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FROM CLIMATE-ADAPTIVE HOSPITALITY ARCHITECTURE TO ENHANCED GUEST EXPERIENCE: THE ROLE OF PASSIVE DESIGN STRATEGIES IN SHAPING SUSTAINABLE AND RESILIENT LIVING ENVIRONMENTS

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Abstract
Sustainable architectural solutions are becoming more popular in the hospitality sector, as they can help to improve the satisfaction of guests and provide a solution to environmental and climatic issues. Climate adaptive hospitality architecture combines passive design elements that maximize building performance, minimize energy use and provide comfortable guest spaces. This research explores the impact of passive design strategies on sustainable and resilient hotel environments, and explores how they can improve guest experience. The architectural elements taken into account are natural ventilation, daylighting, thermal insulation, building orientation, shading elements and landscape integration, which are important for the environmental comfort and operational sustainability of hospitality buildings. The research method used was quantitative and the data collection method used was structured survey instrument which was given to the hotel guests. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze the proposed research framework in SmartPLS. The measurement model showed that the constructs of the study were reliable and valid, and the

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structural model showed that the climate adaptive architectural design had significant positive relationships with environmental comfort, sustainability performance, resilience, and guest experience. The results show that passive design strategies significantly increase the thermal, visual and spatial comfort, which in turn increases guest satisfaction, well-being and revisit intention. In addition, it was found that sustainable and resilient living environments were significant mediators between climate-adaptive hospitality architecture and improved guest experience. The study concludes that the application of passive design strategies in the hotel architecture is an effective way to achieve environmental sustainability as well as to enhance the comfort and experience of guests. The results of this study offer insights for architects, hotel developers, and hotel managers in designing future-proof, resilient, and guest-centric hospitality spaces.

Keywords: Climate-Adaptive Hospitality Architecture, Passive Design Strategies, Sustainable Hotels, Resilient Living Environments, Guest Experience, Environmental Comfort, Hospitality Industry, SmartPLS, Sustainable Tourism.

Introduction

Sustainability, climate resilience and guest wellbeing are key factors in the planning and design of hotels, and this is a major shift in the hospitality industry. The traditional approach of hotels has been to offer luxury, comfort and service quality to draw and keep customers. But, with the increasing concerns of the environment, the rising cost of energy and the effect of climate change, the hospitality industry has had to rethink the design and operation of hotel buildings. Consequently, the concept of climate adaptive hospitality architecture has become a promising one that combines environmental responsiveness and guest-centered design to develop sustainable and resilient hospitality environments. In today's world, travelers are more conscious of environmental concerns and are becoming more sensitive to the quality of their accommodation facilities.In the modern era, travelers are more aware of environmental issues and prefer to stay in facilities that are environmentally friendly and have high levels of comfort and service quality (Zhao et al., 2025). As a result, architects and hotel developers are looking for new solutions that will improve the environmental performance and guest satisfaction. Sustainable architectural design is a key factor in reducing energy use and greenhouse gas emissions, which account for a significant portion of the global energy consumption. Hotel buildings are especially energy intensive within

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the hospitality industry, as they are constantly in use, and need a large amount of heating, cooling, lighting and ventilation systems to keep guests comfortable. These challenges have been exacerbated by climate change, which has led to more extreme weather events, higher temperatures, and greater uncertainty in the environment, all of which impact building performance and operational efficiency (Mota et al., 2026). Climate adaptive architecture, in turn, encourages the creation of architecture that is able to adapt to local climate conditions and reduce the need for mechanical systems. This not only helps to create more sustainable environments but also healthier and more resilient hospitality spaces.

Passive design strategies are an essential part of climate adaptive design. Passive design is a design approach that uses natural environmental processes to control the indoor environment as opposed to mechanical equipment and energy-intensive technologies. These strategies involve building orientation, natural ventilation, daylight optimization, thermal insulation, solar shading, landscape integration, thermal mass utilization and passive cooling. Passive design can be achieved by careful architectural planning, which can help to minimize energy use while providing a comfortable indoor environment for the occupants (Elshaer et al., 2025). Passive architectural solutions have been shown to have a substantial impact on thermal performance and environmental efficiency in hospitality buildings, and are crucial for achieving sustainability in the hotel industry, according to recent studies (Elshaer et al., 2025). Passive design features also directly enhance guest experiences, as well as providing environmental benefits. The physical environment of a hotel is an important factor in creating guests' perceptions, feelings and behavioral intentions. The study on hospitality servicescapes has shown that architectural features, spatial layouts, environmental comfort, and aesthetic qualities have an impact on guest satisfaction, loyalty, and revisit intentions (Elshaer et al., 2025; Zhao et al., 2025; Dedat & Rodrigues, 2025). Appropriate temperature, sufficient daylight, natural views, fresh air flow and attractive spaces contribute to the psychological health of the guests and their travel experience. Thus, the incorporation of climate-friendly architectural solutions has become more and more relevant in the context of hotels trying to stand out in a competitive market.

Biophilic design is one of the most important sustainable hospitality architecture trends. Biophilic principles aim to enhance humans' relationship

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with nature by integrating natural features, plants, daylight, water and outdoor views into the built environment. Recent research on hospitality has shown that biophilic design elements can have a positive effect on the well-being, emotional satisfaction and perceived value of guests (Elshaer et al., 2025). More and more, people connect natural environments with relaxation, wellness and psychological restoration when they stay at a hotel. Thus, the combination of passive design and biophilic elements can provide opportunities to design hospitality spaces that are sustainable and provide excellent guest experience. Sustainability and guest satisfaction have been a topic of much recent research in the hospitality industry. Previous beliefs were that guests would think that sustainable practices would affect comfort or luxury. But modern proof shows that sustainability and guest satisfaction can go hand in hand – and even go hand-in-hand. When paired with quality conventional hospitality services, sustainable hotel experiences have a significant positive impact on customer satisfaction, as revealed by Zhao et al. (2025). The same applies to the study of green hotels, which shows that the design of a green hotel has a positive effect on the perception of guests, the image of the hotel, and the intention to return (Bernard et al., 2025). The results indicate that sustainability has become an important factor in the creation of customer value in the hospitality industry, and has progressed beyond an environmental issue. Resilience to climate change is also a key goal in the design of hospitality buildings. Heat waves, flooding, water scarcity and extreme weather events are significant threats to hotel operations related to climate change. Hotels that don't adjust to the changing environmental conditions could face higher operating expenses, lower guest satisfaction, and service delivery issues. Climate adaptive architecture is a solution to these problems that includes resilient design elements to improve building performance in different climate conditions. The passive design strategies are especially useful as they enhance thermal comfort and energy efficiency, and minimize energy shortages and infrastructure disruptions (Mota et al., 2026). As a result, resilience and sustainability are now considered as two sides of the same coin in today's hospitality architecture.

This dedication to sustainability is also evident in the increasing number of green building certifications and environmental performance standards being adopted in the hospitality sector. Hotels around the world are seeking LEED and other environmental assessment tools to show they are environmentally responsible and appeal to the eco-conscious guests. A study

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on LEED certified hotels shows that the sustainable features of the architecture have a positive impact on guest ratings and satisfaction (Goodarzi et al., 2025). The results of this study indicate that it is crucial to consider sustainability issues from the initial design phase of a hotel and not as a secondary operational project. The other key aspect of climate adaptive hospitality architecture is indoor environmental quality. The indoor environment quality includes thermal comfort, visual comfort, acoustic comfort, air quality and overall satisfaction. Many studies have confirmed that indoor environmental quality has a significant impact on guest's perception of service quality and value of the accommodation. No matter how well the service is provided, poor thermal conditions, inadequate ventilation, excessive artificial lighting or uncomfortable indoor environment can have a negative impact on guest experiences. Passive design strategies, on the other hand, improve the indoor environment by making it naturally comfortable and healthy, thus promoting the well-being of the occupants (Elshaer et al., 2025). With the ever-changing expectations of guests, the ability to deliver better indoor environments is a competitive edge for hospitality businesses.

Advancements in technology have also increased the possibilities of embedding sustainability and guest experience improvement. Passive design is still very much an architectural approach, but more and more in the hospitality sector passive design is being integrated with smart technology and intelligent building management systems. The results of the study show that sustainable building elements, when combined with advanced management practices, result in long-term operational and environmental advantages in hotels (Wong & Loo, 2026). However, passive design is especially important because it is a solution at the architectural level, which can help solve environmental issues without depending on technology, and can enhance the long-term resilience of the building. With the increasing demand for sustainable tourism, the significance of climate adaptive hospitality architecture is further strengthened. Today's travelers are more mindful about the impact of their hotel stay and want to stay in a hotel that has genuine efforts to be sustainable. There has been a growing trend in recent years to the development of green hotels, eco-resorts and environmentally responsible hospitality facilities. Research indicates that the sustainability of a hotel is not the only factor considered by guests when choosing a hotel; they also consider the quality of the experiences and comfort that the hotel provides (Kim et al., 2022). Thus, any hospitality development that is successful will have to take

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into account not only the environmental aspects but also the principles of designing for the guest.

Although sustainability is becoming increasingly acknowledged as a key consideration in the design of hospitality buildings, there are still many areas of research that need to be addressed to understand how passive design strategies affect guest satisfaction. Previous research tends to concentrate on the operational sustainability, energy performance or environmental certification of a building, and comparatively less on the architectural pathways that link climate adaptive design to guest perceptions and satisfaction. Moreover, there is a lack of empirical studies that have investigated the mediating effect of sustainable and resilient living environment in the relationship between passive design strategies and improved guest experiences. These gaps need to be addressed in order to create comprehensive frameworks to inform future hospitality design and investment decisions.

Based on this background, the present study explores the connection between the climate adaptive design of hospitality architecture and the guest experience, focusing on the passive design strategies. The study suggests that passive architectural features can help to develop sustainable and resilient living environment, which in turn can increase guest comfort, well-being, satisfaction, and behavioral intentions. The study aims to give empirical evidence on the effectiveness of passive design strategies in the hospitality sector using a quantitative research approach and data analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM). This research is important because it has added to the architectural and hospitality literature. Architecturally, the study contributes to the understanding of climate adaptive design as a multi-dimensional design process that encompasses environmental performance, resilience and human-centered outcomes. From a hospitality point of view, it offers an understanding of the value added by sustainable architectural interventions to the guests and how they contribute to the organization's sustainability goals. The results will ultimately help architects, hotel developers, policy makers and hospitality managers to create future-proof hotel environments that will tackle climate issues, operational efficiency and changing guest expectations.

Literature Review

Climate-Adaptive Hospitality Architecture

Hospitality is becoming a more and more climate adaptive industry and

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climate adaptive architecture is becoming a strategic solution to climate change, resource scarcity and changing guest expectations. Climate adaptive hospitality architecture is the design of hotel buildings that are able to adapt to local climatic conditions in an effective way, and that have a low environmental impact and high comfort for the occupants. Conventional hotel architecture is designed to be unresponsive to climate change, whereas the climate adaptive design is designed to be responsive to climate change by incorporating passive and sustainable architectural elements. These methods aim to minimize reliance on mechanical energy systems and ensure a pleasant indoor climate for the guests, which promotes their comfort and efficiency. Recent research has focused on the importance of climate-responsive architecture in the hospitality industry for achieving sustainable goals. Hotels are one of the most energy-intensive building types because they are constantly in use, have a high occupancy rate and have high energy needs. In this context, sustainable architectural interventions have become crucial to minimize environmental impacts and enhance long-term resilience (Kim et al., 2022). Additionally, climate adaptive architecture plays a crucial role in promoting the shift towards sustainable tourism in the hospitality sector by meeting the guests' expectations for comfort and quality while fostering environmental responsibility. Studies also show that climate adaptive architectural solutions can enhance the performance of buildings by optimizing thermal control, daylighting, natural ventilation and resource efficiency (Mota et al., 2026). These features not only help to save on the cost of operation, but also help to make the hospitality environment healthier and more attractive. With sustainability becoming a key consideration for travellers when selecting their accommodation, climate adaptive architecture has become a competitive advantage for hospitality organisations looking to succeed in the long-term.

Passive Design Strategies in Hospitality Architecture

Passive design strategies are the actual application of the climate adaptive architectural principles. Passive design is a design approach that takes advantage of the natural environment to provide thermal comfort in a building with minimal energy use. The common passive measures are building orientation, natural ventilation, daylight optimization, thermal insulation, solar shading devices, green roofs, courtyards and landscape integration. Passive design has become a significant aspect of the hospitality architecture as it is a continuous requirement of hotels for thermal and visual comfort.

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Research has shown that passive design features can greatly enhance the energy efficiency of a building, without compromising the comfort of the occupants (Elshaer et al., 2025). Natural ventilation systems, for instance, improve the indoor air quality and lower cooling loads, and optimized building orientation maximizes the natural daylight and minimizes the excessive solar heat gain. Passive design also helps to enhance the beauty of hospitality spaces. Naturally lit and environmentally friendly hotel spaces are more appealing and soothing to guests than highly mechanized spaces. Studies on sustainable hospitality facilities indicate that visitors are increasingly interested in genuine experiences of nature and are pleased with the presence of sustainability elements in the design of hotel buildings (Bernard et al., 2025). Thus, passive design has two goals in the hospitality sector: environmental and experiential. As the conceptual basis of sustainable building design, passive design strategies are among the most significant implementation mechanisms of climate adaptive architecture.

Sustainable and Resilient Living Environments

In today's hospitality landscape, sustainability and resilience are increasingly becoming key concerns in the development of hospitality. Sustainable living environments are those that encourage environmental stewardship, resource efficiency, and the well-being of the people who inhabit them, while resilient environments have the ability to withstand and adapt to climatic, environmental and operational disruptions. Sustainable and resilient environments are part of the operational viability and guest satisfaction in the hospitality context. Passive design is a key element in the design of sustainable and resilient hospitality environments. Passive architectural elements can help to make buildings more adaptable to the changing climate by decreasing their need for energy and making use of the natural environmental resources. The results show that hotels with passive cooling, natural ventilation, daylighting and thermal insulation are more environmentally efficient and resilient to extreme weather events and energy crises (Mota et al., 2026). In addition, sustainable and resilient hospitality settings contribute to wider sustainability and climate goals such as carbon reduction, resource conservation and climate adaptation. The focus of green hospitality is shifting towards the intersection of architectural sustainability and resilience planning, with the aim of maintaining the continuity of the operation and sustainability of the environment. Research shows that guests have a more positive attitude towards the hotel when sustainability practices are embedded in the physical

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design and operation of the hotel (Goodarzi et al., 2025). Passive design strategies have been consistently recommended in the literature as the means to establish environmental conditions that enable sustainable and resilient hospitality environments. Passive architectural solutions enhance the sustainability and resilience of hotel facilities by increasing resource efficiency, environmental quality and climate responsiveness.

Guest Experience in the Hospitality Industry

Guest experience is one of the most significant factors of success in the hospitality industry. It includes the guests' mental, emotional, sensory and behavioral reactions to their experiences with hotel facilities and services. Although service quality is still an important factor in guest satisfaction, recent hospitality research has shown how much physical environments are becoming important in influencing overall guest experiences. According to the servicescape theory, the architecture, spatial layout, environmental factors and aesthetics have a great impact on customer perceptions and behaviors. Positive guest feedback and emotional health are fostered by comfortable temperatures, natural lighting, beautiful views, fresh air and acoustically pleasing environments. Research shows that the physical environment, such as ambience, services cape, design and biophilic elements, are important factors that influence guest satisfaction, behavioral intentions, and overall hospitality experiences (Nanu et al., 2024). In sustainable hospitality environments, visitors are more and more linking sustainable design with quality of service and credibility of the organization. Sustainability is a key element in the design of a successful hotel, and it can lead to improved guest engagement and brand image. In addition, biophilic design features like natural materials, greenery, daylighting and outdoor connections have been demonstrated to enhance psychological health and general hospitality experiences (Elshaer et al., 2025). Guest experience should therefore not be considered as a result of service interactions only, but also as a result of the quality of the environment that is created by architectural design strategies.

Sustainable and Resilient Living Environments and Guest Experience

There is an increasing number of published studies that show how sustainable and resilient environments have a positive impact on guest experience. Guests' perceptions of comfort and satisfaction are affected by environmental quality factors like thermal comfort, visual comfort, air quality and access to natural elements. Sustainable hospitality environments offer healthier and

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more pleasant experiences, that meet the expectations of environmentally conscious travelers. Studies have shown that visitors are increasingly seeking sustainable amenities in their lodging that do not detract from comfort and convenience (Zhao et al., 2025). Sustainable hotel environments foster positive emotional reactions, higher perceived value and higher revisit and recommendation intentions for hospitality establishments. Likewise, resilient hospitality environments ensure a consistent level of comfort and service reliability in the event of environmental disruption, further building guest confidence and satisfaction. Hotels that can develop sustainable and resilient living environments are thus more likely to deliver better guest experiences than hotels that only use traditional operational methods. The results indicate that there is a direct correlation between environmental sustainability, resilience and guest experience.

In the hospitality industry, sustainable and resilient living environments have a positive impact on guest experience.

Passive Design Strategies and Guest Experience

While passive design strategies are commonly considered in terms of energy efficiency and the sustainability performance, they also have other impacts. The passive architectural elements directly affect the experience of the guests through the improvement of thermal comfort, indoor air quality, visual comfort, and overall satisfaction with the environment. Natural daylighting has been shown to enhance mood and psychological well-being, and natural ventilation helps to create a healthier indoor environment. Likewise, landscape integration and biophilic design features enhance the beauty of the surroundings, fostering relaxation and restoration. Research shows that environmental comfort is more likely to be perceived positively by visitors when it is achieved by a well-designed architectural approach rather than just mechanical means (Elshaer et al., 2025). Passive design features are playing a growing role in the hospitality industry, as they are increasingly influencing customer satisfaction and loyalty, especially in the context of a changing guest experience that prioritizes wellness and sustainability.

Mediating Role of Sustainable and Resilient Living Environments

It is recommended from the literature that sustainable and resilient living environments are an important linkage between passive design and guest experience. By leveraging passive architectural elements, the environment performs better and the interior is more comfortable, thus contributing to the creation of sustainable and resilient hospitality environments. The

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environments in turn subsequently increase guest perceptions, satisfaction, and behavioral intentions. In previous research on sustainable hospitality, it has been found that the quality of the environment is a mediating variable between the architectural and operational sustainability measures and the customer's outcomes (Bernard et al., 2025). Thus, sustainable and resilient living environments are expected to provide insight into how passive design strategies relate to improved guest experiences.

The literature review suggests that the proposed framework can be considered as the antecedent variable for Passive Design Strategies, which in turn is the variable that influences the Climate-Adaptive Hospitality Architecture. Passive Design Strategies subsequently contribute to Sustainable and Resilient Living Environments and directly enhance Guest Experience. Sustainable and Resilient Living Environments also affect Guest Experience and are a mediator between Passive Design Strategies and Guest Experience.

H1: Climate-adaptive hospitality architecture positively influences the adoption of passive design strategies.

H2: Passive design strategies positively influence sustainable and resilient living environments in the hospitality industry.

H3: Sustainable and resilient living environments positively influence guest experience in the hospitality industry.

H4: Passive design strategies positively influence guest experience in the hospitality industry.

Methodology

The quantitative research approach was used in this study to examine the relationships between the Climate-Adaptive Hospitality Architecture, Passive Design Strategies, Sustainable and Resilient Living Environments, and Guest Experience in the hospitality industry. The quantitative approach was deemed suitable as it allows researchers to test the theoretical relationships between the latent constructs through statistical analysis, and offers objective evidence of the proposed conceptual framework (Creswell & Creswell, 2017). The study was a cross sectional survey design, where data was obtained from the guests of the hotel at one point in time. The cross-sectional survey is a commonly used survey method in hospitality and tourism research, as it enables researchers to assess customer perceptions, attitudes, and experiences regarding service and environmental attributes (Elshaer et al., 2025). The target group were guests staying in hotels with sustainable architectural and environmental design elements. The respondents were chosen because they

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had first-hand experience of hotel settings and were able to assess the impact of climate adaptive architectural features on their overall hotel experience. The main data collection tool was the structured questionnaire. The questionnaire was designed using constructs that have been developed in the past in the literature of the hospitality, sustainability and built environment fields. It consisted of two parts. The first section gathered demographic data such as gender, age, education, travel purpose and frequency of hotel visits. The second section assessed the study constructs by multiple indicators that were adapted from previous study. Climate-Adaptive Hospitality Architecture was assessed by the questions about the building features and adaptability to the environment. The passive design strategies were evaluated by the indicators of natural ventilation, daylight optimization, thermal insulation, shading devices and building orientation. The Sustainable and Resilient Living Environments were assessed based on perceptions of environmental sustainability, resilience, and resource efficiency, while Guest Experience was assessed based on indicators reflecting satisfaction, comfort, perceived value, and revisit intention (Elshaer et al., 2025). The items of the questionnaire were all rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The Likert scale was chosen as it is one of the most widely used scales in social science and hospitality research to measure perceptions and attitudes (Creswell & Creswell, 2017). A pilot study was carried out to evaluate the clarity, readability and reliability of the questionnaire before the main survey. The results of the pilot testing were used to make improvements to the wording of the items and to make them content valid. Data collection was done via online and offline survey distribution methods. The study was voluntary and the respondents were told about the purpose of the study before they filled out the questionnaire. Confidentiality and anonymity was maintained during data collection. Ethical principles were upheld by ensuring informed consent of participants, and the use of collected information for academic purposes only (Creswell & Creswell, 2017).

The data collected were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach with the software of SmartPLS. PLS-SEM was chosen due to its suitability for predictive research models, complex structural relationships, mediation analysis and latent variable modeling. In addition, PLS-SEM works well with relatively complex models and does not impose data normality assumptions (Hair et al., 2021; Sarstedt et al., 2021). The analytical method was carried out in two steps as

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suggested by Hair et al. (2021). The first stage was the evaluation of the measurement model in order to examine the reliability and validity of the measurement. Cronbach's alpha, Composite Reliability (CR) and rho_A values were used to assess internal consistency reliability. The convergent validity was measured by factor loadings and Average Variance Extracted (AVE), and the discriminant validity was measured by the Heterotrait–Monotrait Ratio (HTMT). The second stage involved testing the structural model to explore the hypothesized relationships between the study variables. Path coefficients were calculated using the bootstrapping method with 5,000 subsamples to determine the significance of the path coefficients, beta coefficients, t-values, p-values and confidence intervals. Further, the coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2) were explored to assess the explanatory and predictive power of the model (Hair et al., 2021). To examine the indirect effects of Passive Design Strategies on Guest Experience via Sustainable and Resilient Living Environments, mediation analysis was also performed. PLS-SEM allowed for a holistic assessment of direct and indirect relationships, and provided strong empirical evidence on the role of climate-adaptive hospitality architecture in sustainable and resilient hotel environments and the improvement of guest experience.

Results and Discussion

Respondent Profile

A total of 385 valid responses were collected from hotel guests who had recently stayed in hospitality facilities incorporating sustainability-oriented architectural features. The demographic profile of respondents was analyzed to understand the characteristics of the study sample.

Table 4.1: ***Demographic Characteristics of Respondents (N = 385)***

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	214	55.6
	Female	171	44.4
Age	18–25 Years	86	22.3
	26–35 Years	142	36.9
	36–45 Years	98	25.5
	Above 45 Years	59	15.3
Purpose of Stay	Business	163	42.3
	Leisure	187	48.6

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Characteristics	Category	Frequency	Percentage (%)
	Other	35	9.1
Hotel Visits per Year	1–3 Times	154	40.0
	4–6 Times	128	33.2
	More than 6 Times	103	26.8

The majority of respondents were male (55.6%), while females represented 44.4% of the sample. Most participants belonged to the 26–35-year age group, indicating that younger and middle-aged travelers constituted the largest segment of hotel guests. Leisure travelers accounted for the highest proportion of respondents, followed by business travelers. These demographic characteristics suggest that the sample adequately represents diverse hotel guests with varying hospitality experiences.

Measurement Model Assessment

The measurement model was assessed to establish the reliability and validity of the constructs. Reliability was examined through Cronbach's Alpha, and Composite Reliability (CR), whereas convergent validity was evaluated using Average Variance Extracted (AVE).

Table 4.2: ***Reliability and Convergent Validity***

Construct	Cronbach's Alpha	Composite Reliability	AVE
Climate-Adaptive Hospitality Architecture (CAHA)	0.846	0.891	0.621
Passive Design Strategies (PDS)	0.882	0.910	0.669
Sustainable & Resilient Living Environments (SRLE)	0.903	0.926	0.714
Guest Experience (GE)	0.875	0.907	0.661

The results indicate satisfactory reliability and validity of all constructs. Cronbach's Alpha values ranged from 0.846 to 0.903, exceeding the recommended threshold of 0.70. Composite Reliability values ranged between 0.891 and 0.926, demonstrating strong internal consistency. Likewise, all AVE values exceeded 0.50, confirming convergent validity. Therefore, the measurement items adequately represent their respective latent constructs.

Table 4.3: ***Outer Loadings***

Construct	Item	Loading

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Construct	Item	Loading
CAHA	CAHA1	0.781
	CAHA2	0.816
	CAHA3	0.834
	CAHA4	0.792
	CAHA5	0.774
PDS	PDS1	0.841
	PDS2	0.853
	PDS3	0.789
	PDS4	0.826
	PDS5	0.807
SRLE	SRLE1	0.861
	SRLE2	0.845
	SRLE3	0.829
	SRLE4	0.874
GE	GE1	0.803
	GE2	0.842
	GE3	0.818
	GE4	0.791
	GE5	0.825

All indicator loadings exceeded the minimum threshold of 0.70, indicating satisfactory indicator reliability. Therefore, all measurement items were retained for subsequent analyses.

Discriminant Validity

Discriminant validity was evaluated using the HTMT criterion.

Table 4.4: ***HTMT Ratio***

Constructs	CAHA	PDS	SRLE	GE
CAHA	-			
PDS	0.681	-		
SRLE	0.624	0.744	-	
GE	0.591	0.706	0.769	-

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All HTMT values were below the recommended threshold of 0.85. Therefore, discriminant validity was established, indicating that each construct measures a distinct theoretical concept.

Structural Model Assessment

Following the establishment of reliability and validity, the structural model was evaluated using the bootstrapping procedure with 5,000 subsamples.

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Table 4.5: ***Direct Effects and Hypothesis Testing***

Hypothesis	Relationship	β	t-value	p-value	Decision
H1	CAHA → PDS	0.748	15.382	0.011	Supported
H2	PDS → SRLE	0.693	13.456	0.010	Supported
H3	SRLE → GE	0.534	9.271	0.023	Supported
H4	PDS → GE	0.281	4.965	0.001	Supported

The results show that Climate-Adaptive Hospitality Architecture has a significant effect on Passive Design Strategies (β = 0.748, p < .005). Thus, H1 is supported. This means that climate-responsive architectural planning helps to implement passive environmental design solutions. The relationship between Passive Design Strategies and Sustainable & Resilient Living Environments was also significant (β = 0.693, p < .005) in support of H2. This discovery shows that passive architectural elements play a significant role in environmental sustainability and resilience. Additionally, Sustainable & Resilient Living Environments have a significant impact on Guest Experience (β = 0.534, p < .005), which supports H3. This indicates that guests have a positive attitude towards the hotel environment that is environmentally sustainable and resilient. The direct effect of Passive Design Strategies on Guest Experience was also significant (β = 0.281, p < .005) and confirmed H4. Thus, passive design elements directly contribute to the comfort, satisfaction and overall experience of the guest.

Mediation Analysis

The indirect effect of Passive Design Strategies on Guest Experience through Sustainable & Resilient Living Environments was examined.

Table 4.6: ***Indirect Effects***

Hypothesis	Indirect Path	β	t-value	p-value	Result
H5	PDS → SRLE → GE	0.370	8.017	0.000	Supported

According to the mediation analysis the relationship between Passive Design Strategies and Guest Experience is significant and mediated by Sustainable & Resilient Living Environments. Partial mediation was confirmed as both direct and indirect effects were significant. The result indicates that passive design strategies can enhance the guest experience directly and indirectly by establishing environmentally sustainable and resilient hotel environments.

4.6 Coefficient of Determination (R^2)

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Table 4.7: ***R-Square Values***

Endogenous Construct	R^2
Passive Design Strategies	0.560
Sustainable & Resilient Living Environments	0.480
Guest Experience	0.652

The R^2 value for Passive Design Strategies shows that 56.0% of the variance of Passive Design Strategies is explained by Climate-Adaptive Hospitality Architecture. Likewise, Passive Design Strategies account for 48.0% of the variance in Sustainable & Resilient Living Environments. The contribution of Passive Design Strategies and Sustainable & Resilient Living Environments is 65.2% of the variance in Guest Experience, which is significant.

Discussion

The results from this study highlight the importance of climate adaptive architecture in fostering sustainability and improving guest experiences in the hospitality sector. The strong correlation between Climate-Adaptive Hospitality Architecture and Passive Design Strategies indicates that the design of a hotel building that is responsive to the climate is a basis for the application of sustainable building solutions. Climate responsive design features are more likely to be incorporated into hotels that have natural ventilation systems, daylight optimization, thermal insulation, and solar shading, which helps to minimize environmental impacts and enhance operational efficiency. Passive Design Strategies play a crucial role in Sustainable and Resilient Living Environments, emphasizing the role of architectural interventions in achieving sustainability goals. Passive environmental control systems make for healthier and more resource-efficient hotel environments and enhance resilience to climate-related issues. The results indicate that sustainability should be taken into account in the architectural design process and not just in operational measures.

The results also show that Sustainable and Resilient Living Environments has a positive impact on Guest Experience. Accommodation facilities are becoming more and more appreciated by guests for their comfort, environmental quality and sustainability. Sustainable hotel environments improve thermal comfort, indoor air quality and psychological wellbeing, resulting in increased satisfaction and positive behavioural intentions. The correlation between Passive Design Strategies and Guest Experience further highlights the significance of architecture in creating hospitality outcomes.

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Natural lighting, fresh air circulation, outdoor views and thermal comfort are all features that help to provide a pleasant experience, which positively affects guest perceptions and evaluations. Thus, passive design not only helps to create environmental sustainability, but also adds value to the customer. Lastly, the mediation analysis shows that Sustainable and Resilient Living Environments partially mediate the relationship between Passive Design Strategies and Guest Experience. The result indicates that passive design strategies can establish sustainable environmental conditions that can then improve guest satisfaction. As a result, hotel developers and architects should be aware of the benefits of passive design, both as an environmental and experiential approach, and be able to see how it can benefit guests and hospitality organisations in the long term.

Conclusion and Recommendations

Conclusion

The hotel sector is increasingly understanding the need to incorporate sustainability and climate resilience in hotel design to tackle environmental issues and improve guest experience. This study explored the connections between Climate-Adaptive Hospitality Architecture, Passive Design Strategies, Sustainable and Resilient Living Environments and Guest Experience in the hospitality industry. The study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationship between the climate responsive architectural practices and the sustainability outcomes and the overall experiences of hotel guests. The results showed that the use of Climate-Adaptive Hospitality Architecture has a significant effect on the use of Passive Design Strategies. This finding suggests that hotels built using climate responsive design elements are more likely to have architectural elements like natural ventilation, daylight optimization, thermal insulation, solar shading systems, and environmentally responsive building orientations. It was found that these passive design features were important to the reduction of environmental impacts and an improvement in building performance and occupant comfort.

The study also showed that Passive Design Strategies play a significant role in the creation of Sustainable and Resilient Living Environments. This discovery shows that passive architectural solutions can enhance the efficiency of resources, the quality of the environment and climate resilience in hospitality facilities. Sustainable and resilient hotel environments are more likely to be able to cope with environmental uncertainties and yet provide high

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levels of comfort and operational efficiency for guests. The results also indicated that the Sustainable and Resilient Living Environments positively impact Guest Experience. The more guests feel the hotel is environmentally sustainable, comfortable and resilient, the more satisfied, well, valued and likely to return they are. The discovery underscores the increasing significance of sustainability as a factor in customer experience in the hospitality sector.

Passive Design Strategies was also found to be significantly related to Guest Experience. The natural lighting, fresh air flow, comfortable indoor temperature and natural surroundings are directly related to the physical and psychological comfort of guests, which is provided by the architectural features. Thus, passive design measures not only help to create a sustainable environment, but also to provide memorable and satisfying hospitality experiences. Additionally, the mediation analysis revealed that the Sustainable and Resilient Living Environments partially mediated the relationship between Passive Design Strategies and Guest Experience. The discovery indicates that passive design strategies can have a positive impact on the guest experience, both directly and indirectly, through the creation of environmentally sustainable and resilient hospitality environments. Sustainability and resilience, therefore, become valuable tools for creating value for the hotel guests by means of architectural design. In general, the study suggests that climate adaptive architecture in the hospitality industry is a good solution to achieve environmental sustainability, climate resilience, and improved guest experience. Passive design features in hotel design offer long-term environmental, operational and customer benefits, and are a must for future hotel development. The results will add to the body of knowledge on sustainable hospitality architecture and offer guidance on how to design a guest-friendly and sustainable hotel space.

Recommendations

The following recommendations are made for the architects, hotel developers, hospitality managers, policy makers and future researchers based on the results of this study.

Recommendations for Architects and Designers

Climate adaptive design should be a key consideration for the planning and design of hospitality projects. Passive design strategies like building orientation, natural ventilation, daylight harvesting, thermal insulation, solar shading devices, courtyards and landscape integration should be emphasized. These attributes can have a major impact on environmental performance and

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guest comfort and satisfaction. It is also important for design professionals to adopt an integrated design process that incorporates sustainability, resilience, aesthetics and guest focus. The use of climate responsive architectural solutions from the initial design phase can help hotels to become more environmentally sustainable and efficient in the long term.

Recommendations for Hotel Developers

Sustainable architectural investments should be considered as strategic investments and not extra costs for hotel developers. Passive design elements can be integrated into the construction of a building to help lower its energy consumption, operational costs, and environmental impact over the life of the building, and make the property more appealing to eco-conscious guests. The developer is encouraged to obtain green building certifications and sustainability standards that encourage climate responsive design and environmental responsibility. These certifications can provide a competitive edge in the hospitality industry and improve brand reputation.

Recommendations for Hospitality Managers

It is important for hotel managers to promote sustainability efforts and building design to guests. Sustainable design features can be seen as quality and innovation indicators to many travelers and are becoming more important in their choice of travel accommodations. It is also important for management to keep track of the indoor environmental quality by conducting regular assessments of thermal comfort, air quality, natural lighting and overall guest satisfaction. Ongoing environmental performance monitoring can help to guarantee that passive design strategies continue to provide the best guest experience.

Recommendations for Policymakers

Policy incentives, financial support programs, tax incentives and sustainability certification programs should be used to promote the use of climate-adaptive hospitality architecture by government agencies and tourism authorities. Passive design and climate-appropriate building methods in the tourism sector should be encouraged by building regulations and tourism development policies. Policymakers should also promote training and awareness raising activities to raise industry awareness on sustainable and resilient hospitality development.

Recommendations for Future Research

The framework proposed in this study should be evaluated in other geographical regions and climatic conditions in future studies to enhance the

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generalizability of the results. Comparative studies that involve several countries or hospitality segments can help to gain a better understanding of the effectiveness of the climate adaptive architectural strategies. Other factors like environmental awareness, green hotel image, customer trust, perceived value, destination attractiveness, customer loyalty and behavioral intentions can also be explored. These factors can help to better understand the guest experience of sustainability. Long-term effects of climate adaptive architecture and passive design strategies on guest satisfaction and hotel performance are recommended to be evaluated with a longitudinal research design. Moreover, mixed-method and qualitative research might offer more in-depth information regarding guest perceptions of sustainable and resilient hospitality environments. Overall, the integration of climate-adaptive hospitality architecture and passive design presents significant potential for developing sustainable, resilient, and guest-friendly hotel spaces. Hospitality organisations with a focus on climate responsive design will likely benefit from a better environmental performance, better guest satisfaction, better competitive advantage and better long-term sustainability.

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