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Achieving Sustainable Development in the Hospitality Industry: An Evidence-Based Empirical Study

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Abstract: 2015 saw all UN members embrace the 2030 Agenda for Sustainable Development. It aims to create a global collaboration to achieve peace and prosperity for the planet and people. 17 SDGs aspire to improve the world by 2030 without excluding anybody. This study will evaluate how hotels fulfill SDGs sustainably, especially SDG6. The data from 57 star-category hotels were collected from Rajasthan, India, and analyzed. Results indicate that water conservation, sanitation, and hygiene for everyone contributed significantly to sustainable development. According to findings, different-star category hotels contribute differently to SDG6 by implementing sustainable practices to satisfy environmental SDGs.

Keywords: Sustainable Development, Sustainable Development Goals, Sustainable Practices, Hospitality, Hotels, SDG

1. Introduction

Sustainability is described as a series of measures made to meet current demands without jeopardizing future potential[1)]. The evolution of Sustainable practices or green innovations has been evident in the hospitality industry for decades, but it got considerable attention in the 1990s, the last decade recorded much more substantial growth in terms of significance and importance. The global competition and challenges forced the hospitality industry to adopt and implement sustainable practices[2)].

Tourism and Hospitality is a dynamic force that encourages travel for the purpose of discovering new cultures, communities, experiences, and marvels; meeting new people; interacting with existing values; and experiencing brand-new customs and occasions[3)]. The hospitality industry has recently seen rapid growth and diversification, putting it among the world's most popular and rapidly expanding financial industries. As a result of these shifts, the sector is now a significant contributor to the economies of all countries, contributing more than ten percent to the overall GDP of the world[4)]. There is no denying the hospitality industry's rising influence as a driving factor in the economy and because of its potential role as a tool for international development. There is a growing consensus that sustainable tourism is essential to the accomplishment of the seventeen Sustainable Development Goals (SDGs) and the one hundred and sixty-nine linked goals established in accordance with the United Nations. One of the most significant sectors in the economies of both industrialized and emerging nations alike is the tourism industry. It helps to alleviate poverty, promotes equality between the sexes, protects and promotes the planet's natural resources, and fosters international harmony. The United Nations (UN) has identified tourism as one of the 10 sectors that can shift communities toward a Green Economy[4)]; furthermore, the Rio+20 outcome document "The Future We Want" identified tourism as one of the critical sectors that can significantly contribute to the accomplishment of the three goals that comprise sustainable development (social, economic, and environmental).

The hotel industry recognizes sustainability as a key concern for future growth, and it is one of several sectors actively pursuing it. In an effort to enrich human life, certain hotels have instituted environmental policies that emphasize the conservation of natural resources, Despite the fact that several experts have demonstrated that the hotel industry's fast expansion contributes considerably to

global environmental deterioration since hotels requires for heating, ventilating, and lighting a considerable quantity of energy and water. In addition, the tourism and hospitality sector are also responsible for considerable greenhouse gases emission as well as environmental degradation. Increased awareness, government, and customer pressure to adopt sustainable practices is motivating many hotels to do so. Hotels are having advantage from adopting sustainable practices[5] are beneficial in two ways: first, they increase asset efficiency and cost savings by reducing their consumption of energy and water; second, it's a method of attracting eco-conscious customers.

Water is a vital resource for the hotel industry, with hotels using large amounts of water for a variety of purposes including cleaning, laundry, irrigation, and guest amenities such as showers and pools. One major area of water usage in hotels is in the provision of guest amenities. Hotels use large amounts of water for showers, baths, and swimming pools, as well as for washing linens and towels[6]. Another area of water usage in hotels is in the maintenance of landscaping and gardens[6]. Hotels often have large, lush landscaped areas that require frequent watering. In addition, the hotel business is responsible for a significant portion of the damage done to the natural environment and world because of the amount of water and energy it uses along with the wastewater generation. As such, the adoption of water conservation practices has become increasingly important for the hotel sector. The hotel sector has embraced environmentally responsible methods, which have created a huge potential to conserve water use as well as consumption of energy and preserve sustainable practices in the tourist and hospitality sectors. This possibility has been made possible by eco-friendly procedures in the hospitality sector[7].

Green certification, online shopping, and environmental education may all help create a low-carbon economy with decreased carbon emissions, which is essential for a sustainable future; yet, relatively few studies examine these topics in relation to the hotel business[8]. In order to show that it is serious about preserving the environment, the hotel industry has undertaken a variety of initiatives, one of which is the use of environmental labels, the adoption of sustainable practices, and the use of environmental protection programs. Pollution may weaken the foundation for ongoing industry growth, therefore it's clear that hotels must prioritize sustainability and asset conservation if they want to survive into the future. By conserving energy (via measures like installing energy-efficient devices and incorporating renewable energy programmes), lowering water consumption (via measures like installing water-efficient equipment and devices and incorporating a scheme for the reusing of linens and towels), and decreasing waste (via measures like instituting recycling programmes as well as the establishment of a programme for the reutilization of linens and towels), a hotel can move in a direction of being sustainable. Hotels are having a number of initiatives under way to reduce humankind's destructive effects on the planet[9], and "green hotel practices" are one such example.

Studies has shown that hotel management is interested in sustainability and that there are impacts of sustainability motivating elements in hotel management decisions. Various perspectives on sustainability in the hospitality sector have been discussed by many researchers. For instance, I. Kepara[10] addressed the present condition of the adoption of sustainable development concepts in the Poland hotel business, including the capacities and impediments for doing so. In a similar way H. Han[11] looked at the impact that customers' thoughts and comments on the hotels' administration of water-saving and garbage reduction efforts and techniques on their plans to take part in the event being discussed as implemented green initiatives and their loyalty to the establishment. Researchers like[12] addressed many fundamental concerns, such as eco-friendly hotel layouts, energy savings, the value of cutting-edge technologies in the pursuit of sustainability, and the potential management of human resources and its influence on the advancement of the cause. Information and communication technology (ICT) applications have been shown to reduce energy consumption. Prud'homme & Raymond[13] looked on how hotels in Quebec, Canada, used sustainable development methods and how it affected customer satisfaction. Using the hotel quality indicators provided by the Global Sustainable Tourism Council, the sustainable development indicators for travel destinations, as well as the sustainability framework established by the European Union for hotels in the Mediterranean region, are discussed in light of the fact that sustainable development is built on three pillars of sustainable development (social, economic, and environmental), Authors[14] investigated the staff members' points of view on the sustainable business methods of Mediterranean island hotels rated four and five stars.

Some empirical studies have looked at the contribution that eco-friendly business operations[15] may make toward the goal of achieving sustainable development objectives, particularly in developing countries like India, despite the fact that these practices have been shown to contribute to lower operational costs and higher profits for hotels, higher guest satisfaction and loyalty, a more sustainable environment, and a competitive advantage. Therefore, the purpose of the present research is to examine the perspectives of representatives from environmental management on the scope of the problem the goals of which eco-friendly measures at hotels assist to accomplishing the environment-related SDG, specifically SDGs 6 (clean water and sanitation).

This study will be conducted by designing research method, collecting and analyzing data, followed by conclusion and recommendation for the hotel sector regarding attainment of targets of SDG6.

2. Research Background

2.1 Sustainable Development

Our Common Future, a report commissioned by the United Nations in 1987, is seen as the first formal introduction to the idea of environmentally friendly and responsible growth, that is sustainable development. Sustainable development is described by the Brundtland report issued by the World Commission on Environment and Development (WCED) as "a kind of development that fulfils the necessities of the present without jeopardizing the potential of future generations to satiate their own desires[16]. In accordance with this, sustainable tourism development is described as "an activity that fully considers its present and future economic, social, and environmental implications, fulfilling the requirements of tourists, the industry, the environment, and host communities in an appropriate manner"[17]. Tourism that is really sustainable makes responsible use of the world's limited natural resources, safeguards the financial health of its enterprises, shows due respect for its hosts, and shares its spoils fairly. In order to realize the three fundamental elements and in order for there to be sustainable tourist development, there has to be harmony between economic growth, social inclusion, and environmental conservation. All of these things work together to ensure that people and communities thrive. In a broad sense, sustainable tourism development may be seen as a strategy for implementing sustainable development concepts.

Fig. 1. Sustainable Development Goals[46]

The General Assembly of the United Nations had its meeting on September 25, 2015 and had voted in favour of adopting the Agenda for Sustainable Development for the Year 2030. This agenda is made up of 169 different objectives and 17 different Sustainable Development Goals (SDGs). The international community has set out this agenda and its associated goals with the intention of attaining sustainable development across all three aspects of the concept (economic, social, and environmental). Sustainable development may be achieved with the help of these dimensions. A system is not sustainable if any of its pillars are flimsy[18].

Fig. 1 depicts the 17 Sustainable Development Goals (SDGs), which are described as "the plan to build a better and more sustainable future for everybody." Problems like global poverty, inequality, climate change, environmental degradation, conflict, and injustice are among the global challenges they tackle. All of the Sustainable Development Goals and its related objectives are interconnected and cannot be achieved separately. They are universal in scope and apply to all countries, regardless of size or degree of development. All 17 Sustainable Development Goals (SDGs) may benefit from tourism in some way, given the industry's reach and clout. Goal 6 of the Sustainable Development Goals is to "ensure availability and sustainable management of water and sanitation for all." One way that tourism and hospitality can help accomplish this is through the "tourism investment requirement for providing utilities," which can be instrumental in ensuring that everyone has reliable access to clean water and facilities for proper hygiene and waste disposal. Water conservation may depend on its efficient usage for tourism, pollution prevention, and technological advancement. Tracking the positive economic, social, and environmental effects of tourism through the use of sustainable consumption and production (SCP) methods and tools like technology relating to water and energy efficiency (including renewable energies), recycling, and reductions in pollution and waste treatment, local purchasing and enterprises, and community involvement., could help the hospitality sector reach Sustainable Development Goals.

2.2 Sustainable Hotel Practices and Environmental Sustainability

The sustainability model in the workplace aims to improve the responsiveness and wellbeing of organizational structures and workers[19]. The hotel industry is just one part of the tourism sector whose operations pose a significant risk to the natural environment due to their massive resource usage (especially in terms of water, energy, and non-durable goods) and waste production (particularly in terms of raw materials and solid waste). Agricultural tourism could now be one of the most important economic goals for rural development[20]. Though, the world and organizations demanding highly efficient requirements now a days[21] but, a company's running expenses and the state of our mother planet earth will suffer if the resources are mismanaged. The hotel industry has been encouraged to become more environmentally friendly in recent years by a number of factors, including an increase in customers' environmental awareness, a desire to lessen the hotels' negative impacts on the environment, the desire to improve the hotels' public image, and the potential for financial gain. As a result, many hotels have started employing a wide range of cutting-edge procedures to boost the "greenness" of their operations in order to reduce their impact on the environment and appease the more environmentally conscious demands of their clientele.

Customers' growing concern for the environment has prompted many hotels to make changes in their

operations[22], such as adopting eco-friendly policies, in order to attract a more discerning population and increase their market share. A sustainable environment in the hotel sector is one in which human activities have little negative impact on the natural environment. In terms of environmental concerns which are changing continuously around the world[23], the hotel sector should give attention to the issues of water and energy conservation, global warming, and the release of greenhouse gases, Conservation of biological variety and natural materials, recycling, and waste minimization, reduced negative effects on the environment, eco-friendly sourcing and standardizing green building practices in the hospitality industry. As environmental concerns have been brought to the forefront of the public consciousness, the issue of how to manage these elements has emerged as a top priority.

There have been a number of studies that highlight the benefits of environmental sustainability for the traveler's experience. LCA (Life cycle assessment) is an international standard that provides a methodology for assessing the environmental impact of products and processes[24]. Some studies concluded that Customers are more likely to refer and return to a hotel with a green image, and they are also more prepared to pay a premium for such hotel booking. Sustainable hotels have a competitive advantage since their guests want eco-friendly amenities. As a result, customers' pleasure with their stay and their overall impression of the property are both positively affected by environmentally sustainable practices[25].

Conservation of electricity and water, as well as effective waste management and reduction, make up the bulk of environmentally responsible measures in the hospitality industry. The reason of adopting green practices varies for different players in the segment. Different players of hospitality sector find different reasons for implementing green practices in their organization. Branding, competitive advantage, and profit making are some of major reason for such implementations.

2.2.1 Reducing Energy Consumption

The hospitality sector has identified energy conservation as a key component of environmental management. Hotel operations across the board use up a substantial quantity of different source of energy and electrical power as shown in **Fig. 2 .** The hotel business has developed a variety of energy-saving methods.

These include switching to renewable energy sources, installing energy-efficient appliances and equipment, limiting energy use in guest rooms, buying products with the Energy Star label, dimming lights in unoccupied areas, switching to LED bulbs, and cleaning rooms with natural light rather than the lights on. The role of building automation technology in creating a smart and sustainable built environment for hotels are another important thing to look for reducing energy consumption[26].

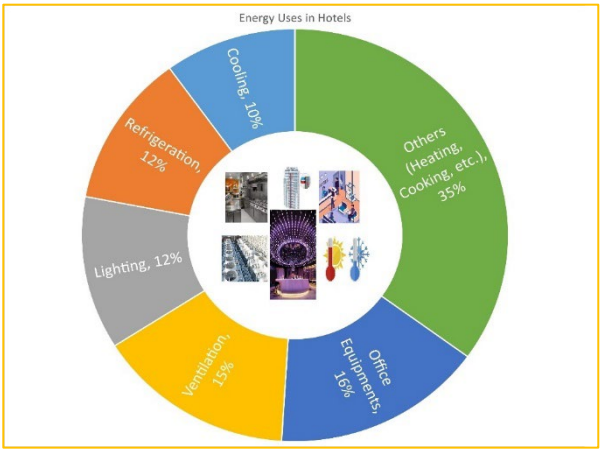

Fig. 2. Energy Uses in Hotels[47]

2.2.2 Reducing Water Consumption

The hotel industry is a major consumer of water and energy, with water usage comprising a significant portion of a hotel's operational costs. In addition, the hospitality industry has a significant impact on the environment due to its water consumption, wastewater generation, and energy use. As such, the adoption of water conservation practices has become increasingly important for the hotel sector.

There are a number of water conservation practices that hotels can implement in order to reduce their water usage and environmental impact. These include:

- Installing low-flow fixtures and appliances: Low-flow fixtures and appliances, such as showerheads and toilets, use less water per flush or per minute of use, resulting in significant water savings.
- Implementing water-efficient landscaping: Water-efficient landscaping techniques, such as using drought-resistant plants and drip irrigation systems, can significantly reduce a hotel's water usage.
- Recycling and reusing water: Many hotels have implemented systems for collecting and treating greywater, which is water that has been used for tasks such as washing dishes or clothes. This water can then be reused for irrigation or other non-potable purposes.
- Educating guests and staff: Hotels can also encourage water conservation by providing guests with information on the importance of water conservation and by training staff on the proper use and maintenance of water-efficient fixtures and appliances.

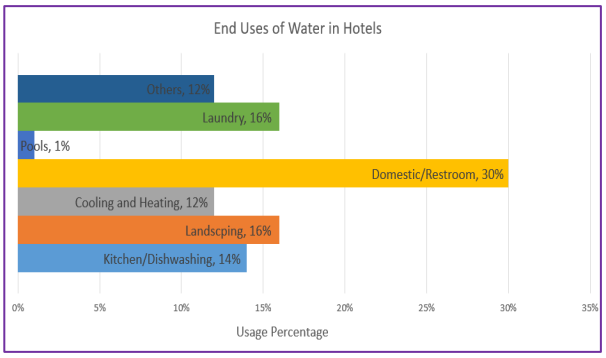

Fig. 3. End Uses of Water in Hotels[28)]

The hotel industry has extensively adopted water conservation management as an essential green management method[27)].

In order to function properly, hotels need a lot of water every day[28)] as shown in **Fig. 3.** The amount of water used by hotels varies widely based on factors such as their size and capacity, occupancy rate, service quality, and the kind of amenities they provide. The hospitality industry has taken a variety of steps to reduce its water footprint, including the adoption of water-efficient devices and appliances, the introduction of towel/bed linen reuse programmes, the routine repair of leaks in toilets and bathtubs, the watering of grass and plants at odd hours to reduce water loss due to evaporation, the recycling of grey water for use on lawns, and the monitoring of water consumption in each department.

2.2.3 Reducing Waste Generation

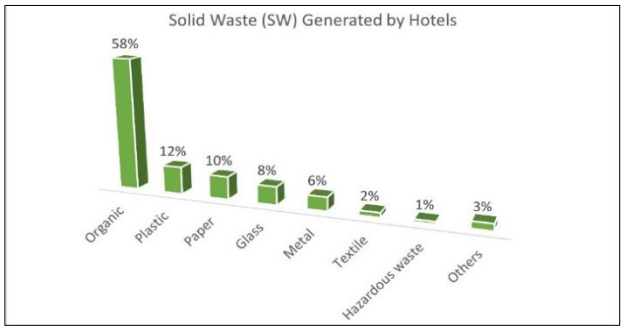

Fig. 4. Solid Waste (SW) Generated by Hotels

It is widely accepted that the hotel sector is one of the largest sources of landfill garbage and other types of waste as shown in **Fig. 4** and, by extension, greenhouse gas emissions.

As a direct consequence of this, the hotel sector has embraced a variety of practises that strive to reduce the amount of trash produced. Using containers with legible labels and different coloured bins for the collection of recyclables, purchasing items that include recycled materials and separating organic trash from other kitchen garbage for use in soil composting, purchasing food and cleaning supplies in large quantities, as well as starting a contribution scheme, and One method of reusing soaps from guests is to ground up the leftovers and use them as laundry detergent are some methods that are used to separate waste adopted by hotels.

2.3 Water-Related Sustainability in Hotels and SDG 6

In the pursuit of global sustainable development, the hospitality industry plays a vital role in shaping a future that aligns with the United Nations' Sustainable Development Goal 6 (SDG 6) - Clean Water and Sanitation. As our world faces increasing water scarcity and environmental challenges, it is imperative for hotels to take proactive steps towards water-related sustainability. Hotels are actively adopting sustainable efforts and practical strategies to contribute to SDG 6[29)].

Water scarcity is a growing concern that transcends geographical boundaries. Hotels, as significant consumers of water resources, have an opportunity to make a positive impact on water conservation[5)]. By implementing water-efficient technologies and practices, hotels can not only reduce their ecological footprint but also lower operational costs[30)]. Low-flow faucets, dual-flush toilets, intelligent irrigation systems, and water recycling are just a few examples of strategies that can dramatically reduce water consumption without compromising guest satisfaction[30)].

Nowadays, hotels are organizing awareness campaigns to educate both staff and guests about responsible water use[31)]. Simple actions like reusing towels and linens[32)], reporting leaks promptly, and opting for filtered tap water instead of bottled water can collectively make a considerable difference[33)]. Collaborating with local communities and organizations can amplify the impact of a hotel's sustainability initiatives[34)]. Participating in community-based water management projects, supporting watershed restoration efforts, and engaging in beach clean-ups not only strengthen a hotel's sustainability ethos but also foster goodwill within the local community[19)]. In the direction of achieving SDG 6, hotels can also explore innovative solutions like rainwater harvesting[27)], greywater recycling[35)], and incorporating sustainable landscaping practices[36)]. These approaches not only conserve water but also promote holistic environmental harmony.

So, the hospitality industry's commitment to water-related sustainability is crucial in attaining SDG 6. By embracing water-efficient technologies, fostering awareness, and engaging with local communities, hotels can lead the way in conserving this invaluable resource. As responsible stewards of both comfort and conservation, hotels have the power to leave an indelible mark on the path to a more sustainable and water-secure world.

3. Methodology

Although the practical steps to attaining sustainability in the hotel business are difficult to navigate. In order to determine whether or not green hotel practices, as

implemented in hotels of Rajasthan, help to achieve sustainable development goal, The conceptual framework developed here in **Fig. 5** is particularly useful for thinking about how to achieve sustainable development goals in the realm of the environment. It is also making a bridge in order to demonstrate the connection between environmentally friendly hotel operations and the environment-related Sustainable Development Goal 6 and associated targets.

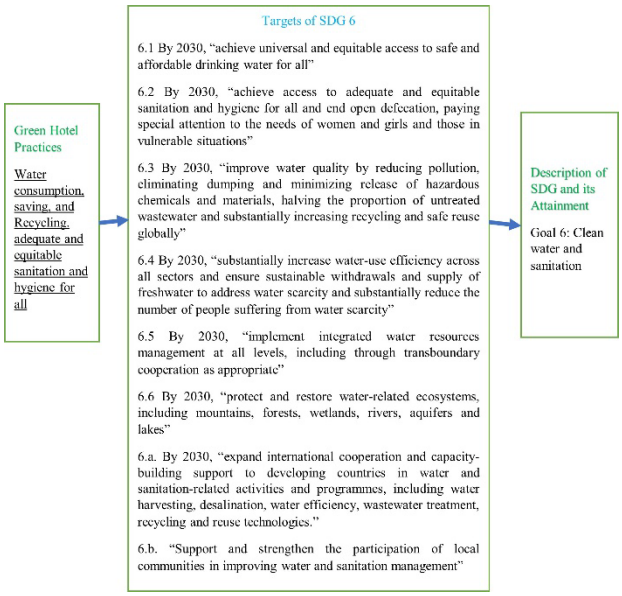

Fig. 5. Conceptual Framework for the Study

The population of this study was composed of individuals (mangers, engineers, service engineers, other staffs) from different star category hotels of Rajasthan, a state, known as the leading tourist destination to welcome majority of tourists from the country as well as from different places of globe. The star rating levels of these hotels are from below three-star, three-star, four-star, and five-star. In which 15 hotels are below three-star category, 15 are three-star, 15 are four-star, and 12 hotels are five-star rated. So, a total number of 57 hotels are selected for the current study.

The primary purpose of this research is to examine how green hotel practices are seen by environmental management professionals in terms of their impact on accomplishing sustainable development objectives connected to the clean water and sanitation. A questionnaire was developed and presented to the concerned officer (Chief engineers, Managers, Sustainability In charges) in order to collect the necessary data. The data of 57 hotels were collected in a time span of 70 days. The questionnaire was designed after researching similar studies and literatures. To learn how much hotels think sustainable practices help in the pursuit for sustainable development objectives[37], a quantitative study based on a questionnaire was conducted. Statements on green hotel practices in the areas of water consumption[38], saving, and Recycling[39], adequate and equitable sanitation[40] and hygiene for all were derived from existing research[41]. Taking the 2030 Agenda for Sustainable Development, which was accepted by all United Nations Member States in 2015, the declarations addressing sustainable development objectives and accompanying targets were changed to correspond with the hotel business. Eight experts, four from the hotel industry and four from academia, reviewed the face validity of the questionnaire form. Some remarks were reworded and others were removed based on feedback from experts. Five hotel managers and five service engineers tested the second version of the questionnaire. The feedback received was carefully considered when crafted the final version of the questionnaire. The ideas made by the responders helped to increase the validity. Cronbach's alpha coefficients were determined to examine the reliability of each individual chapter. The good dependability of the research instrument was confirmed by a Cronbach's alpha of 0.733.

The questionnaire was broken up into two parts. The first part of the survey collected basic demographic information from respondents, while the second was designed to elicit opinions on how much respondents believed their hotel's operations helped achieve the SDG 6 under review via their dedication to green hotel practices.

The achievement of each objective may be measured by, its corresponding goals, and its corresponding practices, the Likert-type scale with five levels of intensity was used as - strongly disagree (1), disagree (2), neutral or somehow agree (3), agree (4), Strongly agree (5). Statistical Package for the Social Sciences (SPSS) 21.0 for Windows was used to process and analyze the information obtained from the people who were the focus of the investigation. We computed and examined the frequency counts, mean and standard deviation. An independent sample t test was performed to compare hotels rated three stars or below, three stars, four stars, and five stars to see whether there was a statistically significant difference in mean quality between the groups.

4. Results and Discussion

4.1 Analysis of Demographic data of Respondents

The results showed in **Table 1** indicating that 82.45% of the participants were men (n = 47), based on the data obtained from the researched respondents (n = 57). With regard to respondents' input for How long you been with your current Hospitality Industry/Hotel, participants with an average "3 to 6 years" (40.4 %) were the high category followed by "less than three years" (28.1 %). The annual turnover wise analysis reveals that 0 – 50 crore turnover hotel participants were 77.2% followed by 101 – 150 crores with 10.5 %. The analysis position of respondent in hotel reveals that 75.4% respondents were managers followed by 17.5% of service engineers. In terms of star categories 15 hotels were labeled as below three star (26.3%), 15 were three star (26.3%), 15 were four star

(26.3%), and 12 were five star (21.1%). In terms of number of employees working with particular hotel industry, participant with "below 50 employees" topped the table with 61.4% followed by "51 – 100" as 24.6%.

Table 1. Analysis of Demographic data of Respondents

Demographics	Category	Frequency	Percentage (%)
Gender of Respondents	Male	47	82.45 %
	Female	10	17.54 %
Number of employees	Below 50	35	61.4 %
	51 - 100	14	24.6 %
	101 – 500	08	14.0 %
Hotel Classifications	Below 3 Star	15	26.3 %
	Three-star	15	26.3 %
	Four-star	15	26.3 %
	Five-star	12	21.1 %
Experience in years	0 – 3 Years	08	14.0 %
	3 – 6 Years	15	26.3 %
	6 – 9 Years	28	49.1 %
	9 Years and above	06	10.6 %
Position in hotel	Manager	43	75.4 %
	Service Engineer	10	17.5 %
	Other Staff	4	7.1 %
Tenure of working with the same Hotel	0 – 3 Years	16	28.1 %
	3 – 6 Years	23	40.4 %
	6 – 9 Years	12	21.0 %
	9 Years and above	06	10.5 %
The geographical location of the parent hotel group	Indian parent group	56	98.2 %
	USA parent group	01	1.8 %
Hotels annual turnover	0 – 50 crores	44	77.2 %
	51 – 100 crores	07	12.3 %
	101 – 150 crores	06	10.5 %

Mostly respondents (98.2%) belong from the hotel, are part of Indian parent group of hotels. In terms of total years of experiences of respondents, the category 6 – 9 years dominated the segment with contribution of 49.1% followed by 3 – 6 years, 26.3%. So overall the respondents are well experienced in the hospitality industry with significant knowledge of hotel operations and processes.

4.2 Respondents Opinions on the SDGs Based on the Research

Respondents were asked questions designed to elicit their thoughts on how their hotel's efforts to embrace green hospitality practices aided in the pursuit of the SDG 6 under consideration. By use of a five-point Likert scale, respondents were prompted to rate their level of agreement or disagreement with statements pertaining to the variables under study. **Table 2** and **Table 3** shows data from the respondents who were interviewed during the survey.

Table 2 shows that most respondents across the four categories (below three-star, three-star, four-star and five-Star hotels) agreed that green hotel practices helped them get closer to achieving targets of Sustainable Development Goal 6. As indicated in the results of descriptive statistics the respondents from high star category (five-star hotels and four-star hotels) strongly agreed that their hotel prefers "contributing to achieving universal and equitable access to safe and affordable drinking water for all". The three-star (M = 3.67), and below than three-star (M = 3.6) hotels have shown less commitment towards this in comparison with five-star (M = 4) hotels and four-star (M = 3.93) hotels. In the same way the target "The Hotel is committed to access to adequate and equitable sanitation and hygiene for all" got less attention by the three-star (M = 3.53), and below than three-star (M = 3.13) hotels than five-star (M = 3.92) hotels and four-star (M = 3.71) hotels.

The targets "The hotel contributes to improving water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals and materials", "The hotel is committed to substantially increasing water-use efficiency across all sectors and ensuring sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity" and "The hotel is contributing towards implementing integrated water resources management at all levels, including through transboundary cooperation as appropriate" has shown same pattern as shown for first two targets from all star category hotels, that is less level of commitment has been found for below three star and three star category hotels where as four and five-star hotels have shown greater level of commitment towards achieving these targets. The target "The hotel is contributing towards protecting and restoring water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes" is showing different pattern than previous ones, as for below three-star (M = 2.17) and for three-star (M = 2.87) showing disagreement towards achieving of this target, and for four-star (M = 3) and for five-star (M = 3.73) it is showing the neutral attitude towards attainment of this goal.

While trying to address the attainment of SDG 6a though the analysis of data collected the variable "The hotel is committed to expand international cooperation and capacity-building support in water and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater

treatment, recycling and reuse technologies" shown the higher level of commitment from five-star hotels (M = 4.13) and four-star hotels (M = 4) in comparison with three-star hotels (M = 3.93) and below three star (M= 3.33) hotels. The variable "The Hotel Support and strengthen the participation of local communities in improving water and sanitation management" which was marked as statement of SDG 6b, shown the incremental pattern for high star category hotels in comparison with low star category hotels as shown by analysis of data. The mean value for this variable under five-star category (M = 4.08), four-star (M = 3.8), three-star (M= 3.73), and below three-star (M= 3.27) is reflecting the level of commitments for different star category hotels.

The results of descriptive data analysis showed that there were statistically significant differences between below three-star, three star, four-star, and five Star hotels in target "The hotel is contributing towards implementing integrated water resources management at all levels, including through transboundary cooperation as appropriate" (P value = 0.001), target "The hotel is contributing towards protecting and restoring water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes" (P value = 0), target "The hotel is committed to expand international cooperation and capacity-building support in water and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies" (P value = 0.001), and target "The Hotel Support and strengthen the participation of local communities in improving water and sanitation management" (P value = 0.026). At the same time there were no statistically significant differences between them in targets "The hotel is contributing to achieving universal and equitable access to safe and affordable drinking water for all", "The Hotel is committed to access to adequate and equitable sanitation and hygiene for all", "The hotel contributes to improving water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals and materials", and "The hotel is committed to substantially increasing water-use efficiency across all sectors and ensuring sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity".

Table 2. Descriptive statistics of the opinion of the surveyed population regarding SDG 6

Goal 6: Clean Water and Sanitation									
Targets of SDG 6	**Below Three Star**		**Three Star**		**Four Star**		**Five Star**		**P Value**
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	
"The hotel is contributing to achieving universal and equitable access to safe and affordable drinking water for all"	3.6	0.828	3.67	0.976	3.93	0.704	4	0.426	0.461
"The Hotel is committed to access to adequate and equitable sanitation and hygiene for all"	3.13	0.516	3.53	0.99	3.71	0.915	3.92	0.669	0.094
"The hotel contributes to improving water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals and materials"	3.13	0.756	3.67	0.99	4.13	0.961	4.17	0.718	0.975
"The hotel is committed to substantially increasing water-use efficiency across all sectors and ensuring sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity"	3.47	1.407	3.97	0.535	4	0.676	4.2	0.426	0.471
"The hotel is contributing towards implementing integrated water resources management at all levels, including through transboundary cooperation as appropriate"	2.93	0.799	3.67	0.617	3.73	0.799	4	0	0.001 *
"The hotel is contributing towards protecting and restoring water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes"	2.17	0.577	2.87	1.06	3	0.926	3.73	0.594	0*

"The hotel is committed to expand international cooperation and capacity-building support in water and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies."	3.33	0.724	3.93	0.458	4	0	4.13	0.516	0.001 *
"The Hotel Support and strengthen the participation of local communities in improving water and sanitation management"	3.27	0.799	3.73	0.676	3.8	0.799	4.08	0.289	0.026 *

* p-value = Significant difference at level 0.05, SD = Standard Deviation

Table 3 is showing descriptive results of achieving targets of SDG 6 by implementing sustainable initiatives in different star category of hotels. As indicated in the results of descriptive statistics shown in **Table 3** the respondents specially from high star category hotels strongly agreed that their hotel prefers towel and linen reuse practices and have techniques/devices which is conserving water, and as a result of which water consumption has decreased over the past years. The three-star (M = 3.67) and below than three-star (M = 3.6) hotels have shown less commitment towards this than four-star hotels (M = 3.93), and Five-star hotels (M = 4).

Table 3. Descriptive Statistics Results of Achieving Targets of SDG 6 by Implementing Sustainable Initiatives

Achieving Targets of SDG 6 by Implementing Sustainable Initiatives									
Sustainability Initiatives of Hotels approaching targets of SDG 6	**Below Three Star**		**Three Star**		**Four Star**		**Five Star**		**P Value**
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	
The hotel prefers towel and linen reuse practices.	3.87	1.246	4	1.32	4.2	1.121	4.4	0	0.63
The Hotel is having a water conservation program.	2.83	0.64	3.2	0.834	4.47	0.862	4.53	0.718	0.99
The hotel has devices with water-saving techniques.	3.2	1.06	3.33	1.082	3.47	0.724	4	0.426	0.104
Daily water consumption has decreased in past years.	3.07	0.884	3.53	0.834	3	0.926	3	0.739	0.243
Hotel's recycled water is used for secondary purposes.	2.47	0.99	2.67	1.175	3.13	1.06	3.92	0.669	0.002*
The hotel has rainwater conservation strategies.	3.39	1.033	3.67	0.976	3.81	1.056	4.08	0.289	0.572
The hotel is having plants that need less water.	2.58	0.669	2.47	0.743	2.47	0.64	3.4	0.986	0.018*
The hotel is having Water-saving systems for garden irrigation	3.27	0.884	3.47	0.834	3.4	1.056	3.92	0.669	0.227
The hotel is having awareness programs for water conservation.	1.8	1.082	2.8	1.424	2.2	1.265	2.17	0.718	0.105
Hotel prefers to purchase devices with water-saving techniques	3.33	0.724	3.53	0.834	3.53	1.06	3.58	0.515	0.852
Hotel prefers monitoring of water consumption	3	0.756	3.13	0.99	3.07	0.961	3.17	0.718	0.975

* p-value = Significant difference at level 0.05, SD = Standard Deviation

In the same way "hotel has devices with water-saving techniques", and "using recycled water for secondary purposes" are broadly reported in high star category hotels, while less star category hotels have shown less commitment towards it. For example, the hotel has devices with water-saving techniques for below three-star hotel (M = 3.2), for three-star hotels (M = 3.33), for four-star hotels (M = 3.47), for Five-star hotels (M = 4) shows the increased level of commitment for such sustainable practices for high star category hotels. In the same way using recycled water for secondary purposes in hotels for below three-star hotel (M = 2.47), for three-star hotels (M = 2.67), for four-star hotels (M = 3.13), for Five-star hotels (M = 3.92) shows the same incremental pattern towards these green practices with high star rating hotels, but the hotels having three of below star ratings are not contributing significantly towards this sustainable initiative. The daily water consumption for below three-

star hotel (M = 3.07), for three-star hotels (M = 3.53), for four-star hotels (M = 3), for Five-star hotels (M = 3) shows higher rate of water consumption for high star category hotel.

Five-star hotels (M = 4.08), for Four-star hotels (M = 3.81) shows the increased level of awareness for initiative "The hotel has rainwater conservation strategies" by installing rain water conservation programs, then below three-star hotel (M = 3.39), and three-star hotels (M = 3.67). The descriptive statistics results of the responses towards initiative "The hotel is having Water-saving systems for garden irrigation" have shown again incremental level of commitment for high star category hotels in comparison with low star category hotels.

Except some of the five-star hotels (M = 3.4) almost all hotels of all categories mark their disagreement for green practice "The hotel is having plants that need less water". Almost all respondents from all star category of hotels shown their disagreement towards the sustainable act of "The hotel is having awareness programs for water conservation". The initiatives "Hotel prefers to purchase devices with water-saving techniques" and "Hotel prefers monitoring of water consumption" showing almost neutral attitude for all respondents from all star category hotel. Results shows significant attention of four-star and five-star hotels towards this practice in comparison with three and less star hotels.

Data showed that there were statistically significant differences between below three-star, three star, four-star, and five Star hotels in target "Hotel's recycled water is used for secondary purposes" (P value = 0.002), and target "The hotel is having plants that need less water." (P value =0.018). At the same time there were no statistically significant differences between them in targets "The hotel prefers towel and linen reuse practices", "The Hotel is not having a water conservation program", "The hotel has devices with water-saving techniques", "Daily water consumption has decreased in past years", "The hotel has rainwater conservation strategies", "The hotel is having Water-saving systems for garden irrigation", "The hotel is having awareness programs for water conservation", "Hotel prefers to purchase devices with water-saving techniques", and "Hotel prefers monitoring of water consumption".

The findings underscore the hospitality industry's evolving commitment to SDG 6 through a range of sustainable practices. From technological advancements to community engagement, hotels are playing a pivotal role in water conservation efforts. Hotels not only contribute to environmental preservation but also showcase their dedication to responsible business practices.

5. Conclusions

The purpose of this research is to learn how green hotel practises contribute to the attainment of environmental SDGs, as seen by representatives from environmental management. Sustainable Development Goal 6 and its attainment have been analyzed; they are the goals that are most concerned with environmental preservation. In terms of SDG 6, the surveyed population felt that their hotels were more eager to help achieve the goals and objectives by adopting environmentally friendly policies and procedures. Safe and inexpensive water requires a system that hygienically removes wastes from human touch and improves water quality, as well as equal sanitation and hygiene to everyone. All of the hotels that participated in the survey were dedicated to doing their part to protect the environment by, among other things, cutting down on pollution, ending dumping (the improper disposal of wastes), cutting back on the use of potentially harmful chemicals, and improving wastewater recycling and reuse. These observations are in line with, who warned that hotels may run out of water if it wasn't handled properly. Issues with water quality or availability might disrupt hotel operations. Kitchen and laundry wastewater should be recycled after being properly purified, It was also stated in the study[42] and the study conducted by Parece, 2016 that when the quality of the water being used isn't critical for human consumption, a system of alternate recycled water usage may help preserve certain potable water supplies. Cleaning surfaces outside, watering plants, and flushing toilets are just some of the many uses for purified grey water. Studies highlighted the use of water efficient devices in household and washrooms with linen reuse program[43].

Clean water and sanitation (SDG 6), is the environmentally Sustainable Development Goal (SDG) that is examined in this study. There was a total of 57 respondents included in the research, 15 from hotels rated less than three stars, 15 from hotels rated three stars, 15 from hotels rated four stars, and 12 from hotels rated five stars. To respondents' perspectives on green hotel practices' impact on the achievement of SDGs relating to the natural world, was recorded using designing and distributing a self-administered survey. According to the results of this survey, hotel managers and participants alike believe their establishments are making strides in achieving the Sustainable Development Goals (SDGs) connected to the environment, especially water conservation, proper sanitation and hygiene. Overall, respondents from hotels with five Stars reported a greater level of implementation of all practices and objectives related to the sustainable development goals assessed than those from hotels with four and less Stars. In addition, the results show that there were statistically significant disparities between different Star hotels rated below three-star, three star, four and five stars on SDG studied.

In order to conserve water in the areas such as showers, baths, and swimming pools, as well as for washing linens and towels, hotels can install low-flow showerheads, which use less water per minute than traditional showerheads, and low-flow toilets, which use less water per flush. Hotels can also encourage guests to conserve

water by providing information on the importance of water conservation and by offering incentives for guests who choose to reuse towels and linens. In order to conserve water in the maintenance of landscaping and gardens, hotels can implement water-efficient landscaping practices such as using drought-resistant plants, drip irrigation systems, and mulch to retain moisture in the soil. In addition, hotels can capture and reuse greywater, which is water that has been used for tasks such as washing dishes or clothes, for irrigation purposes. Water conservation can also be achieved through the use of water-efficient appliances and equipment in hotels. Many hotels have switched to front-loading washing machines[44], or similar techniques which use less water and energy than traditional top-loading machines, and have installed low-flow dishwashers and ice makers. In addition, hotels can install water meters to track and monitor water usage, which can help identify areas for water conservation and identify any potential leaks.

The adoption of water conservation practices is important for the hotel industry in order to reduce its environmental impact and operational costs. By implementing a combination of low-flow fixtures, water-efficient landscaping, water recycling and reuse, and energy conservation measures, hotels can significantly reduce their water and energy usage and contribute to a more sustainable future[43].

The adoption of water conservation practices can also bring financial benefits for hotels. In addition to reducing water and energy costs, hotels that adopt sustainable practices may also attract more environmentally conscious guests and be able to charge a premium for their sustainability efforts. In addition, hotels that demonstrate a commitment to sustainability may also be able to take advantage of government incentives and grants for water and energy conservation. Marine tourism sector's sustainability issues are also a kind of evolving dimension, in which hotels link with marine life or coastal areas are considered[45].

So, the hotel industry plays a significant role in water consumption and wastewater generation, and the adoption of water conservation practices is essential in order to reduce the industry's environmental impact and operating costs. By implementing low-flow fixtures, water-efficient landscaping, water recycling and reuse, and energy conservation measures, hotels can significantly reduce their water and energy usage and contribute to a more sustainable future.

This study is first of its kind in the region selected for study, and the participants from all the star category hotels are contributed in the study, giving this study a generalized and broad scope. Future studies can increase the sample size and cover advanced methods implemented by hotels towards attainment of SDG6.

Availability of data and materials

Not applicable

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