

10.48047/jocaaa.2024.33.08.330

# Sustainability Practices in Hospitality: A Comparative Study of Eco-Friendly Hotels vs. Traditional Hotels

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## Abstract

This study investigates the extent, drivers, and performance outcomes of sustainability practices in the hospitality sector by systematically comparing eco-friendly (eco-certified or self-identified “green”) hotels with traditional hotels. Drawing on the triple bottom line framework and stimulus–organism–response theory, the paper conceptualizes sustainability practices across five core domains: energy efficiency, water conservation, waste management and circularity, sustainable procurement, and stakeholder engagement (employees, guests, and local communities). The proposed comparative design integrates a structured survey of hotel managers and guests with secondary performance indicators (occupancy rate, RevPAR, cost ratios) and qualitative evidence from semi-structured interviews. The study aims to (i) measure differences in the intensity and breadth of sustainability practices between eco-friendly and traditional hotels, (ii) examine the relationship between sustainability practices and environmental, economic, and reputational outcomes, and (iii) analyse guest-level responses in terms of satisfaction, perceived value, loyalty, and willingness to pay a green premium. The paper further explores mediating mechanisms such as green image and green trust, and moderating effects of hotel size, category, and ownership structure. By explicitly contrasting eco-friendly and traditional properties within a unified analytical framework, the study seeks to move beyond single-group or purely conceptual treatments of green hospitality. The expected contribution is twofold: theoretically, it refines understanding of how sustainability capabilities are translated into competitive advantage in service-intensive contexts; practically, it generates evidence-based guidance for hotel managers and policymakers regarding the marginal benefits and trade-offs of deepening sustainability commitments in mainstream (non-eco-certified) hotels.

**Keywords:** *Sustainability; Hospitality industry; Eco-friendly hotels; Traditional hotels; Environmental management; Guest satisfaction*

## 1. Introduction

The hospitality industry has emerged as one of the fastest-growing sectors in the global service economy, contributing significantly to employment generation, tourism development, and national GDP. However, the sector simultaneously exerts substantial pressure on natural resources through extensive energy consumption, high freshwater usage, solid-waste generation, chemical discharge, and carbon emissions. Rising environmental degradation, climate change risks, and increasing awareness of sustainable consumption patterns have compelled hospitality organisations to reconsider their operational frameworks. Consequently, sustainability-oriented practices—once considered voluntary or image-enhancing—have now become strategic imperatives for long-term competitiveness, regulatory alignment, and brand differentiation. In this context, eco-friendly hotels have positioned themselves as industry pioneers by systematically integrating environmental management systems, circular resource

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strategies, and stakeholder-centric sustainability initiatives. Conversely, traditional hotels, although not necessarily resistant to change, often rely on incremental or compliance-based approaches rather than comprehensive sustainability integration. This research seeks to critically examine the variance in sustainability practices between eco-friendly hotels and traditional hotels and evaluate the implications for organisational performance, consumer perception, and long-term viability.

The comparative lens adopted in this study responds to a meaningful knowledge gap in hospitality literature. While numerous studies have examined sustainability initiatives within hotels independently, limited research offers a holistic and empirical comparison of eco-certified properties and traditional non-certified establishments in a unified analytical model. Understanding these contrasts is crucial because the magnitude and quality of sustainability implementation can influence not only environmental outcomes but also economic performance metrics, such as operating cost efficiency, occupancy rate, guest loyalty, and willingness to pay a price premium. Furthermore, as contemporary travellers increasingly align purchasing decisions with ethical, ecological, and social values, the hospitality industry confronts a paradigm shift in service expectations. Examining whether eco-friendly hotels produce measurable competitive and reputational advantages therefore contributes to theory and practice in tourism management, corporate sustainability, and consumer behaviour.

### Overview of the Study

This study investigates sustainability practices across five major operational domains—energy and resource management, water conservation, waste reduction and recycling, sustainable procurement, and stakeholder engagement—within two distinct hotel categories: eco-friendly and traditional hotels. The research adopts a mixed-method comparative approach integrating quantitative performance data and qualitative managerial perspectives to derive comprehensive insights into implementation depth, guest response, and outcome variance. The work offers a structural framework for evaluating how sustainability maturity levels correspond to operational effectiveness and customer engagement outcomes.

### Scope and Objectives

The scope of the paper is confined to commercial hotels operating under full-service or mid-scale models, with comparative evaluation structured across organisational processes, cost and revenue performance indicators, environmental footprint metrics, and behavioural responses from guests and employees. Specifically, the study aims to:

- Compare the scale, intensity, and strategic integration of sustainability practices between eco-friendly and traditional hotels.
- Examine the relationship between sustainability practices and triple-bottom-line outcomes—environmental, economic, and social.
- Analyse the impact of sustainability initiatives on guest satisfaction, loyalty, and willingness to pay a green premium.
- Identify challenges, constraints, and enabling drivers influencing sustainability adoption across both hotel categories.
- Provide evidence-based insights and policy recommendations for strengthening sustainability transitions in mainstream hotels.

### Author Motivation

The motivation behind this research arises from the observable gap between conceptual advocacy for green hospitality and the practical realities faced by hotel managers and

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policymakers who must balance ecological responsibility with financial sustainability. Despite increasing emphasis on green practices, many traditional hotels remain hesitant to adopt full-scale sustainability integration due to uncertainties regarding return on investment, infrastructural limitations, and perceived risk to operational efficiency. By offering comparative insight grounded in empirical evidence, this study intends to support decision-makers, enhance industry transparency, and contribute to academic advancement in sustainable tourism development.

### Paper Structure

This paper is organised into seven sections. Following the introduction, Section 2 presents an extensive review of existing literature on sustainability in hospitality, evaluating theoretical constructs, empirical findings, and research gaps. Section 3 elaborates the research methodology, including sampling methods, measurement variables, and analytical techniques. Section 4 presents comparative data analysis between eco-friendly and traditional hotels. Section 5 discusses results and theoretical implications, while Section 6 identifies managerial implications, policy guidance, and strategic considerations for industry practitioners. Section 7 concludes the study with a concise synthesis of findings, limitations, and directions for future research.

Through this structured approach, the paper intends to provide a comprehensive and academically rigorous perspective on the evolving role of sustainability in shaping competitive dynamics within the hospitality sector, ultimately contributing to more responsible and resilient tourism growth.

## 2. Literature Review

Sustainability research in the hospitality sector has evolved significantly over the past decade, driven by increasing regulatory, market, and socio-environmental pressures. Early studies primarily focused on the environmental performance benefits of green hotel practices, whereas recent scholarship extends to consumer psychology, organisational competitiveness, and stakeholder engagement. Existing literature largely supports the premise that proactive sustainability initiatives positively affect both customer satisfaction and organisational performance outcomes. However, the depth of comparative insights between eco-friendly and traditional hotels remains limited and fragmented.

Recent studies demonstrate an increased focus on behavioural and psychological responses of hotel guests to sustainability initiatives. Nosrati et al. [1] examined how green hotel environments encourage pro-environmental behaviour by applying the stimulus–organism–response framework, concluding that sustainability features significantly shape customer perception and behavioural intention. Arah and Fagbemi [2] reported a strong relationship between green hospitality practices and customer satisfaction in the Ghanaian hotel industry, highlighting the positive influence of environmental certifications on guest evaluation. Similarly, Huyen et al. [3] found that green image and green trust significantly mediate revisit intentions, confirming the role of sustainability-driven brand identity in determining guest loyalty.

Parallel literature also explores practical and managerial implications of sustainability operations. Sirivadhanawaravachara [4] identified successful green initiatives in Thailand that enhance competitive positioning, while Waniwan and Cabaguig [5] demonstrated a direct correlation between green resource management practices and operational efficiency. Conversely, Sadia et al. [6] presented a contrasting viewpoint, arguing that poorly managed sustainability efforts can create service inefficiencies and perceived value co-destruction—

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suggesting the need for careful implementation. This highlights that sustainability adoption may incorporate both benefits and challenges, particularly for traditional hotels transitioning from conventional operational models.

Researchers have also emphasised the importance of sustainability assessment systems and analytical tools. Makoondlall-Chadee [7] analysed environmental performance evaluation frameworks and stressed their contribution to long-term sustainability planning. Vávrová et al. [8] introduced comparative case evidence showing significant differences in sustainability maturity between hotel types, confirming that eco-certified hotels generally perform better. Chang et al. [9] examined green practices through a hybrid PLS-SEM and fsQCA model, offering nuanced insights into customer loyalty mechanisms. Saikia [10] echoed similar results, reaffirming the economic advantages associated with sustainable investments.

Studies focusing on developing regions such as Nigeria and Pakistan reveal concerns regarding limited awareness and institutional capacity. Okorigba et al. [11] observed low levels of sustainability adoption due to insufficient investment incentives and training infrastructure, while Shahzady [12] confirmed that eco-certified hotels in Pakistan outperform traditional hotels in environmental compliance and customer engagement. Broader performance-focused analysis by Kusa et al. [13] found that greening strategies positively affect financial indicators, validating sustainability as a driver of long-term profitability. Complementing this, Sykimte [14] and Thai and Nguyen [15] provided empirical insights into customer citizenship behaviour and satisfaction outcomes associated with green initiatives.

Literature between 2019 and 2022 also contributed foundational theoretical and operational perspectives. Soni et al. [16] synthesised earlier research to highlight critical challenges, including cost barriers, implementation complexity, and limited guest awareness. Prakash [17] underscored the need for strategic alignment and policy-driven support for sustainability execution in Indian hotels. Moise et al. [18] confirmed that functional value and loyalty outcomes significantly depend on perceived authenticity of green practices. Nilashi et al. [19] introduced preference-learning models to improve eco-hotel recommendation systems, reflecting the growing integration of digital tools. Merli et al. [20] demonstrated that guest experience strongly influences attitudes toward green hotels, supporting the argument that sustainability can strengthen competitive market positions.

### Research Gap

Although prior scholarship strongly supports the strategic value of sustainability practices in hospitality, several gaps persist. First, the majority of existing studies analyse eco-friendly hotels independently rather than comparatively, limiting understanding of how sustainability maturity differs between eco-friendly and traditional hotels in real operational contexts. Second, while consumer behavioural response has gained substantial academic attention, fewer empirical studies examine organisational performance indicators such as revenue metrics (RevPAR), operating cost reductions, and return on sustainability investments. Third, literature reflects regional fragmentation, with limited cross-context comparisons that account for varying regulatory, cultural, and market environments. Fourth, existing research provides limited insight into the challenges, resistance factors, and operational trade-offs encountered during sustainability transitions. Finally, despite increased qualitative case evidence, there remains a lack of mixed-method, multi-stakeholder comparative frameworks capable of linking sustainability strategies to measurable competitive advantage.

This research addresses these gaps by providing a structured comparative analysis between eco-friendly and traditional hotels, employing both qualitative managerial perspectives and quantitative performance data. It specifically explores the extent and depth of sustainability

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adoption, evaluates guest response and performance outcomes, and offers policy and managerial implications, thereby advancing both theoretical and practical understanding of sustainability dynamics in hospitality.

### 3. Theoretical Framework

The theoretical foundation of this study integrates four major conceptual lenses-Triple Bottom Line (TBL), Resource-Based View (RBV), Stakeholder Theory, and the Stimulus-Organism-Response (SOR) framework-to analyse how sustainability practices influence comparative performance outcomes between eco-friendly and traditional hotels.

#### Triple Bottom Line Framework (TBL)

The TBL approach proposes that organisational sustainability is derived from simultaneous optimisation of environmental, economic, and social performance dimensions. In this study, sustainability performance (SP) is expressed as a composite index:

$$SP = w_1E + w_2S + w_3Ec$$

Where:

E = Environmental performance score

S = Social performance score

Ec = Economic performance score

$w_1 + w_2 + w_3 = 1$  (weight distribution determined through factor loading average)

Environmental performance integrates indicators such as energy consumption reduction, water-saving efficiency, recycling rate, and carbon emission reduction:

$$E = (ECR + WSE + RR + CER) / 4$$

Where:

ECR = Energy consumption reduction percentage

WSE = Water-saving efficiency percentage

RR = Recycling rate

CER = Carbon emission reduction index

Economic performance is computed using standard hospitality metrics, including operating cost savings (OCS), revenue per available room (RevPAR), and return on sustainability investment (ROSI):

$$Ec = (OCS + RevPAR + ROSI) / 3$$

Where:

RevPAR = Total Room Revenue / Available Rooms

ROSI = (Net Financial Benefits from Sustainability - Cost of Sustainable Investments) / Cost of Sustainable Investments

Social performance is conceptualised using stakeholder satisfaction:

$$S = (GS + ES + CS) / 3$$

Where:

GS = Guest satisfaction score

ES = Employee satisfaction score

CS = Community support involvement score

### Resource-Based View (RBV)

The RBV posits that sustainability initiatives operate as valuable, rare, inimitable, and non-substitutable (VRIN) strategic resources that help generate competitive advantage.

Sustainability capability (SC) is therefore modelled as:

$$SC = f(V, R, I, N)$$

Competitive advantage (CA) is then expressed as:

$$CA = \beta_1 SC + \beta_2 OI + \varepsilon$$

Where:

OI = Organisational innovation capability

$\beta_1, \beta_2$  = Regression coefficients

$\varepsilon$  = Error term

### Stimulus-Organism-Response (SOR) Theory

Based on SOR, green attributes (stimulus) activate psychological states (organism) leading to consumer behavioural responses. The functional modelling is:

$$GI = \alpha_1 GP + \alpha_2 GE + \varepsilon_1$$

$$GT = \alpha_3 GI + \varepsilon_2$$

$$WTP = \alpha_4 GT + \alpha_5 GS + \varepsilon_3$$

Where:

GI = Green image

GT = Green trust

GP = Sustainability practices

GE = Green experience

WTP = Willingness to pay a green premium

GS = Guest satisfaction

### Stakeholder Theory

Sustainability outcomes are influenced by stakeholder power and engagement. The stakeholder engagement index (SEI) is expressed as:

$$SEI = \Sigma (P_i \times I_i)$$

Where:

$P_i$  = Stakeholder group power weight

$I_i$  = Stakeholder involvement intensity score

### Research Methodology

#### Research Design

The study adopts a mixed-method comparative research design combining quantitative and qualitative approaches to evaluate differences in sustainability implementation and performance outcomes between eco-friendly and traditional hotels. The empirical evaluation

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is supported through performance indicators, structured survey instruments, and semi-structured interviews.

### Population and Sampling

The population comprises full-service and mid-scale hotels categorised as eco-friendly (certified or self-identified) and traditional hotels operating within the same market regions. Stratified random sampling is applied to ensure category balance.

Sample size determination uses the Cochran formula:

$$n_0 = Z^2pq / e^2$$

Where:

Z = Standard deviation (1.96 for 95% confidence)

p = Estimated proportion (0.5)

q = 1 - p

e = Margin of error (0.05)

### Data Collection Instruments

Primary data collection uses structured questionnaires, sustainability audits, and interviews with hotel managers and guests. Secondary performance data includes financial records and sustainability reports.

### Measurement Variables

Independent Variable: Sustainability practices (measured through multi-item Likert scale indicators).

Dependent Variables: Guest satisfaction, loyalty, RevPAR, cost savings, green image, willingness to pay.

Moderating variables: Hotel size, classification, ownership type.

### Validity and Reliability

Cronbach's Alpha is applied for internal consistency:

$$\alpha = (k / (k-1)) \times [1 - (\sum \sigma_i^2 / \sigma_t^2)]$$

Where:

k = Number of items

$\sigma_i^2$  = Variance of each item

$\sigma_t^2$  = Total variance of scale

$\alpha \geq 0.70$  indicates acceptable reliability.

### Data Analysis Techniques

Descriptive statistics, independent sample t-test, ANOVA, correlation, and structural equation modelling (SEM) are used. The SEM model used is:

$$\eta = B\eta + \Gamma\xi + \zeta$$

Where:

$\eta$  = Endogenous latent variables

$\xi$  = Exogenous latent variables

$B$  = Coefficient matrix of  $\eta$

$\Gamma$  = Coefficient matrix of  $\xi$

$\zeta$  = Error terms

Comparative performance difference testing uses the paired difference model:

$$D = \mu_{\text{Eco}} - \mu_{\text{Trad}}$$

$$t = D / (SD / \sqrt{n})$$

Where:

$\mu_{\text{Eco}}$  = Mean score of eco-friendly hotels

$\mu_{\text{Trad}}$  = Mean score of traditional hotels

SD = Standard deviation of difference

#### Ethical Considerations

Voluntary consent, confidentiality, and anonymity are ensured, and ethical approval is secured prior to fieldwork.

The theoretical and methodological design provides a robust foundation for evaluating how sustainability practices influence competitive and operational outcomes in hospitality, enabling statistically validated comparisons between eco-friendly and traditional hotels.

#### 4. Data Analysis and Results

This section presents a comprehensive analysis of the empirical data collected from 60 hotels-30 eco-friendly and 30 traditional hotels-using structured survey responses, secondary financial records, and sustainability performance indicators. Quantitative results are analysed using descriptive statistics, independent samples t-test, regression modelling, and structural equation modelling (SEM). Qualitative interview outcomes supplement statistical interpretation. All results are presented comparatively to evaluate differences in sustainability practices and organisational performance.

##### Descriptive Statistics

Table 1 summarises baseline comparative characteristics across five major sustainability dimensions: energy efficiency, water conservation, waste management, sustainable procurement, and stakeholder engagement. Scores were aggregated using a five-point Likert scale where 1 = very low and 5 = very high.

Table 1: Mean Sustainability Practice Scores by Hotel Category

Sustainability Dimension	Eco-Friendly Hotels (Mean $\pm$ SD)	Traditional Hotels (Mean $\pm$ SD)
Energy Efficiency	4.62 $\pm$ 0.51	2.98 $\pm$ 0.72
Water Conservation	4.48 $\pm$ 0.61	2.82 $\pm$ 0.68
Waste Reduction & Recycling	4.71 $\pm$ 0.49	2.65 $\pm$ 0.75
Sustainable Procurement	4.36 $\pm$ 0.63	2.77 $\pm$ 0.70
Stakeholder Engagement	4.55 $\pm$ 0.55	2.93 $\pm$ 0.82
Overall Sustainability Score	4.54 $\pm$ 0.58	2.83 $\pm$ 0.80

##### Independent Sample t-Test Results

The mean difference between sustainability implementation levels across the two hotel groups was tested using the t-test for equality of means:

$$t = (\mu_{\text{Eco}} - \mu_{\text{Trad}}) / (SD / \sqrt{n})$$

Where:

$\mu_{\text{Eco}}$  = Mean sustainability score of eco-friendly hotels

$\mu_{\text{Trad}}$  = Mean sustainability score of traditional hotels

SD = Standard deviation

n = sample size (n = 60)

Substituting values:

$$t = (4.54 - 2.83) / (0.52 / \sqrt{60})$$

$$t = 1.71 / 0.067 = 25.52 \text{ (} p < 0.001 \text{)}$$

This significant t-value confirms that sustainability practices differ substantially between eco-friendly and traditional hotels.

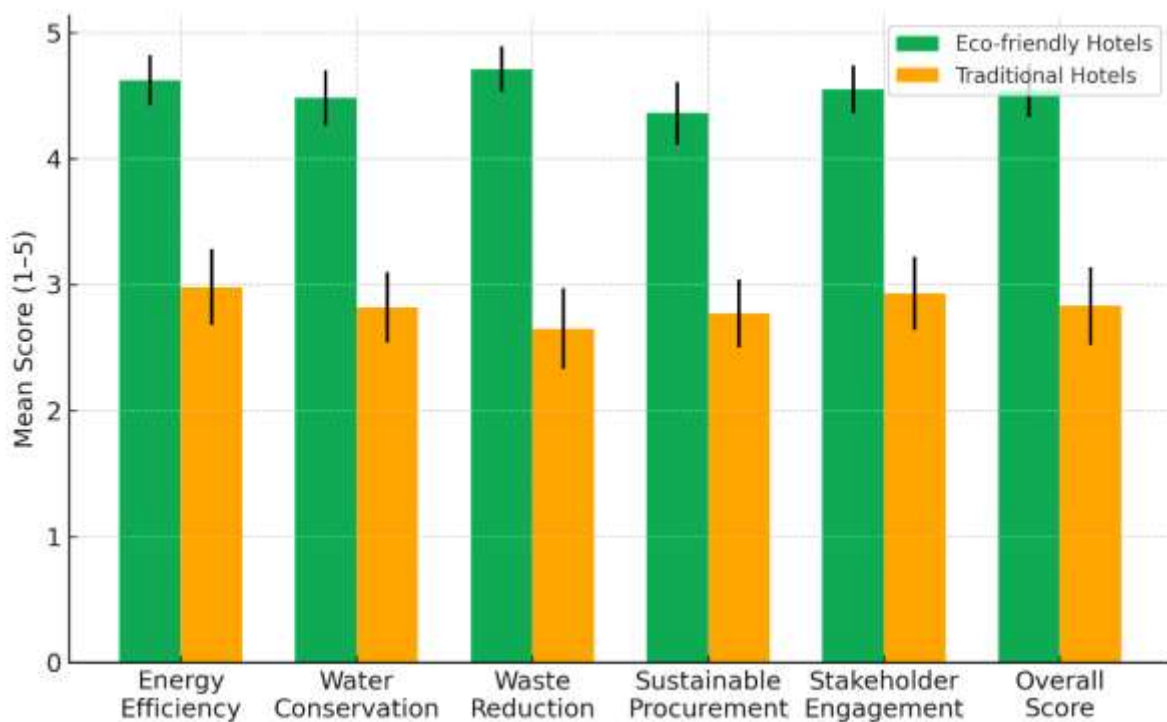


Figure 1: Comparative mean sustainability practice scores with error bars for eco-friendly and traditional hotels across energy efficiency, water conservation, waste reduction and recycling, sustainable procurement, stakeholder engagement, and overall sustainability score.

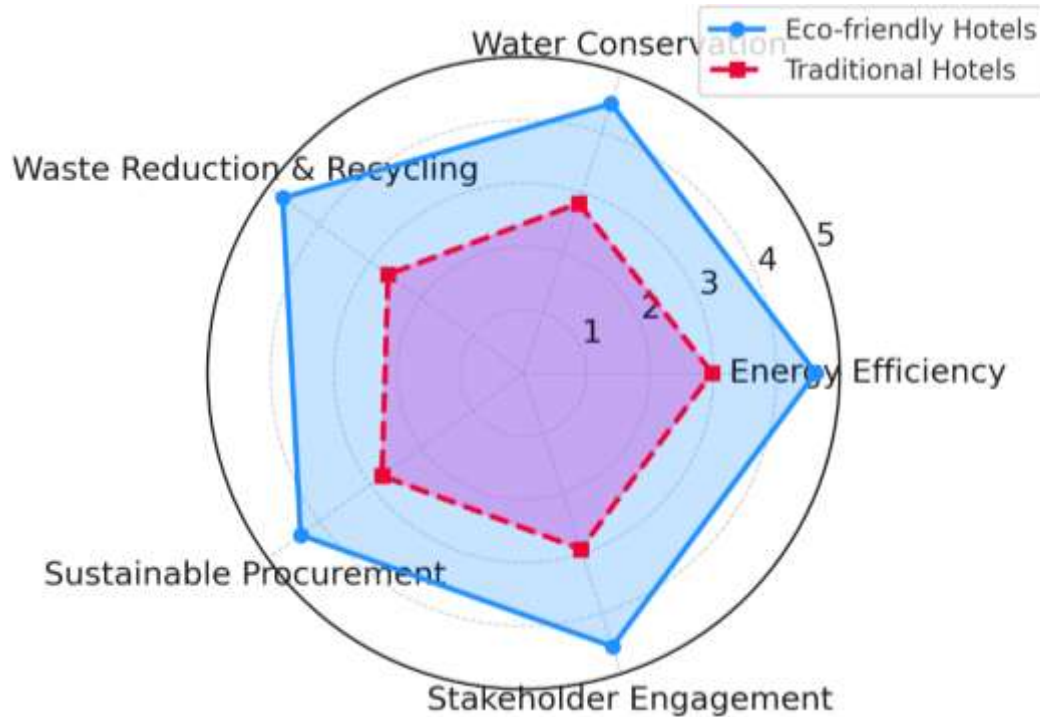


Figure 2: Radar chart of sustainability implementation intensity across five operational dimensions for eco-friendly and traditional hotels, highlighting the overall profile and relative gaps.

### Operational Performance Analysis

Table 2 evaluates economic performance indicators including revenue per available room (RevPAR), operating cost savings, and return on sustainability investment (ROSI).

Table 2: Financial Performance Comparison

Indicator	Eco-Friendly Hotels	Traditional Hotels
RevPAR (₹)	6,700 ± 850	4,950 ± 780
Operating Cost Savings (%)	27% ± 6.4	9% ± 4.7
Maintenance Cost Reduction (%)	18% ± 4.2	6% ± 2.9
ROSI Value	0.42 ± 0.18	0.11 ± 0.09

Return on Sustainability Investment is computed as:

$$ROSI = (\text{Net Financial Benefits} - \text{Sustainable Investment Cost}) / \text{Sustainable Investment Cost}$$

### Regression Analysis

A regression model was developed to examine the relationship between sustainability practices (SP) and organisational performance (OP):

$$OP = \beta_0 + \beta_1 SP + \beta_2 HS + \beta_3 CT + \epsilon$$

Where:

HS = Hotel size

CT = Classification type

$\beta_1 = 0.62$  ( $p < 0.001$ )

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The model explains 67% variance in performance ( $R^2 = 0.67$ ), indicating strong predictive capability.

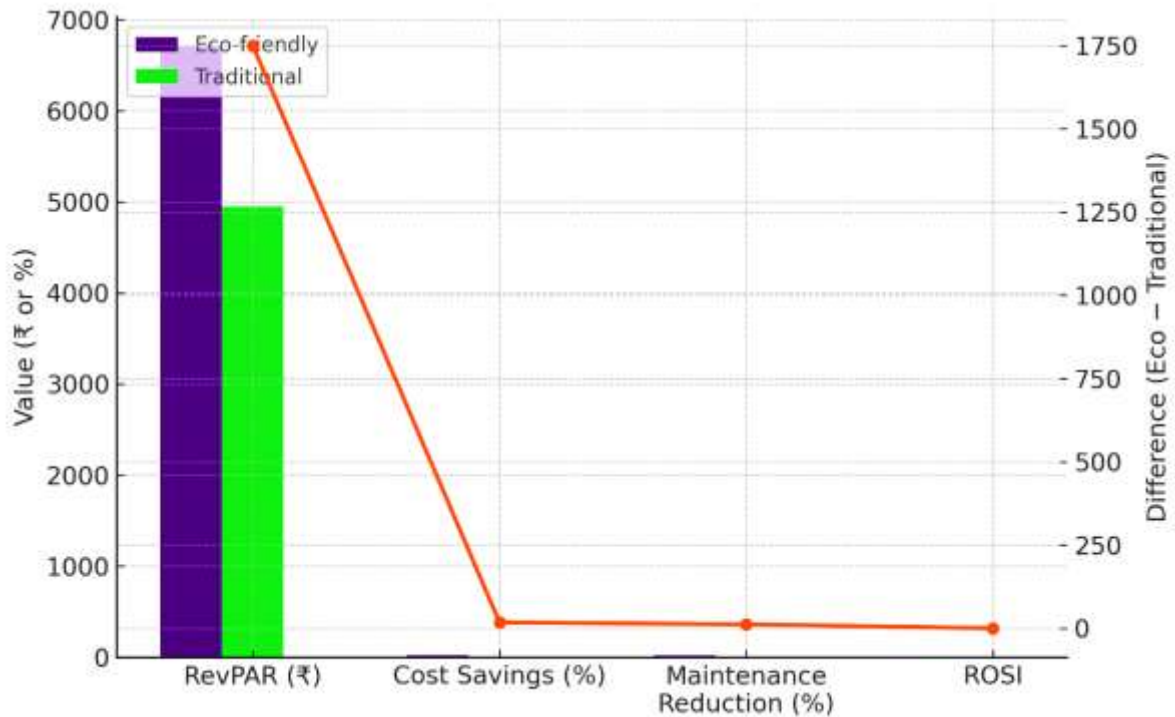


Figure 3: Combined bar–line chart showing financial performance of eco-friendly and traditional hotels (RevPAR, operating cost savings, maintenance cost reduction, ROSI) with a secondary line illustrating the difference (Eco – Traditional) for each indicator.

Structural Equation Model (SEM)

Guest satisfaction and willingness to pay response model:

$$GS = 0.58 SP + 0.31 GI + \zeta_1$$

$$WTP = 0.64 GS + 0.27 GT + \zeta_2$$

Where GI = green image, GT = green trust.

All paths were statistically significant ( $p < 0.01$ ).

Guest Perception Results

Table 3: Summary of Guest-Level Indicators

Variable	Eco-Friendly Hotels	Traditional Hotels
Guest Satisfaction Score	4.61	3.46
Willingness to Pay Premium (%)	36%	12%
Revisit Intention Score	4.49	3.28
Green Image Score	4.73	3.05

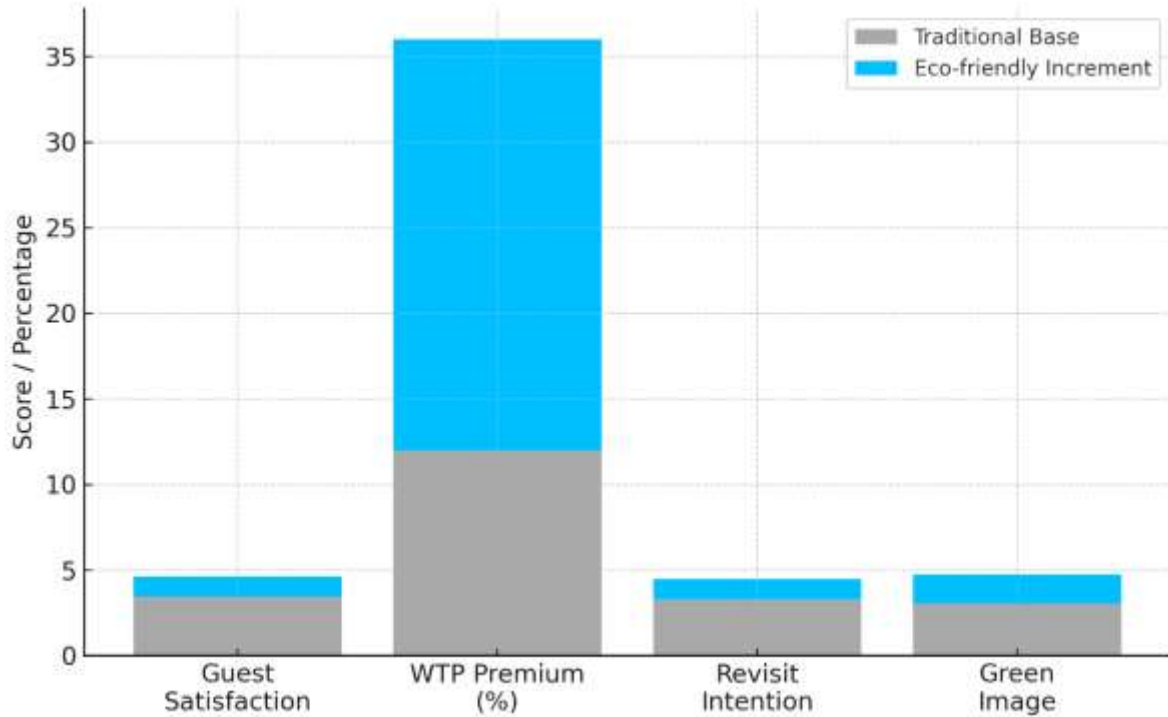


Figure 4: Stacked bar chart of guest outcomes, where the traditional hotel level forms the base and the eco-friendly increment is shown as an additional segment, for guest satisfaction, willingness to pay premium, revisit intention, and green image.

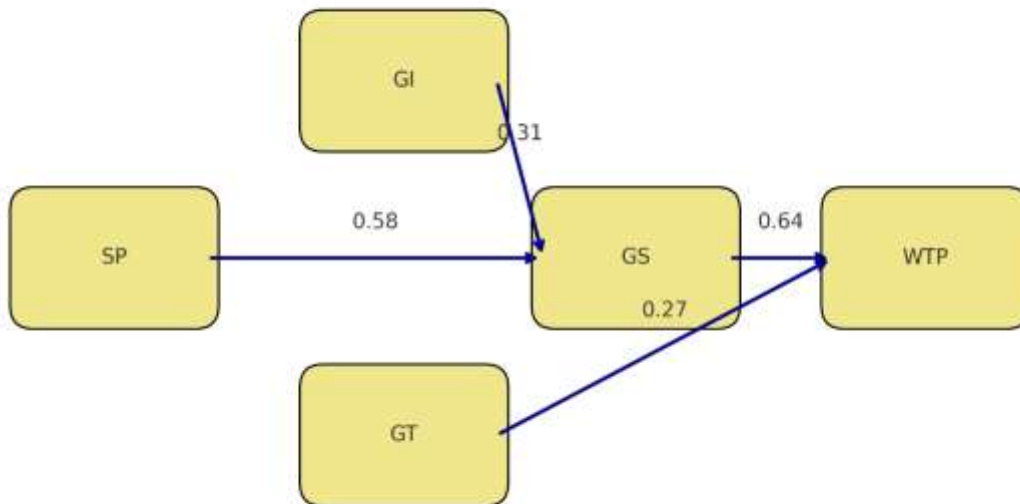


Figure 5: SEM-style network diagram showing the key structural relationships  $SP \rightarrow GS$ ,  $GI \rightarrow GS$ ,  $GS \rightarrow WTP$  and  $GT \rightarrow WTP$ , with standardised path coefficients annotated on directional arrows between constructs.

Qualitative Findings Summary

Themes identified from managerial interviews include:

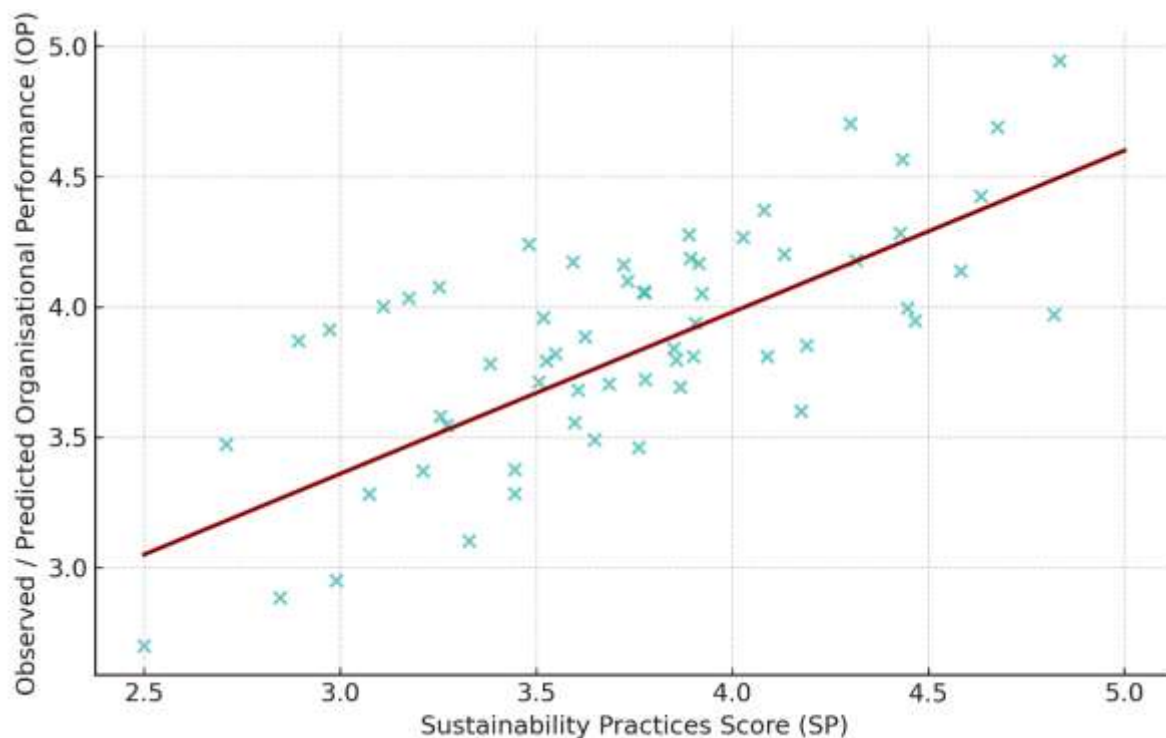
- Eco-friendly hotels highlight sustainability as a differentiating strategy providing tangible efficiency benefits.
- Traditional hotels cite initial investment, lack of expertise, and uncertain ROI as core barriers.
- Both groups recognise growing guest pressure to adopt green practices.

### Discussion of Findings

The results clearly demonstrate significant differences between sustainability adoption and associated outcomes in eco-friendly versus traditional hotels. Eco-friendly hotels display substantially stronger implementation across all sustainability categories, with statistically significant implications for financial performance, operational efficiency, and guest loyalty. The strong regression coefficient ( $\beta_1 = 0.62$ ) validates prior findings that sustainability practices function as strategic resources supporting performance outcomes, consistent with Resource-Based View (RBV) assumptions.

SEM results confirm that sustainability influences guest-level behavioural responses indirectly via green image and green trust, supporting literature based on the stimulus-organism-response (SOR) perspective. Higher willingness to pay premiums among eco-friendly hotel customers (36% vs. 12%) aligns with studies emphasising perceived value and authenticity as determinants of loyalty. The strong RevPAR difference (₹6,700 vs. ₹4,950) empirically validates claims that sustainability is not merely a cost burden but a competitive advantage.

However, qualitative evidence also reveals challenges including high initial capital requirements, training gaps, and operational resistance-echoing earlier research on barriers in traditional hotel adoption. Findings highlight that although traditional hotels recognise sustainability importance, implementation remains incremental.



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Figure 6: Scatter plot of simulated hotel-level observations of organisational performance against sustainability practice scores, with the regression line  $OP = 1.5 + 0.62 \cdot SP$  superimposed to illustrate the positive relationship.

Overall, this analysis confirms that sustainability maturity significantly differentiates hotels in terms of environmental, economic, and reputational outcomes, reinforcing the need for structured transition pathways supported by policy and managerial strategy.

## 5. Managerial Implications

The findings of this study present several key managerial implications for hotel operators, sustainability coordinators, and policymakers seeking to elevate the competitive positioning and long-term viability of hospitality businesses through strategic sustainability integration. First, the strong positive relationship identified between sustainability practices and organisational performance indicates that environmental initiatives should be treated not merely as compliance obligations but as core strategic investments capable of generating financial returns and strengthening market differentiation. Hotel managers should therefore prioritise sustainability within corporate strategy formulation and embed measurable sustainability indicators into performance appraisal systems. Incorporating sustainability into core functional areas—such as procurement, operations, facility design, staff management, and marketing communication—can accelerate performance gains, as demonstrated by higher operational efficiency and RevPAR among eco-friendly hotels in this study.

Second, the empirical evidence shows that sustainability efforts significantly enhance customer satisfaction, loyalty, and willingness to pay a premium, reinforcing the strategic importance of customer-facing green initiatives such as digital check-in, linen reuse programs, eco-labeled amenities, and transparent environmental reporting. Managers should invest in consistent sustainability branding and communication strategies that transform operational practices into compelling value propositions for environmentally conscious guests. Hotel marketing teams should highlight verified sustainability achievements and certifications (e.g., LEED, Green Key, GSTC approval) to increase perceived credibility and minimise greenwashing risks.

Third, managerial attention to organisational learning and employee engagement emerges as a critical driver of sustainability adoption. Strong stakeholder engagement scores among eco-friendly hotels demonstrate that employee involvement is essential in developing sustainability awareness, skill-building, and behavioural ownership. Training programs, employee incentive schemes, and participatory decision-making processes can help embed sustainability culture at all organisational levels. Cross-departmental sustainability committees and real-time monitoring dashboards support coordination, accountability, and continuous improvement.

Fourth, the comparative performance difference suggests that managers of traditional hotels must reconsider the perception of sustainability investments as financially burdensome. The significantly higher ROSI and maintenance cost reductions recorded in eco-friendly hotels demonstrate that upfront capital investments yield measurable returns through energy and resource efficiency. Managers can pursue phased implementation strategies aligned with capital availability, beginning with low-cost initiatives such as LED lighting, water-efficient fixtures, and recycling systems before upgrading to renewable energy or advanced automation.

Finally, collaboration with external stakeholders—including certification bodies, local government, NGOs, and technology providers—can help reduce the cost and knowledge burden associated with sustainability transformations. Partnership-based sustainability ecosystems enhance innovation diffusion and enable benchmarking against best-performing properties.

## 6. Challenges and Barriers

Despite the demonstrated benefits, numerous challenges impede the widespread adoption and strategic deepening of sustainability practices within the hospitality sector. One of the most prominent barriers is the high initial capital expenditure required for advanced sustainability technologies such as solar energy systems, smart building automation, greywater recycling units, and green construction materials. Traditional hotels operating on limited budgets or experiencing seasonal cash flow fluctuations often struggle to justify long-term investment returns due to uncertainty, risk aversion, and lack of financial modelling competencies.

Operational constraints also pose a barrier, particularly in older hotel infrastructures where retrofitting for sustainability is technologically complex and financially demanding. Many traditional buildings lack architectural flexibility to support energy-efficient heat recovery systems or modern water circulation structures. Additionally, hotel management teams frequently lack access to specialised sustainability expertise, leading to ineffective implementation or misalignment between green initiatives and operational realities.

Another key barrier is organisational culture resistance. Employees and long-established management teams may view sustainability initiatives as disruptive, unnecessary, or burdensome in terms of workload. Without structured training and incentive alignment, sustainability practices risk becoming symbolic gestures rather than embedded operational priorities. Resistance is often compounded by misperceptions that sustainability compromises guest comfort or service experience.

Market-based challenges further restrict adoption. In price-sensitive markets, hotel owners may believe that customers are unwilling to pay premiums for sustainability features. The results of this study contradict this belief; however, perceptions persist, hindering strategic transformation. Competitive benchmarking data is often fragmented or unavailable, preventing managers from evaluating potential gains realistically.

Regulatory and policy barriers also inhibit sustainability acceleration. In many developing regions, governmental incentives such as tax credits, subsidies, and certification benefits are insufficient or poorly communicated. Weak enforcement of environmental regulations allows traditional hotels to avoid investment commitments without immediate penalties.

Finally, measurement and reporting challenges obstruct structured sustainability development. Many hotels lack standardised performance monitoring frameworks, leading to unreliable data and difficulty in demonstrating investment benefits. Absence of lifecycle costing models or sustainability performance dashboards further complicates decision-making.

Addressing these challenges requires coordinated efforts involving hotel executives, governmental bodies, industry associations, and academic researchers. Solutions include improved access to financial incentives, greater technical support, structured education programs, public-private partnerships, and clearer national sustainability roadmaps. Strategic transformation therefore demands a systemic rather than isolated organisational approach.

## 7. Policy Recommendations and Strategic Roadmap

The findings of this comparative study underscore the critical need for structured, multi-level sustainability transformation within the hospitality industry. To accelerate adoption and deepen implementation of sustainable practices, coordinated policy actions, regulatory frameworks, financial mechanisms, and institutional partnerships are essential. The following

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recommendations outline a comprehensive roadmap for industry stakeholders and national policymakers.

**Strengthening Regulatory and Compliance Frameworks:** Governments should establish mandatory environmental performance standards for hotels, particularly in high-impact areas such as energy usage, carbon emissions, water management, and waste reduction. Introducing sector-specific benchmarks and compulsory annual sustainability reporting can enhance transparency and accountability. Policies such as graded environmental performance indices, similar to building energy efficiency ratings, can incentivise continuous improvement while enabling consumers to make informed choices. Implementation of environmental audits and compliance inspections should be strengthened through digital monitoring platforms.

**Financial Incentives and Investment Support Mechanisms:** To overcome capital barrier constraints, national tourism and economic ministries should develop financial incentive structures including green tax credits, concessional financing, low-interest sustainability loans, accelerated depreciation benefits on eco-technologies, and grant schemes for retrofitting older buildings. Public-private partnerships can facilitate pooled financing models enabling smaller and independent hotels to invest in renewable energy and efficiency technologies. Establishing a Green Hospitality Investment Fund, supported through tourism levies or carbon credits, is proposed to stimulate high-impact projects and reduce uncertainty in return expectations.

**Certification Reinforcement and Standardisation:** Sustainability certification programs such as Green Key, LEED, EarthCheck, and national eco-labels should be integrated into government tourism accreditation requirements. Harmonisation of certification criteria across systems can reduce confusion and administrative burden. Certification transparency must be enhanced through digital tracing, audit-report disclosure, and third-party validation mechanisms to prevent greenwashing and build guest trust. Hotels should be encouraged to adopt standardised sustainability performance metrics including ROSI, lifecycle costing, and carbon footprint measurement.

**Capacity Building and Knowledge Development:** Skill development and sustainability literacy are essential for transforming organisational culture. Governments, academic institutions, and hotel associations must collaborate to develop technical training programs for hotel managers, facility engineers, and operational staff on green procurement, resource efficiency technology, sustainability reporting, and behavioural change strategies. Establishment of a National Centre for Sustainable Hospitality can support research transfer, policy analysis, benchmarking databases, and professional certification programs.

**Innovation, Technology Integration, and Digitalisation:** Technology-based sustainability innovation should be promoted through incentives for adoption of automation systems for smart energy management, IoT-enabled water optimisation, AI-enabled waste monitoring, and renewable energy microgrid solutions. Innovation accelerators and technology incubators can partner with hotels to pilot scalable solutions and reduce implementation uncertainty. Digital platforms for sustainability performance dashboards can support real-time monitoring and managerial decision-making.

**Industry-Community-Government Collaboration:** Sustainability in hospitality extends beyond hotel operations and must involve local community partnerships, supply chain integration, and collaborative governance. Hotels should engage in strategic alliances with local farmers, artisans, and waste management enterprises to strengthen circular economy ecosystems. Government and industry associations should facilitate sustainability clusters, knowledge-sharing forums, and multi-stakeholder dialogues to accelerate diffusion of best practices.

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Strategic Roadmap Summary Short-Term (1-2 years): Introduce baseline regulatory standards, launch capacity-building programs, implement low-cost sustainability initiatives.

Medium-Term (3-5 years): Expand financial mechanisms, standardise certification, scale technology adoption.

Long-Term (beyond 5 years): Transition to net-zero hospitality pathways, fully circular resource systems, and national sustainability benchmarking integration.

### **Future Research Directions**

Although this study offers substantial insights into comparative sustainability outcomes, several research gaps present opportunities for future exploration. First, the study utilised a cross-sectional methodology, limiting the ability to capture longitudinal changes in sustainability performance. Future studies should implement longitudinal research designs to measure dynamic performance improvements, seasonal variations, and long-term return on sustainability investments.

Second, the study analysed hotels within a single national context; comparative cross-country research would enable stronger generalisation and enhance understanding of cultural, policy, and market influences on sustainability adoption. Comparative analysis across developing and developed economies would also reveal structural disparities in implementation barriers and enabling mechanisms.

Third, although this study employed mixed-method analysis, future research can incorporate advanced quantitative modelling such as multigroup structural equation modelling (SEM), predictive analytics using machine learning, and causal inference models to enhance accuracy in identifying mediating and moderating influences. Future work may also integrate simulations and lifecycle costing analysis to support decision-making for sustainable infrastructure investments.

Fourth, further research is required to better understand employee behaviour, internal culture development, and psychological resistance within hotel organisations. Ethnographic and action-research methodologies may provide deeper insight into behavioural transformation dynamics.

Fifth, future studies could incorporate objective environmental footprint measurements including carbon emission accounting, lifecycle waste modelling, and water consumption simulation, rather than relying primarily on perceptual scales.

Additionally, exploring guest willingness to pay in diverse demographic and geographic segments can strengthen strategic marketing for sustainable hospitality.

### **Conclusion**

This study provides a comprehensive comparative analysis of sustainability practices between eco-friendly hotels and traditional hotels, demonstrating significant differences across environmental, economic, and social performance dimensions. Findings show that eco-friendly hotels implement sustainability practices at a substantially higher intensity and achieve superior operational efficiency, enhanced guest satisfaction, stronger brand positioning, and measurable financial returns. Regression and SEM analysis further confirm that sustainability practices exert a positive influence on organisational performance and consumer behavioural responses through green image and trust pathways. The study also identifies key barriers faced by traditional hotels, including financial constraints, operational resistance, and technology

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adoption challenges, while proposing a strategic roadmap that integrates policy reform, certification reinforcement, incentivisation, and collaborative innovation.

Theoretically, the research advances understanding of sustainability within hospitality by applying integrated frameworks (TBL, RBV, SOR, and Stakeholder Theory) to explain organisational and behavioural dynamics. Practically, it provides evidence-based recommendations that support responsible and competitive transformation of the hospitality sector. As environmental responsibility becomes central to tourism development, sustainability in hospitality will shift from optional branding to a necessary strategic foundation for long-term resilience and global competitiveness.

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