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Toward sustainability: An analysis of sustainable tourism practices by hoteliers in the Andaman and Nicobar Islands, India.

Mamata Das[1], Dr. S Mahalakshmi[2]
[1] Department of Commerce School of Commerce and Business Management Central University of Tamil Nadu, Thiruvarur, Tamil Nadu, India
[2] Assistant Professor, Department of Commerce School of Commerce and Business Management Central University of Tamil Nadu Thiruvarur Tamil Nadu, India

Abstract
Unregulated tourism development has increased the carbon footprint, disturbed ecosystems, and strained resources, particularly in ecologically sensitive areas like the Andaman and Nicobar Islands—one of India's vital carbon sinks. As awareness of tourism's negative impacts grows, the role of hotels in fostering sustainable practices becomes critical. This study aims to explore the sustainable tourism practices adopted by hoteliers in the region. The study has employed descriptive analysis, exploratory factor analysis, independent sample t-tests, and one-way ANOVA in SPSS. Using EFA, the study identified five key areas: Environmental Awareness Campaigns, Energy and Water Conservation, Sustainable Waste Management, Delivery of Sustainable Toiletries, and Local Sourcing. Findings show that hoteliers demonstrate strong commitment to local sourcing and waste management, reflecting their sense of environmental and community responsibility. However, efforts toward energy and water conservation and the provision of eco-friendly toiletries remain insufficient. Notably, islander hoteliers engage more actively in local sourcing compared to non-islanders, suggesting disparities due to access and community ties. The study recommends targeted training, financial incentives, and technical assistance to support sustainable practices. Strengthening government policies, encouraging collaboration between islander and non-islander hoteliers, and enhancing community involvement can further promote a holistic and effective approach to sustainable tourism development in the islands.

Keywords: Sustainable tourism, tourism entrepreneurs, hoteliers, hotels, Andaman and Nicobar Islands, sustainable tourism practices

Introduction

The imprudent tourism practices increased the carbon footprint by upsetting ecosystems and biodiversity and exhausting resources. It is the consequence of poorly managed development and badly thought-out tourism plans. A rising number of stakeholders are now actively involved in supporting sustainable tourism development methods as destinations become more concerned about the negative effects of tourism (Chandralal & Fernando, 2022) [3]. Incorporating responsible stakeholders into the planning and decision-making processes is crucial, especially as sustainability has emerged as a global issue. Their involvement is particularly important for attaining sustainable development, which can be a major factor in combating climate change. Numerous stakeholders are involved in tourism, including tourists, service providers, local government organizations, and tourism entrepreneurs. One of the most important factors in determining whether tourism becomes sustainable is the lodging-oriented tourism industry, especially hotels. By creating jobs, utilizing renewable energy sources, procuring locally produced food, and properly managing solid waste, hotels greatly aid in environmental preservation and bring socioeconomic advantages to the community. But hotels can also damage the environment by using too much water and electricity, processing garbage improperly, and producing pollutants. Therefore, to achieve sustainable development, hoteliers must manage their establishments responsibly and play a critical role in implementing sustainable tourism practices (Necati Çelik & Çevirgen, 2021 [14]; Sharma *et al*., 2023) [19]. Therefore, the development of sustainable tourism needs to comprehend the perspectives of lodging providers and hoteliers, since they are important stakeholders in the tourism industry. Their opinions and behavior on tourism-related activities can provide insightful information about how to advance sustainability in the sector. We can create more successful plans for sustainable tourism that strike a balance between expansion and the preservation of local communities and ecosystems by looking at how these entrepreneurs consciously take necessary activities (Chandralal & Fernando, 2022) [3].

The study looked at the destination's resort owners' use of sustainable tourism approaches. It is crucial to comprehend the sustainable tourism techniques that resort owners have implemented, particularly in the Andaman and Nicobar Islands of India, to determine how well these tactics work when included in the islands' tourism models. Despite being a rapidly expanding industry that plays a major role in the socioeconomic development of the island (Michailidou *et al*., 2015) [13], it presents significant environmental challenges because of its high energy and water consumption, non-durable goods, and waste generation, including solid waste and pollutants that are released into the air and water (Kasimu *et al*., 2012) [12]. Unresolved issues may result in the swift depletion of natural resources essential to the tourism industry, along with increased costs and taxes that could threaten the sustainability of their business. (Akhtar & Najar, 2020) [1]. This study's primary focus is on the sustainable tourism practices that Andaman and Nicobar Islands accommodation owners currently use.

The research is organized as follows: A thorough analysis of the research on hotel providers' adoption of sustainable tourism practices is given in Section 2. The research technique is presented in Section 3. The results are presented in Section 4 and discussed in Section 5. The study is concluded in the last portion.

Review of Literature

Hoteliers in eco-sensitive destinations such as the Andaman and Nicobar Islands hold a vital responsibility in safeguarding the region's unique natural environment through sustainable practices. Beyond offering essential services like lodging and boarding, they engage directly with tourists whose presence can significantly strain local resources. Excessive consumption of raw materials, energy, and water by hotel operations can lead to severe degradation of forests and coastal areas (Tilikidou *et al*., 2014 [20]; Verma & Chandra, 2018) [21]. The hotel industry's excessive use of energy, water, and natural resources depletes local ecosystems and boosts greenhouse gas emissions. Services like air conditioning, heated pools, and disposable products increase waste and environmental strain. High water usage in pools, spas, and laundry adds to the carbon footprint. Growing consumer awareness has fueled interest in green initiatives, offering both ethical value and strategic advantages for long-term success (Patwary *et al*., 2023) [16]. Studies show that these practices help firms achieve economic, social, and environmental sustainability while offering multiple business benefits (Piramanayagam *et al*., 2023) [17].

Globally, the hospitality and tourism industries are embracing sustainable practices through certifications like LEED, Green Leaf, Green Globe, and Ecotel. These include energy-efficient systems, water-saving fixtures, rainwater harvesting, renewable energy, and waste-reduction measures. Hotels also use refillable dispensers, recycling bins, and clean air systems, and support wildlife conservation and environmental education to enhance guest experiences while minimizing ecological impact (Verma & Chandra, 2018) [21]. As demand for sustainable travel grows, tour operators, hoteliers, and booking platforms are adopting eco-friendly policies and showcasing them with green badges. These help travelers identify responsible accommodations. Booking.com highlights key practices such as waste reduction, energy and water conservation, community support, and environmental protection (Godovykh *et al*., 2024) [7]. Consumers' opinions of a hotel's environmental consciousness and friendliness affect their decisions to make a reservation and how long they stay. Businesses must modify their procedures to accommodate consumers' demands for eco-friendly goods and services (Y. Yılmaz *et al*., 2019) [22, 23].

Sustainable tourism practices are closely connected to several key factors, such as conservation and protection of the environment, generation of economic benefits, and promotion of future growth. Such practices also play a crucial role in creating awareness and enhancing knowledge of eco-friendly practices(Chan, 2023) [2]. It is also evident that adopting sustainable destination management principles and sustainable business management practices favorably impacts business performance (Hamid *et al*., 2020) [10]. Sustainability boosts profits and brand image by attracting eco-conscious guests, but many hotels adopt it for financial, not environmental, reasons. Cost, quality, and guest comfort often outweigh green goals, while strict policies and luxury concerns hinder implementation (Ramukumba & Ferreira, 2017) [18]. Guest houses are adopting sustainable practices, showing promise but needing more support and awareness efforts. Clear communication and guest engagement are key. Economically, these practices lower costs and boost revenue, strengthening destination sustainability and competitiveness (Ramukumba & Ferreira, 2017) [18]. The success of a hotel's green initiatives depends on managers' and employees' attitudes toward the environment. Many small accommodations face challenges due to low awareness, weak policies, limited collaboration, capacity issues, and doubts about the business benefit (Glen & Mearns, 2020) [6]. Some managers view eco-labels as costly and ineffective, while others see them as valuable for cost savings, environmental impact reduction, customer and staff education, and supporting local communities (Y. Yılmaz *et al*., 2019) [22, 23]. Additionally, the size, location, and category of the property have been found to have a major impact on how much lodging facilities implement sustainable practices. All things considered, though, these companies are still in the early phases of adopting sustainable practices (Ivanov *et al*., 2014) [11].

The review of the literature reveals a notable research gap in the study of sustainable tourism practices within the Indian accommodation sector, particularly in Andaman and Nicobar Islands, a prominent tourist destination and carbon sink in India. Despite extensive research on sustainability in hospitality, there is a lack of in-depth studies focusing on the specific sustainable measures adopted by Indian hoteliers. This gap is especially critical considering the growing environmental pressures and the need for sustainable practices in ecologically sensitive regions that are economically dependent on tourism. To address this gap, the current study investigates the sustainable tourism practices implemented by hoteliers in the Andaman and Nicobar Islands, who are key stakeholders in the tourism industry. This study aims to provide insights into the initiatives these hoteliers are undertaking to promote sustainable tourism, thereby contributing to the broader understanding of sustainability in the Indian hospitality sector and offering a model that could be referenced by other regions.

Research Methodology

The research design applied in this study is descriptive and exploratory, using strictly structured interviews to collect data from the selected hotels of Andaman and Nicobar Islands, which are known for their pristine beaches, vibrant coral reefs, and unique bio-diversity, offer substantial opportunities for ecotourism. The 572 small and large islands that make up these islands, a union territory of India in the Bay of Bengal, are renowned for their unique ecosystems and wildlife. Topical semi-evergreen deciduous forests, extensive coastal mangroves, bays, natural harbors, coral reefs, sea grass, and vast sandy beaches with pristine seawater are the hallmarks of ANI's 1,962-kilometer coastline. A convenient sampling method was used to select respondents due to the geographical spread and varying accessibility of islands. Sri Vijaya Puram, Swaraj Dweep, and Saheed Dweep were chosen as they attract maximum tourist traffic among the tourist-accessible islands, making them representative of the region’s tourism activity. 166 accommodation providers from these islands were selected

based on proximity, accessibility, and willingness to participate. The required sample size was calculated using two approaches: a G*Power analysis (Faul *et al*., 2009) [5] and the rule of thumb suggested by Hair, Jr. *et al*.(2019) [9].

The sample characteristics include male and female, where male entrepreneurs (86.7%) dominate the ownership within the accommodation sector. In terms of age distribution, the majority of entrepreneurs (56.6%) are from Generation X (Dimock, 2019) [4]. In terms of education, 56.6% of owners have a senior secondary level education. The marital status of the respondents indicates that 90.4% of respondents are married. Geographically, 50% of the resorts are located in rural areas. In terms of ownership structure, 97% of the resorts are privately owned, with the remaining resorts being owned by government and semi-government entities. Regarding the sources of funding for business establishment, 48.8% of the resorts were financed through bank loans. Regarding the size of the resorts, approximately 60.8% of resorts (101 resorts) have up to 20 rooms (small in size). In terms of ownership, a significant 92.2% of the resorts (153 resorts) are owned by residents, highlighting a positive economic impact on the local community.

Descriptive analysis has been conducted to explore items, providing an initial understanding of the data. To organize the items into manageable and meaningful categories, the study utilized exploratory factor analysis (EFA) (Hair *et al*., 2014) [8]. It is an effective method to simplify complex datasets by reducing many variables into a smaller set of interpretable factors. The factors extracted using PCA with Varimax Rotation, which had eigenvalues greater than one, were considered. Before conducting the analysis, essential assumptions were tested for adequacy. The Kaiser-Meyer-Olkin (KMO) test for Sampling Adequacy and Bartlett's Test of Sphericity were employed to assess the suitability of the data for factor analysis. Furthermore, the amount of variance each variable shared with the extracted factors was examined using the commonality value. Variables with factor loadings greater than 0.50 were considered significant. Additionally, independent sample t-tests and one-way ANOVA(Park, 2009) [15] were applied to determine whether there were significant variations in respondents' opinions based on their demographic characteristics. For this investigation, Microsoft Excel and the Statistical Package for Social Sciences (SPSS) were utilized.

Results

Descriptive Analysis

Table 1: Descriptive Analysis of Items

Sl/no.	Statements	Mean	S. D	Rank
Stpte19	The organization procures a large quantity of food products and materials from local producers.	4.19	1.03	1
Stpte9	Reusable towels, cloth napkins, and glass cups are provided to the customers.	4.16	1.10	2
Stpte18	Residents, minorities, and women are prioritized in the workforce.	4.06	0.91	3
Stpte13	A sufficient number of separate recycle bins are kept for wet and dry waste disposal.	4.04	1.25	4
Stpte3	Energy-saving electric bulbs and other energy-efficient equipment and products are installed to reduce energy consumption.	3.99	1.06	5
Stpte14	Kitchen garbage and wastewater have been appropriately treated and are being used for garden composite and garden irrigation.	3.89	1.21	6
Stpte16	The organization frequently campaigns to reduce single-use plastics and eliminate littering.	3.62	1.48	7
Stpte17	The display of leaflets in the hotel or hotel rooms, regarding careful use of water, and electricity or to follow environmentally friendly activities during staying.	3.59	1.58	8
Stpte2	Local materials, practices, crafts, arts, and architecture have been included in the construction, design, and decoration of buildings to display the cultural heritage.	3.58	1.32	9
Stpte1	Tourists are informed about local traditions, practices, beliefs, and protocols during their check-in.	3.54	1.27	10
Stpte15	Water and energy conservation campaigns are carried out to sensitize the guests and kitchen and cleaning staff.	3.41	1.41	11
Stpte4	Motion sensor light switches are installed in each room.	2.33	1.00	12
Stpte10	Every guest room has a low-water volume toilet.	2.18	1.07	13
Stpte11	A dual piping system is used.	2.14	1.14	14
Stpte5	Occupancy sensors and key cards are installed.	2.10	1.23	15
Stpte8	Customers are given environmentally friendly soaps, cleaners, hand wash, etc.	2.05	0.91	16
Stpte12	In each of the guest rooms, a water meter is installed.	1.99	1.13	17
Stpte6	Every room has a refillable soap and shampoo dispenser	1.83	0.84	18
Stpte7	Grinding of guest soap as laundry detergent.	1.77	0.91	19

Source: Primary Data {Note: S D – Standard Deviation}

The study reveals that hoteliers prioritize sustainable practices, particularly sourcing food and materials from local producers providing reusable towels and cloth napkins, and promoting workforce diversity by hiring residents, minorities, and women. However, the least favored practice among respondents was grinding guest soap as laundry detergent, which was viewed as unhygienic and a cost-cutting measure. This indicates a lack of awareness of sustainable practices among tourism entrepreneurs at the destination. Additionally, energy and water-saving technologies such as motion sensor light switches, occupancy sensors, key cards, water meters, and low-volume toilets are considered impractical due to inadequate infrastructure and resource availability.

Exploratory Factor Analysis

The exploratory factor analyses (EFAs) ensure the robustness of the collected data, identify the underlying patterns, and condense the data into meaningful factors that capture the key dimensions of items. The KMO value of 0.832 and the statistically significant Bartlett's Test of Sphericity ($p < 0.05$) confirm that the data collected from hoteliers regarding the sustainable tourism practices adopted by them is suitable for factor analysis (Hair *et al*., 2014) [8]. The KMO value of 0.832 and the statistically significant Bartlett's Test of Sphericity ($p < 0.05$) confirm that the data collected from hoteliers regarding the sustainable tourism practices adopted by them is suitable for factor analysis (Hair *et al*., 2014) [8]. The commonality values, which

indicate the proportion of each variable's variance explained by the factor solution, range from 0.710 to 0.897. Additionally, 83.712% of the total percentage variance is explained by the extracted components. This high percentage suggests that a considerable amount of the variation in sustainability practices among lodging providers can be attributed to the identified factors. The factor loadings (Table 2), which range from 0.815 to 0.929, show the direction and degree of the association between each variable and its corresponding factor. Higher factor loadings reflect stronger correlations between variables and the factors associated with sustainability initiatives. Through the analysis, five distinct factors were identified (Table 3), each appropriately named based on the items included. These factors represent key areas in which accommodation providers focus their sustainability efforts.

Table 2: Results of EFA (Factor Loading)

Items	Item Name	EAC	EWC	SWM	DST	LS
1	Stpte1	0.897				
2	Stpte17	0.932				
3	Stpte15	0.926				
4	Stpte16	0.921				
5	Stpte2	0.916				
6	Stpte4		0.915			
7	Stpte5		0.893			
8	Stpte11		0.884			
9	Stpte10		0.881			
10	Stpte12		0.878			
11	Stpte3			0.933		
12	Stpte13			0.922		
13	Stpte14			0.895		
14	Stpte9			0.894		
15	Stpte6				0.913	
16	Stpte7				0.890	
17	Stpte8				0.815	
18	Stpte19					0.929
19	Stpte18					0.916

Source: Primary Data

(Note: EAC- Environmental Awareness campaign, EWC- Energy and water conservation,
SWM- Sustainable waste management, DST- Delivering Sustainable toiletries, LS- Local Sourcing)

Table 3: Naming of Factors with Descriptive Analysis of Factors

Sl/no.	Factors	Mean	Std.	Rank
Factor 1	Environmental Awareness Campaign	3.55	1.31	3
Factor 2	Energy and water conservation	2.15	1.00	4
Factor 3	Sustainable waste management	4.02	1.06	2
Factor 4	Delivering Sustainable toiletries	1.88	0.78	5
Factor 5	Local Sourcing	4.13	0.91	1

Source: Primary Data

The descriptive statistics of sustainable factors adopted by the hoteliers reveal that they prioritize local sourcing with a mean score of 4.13, reflecting a strong commitment to supporting the local economies. Similarly, hoteliers considered sustainable waste management necessary, as indicated by their high mean scores of 4.02, reflecting their preference to implement effective waste management and recycling practices in fostering environmental stewardship. Further, Environmental awareness campaigns with a mean score of 3.55 are viewed positively but exhibit more significant variability in responses. However, energy and water conservation practices receive lower priority with a mean score of 2.15. Finally, delivering sustainable toiletries is less emphasized, indicated by their lower mean score of 1.88.

Independent Sample t-tests and One-way ANOVA (Analysis of variance)

Table 4: Results of Independent sample t-test

Factor 1- Environmental Awareness campaign (Dependent Variable)					
Factor Name (IV)	**Categories**	**N**	**Mean**	**Statistics (t-test)**	**p-value**
Gender	Male	144	3.5097	-0.965	0.336
	Female	22	3.8000		
Marital Status	Married	150	3.5493	0.034	0.973
	Unmarried	16	3.5375		
Business Location	Rural	83	3.5133	-0.342	0.733
	Urban	83	3.5831		
Residential Status of owner	Islander	153	3.5294	-0.630	0.529
	Non-islander Indian	13	3.7692		
Factor 2- Energy and water conservation (Dependent Variable)					
Gender	Male	144	2.1653	0.564	0.573
	Female	22	2.0364		
Marital Status	Married	150	2.1573	0.361	0.718
	Unmarried	16	2.0625		
Business Location	Rural	83	2.2386	1.170	0.244
	Urban	83	2.0578		
Residential Status of owner	Islander	153	2.1464	-0.079	0.937
	Non-islander Indian	13	2.1692		
Factor 3- Sustainable waste and management (Dependent Variable)					
Gender	Male	144	4.0573	0.898	0.378
	Female	22	3.7841		
Marital Status	Married	150	4.0167	-0.163	0.870
	Unmarried	16	4.0625		

Business Location	Rural	83	4.1506	1.577	0.117
	Urban	83	3.8916		
Residential Status of owner	Islander	153	4.0196	-0.061	0.951
	Non-islander Indian	13	4.0385		
Factor 4- Delivering Sustainable toiletries (Dependent Variable)					
Gender	Male	144	1.8330	-1.436	0.164
	Female	22	2.1973		
Marital Status	Married	150	1.8842	0.148	0.883
	Unmarried	16	1.8538		
Business Location	Rural	83	1.9594	1.291	0.199
	Urban	83	1.8031		
Residential Status of owner	Islander	153	1.9016	1.153	0.251
	Non-islander Indian	13	1.6415		
Factor 5- Local Sourcing (Dependent Variable)					
Gender	Male	144	4.1389	0.450	0.654
	Female	22	4.0455		
Marital Status	Married	150	4.1100	-0.718	0.474
	Unmarried	16	4.2813		
Business Location	Rural	83	4.1205	-0.085	0.932
	Urban	83	4.1325		
Residential Status of owner	Islander	153	4.1667	1.977	0.050
	Non-islander Indian	13	3.6538		

Source: Primary Data, {Note: IV – Independent Variable}

The results of the independent sample t-test on sustainable initiatives—specifically, Environmental Awareness campaigns, Energy and water conservation, Delivering Sustainable toiletries, and Local Sourcing—revealed no significant differences based on the hotel owner's gender, marital status, residential status, and business location, across several factors. However, a borderline significant difference was found in the local sourcing initiative based on residential status (p=0.050), where islander owners (mean = 4.1667) were found to engage more in local sourcing compared to non-islander Indian owners (Mean = 3.6538). The slight difference observed in local sourcing based on residential status may be due to islander owners having easier access to local resources or a stronger intention to support local suppliers due to their proximity and connection to the community.

Table 5: Results of the One-way ANOVA test

Factor 1- Environmental Awareness Campaign (Dependent Variable)						
Factor Name (IV)	**Categories**	**N**	**Mean**	**Statistics (t-test)**	**p-value**	
Age	21 to 40 years	55	3.5491	0.246	0.782	
	41 to 60 years	94	3.5851			
	Above 60 years	17	3.3412			
Educational Qualification	Primary	7	3.6000	0.969	0.409	
	Senior Secondary	94	3.6447			
	Undergraduate	52	3.3000			
	Postgraduate & above	13	3.8154			
Business Finance	Lease and Loans from the bank	81	3.8198	3.620	0.029	
	Own funds	48	3.2250			
	Combination of both	37	3.3730			
Rooms	Up to 20	101	3.6495	0.764	0.467	
	21 to 40	54	3.3926			
	Above 40	11	3.3818			
Results of Post-hoc Test						
Variable	**Reference category**	**Other Categories**		**Mean Difference**	**Std. Error**	**p-value**
Business Finance	Loan from Bank	Own Funds		0.60	0.24	0.033

Factor 2- Energy and Water Conservation (Dependent Variable)					
Factor Name	**Categories**	**N**	**Mean**	**Statistics (t-test)**	**p-value**
Age	21 to 40	55	2.1927	0.120	0.887
	41 to 60	94	2.1149		
	Above 60	17	2.1882		
Educational Qualification	Primary	7	2.5429	3.926	0.010
	Senior Secondary	94	2.0596		
	Undergraduate	52	2.0500		
	Postgraduate & above	13	2.9692		
Business	Lease and Loans from the bank	81	2.1407		

Finance	Own funds	48	2.0542	0.570	0.567
	Combination of both	37	2.2865		
Rooms	Up to 20	101	2.0495	5.315	0.006
	21 to 40	54	2.1481		
	Above 40	11	3.0545		

Results of Post-hoc Test					
Variable	**Ref. category**	**Other Categories**	**Mean Diff.**	**Std. Error**	**p-value**
Edu. Qual.	PG and above	Senior Secondary	0.91	0.29	0.010
		Undergraduate	0.92	0.30	0.014
Rooms	Above 40	Up to 20	1.01	0.31	0.004
		21 - 40	0.91	0.32	0.015

Factor 3- Sustainable Waste and Management (Dependent Variable)					
Factor Name	**Categories**	**N**	**Mean**	**Statistics (t-test)**	**p-value**
Age	21 to 40 years	55	4.1273	0.535	0.587
	41 to 60 years	94	3.9468		
	Above 60 years	17	4.0882		
Educational Qualification	Primary	7	4.1429	0.179	0.910
	Senior Secondary	94	3.9734		
	Undergraduate	52	4.0962		
	Postgraduate & above	13	4.0000		
Business Finance	Lease and Loans from the bank	81	4.0247	0.662	0.517
	Own funds	48	3.9010		
	Combination of both	37	4.1689		
Rooms	Up to 20	101	3.9455	0.674	0.511
	21 to 40	54	4.1250		
	Above 40	11	4.2045		

Factor 4- Delivering Sustainable Toiletries (Dependent Variable)					
Factor Name	**Categories**	**N**	**Mean**	**Statistics (t-test)**	**p-value**
Age	21 to 40 years	55	1.8847	1.458	0.236
	41 to 60 years	94	1.8259		
	Above 60 years	17	2.1765		
Educational Qualification	Primary	7	2.4286	1.212	0.307
	Senior Secondary	94	1.8470		
	Undergraduate	52	1.8717		
	Postgraduate & above	13	1.8723		
Business Finance	Lease and Loans from the bank	81	1.9090	0.440	0.645
	Own funds	48	1.9165		
	Combination of both	37	1.7749		
Rooms	Up to 20	101	1.7916	2.004	0.138
	21 to 40	54	1.9878		
	Above 40	11	2.1818		

Factor 5- Local Sourcing Conservation (Dependent Variable)					
Factor Name	**Categories**	**N**	**Mean**	**Statistics (t-test)**	**p-value**
Age	21 to 40 years	55	4.0182	0.838	0.434
	41 to 60 years	94	4.1543		
	Above 60 years	17	4.3235		
Educational Qualification	Primary	7	4.0000	0.146	0.932
	Senior Secondary	94	4.1436		
	Undergraduate	52	4.0865		
	Postgraduate & above	13	4.2308		
Business Finance	Lease and Loans from the bank	81	4.1852	0.405	0.668
	Own funds	48	4.1042		
	Combination of both	37	4.0270		
Rooms	Up to 20	101	4.0545	1.279	0.281
	21 to 40	54	4.2870		
	Above 40	11	4.0000		

Source: Primary Data

The hoteliers' age, educational qualifications, and number of rooms in their hotel did not significantly impact their environmental awareness efforts ($p > 0.05$). However, a significant difference was observed in the hoteliers' efforts on environmental awareness campaigns based on business finance sources ($p = 0.029$). Specifically, hoteliers using their own funds for business operations showed lower engagement in environmental awareness campaigns compared to those relying on loans from banks (mean difference =0.60). Thus, hoteliers who rely on external sources of finance are more likely to engage in environmental awareness campaigns. In terms of energy and water conservation, a significant difference was found based

on educational qualification ($p = 0.010$), with those holding higher education degrees Showing greater engagement in conservation efforts compared to those with lower educational qualifications. Hotel size also significantly influenced conservation practices ($p = 0.006$), with larger hotels demonstrating more active engagement in these initiatives. This could be due to the availability of economies of scale and more sustainable resources to the larger establishments. For sustainable waste management, delivering sustainable toiletries, and local sourcing no significant difference was found across age, education, financial sources, or hotel size ($p > 0.05$). This suggests that these practices are universally adopted and are driven by broader industry standards or regulatory requirements rather than individual characteristics or business factors.

Discussion

The Andaman and Nicobar Islands, a vital ecological and carbon sink region of India, face growing environmental challenges due to decades of over-tourism. Protecting their natural beauty and fragile ecosystem requires the adoption of effective sustainable tourism practices. As tourism is the primary economic driver, raising awareness among industry stakeholders is essential. Among them, accommodation providers significantly influence the environment, making their commitment to sustainability crucial. This study, therefore, examines hoteliers' actions and attitudes toward sustainable tourism practices to support the islands' ecological preservation. The study finds that island hoteliers show a strong commitment to sustainable tourism by locally sourcing food and materials, hiring residents, minorities, and women, and adopting basic eco-friendly practices like reuse, recycling, energy-efficient lighting, and waste segregation to cut costs and reduce waste. However, they struggle with implementing advanced energy and water-saving measures—such as low-flow toilets, dual piping, key card systems, refillable dispensers, and efficient detergents—due to higher upfront costs and limited awareness or expertise. Bridging this gap requires financial incentives, training, and showcasing long-term environmental and economic benefits.

Hoteliers in the Andaman and Nicobar Islands adopt a holistic approach to sustainability by promoting environmental awareness, conserving resources, managing waste, and supporting the local economy. They educate guests and staff, integrate cultural elements, and use technologies like motion sensors and water meters to reduce energy and water use. Sustainable waste practices include recycling, composting, and energy-efficient equipment. Eco-friendly toiletries, such as refillable dispensers and biodegradable products, help reduce single-use waste. Local sourcing and inclusive hiring further strengthen community ties and minimize environmental impact, collectively enhancing sustainability in the hospitality sector. While hoteliers actively support environmental and community well-being through sustainable waste management and local sourcing, they face challenges that limit their focus on energy and water conservation. Similarly, sustainable toiletries receive less attention, likely due to concerns over waste generation. These efforts demonstrate a partial commitment to sustainability, highlighting the need for greater focus and investment in under-addressed areas.

Sustainable tourism practices—such as environmental awareness, resource conservation, waste management, sustainable toiletries, and local sourcing—are generally consistent among hoteliers in the Andaman and Nicobar Islands across age, gender, marital status, and business location. However, differences emerge in energy and water conservation and local sourcing based on hoteliers' education and residential status. Further variations, especially in awareness campaigns and conservation efforts, are linked to business finance sources and hotel size. Islander hoteliers engage more in local sourcing due to stronger community ties and access, while non-islanders face logistical and cost barriers. Better-educated hoteliers and those managing larger properties demonstrate greater sustainability efforts, benefiting from awareness and resource availability. The use of external funding correlates with higher engagement in environmental campaigns, while internal funding limitations often restrict investment in sustainable initiatives. Hoteliers show a strong commitment to sustainable waste management and local sourcing, with moderate participation in environmental awareness initiatives. However, their involvement in energy and water conservation and sustainable toiletries is limited, largely due to challenges such as insufficient funding, lack of expertise, limited resources, rigid industry norms, and the islands' environmental constraints.

To overcome these, strategies such as targeted training, tailored awareness campaigns, stakeholder collaboration, incentive programs, supplier partnerships, and continuous evaluation are recommended to strengthen the adoption of sustainable practices. Key barriers identified include high implementation costs, limited technical knowledge, and inadequate government support. Addressing these requires practical measures like grants, low-interest loans, public-private partnerships, technical support, tax incentives, certification schemes, consumer education, and marketing assistance. Enhancing financial, technical, and regulatory support—alongside community and consumer engagement—can enable hoteliers to adopt more comprehensive sustainability measures, improving environmental outcomes and stakeholder satisfaction.

Conclusion

This study critically examined the attitudes and practical adoption of sustainable tourism practices by hoteliers in the ecologically sensitive Andaman and Nicobar Islands. The findings reveal that hoteliers demonstrate a strong commitment to sustainability through local sourcing and effective waste management, reflecting their environmental and community responsibility. Environmental awareness campaigns show promising progress, yet efforts toward energy and water conservation and the use of eco-friendly toiletries remain limited. Notably, local sourcing practices are more prevalent among islander hoteliers compared to non-islanders, indicating disparities linked to access and community ties. Addressing these gaps through targeted support and incentives could enhance sustainable tourism practices, helping preserve the unique ecology of the islands while supporting their vital role as a carbon sink.

To bridge these gaps, it is recommended that stakeholders provide targeted training, financial incentives, and technical support to promote advanced conservation measures and eco-friendly amenities. Encouraging collaboration between islander and non-islander entrepreneurs, along with strengthened government policies and community engagement, can foster a more holistic approach to

sustainability. Future research could explore the role of tourists' behavior and other service providers' initiatives in enhancing sustainable tourism in the region. By addressing these challenges, the islands can better preserve their unique ecology and maintain their status as a vital carbon sink while sustaining economic growth through tourism.

References

1. Akhtar S, Najar AH. Environmental sustainable practices in the hotels: From exixtence to implementation. Ecology Environment and Conservation,2020:26(1):111–116.
2. Chan JKL. Sustainable tourism practices relate to conservation and preservation, economic benefits, collaboration and protection, environmental impact, future growth, awareness, knowledge, and improvement. Global Business & Finance Review,2023:28(3):136–149.
3. Chandralal L, Fernando B. Attitudes of tourism entrepreneurs and support towards sustainable tourism practices in Sri Lanka. The Journal of Behavioral Science,2022:17(2):1–15.
4. Dimock M. Defining generations: Where Millennials end and Generation Z begins. Pew Research Center, 2019.
5. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behavior Research Method,2009:41:1149–1160.
6. Glen N, Mearns. Sustainable Tourism Implementation for Small Accommodation Establishments in South Africa,2020:9(3):131–148.
7. Godovykh M, Fyal A, Baker C. Sustainable labels in tourism practice: The effects of sustainable hotel badges on guests' attitudes and behavioral intentions. Sustainability,2024:16:2484.
8. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis: Vol. 7th edition. Pearson Education Limited, 2014.
9. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis (8th ed.). Pearson Education Inc, 2019.
10. Hamid MA, Isa SM, Kiumarsi S. Sustainable tourism practices and business performance from the tour operators' perspectives. Anatolia,2020:23–32.
11. Ivanov S, Ivanova M, Iankova K. Sustainable tourism practices of accommodation establishments in Bulgaria. Tourismos: An International Multidisciplinary Journal of Tourism,2014:9(2):31.
12. Kasimu AB, Zaiton SB, Hassan H. Hotels involvement in sustainable tourism practices in Klang Valley, Malaysia. International Journal of Economics and Management,2012:6(1):21–34.
13. Michailidou AV, Vlachokostas C, Moussiopoulos N. A methodology to assess the overall environmental pressure attributed to tourism areas: A combined approach for typical all-sized hotels in Chalkidiki, Greece. Ecological Indicators,2015:50:108–119.
14. Çelik MN, Çevirgen A. The role of accommodation enterprises in the development of sustainable tourism. Journal of Tourism and Services,2021:12(23).
15. Park HM. Comparing group means: T-tests and one-way ANOVA using Stata, SAS, R, and SPSS. The University Information Technology Services (UITS) Center for Statistical and Mathematical Computing, Indiana University, 2009.
16. Patwary AK, Aziz RC, Hashim NAAN. Investigating tourists' intention toward green hotels in Malaysia: A direction on tourist sustainable consumption. Environmental Science and Pollution Research,2023:30:38500–38511.
17. Piramanayagam S, Sen S, Seal PP. Sustainable consumption behaviour among guests in luxury hotels through the lens of the extended theory of planned behaviour. Environment, Development and Sustainability, 2023.
18. Ramukumba DT, Ferreira IW. Sustainable tourism: A view from guest houses in the Eden District Municipality. Tourism and Leisure,2017:6:11.
19. Sharma S, Mahajan A, Virmani N, Kukreja G, Mehta K. An empirical model for assessing consumer behaviour towards hotel sustainable practices: A study from emerging economy. Competitiveness Review: An International Business Journal,2023:33(1):222–239.
20. Tilikidou I, Delistavrou A, Sapountzis N. Customers' ethical behaviour towards hotels. Procedia Economics and Finance,2014:9:425–432.
21. Verma VK, Chandra B. Sustainability and customers' hotel choice behaviour: A choice-based conjoint analysis approach. Environment Development and Sustainability,2018:20:1347–1363.
22. Yılmaz Y, Üngüren E, Kaçmaz YY. Determination of managers' attitudes towards eco-labeling applied in the context of sustainable tourism and evaluation of the effects of eco-labeling on accommodation enterprises. Sustainability,2019:11(18).
23. Yılmaz Y, Üngüren E, Kaçmaz YY. Determination of managers' attitudes towards eco-labeling applied in the context of sustainable tourism and evaluation of the effects of eco-labeling on accommodation enterprises. Sustainability,2019:11(18):5069.