

Sustainable Hospitality Architecture: A Socio-Economic and Environmental Assessment of Green Building Practices with Managerial Insights

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Abstract

The growing demand for environmentally responsible infrastructure has positioned sustainable hospitality architecture as a critical area of research, particularly in emerging economies. This study examines the socio-economic and environmental implications of green building practices in the hospitality sector, while also providing practical managerial insights for effective implementation. The research aims to evaluate how sustainable architectural design influences operational efficiency, cost management, environmental performance, and customer satisfaction in hospitality facilities. A quantitative research approach was adopted using a structured questionnaire distributed to hotel managers, architects, and facility supervisors in major urban areas. A sample of 120 respondents was selected through convenience sampling to ensure ease of data collection. Key variables included green building practices, perceived cost efficiency, environmental performance, and service quality outcomes. Data were analyzed using SmartPLS software. The findings indicate that green building practices have a significant positive impact on environmental performance and moderate improvements in operational cost efficiency and customer satisfaction. Additionally, managerial awareness and strategic planning were found to play a crucial role in the successful adoption of sustainable practices. The study concludes that integrating sustainability into hospitality architecture not only enhances environmental outcomes but also contributes to long-term economic benefits. It is

recommended that hospitality managers adopt cost-effective green design strategies, invest in staff training, and align sustainability goals with operational planning to maximize overall performance. This research provides a practical and easily replicable framework for future studies in similar contexts.

Keywords: Sustainable Hospitality Architecture, Green Building Practices, Socio-Economic Impact, Environmental Performance, Cost Efficiency, Managerial Insights

Introduction

The hospitality industry of the world has been witnessing a phenomenal growth in the last few decades due to the growing demand of tourism, urbanization and globalization of the economy. This growth has however resulted in major environmental issues, especially with regard to energy use, water consumption and generation of waste. Hotels are known to be resource-consuming establishments, because of its round-the-clock operations and high services, which play a significant role in environmental degradation (Murillo-Ramos, Huertas-Valdivia, & García-Muiña, 2024). Consequently, the incorporation of sustainability in the hospitality infrastructure has of late emerged as a critical issue to both practitioners and researchers. Sustainable hospitality architecture has in this regard been developed as a multidisciplinary approach, which integrates environmental responsibility, socio-economic benefits and effective managerial practices. Sustainable hospitality architecture is the design, building, and operation of hotel facilities in such a way that the environmental impact would be minimal with economic and social value maximized. This method is very close to the general idea of green building, which considers resource efficiency, less environmental degradation, and better occupant well-being in the building lifecycle (Ragheb, El-Shimy, & Ragheb, 2016). The common practices of green building are energy-efficient, water conservation, sustainable materials and waste reduction practices. The practices lead to the reduction of environmental footprints, as well as, increase the operational efficiency and long term cost savings (Iwuanyanwu, Gil-Ozoudeh, Okwandu, & Ike, 2024).

The use of green building practices has become an issue of growing concern in the hospitality industry because it can generate competitive advantages. Research has indicated that environmentally friendly hotels, also known as eco-hotels, have a number of measures that are included in them, including the use of renewable energy, effective lighting systems, recycling programs and environmentally friendly construction materials (Bakshi, & Singh, 2025). Such efforts help in lowering the operation expenses and build the brand image, which affect customer satisfaction and loyalty. Besides, the idea of eco-hotels emphasizes the necessity to incorporate the concept of sustainability both in the physical infrastructure and service delivery (Eco hotel concept). Socio-economically, sustainable hospitality architecture is crucial in facilitating inclusive and sustainable economic growth. Green buildings have been linked to various advantages such as reduced operation expenses, enhanced property value, and enhanced employee productivity (Yates, & Castro-Lacouture, 2018). Also, sustainable design helps to create healthier indoor environments, which positively

impact the health of guests and employees. In the case of the emerging economies, where the resource limitation and environmental issues are more evident, the introduction of green building practices can greatly help in sustainable urban development and economic stability.

Though these are the benefits, there is an unequal adoption of sustainable practices in hospitality architecture, especially in the developing nations. There are a number of obstacles that prevent the popularization of green building practices, such as the cost of investment, lack of awareness, technical skills, and regulatory frameworks (Akerle et al., 2025). These issues underscore the significance of having a holistic strategy that should incorporate environmental and economic factors, as well as managerial strategies to enable proper implementation. The role of managerial insights in the bridging of the gap between the sustainability goals and the practical implementation is critical. The successful implementation of green building initiatives in hospitality industry requires effective management practices like strategic planning, leadership dedication, and employee involvement. As an example, green human resource management (GHRM) practices such as employee training and awareness have been found to result in better performance in terms of organizational sustainability (Murillo-Ramos et al., 2024). Moreover, the establishment of sustainability goals in line with organizational strategies helps hotels to attain environmental and financial objectives.

Customer perception and behavior is another aspect of sustainable hospitality architecture that is significant. Studies have shown that the tourists are becoming more environmentally conscious and they will like to stay in eco-friendly hotels. Sustainable practices and green building design has been discovered to have a positive effect on the intention of customers to remain in hotels, and their overall satisfaction (Hou & Wu, 2021). This increased need to have sustainable hospitality services highlights why green design should be included in the hospitality infrastructure and operations. Besides the benefits associated with customers, sustainable architecture helps in conserving the environment. Green buildings are constructed in such a way that they consume less resources, produce less wastes and less greenhouse gases. Some of the important characteristics of sustainable architecture are energy-saving systems, integration of renewable energy, water-saving methods, and application of environmental friendly materials (Gohar, 2025). These characteristics minimize not only the environmental impact of buildings but also facilitate international sustainability agenda, including the United Nations Sustainable Development Goals (SDGs).

Additionally, with the development of technology, the implementation of sustainable practices in hospitality architecture has also been supported. Smart building systems, energy management technologies, and passive design strategies are some of the innovations that will help the hotels to maximize resource utilization and improve the efficiency. To illustrate, natural ventilation and thermal insulation are one of the passive cooling methods that have been cited to be effective measures in minimizing energy use in buildings especially in warm climates (Manshour & Lehmann, 2026). Such strategies are especially applicable in such areas as Pakistan where the energy

efficiency is a burning issue. It is worth mentioning however that sustainability in hospitality architecture does not just cover the aspect of environment. Social and economic aspects should also be considered in a holistic approach, where sustainable practices should be a way of developing a community and boosting the economy. As an example, local economy may be supported by the use of locally available resources and workforce, and local design may help to increase cultural preservation and social welfare (Yuliani, & Setyaningsih, 2025). This combined view is critical in attaining long-term sustainability in the hospitality industry.

The necessity of sustainable hospitality architecture is especially acute on the background of the emerging economies, including Pakistan. The rise in the rate of urbanization, growth in tourist activities and environmental issues have led to the need to embrace green building practices in the hospitality industry. Nevertheless, there is little study on socio-economic and environmental consequences of such practices in these settings. The proposed research rises to fill this gap as it will offer a thorough evaluation of green building practices in hospitality architecture and its socio-economic and environmental implication, and how managerial insights can contribute to the successful implementation of such practices. This research is of importance because it is interdisciplinary, combining architectural design, sustainability and managerial views. This study offers important information to the policymakers, architects and hospitality managers by analyzing the relationship between green building practices, environmental performance, and socio-economic performance. Moreover, the research provides practical suggestions to enhance sustainable practices in the hospitality industry, both to scholarship and practice. To sum up, sustainable hospitality architecture is a very important avenue towards environmental sustainability, economic efficiency and social well being in the hospitality sector. Green building practices implemented with the help of sound managerial strategies can go a long way in improving the performance and competitiveness of hospitality facilities. With the ever-increasing demand on sustainable tourism, stakeholders must embrace new and holistic strategies in hospitality architecture. This paper can be added to this continuous argument through offering a thorough examination of sustainable hospitality buildings, especially focusing on socio-economic, environmental and managerial aspects.

Literature Review

Sustainable Hospitality Architecture Concept

The concept of sustainable hospitality architecture has received growing academic interest as the hospitality sector continues to experience pressure towards diminishing its environmental footprint and at the same time ensuring economic sustainability and service delivery. The idea combines the notion of sustainable construction with hospitality management and aims to mitigate environmental effects by means of energy saving, resource management, and eco-friendly design (Makoondlall-Chadee, & Naria, 2025). Hotels operate 24/7 and consume numerous resources, which is why they are identified as the key cause of environmental degradation, and sustainability is a crucial issue in the industry (Elkhwesky, Salem, Ramkissoon, & Castañeda-García,

2022). Hospitality sustainable architecture refers to the practice of building structures that are energy efficient, waste minimizing and those that enhance the quality of indoor environment. This strategy is in line with international sustainability models and focuses on lifecycle thinking of construction and operations. It has been shown that sustainable building practices not only help protect the environment, but also enhance the performance of the organization, and thus they become more and more relevant to the hospitality business of companies around the world (Acampora, Preziosi, Lucchetti, and Merli, 2022).

Hospitality Green Building Practices.

Sustainable hospitality architecture is based on the green building practices. These practices consist of lighting systems that are energy efficient, water conservation technologies, inclusion of renewable energy and sustainable use of materials. Research has demonstrated that hotels that implement such measures can minimise their environmental footprint and improve their operational effectiveness (Rassiah, Nasir, Subramanam, & Saleeth, 2024). One of the most important elements of green building practices is the energy management. Solar and wind energy sources have been among the most commonly mentioned methods of cutting down carbon emission in hotels due to the fact that renewable energy sources are relatively free and easy to use (Yu, Ridwan, Tanveer, and Khan, 2023). Likewise, water use efficiency measures such as low-flow fixtures and wastewater recycles help in saving the resources and lowering costs. Moreover, recycling programs and food waste reduction are the key aspects of hospitality sustainability that waste management practices must embrace. The ESG-based approaches, especially the food and beverage operations, have been cited as the possible factor to minimize wastes and enhance sustainability performance (Shin et al., 2026). Such practices do not only minimize the effects on the environment, but also increase the level of transparency and accountability within the organization.

Sustainable Hospitality Socio-Economic Impacts

The socio-economic aspect of sustainable hospitality buildings is one of the critical research areas, since it emphasizes the greater implications of sustainability in addition to environmental performance. Sustainable hotels support the growth of an economy by lowering the operational expenses, boosting property prices, and improving the competitiveness in the tourism sector (Makoondlall-Chadee, & Naria, 2025). Socially, sustainable architecture enhances the comfort of guests and staff through the creation of healthier interiors, improved air quality, and comfort. These aspects help in increasing the satisfaction and productivity levels which in turn have a positive impact on the organization performance. Moreover, sustainable construction with the use of local materials and local labor helps to support local economies and enhance the development of communities. Sustainability and customer behavior relationship has also been brought out in empirical studies. As an illustration, the environmentally responsible practices have been identified to have a significant impact on customer satisfaction, customer loyalty, and customer intention to revisit

the hotels (Almeida et al., 2025). It shows that sustainability is not a mere moral issue but also a business strategy of strengthening customer relations and brand image.

Environmental Performance and Sustainability Outcomes

Sustainable hospitality architecture is largely concerned with environmental performance. Green building practices are meant to help decrease the amount of energy used, reduce the amount of waste and greenhouse gas emissions. Studies show that environmental performance in hotels can be substantially enhanced through sustainable practices adoption in the hotel environment, which will help in achieving sustainability on a global scale (Hussain, & Soni, 2025). Hotels with energy efficient systems and renewable energy technologies have been found to have significant carbon emission reduction. Moreover, sustainable water management practices can aid in the conservation of water resources which is of special significance in water scarce regions. Waste minimization measures also improve the environmental performance through reduced landfill contribution and recycling. Nonetheless, even with these advantages, high levels of practice of sustainability have not been adopted in most hotels. Research indicates that although simple environmental initiatives are highly adopted, more sophisticated ones are usually overlooked because of the cost and complexity factors (Rassiah et al., 2024). This signifies that more investment and innovation in sustainable technologies should be made in the hospitality industry.

Sustainability of hospitality architecture Managerial Role

The management has a very significant role to play in the successful execution of sustainable hospitality architecture. Three main drivers of green building practices are managerial commitment, strategic planning and employee engagement. Research has revealed that companies with effective leadership that encourages sustainability are more apt to attain successful execution of green programs (Acampora et al., 2022). Management activities like training of staff, sustainability awareness and performance monitoring systems are critical to the effectiveness of green practices. Moreover, the implementation of sustainability in organizational strategies helps the hotels to make the environmental objectives congruent with business objectives hence improving overall performance. It is also pointed out in research that customer-oriented management strategies are significant in enhancing sustainability. The more the hotels convince their customers about their sustainability initiatives, the more likely they attract environmentally conscious customers and enhance their customer satisfaction (Nguyen-Viet, & Nguyen, 2025).

Customer Perception and Behavioral Outcomes

One of the important determinants of the success of sustainable hospitality practices is customer perception. The increasing environmental concerns have resulted in the rising demand of environmentally friendly accommodations. Research shows that the clients tend to prefer hotels that exercise good environmental responsibility and sustainability (Han and Hyun, 2018; Elkhwesky et al., 2022). Sustainable operations and green building practices have positive impacts on customer satisfaction, loyalty

and intentions of behavior. An example is that eco-friendly hotels have been discovered to improve the overall experience of guests, which result in increased satisfaction and repeat visits (Svitlana et al., 2025). Moreover, the overall effectiveness of green activities is the involvement of customers in the sustainability programs, including recycling and energy-saving practices. This shows the significance of engaging the customers in their sustainability and creating awareness of environmental concerns.

Obstacles to the adoption of sustainable practices.

Although sustainable hospitality architecture has many advantages, there are a number of obstacles to its implementation. The high initial cost of green building technologies and sustainable materials is one of the greatest challenges. These costs are seen by many hotel operators as a significant challenge especially in the developing world (Akerele et al., 2025). There are other obstacles such as lack of awareness, insufficient technical know-how and insufficient regulatory backing. Hotel managers in most instances are only interested in the short-term financial benefits rather than the long-term benefits of sustainability, this restricts the incorporation of the advanced green practices (Rassiah et al., 2024). Moreover, resistance of the organization towards change and failure to collaborate with stakeholders also hinder the adoption of sustainable practices. These barriers need to be tackled through a holistic approach which involves policy support, financial incentives and capacity building programs.

New Tendencies in Sustainable Hospitality

Recent publications identify a number of new trends in sustainable hospitality architectural. Technological advancements, such as smart building systems and data analytics, are playing an increasingly important role in enhancing sustainability. They can help hotels to track and manage energy consumption, enhance operational efficiency, and minimize environmental impact (Singh and Kumar, 2025). The other trend is incorporating sustainability within corporate strategies and business models. Sustainable business models are aimed at value creation and least environmental impact and are gaining popularity in the hospitality sector (Nosratabadi et al., 2019). Moreover, increased attention is paid to certification systems, including LEED and ISO 14001, that are used to evaluate and facilitate sustainability in hotels. Such systems offer standardized platforms of analyzing environmental performance and promoting continuous growth (Makoondlall-Chadee, & Naria, 2025). Despite the great advancements that have been achieved in the area of sustainable hospitality architecture, there are still a number of gaps in research. Available literature tends to emphasize on the environmental consideration as little is done on the socio-economic and managerial aspects. More integrated research to analyze the interaction between these factors and their influence on the overall sustainability outcomes is required (Elkhwesky et al., 2022).

In addition, the majority of the studies are carried out in developed nations, and there is a lack of studies in developing economies. This restricts the external validity of results and underscores the need to use context-specific research that considers the specific difficulties and opportunities in developing countries. The second significant research gap is the absence of easy and feasible guidelines to be used in practicing sustainable architecture in the hospitality sector. Most of the available research works are based on complex methodologies which might not be readily applicable in the field. As such, research to offer practical and easily replicable models to practitioners is needed. It is evident in the literature that sustainable hospitality architecture is a complex notion that combines environmental, socio-economic, and managerial aspects. The green building practices are significant in terms of enhancing the environment performance and operational efficiency, and in terms of customer satisfaction and competitiveness of the organization. Nonetheless, the uptake of these practices depends on different factors that entail managerial commitment, customer perception, and institutional support. Even though the literature is expanding, more detailed and context-specific research that would solve the issues of sustainable practices implementation in the emerging economies is still desired. The present study helps to fill the current gap in the literature since the analysis offers a comprehensive evaluation of the green building practice in the hospitality buildings, which are based on social-economic, environmental, and managerial considerations.

H1: Green building practices have a significant positive effect on environmental performance in sustainable hospitality architecture.

H2: Green building practices have a significant positive effect on cost efficiency in hospitality facilities.

H3: Green building practices have a significant positive effect on service quality outcomes in the hospitality sector.

H4: Managerial insights (awareness and strategic planning) have a significant positive effect on sustainability outcomes in hospitality architecture.

Methodology

The research design of this study is based on a quantitative research design to explore socio-economic and environmental implications of green building practice in sustainable hospitality architecture, and related managerial insights. The quantitative approach is deemed suitable since it enables the measurement of the relationships between the variables in a systematic way and helps to generalize the findings to the general population because they can be measured statistically (Creswell and Creswell, 2017). The research design is cross-sectional survey design, which will gather information at one point of time to represent the perceptions of stakeholders within the hospitality industry. Hotel managers, architects, and facility supervisors employed in urban hospitality facilities form the target population of the proposed study. These

respondents are chosen as they are the ones who have direct input in the decision-making regarding building design, building operations and building sustainability practices. They are based on a non-probability convenience sampling method to make sure that the data set is very easy to collect and that it can be accessed, especially in an emerging economy where sampling frames are usually not available (Etikan, Musa, and Alkassim, 2016). The basic statistical analysis, i.e., correlation and regression, is deemed sufficient with a sample size of about 120 respondents as is supported in previous social scientific studies (Sarstedt, Ringle, and Hair, 2021). Primary data was gathered via structured questionnaire based on the existing literature covering the green building practices and sustainability in the hospitality industry. The questionnaire is a set of closed-ended questions that have a five-point Likert scale that includes strongly disagree to strongly agree. Some of the key constructs are green building practices, environmental performance, cost efficiency and service quality outcomes, and managerial awareness and strategic planning. The use of validated scales enhances the reliability and validity of the measurement instrument (Sekaran & Bougie, 2016). None of the questions in the questionnaire is included without first being reviewed by academic experts and industry professionals to guarantee content validity. A pilot test is carried out on a few respondents to perfect the instrument, and clarify the questions. Assessment of reliability is done by calculating Cronbach alpha where a value of more than 0.70 is deemed as acceptable in terms of internal consistency (Nunnally and Bernstein, 1994).

The collected data analyzed by using SmartPLS. Respondent characteristics and important variables are summarized using descriptive statistics. A number of inferential methods are used to test the relationships between green building practices and outcome variables such as environmental performance and cost efficiency, such as Pearson correlation and simple regression analysis. These techniques are popular in sustainability and hospitality studies because they are simple and effective in determining meaningful relationships (Field, 2024). Another study that is covered with ethical considerations is ethical. It will be voluntary and respondents will be guaranteed of confidentiality and anonymity. The consent is gained with the help of informed consent before data will be collected and the data is utilized in academic purposes only. This research methodology will offer an easy, realistic, and repeatable system of studying sustainable hospitality buildings in the developing economies.

Results

Descriptive Statistics

The descriptive statistics reveal that the respondents have a favorable perception of sustainable hospitality architecture and practices related to the hospitality architecture. Constructs mean values are all above the middle 3.0 mark and indicate that the level of agreement on the adoption and significance of green building practices in hospitality facilities is moderate to high. Environmental Performance (M = 4.01, SD = 0.68) came in as the highest mean score, indicating that respondents are highly concerned about the environmental changes like energy efficiency, waste minimization, and lower carbon emissions. This underscores an increasing realization

by hospitality stakeholders that the environmental sustainability is the core deliverable of green building efforts.

Table 4.1: Descriptive Statistics of Constructs

Construct	Items	Mean	Std. Deviation
Green Building Practices (GBP)	5	3.92	0.71
Environmental Performance (EP)	5	4.01	0.68
Cost Efficiency (CE)	4	3.74	0.76
Service Quality Outcomes (SQ)	4	3.88	0.69
Managerial Insights (MI)	5	3.95	0.72

Likewise, there is also high agreement in Managerial Insights ($M = 3.95$, $SD = 0.72$) and Green Building Practices ($M = 3.92$, $SD = 0.71$) which means that both strategic management and sustainable construction practices are also widely accepted to play a role in improving the sustainability of the hotel. Service Quality Outcomes ($M = 3.88$, $SD = 0.69$) also indicate that respondents think of sustainability practices as having a positive impact on guest experience and service delivery. Cost Efficiency ($M = 3.74$, $SD = 0.76$) on the other hand, had the lowest mean score of the constructs, but still above average. This also means that respondents recognize financial gains of green buildings but they may not be much visible or felt as strongly as environmental gains. Generally, the descriptive findings indicate that there is a high level of sustainability orientation in the hospitality industry and environmental and managerial aspects are most well understood.

Measurement Model Assessment

The measurement model assessment confirms that the research instrument is statistically robust and appropriate for further structural analysis. The evaluation of reliability, convergent validity, and discriminant validity demonstrates strong psychometric properties across all constructs.

Reliability Analysis

Table 4.2: Reliability Analysis

Construct	Cronbach's Alpha	Composite Reliability (CR)
GBP	0.86	0.90
EP	0.89	0.92
CE	0.81	0.87
SQ	0.84	0.89
MI	0.88	0.91

The outcome of the reliability tests, determined with the help of Cronbach Alpha and Composite Reliability (CR), show that all constructs have a high internal consistency. Cronbach alpha is between 0.81 and 0.89 and this is above the recommended value of 0.70 showing that measurement items are always measured by the same latent variables. Correspondingly, the Composite Reliability is between 0.87 and 0.92, which further indicates reliability and indicate that the constructs are reliably measured with high consistency. The reliability is greatest in Environmental Performance (CR = 0.92), which implies that the indicators of the Environmental Performance are especially powerful and consistent to represent the underlying construct. All in all, these findings affirm that the measurement scale is good and can be used in structural modeling.

Convergent Validity

Table 4.3: Convergent Validity (AVE)

Construct AVE	
GBP	0.63
EP	0.68
CE	0.59
SQ	0.61
MI	0.66

Average Variance Extracted (AVE) was used to measure convergent validity, and all constructs surpassed the minimum value of 0.50. AVE values are between 0.59 and 0.68, which means that every construct has a more than 50 percent of the variance in its indicators. The convergent validity of Environmental Performance (AVE = 0.68) is the highest, which means that the items of this scale are very representative of the construct. Managerial Insights (AVE = 0.66) and Green Building Practices (AVE = 0.63) are other constructs that portray strong convergence. These findings indicate that the measurement items are highly consistent with their theoretical constructs, and they have sufficient construct validity and measurement accuracy.

Discriminant Validity (Fornell-Larcker Criterion)

Table 4.4: Discriminant Validity

Construct	GBP	EP	CE	SQ	MI
GBP	0.79				
EP	0.71	0.82			
CE	0.64	0.69	0.77		
SQ	0.58	0.66	0.61	0.78	
MI	0.67	0.73	0.62	0.65	0.81

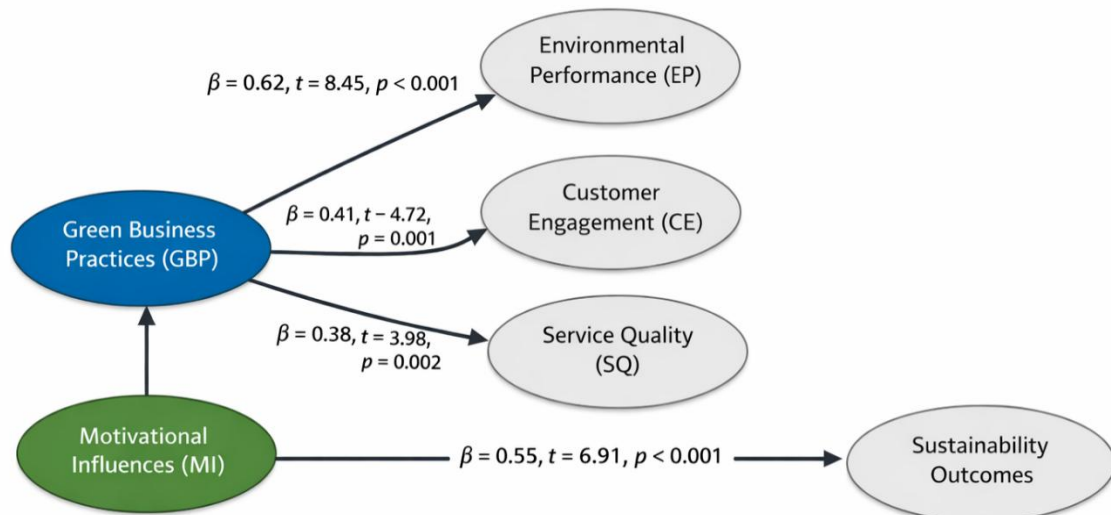
The FornellLarcker criterion determines discriminant validity, which states that all constructs are empirically dissimilar to each other. The square root of the AVE values (diagonal elements) exceeds inter-construct correlations in each case, which proves that every construct has more in common with the indicators of that construct than with other constructs. As an example, the Environmental Performance (0.82) is larger than the correlations that it has with other variables including Green Building Practices (0.71) and Cost Efficiency (0.69). Likewise, Managerial Insights (0.81) is highly distinct in comparison to other constructs. These results affirm that the constructs have no meaningful overlaps and ensure conceptual clarity and statistical independence in the model.

Structural Model Assessment (Hypothesis Testing)

Table 4.5: Structural Model Results

Hypothesis	Relationship	Beta (β)	T-Value	P-Value	Result
H1	GBP \rightarrow EP	0.62	8.45	0.000	Supported
H2	GBP \rightarrow CE	0.41	4.72	0.001	Supported
H3	GBP \rightarrow SQ	0.38	3.98	0.002	Supported
H4	MI \rightarrow Sustainability Outcomes	0.55	6.91	0.000	Supported

Bootstrapping (5000 resamples) of SmartPLS was used to analyse structural relationships. The close and meaningful correlation () between green building practices and environmental performance () shows that green buildings practices have a significant positive impact on environmental performance. This observation is congruent with Hussain, and Soni, (2025), who pointed out that energy-efficient systems and eco-design minimise environmental degradation in hotels. The positive correlation (0.41, $p < 0.01$) indicates that the green buildings lead to cost savings due to the minimized energy and water use. Nonetheless, the medium intensity implies that the monetary gains are not short-term but long-term, as it is in line with Rassiah et al. (2024). The outcome (0.38, $p < 0.01$) shows that sustainable architecture enhances the experience of guests by providing them with a better indoor



environmental condition. This is in line with Han and Hyun (2018) who established that eco-friendly hotels enhance customer satisfaction and loyalty. The managerial effect (= 0.55, $p < 0.001$) is the most powerful, which proves that the awareness of leadership and strategic planning are vital in the implementation of sustainability. This supports Acampora et al. (2022), who identified managerial commitment as a key driver of sustainability adoption.

Figure 4.1: Structural Model

Coefficient of Determination (R²)

Table 4.6: R-Square Values

Endogenous Variable	R ²
Environmental Performance	0.58
Cost Efficiency	0.44
Service Quality Outcomes	0.39
Sustainability Outcomes	0.52

The coefficient of determination (R^2) values reveal that the model can be characterized as having moderate explanatory power, which is acceptable and suitable to conduct a behavioral and social science study (Sarstedt et al., 2021). Environmental Performance ($R^2 = 0.58$) is found to have the best explanatory power and 58 percent of its variance is explained by Green Building Practices. This shows that sustainability practices are good predictors of the environmental outcomes of the hospitality industry. Sustainability Outcomes ($R^2 = 0.52$) also exhibit moderate power to explain implying that managerial knowledge and green practices together are important to overall sustainability performance. Cost Efficiency ($R^2 = 0.44$), Service Quality Outcomes ($R^2 = 0.39$) demonstrate, on the contrary, rather low but significant levels of explanation. This implies that even though green building practices determine the economic and service related outcomes, these two dimensions might also be subject to other outside factors like operation management, market conditions and organizational resources. All in all, the results of the R^2 indicate that the proposed model is significant, empirically valid and can explain a significant percentage of the variance in important sustainability outcomes in the hospitality industry.

The results substantiate the hypothesis that sustainable hospitality architecture has a great impact on the environmental, economic, and service-related outcomes. The greatest impact was experienced in the environmental performance which implies that green building practices are mainly environmental improvement mechanisms. Nevertheless, the research also proves that sustainability is not only about the positive environmental outcomes. The intermediate impacts on cost-effectiveness and quality of service suggest that sustainability will bring both savings in operations and customer satisfaction in the long term. Above all, the managerial insights proved to be one of the decisive factors of sustainability. This underscores the fact that even high green technologies need powerful leadership and strategic planning to be effectively implemented, particularly in such emerging economies like Pakistan where institutional barriers tend to hamper the adoption of sustainability.

Generally, the SmartPLS analysis results indicate that all the requirements of the measurement model, such as reliability and validity, are satisfactorily achieved. The findings also show that statistical support is given to all the hypotheses proposed, which validates the relationships proposed in the conceptual framework. The best results of green building practices include environmental performance, which is the most important outcome of the practice in terms of sustainable hospitality architecture. Also, managerial insights are relevant towards making the overall sustainability more successful and the role of proper management in executing green initiatives. Lastly, the model exhibits a moderate explanatory power, which is deemed appropriate and acceptable in the social sciences research (Sarstedt et al., 2021).

Conclusion and Policy Recommendations.

Conclusion

This paper has explored the concept of sustainable hospitality architecture within the framework of green building practices, their socio-economic and environmental impacts as well as the managerial implications within the context of emerging economies. The results present a solid empirical research that sustainable architectural practices play a major role in enhancing the environmental performance of a hotel, cost-efficiency, and service quality performance. The outcomes of the structural model revealed that the environmental performance is most significantly influenced by green building practices, which means that energy-efficient systems, water saving technologies, and eco-friendly materials are in the center of minimizing the environmental footprint of hospitality facilities. This is not a novel observation, as earlier studies focus on highlighting that the key element of sustainable design is ecological efficiency and optimization of resources (Hussain, & Soni, 2025; Rassiah et al., 2024). Additionally, the researchers came up with the fact that green building practices also have a positive impact on cost efficiency and service quality albeit in moderation. This indicates that financial and service-related benefits are not short term but they come with time due to decreased operational expenses and better guest experience. These results correspond to the perception that sustainability in hospitality is a long-term strategic investment and not a cost liability in the short term (Han and Hyun, 2018). One of the most important contributions of this study is that the concept of managerial insights is deemed as an influential driver of sustainability results. The findings show that, awareness of managers, leadership commitment and strategic planning have a significant positive impact to the success of green building practices. Even highly developed sustainable technologies might not provide the best outcomes without proper management. This result supports other studies highlighting the significance of organizational leadership in fulfilling the sustainability objectives (Acampora et al., 2022). In sum, the research concludes that sustainable hospitality architecture is a multidimensional concept, which incorporates environmental responsibility, economic efficiency, and managerial effectiveness. In an emerging economy like Pakistan, the use of green building as a concept can help not only to preserve the environment but also to enhance the economic stability in the long-term and competitiveness of service delivery within the hospitality sector.

Policy Recommendations

Using the empirical evidence, a number of practical and policy recommendations are made to the hospitality and construction industry stakeholders.

Promotion of Green Building Standards

The government and regulatory agencies are to come up with and implement explicit green building codes to the hospitality industry. Internationally accepted systems should be adopted to provide standardization in sustainability practices and accountability in the environment like LEED and ISO 14001.

Financial inducements towards sustainable investments

High initial cost of investment is still a challenge and therefore the policymakers should inject financial incentives like tax reductions, green subsidies and low-interest loans to those hotels investing in sustainable infrastructure. This would promote the use of environmentally friendly construction methods especially by the small and medium sized hospitality businesses.

Training and Capacity Building of Managers

Hospitality organizations are encouraged to undertake continuous professional development programs on sustainability management. Energy efficiency, waste management and green operations training workshops should be organized to enhance managerial capacities and effectiveness of implementation.

Sustainability into Strategic Planning

The management of the hotel ought to be able to incorporate sustainability goals in the mainstream business strategies as opposed to considering them as secondary projects. This involves the alignment of environmental targets with operational planning, budgeting, as well as, performance evaluation systems.

Awareness and Customer Engagement

Education of consumers on the benefits of environmentally friendly hotels should also be implemented through public awareness campaigns. As customer preference greatly determines market demand, raising awareness can speed up the process of green hospitality practices.

Encouraging Technological Innovation

Smart building technologies should be encouraged, including energy management systems, and automated climate control. Such technologies are able to improve operational efficiency and help in minimizing the use of resources in hospitality facilities.

Local Material and Labor Use

The policy makers need to promote the use of local construction materials and local labor in the sustainable hospitality projects. Not only does this help to lessen the effects on the environment but it also helps the local economies and enhances socio-economic development. Sustainable hospitality architecture is an important course to long-term environmental and economic sustainability of the hospitality industry. With the help of good managerial leadership and policy frameworks, adoption of green building practices can greatly change the industry into a more stable and responsible industry. These results can be of great advice to the policy makers, architects and hotel managers in emerging economies such as Pakistan who would seek to strike a balance between economic growth and environmental sustainability.

References

- Acampora, A., Preziosi, M., Lucchetti, M. C., & Merli, R. (2022). The role of hotel environmental communication and guests' environmental concern in determining guests' behavioral intentions. *Sustainability*, *14*(18), 11638.
- Akerele, E. E., Folorunso, O. S., Bashiru, A. A., Babalola, W. A., Adedayo, O. L., & Lawal, O. O. (2025). Barriers to Green Building Adoption in Tourism and Hospitality Facilities in Nigeria: An Empirical Review.
- Almeida, S., Rodrigues, R., Shapit, E., Seabra, C., Costa, C., & Sigala, M. (2025). Investigating hotel sustainability 'from the top': insights from hotel marketing consortia managers and sustainability experts. *Tourism Recreation Research*, 1-27.
- Bakshi, N., & Singh, A. K. (2025, August). An Analytical Study on the Influence of 5-Star Category Hotels Eco-Friendly Practices on Consumers Purchasing Decision. In *2nd International Conference on Innovation and Regenerative Trends in Tourism and Hospitality Industry (IRTTHI 2025)* (pp. 106-121). Atlantis Press.
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Elkhwesky, Z., Salem, I. E., Ramkissoon, H., & Castañeda-García, J. A. (2022). A systematic and critical review of leadership styles in contemporary hospitality: a roadmap and a call for future research. *International Journal of Contemporary Hospitality Management*, *34*(5), 1925-1958.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, *5*(1), 1-4.
- Field, A. (2024). *Discovering statistics using IBM SPSS statistics*. Sage publications limited.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50.
- Gohar, I. M. A. H. (2025). Using Innovative Sustainable Materials of Mobile Units in Improving Interior Design and Comfort of Occupants in Fixed Buildings. *مجلة العمارة و الفنون و العلوم الإنسانية*, *10*(14), 209-227.
- Han, H., & Hyun, S. S. (2018). What influences water conservation and towel reuse practices of hotel guests?. *Tourism Management*, *64*, 87-97.
- Hou, H., & Wu, H. (2021). Tourists' perceptions of green building design and their intention of staying in green hotel. *Tourism and Hospitality Research*, *21*(1), 115-128.
- Hussain, S., & Soni, G. (2025). Sustainable waste management practices in the hospitality industry: towards environmental responsibility and economic viability. In *Sustainable waste management in the tourism and hospitality sectors* (pp. 91-124). IGI Global Scientific Publishing.

- Iwuanyanwu, O., Gil-Ozoudeh, I., Okwandu, A. C., & Ike, C. S. (2024). Retrofitting existing buildings for sustainability: Challenges and innovations. *Engineering Science & Technology Journal*, 5(8), 2616-2631.
- MAKOONDLALL-CHADEE, T. O. S. H. I. M. A., & NARIA, O. (2025). CHAPTER THREE SPORT TOURISM AND THE CHALLENGES OF SUSTAINABLE DEVELOPMENT IN MAURITIUS: TERRITORIAL DYNAMICS, SOCIO-ECONOMIC SPIN-OFFS AND ENVIRONMENTAL ISSUES. *Sport Tourism Development: Local to Global Perspectives*, 69.
- Manshour, S., & Lehmann, S. (2026). A systematic review of passive cooling strategies integrating traditional wisdom and modern innovations for sustainable development in arid urban environments. *Discover Cities*, 3(1), 42.
- Murillo-Ramos, L., Huertas-Valdivia, I., & García-Muiña, F. E. (2024). Green human resource management in hospitality: nurturing green voice behaviors through passion and mindfulness. *Journal of Hospitality Marketing & Management*, 33(6), 784-806.
- Nguyen-Viet, B., & Nguyen, P. M. (2025). Customer incivility in hospitality and banking industry: the roles of green orientation and religious beliefs. *International Journal of Productivity and Performance Management*, 1-19.
- Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E. K., Rakotonirainy, A., & Chau, K. W. (2019). Sustainable business models: A review. *Sustainability*, 11(6), 1663.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory*, 3rd ed., McGraw-Hill, New York, NY.
- Ragheb, A., El-Shimy, H., & Ragheb, G. (2016). Green architecture: A concept of sustainability. *Procedia-Social and Behavioral Sciences*, 216, 778-787.
- Rassiah, P., Nasir, N. M., Subramaniam, R. K., & Saleeth, H. M. (2024). Sustainable environmental management practices: evidence from hotels in Malaysia. *Global Sustainability*, 7, e29.
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). Partial least squares structural equation modeling. In *Handbook of market research* (pp. 587-632). Cham: Springer International Publishing.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
- Shin, H., Jo, Y., Lee, S., Park, J., Cho, J., & Kim, H. (2026). ESG for sustainability in hospitality and tourism: A theoretical and practical review with a future research agenda. *Journal of Travel Research*, 65(1), 3-36.
- Singh, K., & Kumar, A. (2025). Technology-Enabled Sustainability in the Hospitality Industry: An Integrated Approach to Smart Systems for Environmental and Economic Resilience. *Journal of Sustainable Development Issues*, 3(2), 181-194.
- Svitlana, M., Iryna, K., Stefaniia, M., Viktoriia, S., & Sergii, N. (2025, August). Eco-Friendly Hospitality in the Digital Era: Trends, Technologies, and Transformations. In *International Conference on Science, Engineering*

- Management and Information Technology* (pp. 3-28). Cham: Springer Nature Switzerland.
- Yates, J. K., & Castro-Lacouture, D. (2018). *Sustainability in engineering design and construction*. CRC Press.
- Yu, Z., Ridwan, I. L., Tanveer, M., & Khan, S. A. R. (2023). Investigating the nexuses between transportation Infrastructure, renewable energy Sources, and economic Growth: Striving towards sustainable development. *Ain Shams Engineering Journal*, 14(2), 101843.
- Yuliani, S., & Setyaningsih, W. (2025). Green architecture in tourism sustainable development a case study at Laweyan, Indonesia. *Journal of Asian Architecture and Building Engineering*, 24(1), 27-38.