

Sustainability Through Eco-Innovations: A Study on Assessment of Eco-Innovative Practices of Green Star-Rated Hotels in Himachal Pradesh

Ms. Heena Devi¹, Dr. Puneet Bhushan²

¹Research Scholar, Himachal Pradesh University Business School, Summerhill, Shimla, Himachal Pradesh – 171005

²Assistant Professor, Himachal Pradesh University Business School, Summerhill, Shimla, Himachal Pradesh – 171005

ABSTRACT: Hospitality is an integral part of human civilization since decades which have evolved over time from ancient time inns to the modern world's star rated hotels worldwide. With this evolution, the growing industrialisation as well as globalisation has paced the anthropogenic movement worldwide. People move for work, business, tourism, education, leisure, healthcare and many other purposes from their native places who then take the temporary accommodations in various types of resting places, commonly known as hotels. Hospitality not only is known for shelter but now the services provided by them are widened leading to more utilization of the natural resources as well as waste generation. In this light, this paper has discussed the ways popularly known as "Eco-innovations", through which sustainability can be achieved in this sector. The green star rated hotels of Himachal Pradesh following such practices were chosen under sampling with 254 respondents across the state who were surveyed with a structured questionnaire. Finally, the results are computed and discussed in the later part.

KEYWORDS: Sustainability, Hospitality, Innovations, Tourism, Green Practices.

INTRODUCTION

The hospitality industry is one of the fastest-growing sectors contributing towards the global economy. With this growth, the industry is also utilizing a significant amount of resources worldwide, particularly the consumption of energy and water, thereby, pressurizing the need to integrate the sustainability aspect in its operations and management (Sustainable Travel International, 2024). In this context, eco-innovative practices have emerged as a strategic approach to minimize environmental degradation while maintaining service quality and operational efficiency. Where, eco-innovation is the creation and use of novel concepts, methods and technology that lessen environmental damage and encourage resource efficiency. The "Organisation for Economic Co-operation and Development, OECD" has defined eco-innovation as "The creation of new or significantly improved, products (goods and services), processes, marketing methods, organisational structures and institutional arrangements which with or without intent lead to environmental improvements compared to relevant alternatives" (OECD, 2008). Even the terms "green innovation, environmental innovation, eco-innovation and environmental sustainability innovations" have almost the same content (Gurlek and Koseoglu, 2021). In the hospitality sector, this includes initiatives such as "energy-efficient systems, water conservation technologies, waste management strategies and the adoption of renewable energy sources". These practices not only contribute to environmental protection but also enhance cost efficiency and brand image, thereby offering a competitive advantage to hotels. The adoption of ecoinnovative practices will help hotels to get aligned with global sustainability goals with simultaneous meeting of the expectations of environmentally aware travellers Remenyik et al. (2025). In ecologically sensitive areas like Himachal Pradesh, where tourism growth must be balanced with the preservation of indigenous ecosystems and natural resources, this change is especially pertinent and for the hospitality sector to be sustainable over the long run, eco-innovative techniques must be adopted and evaluated in the hotels.

LITERATURE REVIEW

Eco-innovations can be done through different ways, processes and products. While probing literature, it has been explored that the eco-innovation practices can be broadly divided under four categories for the hospitality industry, i.e. Products, Processes, Services and Organizational Practices. The eco-innovative ways and products can be further classified under different categories as per the requirement of the study. Solar panels for heating water, using LED and motion sensors in lighting, energy production

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from waste, using low temperature systems in the laundry heat recovery systems, wind turbines are some of the ways of eco-innovations in energy management (Aboelmaged, 2018; Menezes and da Cunha, 2016). Real time monitoring with dashboarding is in use for automated energy management, weather-stripping and LED lighting replacements, room occupancy sensors are some other technologies which drastically lowers the hotel running expenses. The energy management system installed also monitors energy use and pinpoints possibilities for energy conservation (Goulden, 2025). The mini-fridges and coffee makers can be placed at common facilities in place of guest room for additional energy saving. Energy-efficient appliances and building retrofits are also some of the ways (Sharma, 2023). Geothermal, biofuel and hydrogen fuel cell are the technologies in addition to on-site solar/wind power which hoteliers are adopting. Even a hotel chain in Japan powers a hydrogen fuel cell generator that generated 450,000 kWh of electricity and lowered CO₂ emissions by 200,000 kg per year by utilizing plastic garbage (Goulden, 2025). Under water management, low-flow faucets, toilets, showerheads, smart irrigation controllers and continuous-batch washing machines are all assisting hotels in conserving water. An Indian chain hotel's rainwater collection system, which consists of three sizable reservoirs, allows the opulent establishment to be maintained year-round by up to 18 million water collected in litres during the monsoon season (Goulden, 2025). Some simplest changes include lowering shower pressure, adding leak detection, washing with less water and encouraging visitors to reuse linens and towels. Other environmentally friendly approaches to water management include dual flush toilets, sewage treatment plants, reusing treated water for irrigation and cooling, and tap sensors (Aboelmaged, 2018; Menezes and da Cunha, 2016). For the management of waste, in addition to recycling, on-site or off-site composting, using biodigesters to help process food waste, donating leftover edible food and utilising waste data to inform menus and portion sizes, phasing out single-use plastics are some of the innovative ways. A Las Vegas resort recently used landfills to recycle 2,63,000 tonnes of food waste, turning it into biofuel and animal feed (Goulden, 2025). Water extraction, biodiversity loss and deforestation are all directly related to food production, making the food service sector one of the most important sectors for waste reduction and efficiency enhancement. Food waste is a common problem in the Asian hospitality business as well. Hoteliers may contribute to good changes by increasing the variety of plant-based items on menus, sourcing locally, producing food on-site and decreasing plate waste (Sharma, 2023). The various waste reduction techniques used by hotels include garbage separation, waste management, recycling of paper, cardboard, aluminium and glass, anaerobic digestion to convert organic waste into energy, recovery of used oil and a system that eliminates food waste (Aboelmaged, 2018; Menezes and da Cunha, 2016). Many hotel operators have switched to "nontoxic, eco-friendly, biodegradable chemicals" in housekeeping and other departments. A hotel in Belgium replaced all of its cleaning supplies with environmentally friendly alternatives by employing "C2C certified goods", which have a well-known ecolabel attesting to their use of recyclable packaging, renewable energy and raw materials. This reduces CO₂ emissions, minimises the usage of crude oil, and prevents microplastic pollution. Furthermore, the packaging for these goods can be recycled for a very long time (Goulden, 2025). Focusing on "local supplier partnerships, onsite gardens and seasonal ingredients" can lower emissions and simplify the supply chain. In the UK, a hotel generates a significant amount of its own electricity using a combined heat and power unit. Its wooden furniture was made in the UK using "trees that had been cut down by storms or arborists" in order to reduce waste (Goulden, 2025). The eco-learning strategies, eco-itineraries, eco-training programs and eco-product designs are also being adopted by the hoteliers, worldwide. These eco-organisational innovations are associated with administrative efforts to modernise organisational practices, procedures, methods or systems (Dankiewicz et al., 2020; Mishchuk et al., 2022; Tager et al., 2024). Digital innovations are also paving the hotel industry vastly. Two important advances are contactless check-ins and keyless room entrance. Among other things, guests can utilise web apps to order room service, make spa appointments and ask for extra towels. By utilising mobile technologies, such as apps for immediate monitoring and reporting, hotel staff can also involve visitors in sustainability activities. The pandemic has significantly quickened the pace of the digital revolution, which has been disrupting the sector for some time (Sharma, 2023). IoT technologies enhance operations and promote sustainability by enabling precise inventory control. IoT-powered sensors can notify staff members of low inventory levels or approaching expiration dates, which helps save costs and superfluous inventory while also lessening the hotel's environmental impact. They include examples such as smart locks that provide occupancy data and facilitate the efficient scheduling of maintenance and room services. Modern technology could enhance visitor experiences, expedite processes and promote sustainability (Aromataris et al., 2015; Drexler and Beckman Lapre, 2019; Gajic et al., 2024; Henri and Journeault, 2009). AI technologies like chatbots, booking engines, and service robots are being used by the hotel industry more and more (Al Yami and Ajmal, 2019; Gajic et al., 2024; Huang et al., 2022). Hotel brands are starting to recognise the importance of protecting and enhancing biodiversity. Many hotels build marine protected zones, collaborate with local conservation organisations, and educate guests about the fragile ecosystems on their property. A global luxury firm has a program that provides funding for projects like sea turtle conservation, coral reef restoration and marine protected area management. They also educates guests about marine conservation through initiatives like educational lectures and guided snorkelling excursions (Goulden, 2025). Additional resources

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include applying sustainable enterprise reporting, certifying ecologically sustainable buildings and redesigning buildings with natural materials (Aboelmaged, 2018; Menezes and da Cunha, 2016). LEED, a globally recognised green building certification, evaluates the environmental efficiency of buildings, including hotels. The U.S. Green Building Council (USGBC) is in charge of LEED, which places an emphasis on sustainable design, construction and operations (Tarkett, 2024; Velaoras et al., 2025). Eco-innovations not only reduces environmental issues but also improves expenses, sales of unique items, profit margins, brand value and the hotel's reputation in the community.

Need of the study

As per the literature review, no such study has been found in context with Himachal Pradesh and further, according to the popular website Bookings.com, Himachal Pradesh has been found to be India's one of the most popular place to visit. Its popular tourism attracts visitors from various places of India as well as world. According to the Himachal Pradesh Tourism report, 1,80,41,929 domestic tourists and 82,765 foreign tourists visited Himachal Pradesh in 2024, which is 13.24% more as of 2023. Therefore, it becomes necessary to probe out the ways through which sustainability of the state can be maintained which will help in regulating the pressure on natural resources of mountains.

Objectives

- To probe out the types of Eco-innovative practices being followed by the green star-rated hotels of the Himachal Pradesh.
- To assess the differences in the type of Eco-innovation practices being adopted in the green star-rated hotels of Himachal Pradesh on the basis of green star rating, chain affiliation and ownership.

Methodology and Sampling

Descriptive and quantitative methodology has been followed in this study. The Himachal Pradesh State Pollution Control Board (HPSPCB) has initiated a scheme called "Him-GRIH" under which various sized hotels are rated for the such practices being followed. This study has undertaken the large hotels under sampling from the four popular places with high tourist footfall and large number of hotels which includes Dharamshala, Shimla, Kasauli and Manali. Large hotels are considered as they are supposed to utilize more energy, water and high waste generation. In total, 127 hotels were visited covering about eighty percent from each star category and 02 respondents from each hotel were surveyed with close responsibility for such practices of the hotel. Therefore, the total sample size is of 254 respondents.

Data collection and analysis

The respondents were asked to fill the 38 items placed on 5-point Likert scale under four different categories viz. services, products, processes and organisational eco-innovation practices. The Eco-innovative practices which were filled by the respondents were ranging from not implemented to fully implemented. The collected data was then transcribed to the excel sheet and coded for further analysis. The SPSS software was utilized to check the reliability and descriptive information. Following are the detailed discussion of the data analysed for different constructs under the four categories of ecoinnovation practices derived from literature. The data presents mean scores of "Eco-Innovation Practices" in hotels across the four different dimensions and compares them across green star ratings (3, 4 and 5 Green Stars), Chain Affiliation (Chain vs. Non-chain) and Ownership (Private vs. Public). In total, 38 items divided under the four dimensions are discussed ahead.

1. Eco-Innovative practices directly related to the services being provided at the customer's end

Table 1 represents the mean scores of eco-innovative service practices across 3, 4 and 5 green star- rated hotels. Eleven items were considered for eco-innovations under services, being provided by the green star hotels in Himachal Pradesh. Upon analysing for reliability using SPSS, the Cronbach's Alpha came out to be 0.855, therefore validating the reliability of the construct. The items are ranked from highest adoption to lowest one as presented in table given below.

Table 1. Eco-Innovative Services (Mean Score)				
Item	Green Star Rating			
	3 Star	4 Star	5 Star	Total
Efficiency in water usage (for e.g. low-flow taps/showers, dual-flush toilets, faucets etc.)	3.76	4.75	4.82	4.28
Increase in the usage of "natural light and heat" (for example, solar panels, natural light, solar heating devices etc.)	3.71	4.40	4.84	4.21
Using energy-saving light bulbs in guest rooms	3.02	4.40	4.98	3.91

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Energy saver control system in guest rooms	3.00	4.25	5.00	3.89
Efficiency in electricity usage (for e.g. sources of lower electrical consumption, sensors for light, thermostats etc.)	2.79	4.25	4.93	3.76
Preserving the natural environment through modifying or creating common spaces	2.97	3.95	4.57	3.68
Using organic products in courts, halls and swimming pools etc. (e.g., organic soaps and shampoos, refillable dispensers, recycled paper products etc.)	2.05	3.65	4.50	3.15
Voluntary linen/towel reuse program	1.81	2.40	4.52	2.84
Local cuisine offered to the guests	2.63	2.65	2.98	2.76
Sensor activated lighting in restrooms, lobby and other locations requiring intermittent lighting	1.60	2.80	4.18	2.69
In-room recycling containers (e.g. for newspaper, plastic bottles etc.)	1.62	2.15	3.82	2.46
Total Mean	2.63	3.60	4.46	3.42
N=254 Cronbach's Alpha= .855 (Items=11)				

Among all practices, improving water-use efficiency received the highest overall mean, indicating that measures such as low-flow taps, dual-flush toilets and water-efficient faucets are widely adopted. This was followed by increasing the use of natural light and heat, using energy-saving light bulbs in guest rooms and systems for energy saving in guest rooms. These results demonstrate that resource and energy conservation measures are well established, particularly in hotels with higher green ratings. The practice of improving electricity-use efficiency also received a relatively high overall mean, reflecting the adoption of energy-efficient technologies such as motion sensors, thermostats and low-energy lighting systems. Likewise, creating or modifying common spaces while preserving the natural environment recorded a moderate overall mean suggesting increasing attention to environmentally sensitive infrastructure. In contrast, several guest-oriented environmental initiatives received comparatively lower mean scores. Voluntary linen/towel reuse programs, using local cuisine in food and beverage services, sensor-activated lighting in intermittent-use areas and in-room recycling containers were less widely implemented, particularly among the 3 and 4 green star hotels. These findings indicate that hotels with higher green star ratings are significantly more committed towards implementing advanced eco-innovative service practices. Overall, the results suggest that energy and water conservation initiatives are the most widely adopted ecoinnovative services, whereas guest participation programs remain less extensively implemented, especially in lower-rated green hotels. Further, table 2 represents the mean scores of eco-innovative service practices according to chain affiliation (chain-affiliated vs. non-chain hotels) and ownership type (private vs. public hotels).

Table 2. Eco-Innovative Services (Mean Score)						
Item	Chain Affiliation			Ownership		
	Yes	No	Total	Private	Public	Total
Efficiency in water usage (for e.g. low-flow taps/showers, dual-flush toilets, faucets etc.)	4.55	4.08	4.28	4.29	4.14	4.28
Increase in the usage of "natural light and heat" (for example, solar panels, natural light, solar heating devices etc.)	4.29	4.15	4.21	4.28	3.00	4.21
Using energy-saving light bulbs in guest rooms	4.47	3.49	3.91	3.93	3.57	3.91
Energy saver control system in guest rooms	4.33	3.56	3.89	3.97	2.43	3.89
Efficiency in electricity usage (for e.g. sources of lower electrical consumption, sensors for light, thermostats etc.)	4.40	3.28	3.76	3.78	3.43	3.76
Preserving the natural environment through modifying or creating common spaces	4.22	3.26	3.68	3.70	3.29	3.68
Using organic products in courts, halls and swimming pools etc. (e.g., organic soaps and shampoos, refillable dispensers, recycled paper products etc.)	3.93	2.56	3.15	3.20	2.29	3.15

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Voluntary linen/towel reuse program	3.87	2.06	2.84	2.92	1.57	2.84
Local cuisine offered to the guests	2.80	2.72	2.76	2.75	2.86	2.76
Sensor activated lighting in restrooms, lobby and other locations requiring intermittent lighting	3.33	2.19	2.69	2.76	1.43	2.69
In-room recycling containers (e.g. for newspaper, plastic bottles etc.)	3.15	1.94	2.46	2.52	1.57	2.46
Total Mean	3.94	3.02	3.42	3.46	2.68	3.42
N=254 Cronbach's Alpha= .855 (Items=11)						

The results indicate that chain-affiliated hotels consistently reported higher mean scores than non-chain hotels across all eco-innovative service practices, suggesting that chain hotels are more proactive in implementing environmental sustainability initiatives. This may be attributed to standardized environmental policies, greater financial resources, stronger corporate sustainability commitments and access to advanced green technologies. These findings indicate that chain hotels place considerable emphasis on resource conservation and energy-efficient operations. In contrast, non-chain hotels exhibited comparatively lower mean scores across most practices. Although, in non-chain hotels, increase in the use of natural light and heat, and water-use efficiency remained the highest-rated initiatives, considerably lower scores were observed for practices such as in-room recycling containers, use of local cuisines offered to the guests, voluntary linen/towel reuse programs and sensor-activated lightings. These results suggest that non-chain hotels have adopted fewer advanced eco-innovative service measures. Further, with respect to ownership, private hotels consistently outperformed public hotels on nearly all eco-innovative service practices. Private hotels recorded the highest mean scores for water-use efficiency, increasing natural light and heat, energy saver control systems and energy-saving light bulbs. This indicates that privately owned hotels are generally more active in adopting sustainability-oriented technologies and operational practices. Conversely, public hotels reported lower levels of implementation for most eco-innovative practices. The largest differences were observed for energy saver control systems (Private: M = 3.97; Public: M = 2.43), voluntary linen/towel reuse programs (Private: M = 2.92; Public: M = 1.57), sensor-activated lighting (Private: M = 2.76; Public: M = 1.43) and in-room recycling containers (Private: M = 2.52; Public: M = 1.57). They outperformed the private hotels in offering local cuisines to the guests. These findings suggest that public hotels may face greater financial, operational or managerial constraints in implementing eco-innovative service initiatives.

2. Eco-Innovative practices related to products

Table 3 represents the mean scores of eco-innovative product related practices across 3, 4 and 5 green star rated hotels. Seven items were considered for eco-innovations under products being adopted by the green star hotels in Himachal Pradesh. Upon analysing for reliability using SPSS, the Cronbach's Alpha came out to be 0.851, therefore validating the reliability of the construct. The items are ranked from highest adoption to lowest one as presented in table given below.

Table 3. Eco-Innovative Products (Mean Score)				
Item	Green Star Rating			
	3 Star	4 Star	5 Star	Total
Purchasing energy-saving materials	3.30	3.70	4.80	3.88
Purchasing products that are designed to be reusable	3.00	3.95	4.98	3.83
Purchasing hotel products and materials that aim to reduce environmental impacts	2.70	4.00	4.86	3.65
The use of sustainable materials has been incorporated in the hotel's construction and continues to be applied during its ongoing modification processes.	2.94	2.95	4.05	3.32
Green product packaging is implemented as much as possible	2.38	3.35	4.48	3.26
The adoption of eco-labelled products wherever possible is implemented	2.25	3.25	4.61	3.23
Purchasing less hazardous cleaning supplies	2.21	3.05	4.45	3.12
Total Mean	2.68	3.46	4.60	3.47
N=254 Cronbach's Alpha= .851 (Items=07)				

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The findings are revealing that the eco-innovative product procurement and practices are increasing as the green star rating is increasing, where, 5 green star hotels are at the top ($M=4.60$) followed by the 4 green star ($M=3.46$) and the 3 green star hotels are remarkably ranking the last ($M=2.68$). Among the items mentioned in the table above, the green star hotels are practicing the procurement of energy-saving materials at top which is followed by the reusable product purchasing, and products and materials that aim to reduce environmental impacts. While the other practices like use of sustainable building material in construction and ongoing modification is somewhat moderate, especially in the 3 and 4 green star hotels, indicating that it may require substantial financial resources and long-term planning which the lower rated hotels might not be able to implement. Similarly, the green product packaging, eco-labelled product adoption and the procurement of less hazardous cleaning supplies are less likely adopted by the lower rated hotels, especially the 3 green star ones. Clearly, within green star rating, the 5 green star are highly adopting the eco-innovation practices at the product level for all of the items mentioned in the table above, followed by the 4 star and lastly the 3 green star hotels are either moderately following a few and less likely the other ones. Further, table 4 represents the mean scores of eco-innovative product practices according to chain affiliation (chain-affiliated vs. non-chain hotels) and ownership type (private vs. public hotels).

Table 4. Eco-Innovative Products (Mean Score)						
Item	Chain Affiliation			Ownership		
	Yes	No	Total	Private	Public	Total
Purchasing energy-saving materials	4.44	3.46	3.88	3.89	3.71	3.88
Purchasing products that are designed to be reusable	4.31	3.47	3.83	3.88	3.14	3.83
Purchasing hotel products and materials that aim to reduce environmental impacts	4.35	3.13	3.65	3.67	3.43	3.65
The use of sustainable materials has been incorporated in the hotel's construction and continues to be applied during its ongoing modification processes.	3.71	3.03	3.32	3.29	3.86	3.32
Green product packaging is implemented as much as possible	3.85	2.81	3.26	3.28	3.00	3.26
The adoption of eco-labelled products wherever possible is implemented	3.76	2.82	3.23	3.25	2.86	3.23
Purchasing less hazardous cleaning supplies	3.71	2.67	3.12	3.11	3.29	3.12
Total Mean	4.01	3.05	3.47	3.48	3.32	3.47
N=254 Cronbach's Alpha= .851 (Items=07)						

From the table above, it can be seen that the chain hotels are at priority following the eco-innovative product practices ($M=4.01$) as compared to the non-chain hotels ($M=3.05$). This may be due to the more standardization and resource availability and commitment among the chain hotels. In these hotels, purchasing energy-saving materials recorded the highest mean score, followed by purchasing products designed to be reusable and purchasing hotel products and materials that reduce environmental impacts. Similarly, chain hotels reported relatively high adoption of eco-labelled products, less hazardous cleaning supplies, use of sustainable materials in construction and renovation and eco-labelled product procurement as compared to the non-chain hotels. These findings indicate that chain-affiliated hotels adopt a broad range of environmentally responsible purchasing practices. In contrast, non-chain hotels recorded lower mean scores for all ecoinnovative product practices, suggesting comparatively limited implementation of sustainable procurement initiatives. The results for ownership indicates that private hotels exhibit a slightly higher level of adoption of eco-innovative product practices ($M = 3.48$) than public hotels ($M = 3.32$). Private hotels reported higher mean scores for purchasing energysaving materials, reusable products, environmentally friendly hotel products and materials, green product packaging and eco-labelled products. Conversely, public hotels showed higher adoption of sustainable materials in construction and modification processes and the use of less hazardous cleaning supplies. Overall, the findings suggest a moderate implementation of eco-innovative product practices across both ownership categories, with private hotels demonstrating a comparatively stronger commitment to environmentally responsible purchasing and product management practices.

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3. Eco-Innovative practices related to processes

Table 5 represents the mean scores of eco-innovative process practices across 3, 4 and 5 green star rated hotels. Fourteen items were considered for eco-innovations under processes being adopted by the green star hotels in Himachal Pradesh. Upon analysing for reliability using SPSS, the Cronbach's Alpha came out to be 0.880, therefore validating the reliability of the construct. The items are ranked from highest adoption to lowest one as presented in table given below.

Table 5. Eco-Innovative Processes (Mean Score)				
Item	Green Star Rating			
	3 Star	4 Star	5 Star	Total
On site waste water treatment	2.90	4.10	4.86	3.77
Introducing or enhancing methods and tools for water reusage	3.02	3.60	4.45	3.61
Rainwater harvesting/snow runoff capture and reuse	2.75	4.00	4.64	3.60
Paying attention to recyclable materials	2.68	3.45	4.93	3.58
Solid waste from both guest and non-guest areas is properly separated, classified and stored	2.70	3.50	4.77	3.54
Use of recycled water for water related utilization	2.90	3.60	4.18	3.46
Separate collection of hazardous waste (Expired or spoiled chemicals, broken bulbs etc.)	2.56	3.30	4.75	3.43
Keeping knowledge of the existence of local recycling firms and their operations	2.43	3.85	4.57	3.39
Carpool/Shuttle facility provided to customers	2.44	3.55	4.50	3.33
Recovery of used cooking oil	2.38	2.80	4.84	3.30
Solar, wind or other renewable sources of energy is implemented for meeting the energy requirements of the hotel	3.35	3.35	3.20	3.30
Recovery and Composting of food waste	2.13	3.25	4.23	3.03
Employee Carpool	1.95	3.15	4.02	2.86
Hotel's transportation fleet utilizing hybrid vehicles or electric vehicles	1.62	2.17	3.41	2.33
Total Mean	2.55	3.40	4.38	3.32
N=254 Cronbach's Alpha= .880 (Items=14)				

Overall, the results reflect a positive association between green star rating and the implementation of eco-innovative processes. 5-green star rated hotels consistently reported the highest mean scores for almost all process-related practices ($M = 4.38$), followed by 4-green star hotels ($M = 3.40$), while 3-green star hotels generally recorded the lowest scores ($M = 2.55$). This suggests that hotels with higher levels of green certification have more comprehensive environmental management systems and operational sustainability practices. Among the listed process related eco-innovative practices, the green star hotels are prioritizing maximum of the water conservation practices like on site waste water treatment, introduction or improvement of forms and devices for the reuse of water, rainwater harvesting/snow runoff capture and reuse. Secondly, these hotels are also prioritizing the waste management processes like paying attention to recyclable materials, solid waste from both guest and non-guest areas is properly separated, classified and stored. While, the hotels are less likely adopting the novel practices of waste management like, recovery of used cooking oil, keeping knowledge of the existence of local recycling firms and their operations, recovery and composting of food waste etc. On the other hand, the energy management practices like solar or other renewable energy utilization, hybrid cars, employee carpool etc. are less likely adopted by the green star hotels in Himachal Pradesh. Further, table 6 represents the mean scores of ecoinnovative process practices according to chain affiliation (chain-affiliated vs. non-chain hotels) and ownership type (private vs. public hotels).

Table 6. Eco-Innovative Processes (Mean Score)						
Item	Chain Affiliation			Ownership		
	Yes	No	Total	Private	Public	Total
On site waste water treatment	4.27	3.39	3.77	3.79	3.43	3.77

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Introducing or enhancing methods and tools for water reuse	3.89	3.39	3.61	3.64	3.00	3.61
Rainwater harvesting/snow runoff capture and reuse	4.16	3.17	3.60	3.62	3.29	3.60
Paying attention to recyclable materials	4.05	3.22	3.58	3.62	3.00	3.58
Solid waste from both guest and non-guest areas is properly separated, classified and stored	4.15	3.08	3.54	3.52	4.00	3.54
Use of recycled water for water related utilization	3.76	3.22	3.46	3.46	3.43	3.46
Separate collection of hazardous waste (Expired or spoiled chemicals, broken bulbs etc.)	3.95	3.04	3.43	3.48	2.57	3.43
Keeping knowledge of the existence of local recycling firms and their operations	4.00	2.93	3.39	3.40	3.29	3.39
Carpool/Shuttle facility provided to customers	3.80	2.97	3.33	3.35	3.00	3.33
Solar, wind or other renewable sources of energy is implemented for meeting the energy requirements of the hotel	2.84	3.65	3.30	3.40	1.57	3.30
Recovery of used cooking oil	3.73	2.97	3.30	3.35	2.43	3.30
Recovery and Composting of food waste	3.71	2.51	3.03	3.00	3.57	3.03
Employee Carpool	3.36	2.47	2.86	2.87	2.71	2.86
Hotel's transportation fleet utilizing hybrid vehicles or electric vehicles	2.66	2.07	2.33	2.34	2.07	2.33
Total Mean	3.73	3.00	3.32	3.34	2.95	3.32
N=254 Cronbach's Alpha= .880 (Items=14)						

From the table above, it can be compared that the chain hotels are adopting maximum of the process related eco-innovative practices than non-chain hotels. Here also, the water related processes are maximally adopted followed by the waste management process practices and the energy management processes are least adopted. On the other hand, the non-chain hotels, interestingly reported a higher mean score ($M = 3.65$) than chain-affiliated hotels ($M = 2.84$), when it came to the implementation of renewable energy. This implies that certain independent hotels might make more investments in renewable energy technologies, whether as a result of operational independence, government incentives or local environmental factors. While talking of ownership, the private hotels are maximally adopting the process eco-innovative practices ($M = 3.34$) as compared to the public hotels ($M = 2.95$). On the other hand, the public hotels are exceeding the private hotels in appropriate separation, classification, and storage of solid waste from both guest and non-guest areas and recovery and composting of food waste. While both are almost equal in using of recycled water for water related utilization. 4. Eco-Innovative practices related to eco-innovative organizational practices

Table 7 represents the mean scores of eco-innovative organizational practices across 3, 4 and 5 green star rated hotels. Six items were considered for eco-innovations under organizational practices head being adopted by the green star hotels in Himachal Pradesh. Upon analysing for reliability using SPSS, the Cronbach's Alpha came out to 0.887, therefore validating the reliability of the construct. The items are ranked from highest adoption to lowest one as presented in table given below.

Table 7. Eco-Innovative Organizational Practices (Mean Score)				
Item	Green Star Rating			
	3 Star	4 Star	5 Star	Total
Preservation of the local flora, fauna and natural areas	2.16	2.95	4.86	3.22
Staff training on eco-innovation practices	2.02	3.15	4.48	3.05
Environmental messages/statements mentioned at required places	1.84	2.70	4.52	2.91
Promotion of novel green management practices to support ecoinnovations	2.21	2.70	4.02	2.91
The hotel subject's suppliers to eco-evaluation before the selection process	2.05	2.20	4.02	2.76

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The adoption of any nationally or internationally recognized sustainability certification programs	1.75	2.20	4.18	2.66
Total Mean	2.00	2.65	4.34	2.91
N=254 Cronbach's Alpha= .887 (Items=06)				

Among the six practices, preservation of the local flora, fauna and natural areas achieved the highest overall mean, indicating that biodiversity conservation and protection of the surrounding environment are the most widely adopted organizational practices. This was followed by the staff training on eco-innovation practices, reflecting the growing recognition of employee awareness and capacity building as essential components of sustainable hotel management. Two practices of mentioning environmental messages or statements at required places and promoting novel green management practices to support eco-innovations, both recorded an overall mean of 2.91, suggesting a moderate level of implementation. These findings indicate that while environmental communication and green management initiatives are increasingly adopted, there is still scope for broader integration across hotels. Lower overall mean scores were observed for subjecting suppliers to eco-evaluation before the selection process and adopting nationally or internationally recognized sustainability certification programs. These results suggest that environmentally responsible supply chain management and formal sustainability certification remain less extensively implemented, particularly among lower-rated hotels. These results suggest that advanced organizational sustainability practices are much more prevalent in hotels with higher green star ratings. Further, table 8 represents the mean scores of eco-innovative organizational practices according to chain affiliation (chain-affiliated vs. non-chain hotels) and ownership type (private vs. public hotels).

Table 8. Eco-Innovative Organizational Practices (Mean Score)						
Item	Chain Affiliation			Ownership		
	Yes	No	Total	Private	Public	Total
Preservation of the local flora, fauna and natural areas	3.95	2.67	3.22	3.23	3.00	3.22
Staff training on eco-innovation practices	3.62	2.61	3.05	3.08	2.57	3.05
Environmental messages/statements mentioned at required places	3.71	2.29	2.91	2.89	3.14	2.91
Promotion of novel green management practices to support eco-innovations	3.51	2.46	2.91	2.90	3.14	2.91
The hotel subject's suppliers to eco-evaluation before the selection process	3.31	2.33	2.76	2.78	2.43	2.76
The adoption of any nationally or internationally recognized sustainability certification programs	3.38	2.11	2.66	2.71	1.86	2.66
Total Mean	3.58	2.41	2.91	2.93	2.69	2.91
N=254 Cronbach's Alpha= .887 (Items=06)						

The findings indicate that the level of implementation of eco-innovative organizational practices are not quite high or above average. Despite this, while comparing, the chain-affiliated hotels consistently reported higher mean scores ($M = 3.58$) than non-chain hotels ($M = 2.41$) across all organizational practices, suggesting that chain hotels have stronger organizational commitment to environmental sustainability. This may be attributed to corporate environmental policies, standardized operating procedures, greater managerial support and stronger institutional emphasis on sustainability. With respect to ownership, private hotels generally achieved slightly higher mean scores ($M = 2.93$) than public hotels ($M = 2.69$) for most of the organizational practices. Private hotels recorded higher implementation of preservation of the local flora, fauna and natural areas, staff training on eco-innovation practices, adoption of sustainability certification programs and supplier eco-evaluation. These findings suggest that private hotels are somewhat more proactive in integrating environmental sustainability into organizational policies and management practices. However, public hotels performed better in two organizational dimensions. They reported higher mean scores for mentioning environmental messages or statements at required places and promoting novel green management practices. These results indicate that public hotels may place greater emphasis on environmental awareness and communication, even though they lag behind private hotels in several other organizational sustainability initiatives. Still the level of implementation is not quite high or above average in both of the cases of ownership too.

CONCLUSION

Across all the four dimensions of eco-innovation practices i.e. “eco-innovative services, products, processes and organizational practices”, the findings consistently demonstrated that the hotels with higher green star ratings, particularly 5 green star, exhibit significantly greater adoption of sustainable practices than 3-star and 4-star hotels. Similarly, chainaffiliated hotels generally outperform non-chain hotels across most eco-innovation indicators, reflecting the benefits of standardized environmental policies, stronger managerial commitment and greater access to financial and technological resources. Private hotels also tend to report higher implementation of eco-innovative initiatives than public hotels, although public hotels show relatively stronger performance in a few specific areas, such as sustainable construction materials, food waste composting and environmental communication. Overall, resource conservation measures, sustainable procurement, waste and wastewater management and environmental conservation emerged as the most extensively implemented practices, whereas guest participation programs, local sourcing, sustainable transportation, formal sustainability certification and supplier eco-evaluation remain comparatively less developed. Additionally, the overall mean score for the four dimensions of eco-innovation practices showed that, among the green star-rated hotels in Himachal Pradesh, ecoinnovative products are highly adopted ($M = 3.47$), which is closely followed by the eco-innovative services ($M = 3.42$), followed by the eco-innovative processes ($M = 3.32$), and finally, the eco-innovative organisational practices ($M = 2.91$).

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