken.

<table>
<thead>
<tr>
<th>Hotel groups (Based in Mauritius)</th>
<th>Sustainability initiatives taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Triple bottom line approach including environmental, social and financial aspects of sustainability</td>
</tr>
<tr>
<td>B</td>
<td>Developed a sustainable management plan that comprises of the following: environmental, socio-cultural, Quality, Health and Safety</td>
</tr>
<tr>
<td>C</td>
<td>Developed a comprehensive and inclusive strategy based on the UN SDGs. The latter comprises of social, environmental, and economic aspect of sustainability. Success is tracked through KPIs</td>
</tr>
<tr>
<td>D</td>
<td>Developed a substantial action plan based on zero-single use plastic waste. This allowed for the promotion of environmentally friendly substitution.</td>
</tr>
<tr>
<td>E</td>
<td>Efficient waste, water and energy management system. Some of the actions taken were to recycle wastewater for irrigation purposes and implementing awareness programs</td>
</tr>
<tr>
<td>F</td>
<td>Alignment with the UN SDGs, the hotel group has included through a map, their collaboration with their stakeholders</td>
</tr>
</tbody>
</table>

Adapted from: Sun resorts [22], Constance Hotels [23], Hotels Attitude [24], Beachcomber hotels [25], Veranda Resorts [26], and Lux Resorts [27].

3. Methodology

To achieve the aim of this research work, a questionnaire was designed for knowledgeable staff in the hotel industry with regards to sustainability. The objectives of the survey were to:

1) Investigate the different sustainable practices adopted by the hospitality industry with regards to the three dimensions of sustainability aspects namely, social, economic, and environmental ones.
2) Assessing the context in which the sustainability practices benefit the hotels in Mauritius.
3) Identifying gaps or issues faced by the hotels that can prevent them from attaining their sustainability goals.
4) Propose or recommend improvement areas which can benefit the hospitality industry in Mauritius.

3.1. Sampling and design of questionnaire

A list of hotels rated 3 to 5 stars were available on the Mauritius Tourism Authority website. A total of 11 hotels across Mauritius were surveyed where most of the hotels were part of main hotel groups. The questionnaire for this research work pertained mostly closed ended questions and some open-ended ones. A brief description of the sections is outlined below in Table 2.

Table 2. Description of the different sections in the questionnaire.

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Characteristics of hotel</td>
<td>• Name, address, number of employees, classification, certification.</td>
</tr>
<tr>
<td>B</td>
<td>Environmental Domain</td>
<td>• Energy Consumption and Conservation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Waste handling, Disposal, and Reduction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CO₂ and Greenhouse gases emissions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Environmental certifications and accreditation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Environmental Activities and Awareness.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Water consumption, saving, and Recycling.</td>
</tr>
<tr>
<td>C</td>
<td>Social Domain</td>
<td>• Customer service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Employees’ welfare.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hotel’s involvement with local businesses.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hotel’s initiative with regards to sustainability.</td>
</tr>
<tr>
<td>D</td>
<td>Economic Domain</td>
<td>• Customer rate trend with regards to sustainability initiatives or certifications.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hotel’s energy consumption costs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Trend in operating costs and returns on investments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Customer complaint trend.</td>
</tr>
<tr>
<td>E</td>
<td>Sustainable development initiative</td>
<td>• Overview on the different sustainable development initiatives, their benefits, the issues faced and how they are tackled.</td>
</tr>
<tr>
<td>F</td>
<td>Profile of respondents</td>
<td>• Contact details of respondents, position in hotel, education level, years of experience.</td>
</tr>
</tbody>
</table>

3.2. Pilot testing

A pilot test was carried out with 8 respondents. The comments or feedback of the respondents were taken into consideration. It allowed the reveal of potential misunderstandings, thus giving the opportunity to make necessary amendments to bring improvement to the questionnaire.

3.3. Statistical analysis

The results obtained through the questionnaire will be later analysed through Statistical Package for the Social Sciences (SPSS) 16.0 and Microsoft Excel 2013. Data was transformed in frequencies, charts, and tables. Moreover, further analysis was conducted, namely, Spearman’s correlation tests, median and mode.
3.4. Framework design

The purpose is to review, synthesize, and refine current literature, to propose a framework that will link quality and sustainability. The aim is to help the hotel industry in Mauritius to overcome various limitations they may encountered in the development of the sustainability practices. The said limitations were assessed through the survey questionnaire. Incorporating the knowledge and technique from Quality Management (QM) and systematic improvements into an organizational component, might provide new options to succeed in establishing long-term sustainability in the wider sense [7].

QM is defined as a philosophy of practices, principles, and tools, according to one of the most prevalent definitions. Main ideas of QM include continual improvement and customer focus. Furthermore, buyers may regard care for or consideration of sustainability as a need. The goal of QM is to increase the efficiency of organizational operations and remove defects. Specific practices like ‘zero defects’ are inextricably linked to the environmental management-based system’s ‘no waste’ aim. Furthermore, there is a similar focus on making better use of inputs. Organizations that have embraced QM methods may encourage and build a set of abilities that assist the adoption of sustainable practices because of these commonalities [28].

3.5. Constraints

The main challenge faced during this research work was to get responses from the hotels. To overcome this constraint, a focus was placed on major hotel groups in Mauritius where sustainability initiatives emanate from the head office prior to be cascaded down to the individual hotels.

4. Results

The result section depicts the key findings following data collection. The latter have been presented in forms of charts, tables and figures derived from statistical analysis. Figures 2 and 3 demonstrated that most of the data collected were from the north and east of Mauritius (36.4% and 36.4%).

![Figure 2. Locations where data were collected.](image)
Most of the respondents’ forms part of major hotel groups in Mauritius comprising individual hotels and resorts throughout the island.

Most of the hotels interviewed pertains a certification related to sustainability, namely, Earthcheck (27%), Green Globe (18%), Travel life (9%). Some hotels also have several certifications active. For instance, one of the interviewees stated that they possess the following: Green Key, The Pledge on Food Waste Gold Distinction and Silver award Sustainable Tourism Awards 2022.

Several questions were asked about the energy consumption and conservation of the hotels/hotel groups. It has been recorded that usage of renewable source of energy is prone among the respondents (54.5%). Moreover, same goes for the implementation of measurable targets for the conversion towards more energy-efficient practices (63.6%). All the respondents agreed about the preference of the hotel to buy green-labelled, energy efficient and water-saving labelled products (where 81.8% strongly agree).

A series of questions were then asked about the management of wastes. The results were quite positive as indicated in the Figure 4. It was recorded that waste
management systems are well established and that 3R culture is promoted (100% agreed where 81.8% strongly agreed).

**Figure 5** indicates one of the most positive responses recorded during the survey. It was noted that environmental initiatives are well established within the hotels. Awareness on environmental stewardship is done and employees are encouraged to engage themselves in sustainability activities being organised (>90% strongly agreed). All the respondents agreed on the hotel’s website that detailed actions undertaken as part of their environmental sustainability programs (90.9% strongly agreed). Further, 72.7% of the respondents strongly agreed about having as a routine procedure to inform the clients about their environmental sustainability policies (ESP).

The respondents were asked if the hotels have established CSR policy. 63.6% strongly agreed and 27.3% agreed. With regards to a potential increase in occupancy rates following the implementation of sustainability efforts, 45.5% and 27.3% strongly agreed and agreed to this statement. The respondents were then asked whether the number of satisfied guests increased in recent years and if loyalty/reward programs were made available to them. The highest percentage checked strongly agree and agree points (45.5% and 36.4% respectively). Furthermore, they were asked if customers are willing to pay more for programs that promotes sustainability, 54.5% were neutral about it and 45.5% strongly agreed.

Moreover, it was asked if the hotels have improved their cost-cutting through process innovation, green supply chain design and enhanced technology adoption. 45.5% strongly agreed and 18.2% agreed. The respondents were requested to indicate whether the quality of products/services have improved in recent years. 45.5% and 27.3% strongly agreed and agreed respectively. Subsequently, a question
was asked regarding a potential in customer complaints in recent years, 45.5% agreed and 36.4% strongly agreed.

Open-ended questions were asked about sustainability initiatives taken by the hotels. It was also noted that several projects were implemented along the processes to adopt a greener approach of doing business.

The categories of responses are stated below including some examples:
1) Certifications and commitments; applying/maintaining their certifications and taking commitments towards sustainability.
2) Reviewing activities and processes towards a more sustainable approach; using less paper, food waste reduction programs, waste sorting, …
3) Working with NGOs; donation of surplus of food
4) Digitalization; digital timers for external lighting, hotel information booklet on TV
5) Protection of biodiversity and eco-systems; organising cleaning days, planting of trees, …
6) Working with local communities; >90% local procurement, supporting and engaging local communities.
7) Climate change concerned approach and lowering carbon footprint, shifting to low carbon footprint and focusing on circular economy.
8) Education and awareness sessions; beach clean ups, awareness programs and regular staff trainings.

The benefits of the above-mentioned initiatives were asked, and the following were revealed: Increase in productivity which includes effectiveness of staff mainly. Moreover, education and awareness are promoted, that is, raising awareness among employees for them to be more conscious and dedicated to sustainability projects and initiatives. The image and competitiveness of the hotel/resort on the market is enhanced as well. It was also mentioned that they gain in reputation and proudness of working for such organisations.

The respondents were then requested to mention any difficulties they may face in line with the sustainability projects/initiatives implementation. The responses were categorised into two parts mainly the management of change and culture development and the cost incurred. As per the respondents, the main difficulty is to bring a change in the mindset of staff. They mentioned as well that the expenses incurred to purchase eco-friendly materials are consequent and the return on investment difficult to define.

It was then asked to mention how the different above-mentioned difficulties are tackled. It was noted that various trainings are organised including programs and plans to raise awareness. Moreover, meetings and quality circles are conducted to discuss on-going projects and lastly, the commitment of some staff that are passionate about this concept is being used mainly for sharing experiences and passion.

A series of variables were chosen based on their pertinence and their link to the objectives of this project. Spearman’s correlation tests were used to determine the correlations as they are more adapted to the context i.e., Likert scales. It has been noted that the majority presents a strong relationship. The results and their interpretation are mentioned in Tables 3 and 4 below respectively.
### Table 3. Spearman’s correlation results.

<table>
<thead>
<tr>
<th>Sustainability dimensions involved</th>
<th>Variables tested</th>
<th>Results obtained</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Domain</td>
<td>Hotels built on a green building idea, And Measurable targets for the conversion towards more energy-efficient practices.</td>
<td>0.168</td>
<td>No or negligible relationship</td>
</tr>
<tr>
<td>Environmental Domain</td>
<td>Waste management system in place, And 3Rs culture promoted/practiced.</td>
<td>0.524</td>
<td>Strong relationship</td>
</tr>
<tr>
<td>Social Domain</td>
<td>CSR established, And Occupancy rates grown since implementation of sustainability.</td>
<td>0.662</td>
<td>Strong relationship</td>
</tr>
<tr>
<td>Social Domain</td>
<td>CSR established, And Trouble putting sustainable initiatives in place.</td>
<td>−0.315</td>
<td>Moderate Relationship</td>
</tr>
<tr>
<td>Economic Domain</td>
<td>Customers willing to pay more for programs that promote sustainability, And Annual turnover grown during last few years.</td>
<td>0.509</td>
<td>Strong relationship</td>
</tr>
<tr>
<td>Economic Domain</td>
<td>Customers willing to pay more for programs that promote sustainability, And Reduction in customer complaints in recent years.</td>
<td>0.529</td>
<td>Strong relationship</td>
</tr>
</tbody>
</table>

### Table 4. Interpretation table of spearman rank-order correlation coefficients.

<table>
<thead>
<tr>
<th>Spearman (ρ)</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥0.70</td>
<td>Very strong relationship</td>
</tr>
<tr>
<td>0.40–0.69</td>
<td>Strong relationship</td>
</tr>
<tr>
<td>0.30–0.39</td>
<td>Moderate relationship</td>
</tr>
<tr>
<td>0.20–0.29</td>
<td>Weak relationship</td>
</tr>
<tr>
<td>0.01–0.019</td>
<td>No or negligible relationship</td>
</tr>
</tbody>
</table>

Note: This descriptor applies to both positive and negative relationships.

Adapted from de Vries et al. [29].

An average median and mode analysis were conducted based on the responses recorded following Likert scales questions. The following were depicted; the subsections pertaining more positive than negative responses (≥4) were pointed out. For instances, waste handling, disposal, and reduction (Average mode 4.1), environmental certifications and accreditation (Average mode 4.2), environmental activities and awareness (Average mode 5), and social and economic domains pertains an average mode of 4.1 and 4 respectively. Further, it was observed that the average median and mode values lies more between 3 and 5, meaning that on an overall basis the responses were more towards the neutral to strongly agree points.

### 5. Discussion

Scholars in the field of hospitality have acknowledged the significance of sustainability in corporate business policies. Hotels may benefit from sustainability measures to save operating costs, comply with regulations, gain a competitive edge,
increase employee productivity, meet shareholder expectations, and foster customer loyalty among others [30]. The hotels interviewed are quite dispersed around the island. Most of them are hotels forming part of main hotel groups in Mauritius. As per Mauritius Hotels [31], Several well-known hotel chains from around the world have decided to invest in the island’s tourism industry because of societal and economic development as well as changes in tourism. In the global hospitality sector, hotel chains are defined as horizontal alliance of hotels operating under a single brand [32]. During the data collection process and literature search, it was noted that most of the groups have been launching and nurturing sustainability practices recently. Those initiatives were reflected in the responses given by the interviewees.

Respondents mentioned about having different types of certifications related to sustainability. Those were, for instances, Earthcheck (27%), Green Globe (18%) and Travelife Certification (9%). It was noted that some hotels have certifications that were not listed in the multiple-choice question i.e., Green Key, the pledge on food waste and the Sustainable Tourism award. Further, it was recorded that some respondents have more than one active certification as well. Studies suggested that many hotels are being required to implement more ecologically friendly methods due to the rising interest in sustainable development principles and the pressure that is being place on them from the media, the government, and consumers [33].

The survey depicts that various hotel groups in Mauritius have invested in concrete projects related to sustainability. For instance, substantial investment in solar thermal systems were made. The goal of the hotel group that implemented this project is to replace conventional hot water boilers powered with fossil fuel with ones using solar energy. It was mentioned that they currently have panels covering a total area of about 3700 [25]. More than half of the respondents strongly agreed about currently using renewable source of energy and more than 80% of them also strongly agreed about the energy efficiency monitoring to save money.

Moreover, there are several hotels that have been certified by “The Pledge on Food Waste.” To eliminate food waste, they have worked to develop new operational procedures, among those initiatives are included, cutting wasteful spending, and give preference to local vendors who share the same values. This pledge shows the hotel’s steadfast determination to start down the road of sustainable development [34]. In parallel, there are instances of hotel chains that have also launched an effort to combat food waste by stating that even if food waste is unavoidable, it is still feasible to turn it into energy by creating biogas or by composting or fertilizing the trash [35].

From both a socioeconomic and an environmental perspective, food waste is a big challenge. Waste presents a sustainability concern since it has a significant negative impact on the environment and public health. Inaccurate demand forecasting in hotels frequently leads to overstocking of food and overproduction of meals. Thus, fostering positive relationships with suppliers may make it easier to reduce food waste. This would assist hotel administrators in placing the right amount of food orders when and if necessary [30].

Maintaining environmental sustainability is essential for businesses to achieve growth, draw in new clients, and satisfy customers as they become more aware of and concerned about how their actions are affecting the environment. Going green
benefits hotels financially, lessens their impact on the environment, and wins them favour with customers. It’s a win-win circumstance [36]. It was noted that all the respondents agreed about being dedicated to the reduction of wastes within all the processes and the usage of digital tools instead of papers and stationery.

More than 80% of the respondents agreed on calculating/estimating the level of CO₂ emissions hotels at regular periods (where 45.5% strongly agreed). This result is in line with what [37] pointed out, that is, with the tourist sector having a substantial influence on global carbon emissions, it is appropriate to measure tourism-related carbon emissions using standard methodologies and to take essential efforts to reduce the emissions as the need for carbon emission reduction has become urgent. In the same vein, Mauritian hospitality industry started to offer its first carbon-neutral hotel stays [38]. The industry is still figuring out how to lessen the effects of climate change and adapt to climatic shifts by implementing the energy transition idea. Further, a resorts group have created several ways to lessen their carbon footprint in accordance with the facts indicated above. It was stated that twelve solar panels that provides renewable energy and warm up the hotel’s water have been installed. Additionally, they chose to utilize LED lamps rather than conventional ones to lower greenhouse gas emissions. Translucent roofing over public places were also picked to reduce the consumption of bulbs [39]. Along with that, initiative to lower carbon emissions year over year have been taken. It has been done by putting into place targeted energy-efficient techniques, including “Carbon Management Strategies” and “Energy Management Systems,” among others [40].

With the rapid development of tourism industry in Mauritius, matters such as over-development of the coastal region, rising pollution and indifference for natural resources are becoming crucial concerns. Players in the tourist sector are requested adopt behaviours that are both socially and ecologically responsible if they want to succeed [41]. Following a series of questions asked on the various activities related to environment organised at the hotels, it has been observed that the responses are quite on the positive side.

90% of the respondents agreed that water consumption has decreased over years. Moreover, it can be specified that water recycling system was implemented (72.7% strongly agreed). To save water, hotels groups in Mauritius have launched several initiatives. For instance, some of them are dedicated in ensuring that their business does not jeopardise basic services including water [23]. Further, ingenunits to minimize water use, implementation of water management systems and recycling of water for irrigation purposes have been implemented throughout the island by different hotel groups [24,26]. Rodrigues Island has initiated practical efforts by relying on seawater desalination to provide its residents with clean drinking water. Each day, this service may deliver 1000 m³ of drinking water [42]. Some hotels have also adopted the use of seawater desalination. For example, as part of their sustainability commitment, a hotel group mentioned that some of their hotels have implemented this technique [43].

Nearly 91% of the interviewees strongly agreed about the hotels working closely with NGOs and local communities Considering the concepts of equality, the significance of community, and its potential, NGOs play an important role in ensuring that benefits reach communities [44]. Various hotel groups in Mauritius
took initiatives towards economic aspect of sustainability. One of them states that the local economy can be strengthened through tourism. Considering the seriousness of environmental challenges, it may also assist Mauritius in innovating, exploring new areas, and proposing new services that benefit everyone. It was noted that their economic strategy is focused on inclusion and that they think everyone should gain from tourism. This hotel group specified their eagerness to help local business owners and have committed to collaborate with them on this matter [24]. In the same vein, a hotel group developed the idea of “Responsible Hospitality”. Within the framework of the circular economy, the latter seeks to balance environmentally responsible economic growth. This means that hospitality encourages a connection with nature as well as accommodations that are more ecologically friendly and ethical behaviour [26].

Studies suggested that adopting sustainable practices improves a business’s performance at many different levels, including employee happiness, brand reputation, image improvement, and stakeholder loyalty, which in turn gives the corporation long-term competitive benefits. The advantages of sustainability for businesses can come in the form of real advantages like lower operating costs and risks as well as intangible advantages like improved brand recognition, talent attraction, and competitiveness [45].

Following spearman’s correlation tests conducted, it was revealed that a proper CSR established and the growth of occupancy rates since implementation of sustainability shares a strong positive correlation ($p = 0.662$). With regards to the debate on willingness of customers to pay more for programs that promote sustainability, it was found that this variable is strongly related to the growth of annual turnover during the last few years ($p = 0.529$). Therefore, based on those two results, it can be said that indeed, customers are becoming more conscious about the urgent need to take actions with regards to sustainability. Those data show how sustainability helped in the economic aspect of the hotel industry. By having more satisfied customers, an increase in profitability is most probably possible thus ensuring ROI in the long run.

**Implications**

The aim of this study was to assess the various practices adopted by the hotels in Mauritius with regards to sustainability. A focus was placed on the three domains of sustainability. This aid in getting a better understanding of the actions being taken by the hotel industry in Mauritius with respect to sustainability. Various research has been conducted on sustainability as a general concept and in various business sector worldwide. However, placing the focus on the 3 to 5 stars hotels in Mauritius was an interesting topic, specially following the COVID-19 pandemic that has impacted drastically this sector. Since the impact of climate change is already affecting Mauritius, there were indeed a need to assess where this sector stands regarding the urgency to develop a more sustainable way of doing business and what can be the difficulties they are facing towards this change.

It was noted through literature search that tourist’s mindset is changing and the demand for ‘greener’ hotels are increasing. To remain competitive on the market, it
is a must for hotels to change their way of operating for a more sustainable one. It was however noted that major hotels have recognized this need for change thus have already started to take concrete actions. As one of the top pillars of our economy in Mauritius, the hotel industry plays a major role in contributing to a more sustainable country. The latter is facing a great challenge nowadays to coincide the preservation of our biodiversity and economic development and growth. This sector has greatly evolved through years and the number of hotels has considerably increased.

As its definition suggested, sustainability is required to be able to meet the needs of the present without compromising the needs of the future generations. The concept comprises of finding a balance between the preservation of our environment, ensuring our economic growth and community involvement. As part of the survey, initiatives taken by the hotels as well as the difficulties being faced by them was assessed and discussed. Based on the analysis made, concrete recommendations to overcome obstacles stipulated and help in a better transition can be presented. Studies revealed that including some quality management features within sustainability framework could help the hotels in overcoming various operational issues that can serve as a barrier to reach sustainability objectives. This research work developed on the history and benefits of QM mainly for the hotel industry.

6. Conclusion and recommendations

Growing demand for ‘green hotels’ has encouraged hospitality industry in Mauritius to take concrete actions towards sustainability. The results revealed that quite diverse initiatives have been taken irrespective of the domains. This study uncovered that people from all parts of the globe are becoming further knowledgeable and conscious of the urgency to act for a further sustainable future. Consequently, as a baseline, most of the hotels interviewed has gone through a sustainability related certification which have help them implement or develop new activities and processes. In parallel, the certification helped in the marketing aspect of the business to demarcate themselves from competitors, attract tourists and boost their image. The survey allowed to identify the various barriers to sustainability being faced by this powerful sector as well as suggestions from the respondents to overcome them. It was however noted that none of the interviewees possesses an Environmental Management System (ISO 14001) certification which focuses on the PDCA cycle to achieve continual improvement.

It was pointed out, throughout this research work that the goal of a QMS closely joins the sustainability one in the sense that the aim is to achieve or exceeds customer satisfaction by increasing efficiency and productivity and in parallel reducing costs by mitigating defects/wastes. Therefore, based on the data collected, the framework below (Figure 6) has been developed which depicts how quality can be incorporated along with sustainability in an hotel operation chain to achieve customer satisfaction.
It is proposed that a quality and a sustainability policy are designed and used as a benchmark. A policy is defined as a guideline for action. Through the latter, the top management will be able to communicate their commitment and align their sustainability/quality mission, strategic direction, and purpose. The policy will help in cascading a clear communication which will contribute to enhancing employee’s understanding, morale and engagement thus boosting their productivity.

The hotel does not necessarily need to go for a certification to incorporate quality in sustainability. Studies suggested that QM is dynamic and multi-interpretable. Thus, the purpose of this framework is to target strategic aspects of TQM that can be used to optimize efficiency and overcome various specific barriers. The Quality Management Principles (QMPs), shown in Figure 7 are proposed to be used as a foundation to implement features of Quality Management (QM).

The QMPs can be understood and adopted at each level to ensure that all actors are included in the chain. This process is important to align communication with respect to customer’s demand. The purpose is that all actors in the chain work for a
common goal which will alleviate delays in operations thus improve customer satisfaction. Table 5 shows the suggested approaches towards the QMPs concept. The approaches were designed based on data collected from the survey and knowledge gathered through the secondary data collected. The goal is to support the hotels in continuously improving numerous key factors in a holistic manner.

Table 5. QMPS and the suggested approaches.

<table>
<thead>
<tr>
<th>QMP</th>
<th>Suggested approach</th>
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<tbody>
<tr>
<td>1. Customer focus</td>
<td>Rising environmental concerns and awareness within customers have triggered more sustainability efforts from hotel industry. Customer focus is about understanding the needs and expectations of the clients to ensure their satisfaction. It is suggested that top management aligns their objectives in this sense. Managing customer relationships through effective communication, feedback mechanisms and measurement of the results can help in enhancing the productivity of the different processes. The purpose is to develop strong customer loyalty thus increasing revenue.</td>
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<td>2. Leadership</td>
<td>Leadership has a significant impact in the development of sustainability within a hotel operation. Leaders are needed to identify clear goals and objectives. This will ensure employees’ involvement to meet the targets set. Making sure that employees understand the organisation’s vision and mission can contribute to boost collaboration and teamwork thus overall efficiency.</td>
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<td>3. Involvement of people</td>
<td>Through the survey, some respondents expressed their pride of working in an organisation that is engaged in SD. Employee engagement is about creating loyalty and trust within the workforce. The latter can contribute to an enhancement in the reputation and image of the hotel. TQM approach in parallel suggested that involvement of people comprises that each employee is responsible to assess the quality of the products or services at their respective levels. This will promote empowerment within the workforce thus serving as a tool to attract, recruit, and retain employees. The recommended approach is a combination of sustainability and involvement of employees to create a positive culture.</td>
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<td>4. Process approach</td>
<td>A process is defined as a set of interrelated activities that transform inputs into outputs. The process approach is about identifying the different processes in the chain as well as their interrelationships to promote transparency. Process maps can be used to do so. Moreover, the hotel can evaluate the risks associated to each process that can impact on the stakeholders. To ensure effectiveness, each process will need to be monitored, analysed, and measured through KPIs for instance so that actions are taken accordingly to create continual improvement. In QM, this approach is generally referred as Plan-Do-Check-Act (PDCA) cycle and risk-based thinking approach.</td>
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<td>5. System approach to management</td>
<td>This principle is about understanding and managing a system of interrelated processes (or a ‘whole’ which comprises of interdependent parts named subsystems) for any opportunity to improve the hotel’s efficiency. The importance of this QMP is linked to the continuous improvement process. An hotel operation is dynamic, this approach is focused on paying attention to the effectiveness of the system as a whole instead of focusing on the subsystems.</td>
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<td>6. Continual improvement</td>
<td>Incorporating continual improvement in sustainability is about having a long-term vision for the hotel. The vision can be cascaded down from top management to middle management who will express their commitment to lower-level employees. Developing a strong leadership and aligning the hotel’s strategy will promote ongoing improvement of the products/services quality. Through continual improvement approach, teamwork and empowerment of employees will be promoted leading to a reduction of defects and variation in the system.</td>
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<td>7. Factual approach to decision making</td>
<td>The ability to make appropriate decisions in SD plays an important role in employee management and customer satisfaction. To ensure that decisions are the most effective ones, it is vital that decision-makers based themselves on analysis of data rather than intuition in some strategic cases. Factual approach can be applied for instance in case of corrective actions that are required after a non-conformity is raised or as a preventive action to avoid a non-conformity. Data collected for decision making process should be correct, reliable, and accessible to all interested parties within the hotel operations. Statistical tools, for instance, the 7 quality tools originally developed by Kaoru Ishikawa can be used to collect or measure data.</td>
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<td>8. Mutually beneficial supplier relationship</td>
<td>This QMP is about building a long and healthy relationship with the suppliers. In QM, an organisation and its suppliers are viewed as interdependent. A mutually beneficial relationship will enhance value creation thus allowing for the improvement of the overall chain. Feedback mechanisms between the hotel and its suppliers can be initiated to promote proper flow of communication, alleviate delays in operations and enhance customer service.</td>
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7. Future work

The recommendations made can contribute to overcome the various barriers that have been mentioned by the respondents namely, the ROI following cost incurred for sustainable development and the change management difficulties. The approach used was based on the incorporation of QM features in SD. It is believed that the application of the framework can contribute to the improvement of customer service, reduction of defects and wastes within the operations, enhancement of employee satisfaction thus improvement of productivity and an overall upgrading in hotel reputation and image among others.

As a future work, it will be interesting to test and to follow up on the practical feasibility of the framework proposed in this research work. Further, since it was raised that QM features can serve as a potential solution to overcome the sustainability barriers faced by the hotel industry, a case study will contribute as a complementary of this project.

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