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The Role of Eco-Friendly Materials in Enhancing Comfort and Aesthetics in Hotel Design

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Abstract

Eco-friendly materials have become an essential component in modern hotel design, providing a combination of sustainability, comfort, and beauty. While their environmental benefits are widely established, their direct impact on guest experience and spatial atmosphere has received little attention in three-star hotel settings. This study takes a qualitative approach, to determine how eco-friendly materials improve both comfort and aesthetics in hotel construction. Data were gathered through case studies of hotels in Lagos, Nigeria, with an emphasis on material performance indicators, indoor environmental quality, and visitor happiness. Thermal comfort analysis, acoustic performance assessments, and user experience surveys were used to examine how eco-friendly materials affect hotel atmosphere and operational efficiency. The study found that eco-friendly materials considerably improved interior air quality, thermal comfort, and acoustic insulation, resulting in a 30% improvement in guest satisfaction. Furthermore, the use of natural materials such as bamboo, repurposed wood, and low-VOC finishes helped to create visually appealing interiors while lowering the building's environmental impact. The study also found that using sustainable materials led in cost savings through increased energy efficiency and lower maintenance expenses. Eco-friendly materials are thus a strategic design approach for enhancing both the functional and aesthetic quality of

hotel rooms. Their capacity to improve comfort, promote sustainability, and create visually appealing environments demonstrates their significance in the future of hospitality design.

Keywords: Eco-Friendly Materials, Hotel Design, Comfort, Aesthetics, Sustainable Architecture, Indoor Air Quality, Thermal Performance.

Introduction

The hospitality industry is facing new problems in balancing guest comfort, aesthetic appeal, and sustainability. As hotels attempt to satisfy changing market expectations, architectural innovations play an important role in improving user experience while reducing environmental footprint. Eco friendly materials, noted for their sustainability, durability, and aesthetic versatility, offer a feasible answer to these issues (Agarwal et al., 2020). These materials are intended to improve indoor air quality, thermal comfort, and visual ambiance, making them especially useful in hotel design, where visitor happiness is strongly tied to spatial quality. However, despite the growing use of sustainable materials in design, their direct impact on hotel comfort and aesthetics is understudied, particularly in Nigeria (Filimonau & Tochukwu, 2020). Thermal regulation, air quality, and acoustic insulation all have an impact on guest comfort in hotels, while aesthetics help to define a hotel's brand and appeal. Hotels, which cater to a broad clientele, require design techniques that use eco-friendly materials while maintaining luxury and functionality. The use of natural materials like bamboo, repurposed wood, and low-VOC coatings has the potential to improve both comfort and visual harmony while lowering environmental impact (Qader, 2023). However, there are major research gaps about how different sustainable materials affect visitor experiences and long-term maintenance costs, particularly in places with contrasting climatic and socioeconomic situations, such as Lagos and Abuja, Nigeria. Hotel architecture in cities must go beyond aesthetics to incorporate sustainable and practical solutions to address environmental problems and energy use (Fousteris, 2023). Hotels function as hubs for leisure, business, and social interactions, necessitating environments that are both physically appealing and functionally pleasant. Eco friendly materials meet these requirements by increasing air circulation, naturally controlling temperature, and lowering noise pollution. Their use is consistent with global sustainability goals, giving hotels the potential to improve visitor happiness while reducing resource depletion (Chan & R, 2023). Integrating eco-friendly materials into hotel architecture provides a transformative

potential to improve comfort and aesthetics. These materials help to improve indoor environmental quality by maximizing natural light, optimizing airflow, and adding tactile and visual appeal (Kujundzic et al., 2023). Furthermore, their renewable nature reduces reliance on synthetic materials, cutting carbon footprints and maintenance expenses. The potential of eco-friendly materials to produce visually appealing, pleasant, and sustainable places is especially useful in hotels, where guest perception is critical to overall business performance (Ali & Anjum, 2024). This article investigates the importance of eco-friendly materials in improving hotel comfort and aesthetics, utilizing case studies from Lagos and Abuja, Nigeria. It investigates the link between sustainable materials, guest experience, and operational efficiency, emphasizing how material selection can address common hotel design difficulties (Kalefa & Gado, 2024). The study uses material performance analysis and user satisfaction questionnaires to provide a thorough understanding of how eco-friendly materials affect hospitality settings.

The study aims to bridge the gap between sustainable material innovation and hospitality design. The objectives of this study are to:

i. Analyze how eco-friendly materials contribute to thermal comfort, indoor air quality, and aesthetic appeal in hotels in Lagos, Nigeria.
ii. Explore the key challenges and limitations associated with adopting eco-friendly materials, including cost, availability, and regulatory constraints.
iii. Develop practical strategies for integrating eco-friendly materials into hotel design to enhance guest experience while promoting sustainability.

PROBLEM STATEMENT

The global hospitality industry's shift toward sustainability has led to widespread adoption of eco-friendly building materials, driven by both environmental concerns and growing consumer demand for green accommodations. However, this transition presents unique challenges in developing economies like Nigeria, where the intersection of material performance, guest experience, and economic viability remains critically understudied, particularly in the context of three-star hotels that form the backbone of the country's hospitality sector.

While extensive research exists on sustainable materials in luxury hotels and temperate climates, there is a striking lack of localized studies examining how these materials perform in Nigeria's unique tropical environment. The country's combination of high temperatures (averaging 28-32°C annually), extreme humidity (often exceeding 80%), and seasonal heavy rainfall creates specific durability and performance requirements that conventional sustainability studies fail to address. For instance, the long-term behavior of materials like bamboo or low-VOC finishes under prolonged moisture exposure remains undocumented in Nigerian contexts.

The economic dimension presents another significant knowledge gap. Current literature predominantly focuses on high-end establishments where budget constraints are less pressing, ignoring the crucial cost-benefit analysis needed for mid-tier hotels that operate with tighter financial margins. Preliminary estimates suggest eco-material premiums of 15-30% in Nigeria due to import dependence and limited local manufacturing capacity, yet there is no comprehensive research on actual return-on-investment timelines when factoring in energy savings, maintenance costs, and potential occupancy rate increases.

From a design perspective, the hospitality industry faces a fundamental tension between sustainability and guest expectations. Three-star hotels in Nigeria must balance ecological responsibility with the aesthetic and comfort standards demanded by both domestic and international travelers. The absence of standardized design frameworks that successfully merge these priorities has resulted in either tokenistic sustainability efforts or designs that prioritize form over function. For example, while green roofs may offer thermal benefits, their implementation without proper structural considerations can lead to leakage issues that ultimately degrade guest experience.

The regulatory landscape further compounds these challenges. Unlike more developed markets with strict green building codes and certification systems (such as LEED or BREEAM), Nigeria lacks comprehensive sustainability standards for the hospitality sector. This regulatory vacuum creates uncertainty for hotel developers, who must navigate conflicting priorities without clear guidelines. Additionally, the shortage of technical expertise in sustainable design among local architects and contractors often leads to improper material specification and installation, undermining potential benefits.

Market perception adds another layer of complexity. While international travelers increasingly value sustainability, domestic guests in Nigeria often prioritize visible luxury over environmental considerations. This disconnect creates a challenging environment for hoteliers attempting to justify sustainable investments without clear evidence of their impact on guest satisfaction and repeat business.

The current research landscape fails to address these multidimensional challenges in an integrated manner. Most studies examine individual aspects - material properties, guest preferences, or economic factors - in isolation, neglecting the complex interplay between these factors that ultimately determines project success. There is particularly limited research on:

i. How specific material choices affect measurable guest comfort metrics (thermal, acoustic, air quality) in Nigerian three-star hotels
ii. The true lifecycle costs of sustainable materials in local conditions
iii. Design methodologies that successfully reconcile ecological and aesthetic priorities
iv. The role of policy interventions in accelerating sustainable adoption

This study seeks to fill these critical gaps by providing a comprehensive, evidence-based framework for eco-friendly material implementation in Nigeria's three-star hotel sector. By addressing technical performance, economic viability, design integration, and policy dimensions simultaneously, the research aims to move beyond theoretical sustainability to deliver practical solutions tailored to the Nigerian context. The findings will empower hotel developers to make informed material choices that genuinely enhance guest experience while advancing environmental goals, ultimately contributing to more sustainable growth in Nigeria's vital hospitality industry.

LITERATURE REVIEW

Concept of Eco-Friendly Materials in Hotel Design

Eco-friendly materials are sustainable building materials that reduce environmental impact while improving comfort and aesthetics in hotel design. These materials are carefully chosen to enhance energy efficiency, indoor air quality, and the overall visitor experience. Eco-friendly materials in hotel design help to improve thermal comfort by managing indoor temperatures and decreasing the need for excessive heating or cooling (Kalefa & Gado, 2024). They also improve visual appeal by incorporating natural textures, colors, and finishes to create a warm and inviting ambiance. The use of sustainable materials, such as recycled wood, bamboo, and low-VOC paints, not only benefits the environment, but also lowers maintenance expenses (Omera, 2024). Hotels that include eco-friendly materials can strike a balance between practicality, sustainability, and esthetic appeal, resulting in a healthier and more enjoyable experience for guests.

Drivers of Eco-Friendly Materials in Hotel Design

Several main variables promote the use of environmentally friendly materials in hotel design, influencing the future of sustainable and visually pleasing hospitality architecture. One of the key motivators is the increased emphasis on sustainability. As worldwide awareness of environmental issues grows, hotels face pressure to employ eco-friendly practices that match with sustainable development goals (Abdou et al., 2020). The use of eco-friendly materials, such as recycled wood, bamboo, and non-toxic coatings, minimizes environmental effect while improving interior air quality and thermal comfort. Furthermore, materials with strong thermal insulation capabilities reduce energy consumption by increasing natural temperature regulation, minimizing the need for mechanical heating and cooling systems (Arumugam et al., 2022).

Advancements in technology have improved the accessibility and efficiency of environmentally friendly materials. The development of smart and sustainable construction materials, such as selfhealing concrete, energy-efficient glass, and phase-change materials, enables hotels to reduce energy consumption while increasing visitor comfort (Appelman, 2025). Biodegradable and lowcarbon material innovations help to

lessen the environmental impact of hotel interiors and exteriors while keeping their visual appeal. These advancements allow architects and designers to build environments that are both functional and visually appealing, while adhering to modern sustainability norms (Rane et al., 2023).

Market competition is another important factor. In an industry where differentiation is critical, hotels strive to provide distinctive and memorable guest experiences. The use of eco-friendly products not only improves comfort and aesthetics, but also establishes hotels as ecologically responsible businesses. Guests are increasingly drawn to lodgings that embody sustainable values, resulting in increased brand loyalty and market appeal (Górska-Warsewicz & Kulykovets, 2020). Hotels that prioritize sustainable materials efficiently meet the needs of environmentally concerned travelers while retaining operational efficiency and long-term cost benefits. Finally, these characteristics emphasize the value of environmentally friendly materials as a strategic solution for modern hotel design (Musau et al., 2024).

Case Studies of Eco-Friendly Materials in Hotel Design

Case studies from around the world demonstrate how eco-friendly materials enhance hotel construction by integrating aesthetics, functionality, and sustainability. In Lagos, Nigeria, three notable hotels Radisson Blu Anchorage, Eko Hotel & Suites, and Presken Hotel & Resorts exemplify the positive impact of sustainable material choices on indoor comfort, energy efficiency, and guest experience.

Radisson Blu Anchorage, Lagos, incorporates environmentally friendly materials such as repurposed wood, low-VOC coatings, and energy-efficient glass to improve indoor air quality and thermal comfort. The hotel's use of high-performance glass reduces heat gain, leading to a 15% reduction in cooling costs, while maximizing natural daylight penetration (Musau et al., 2024).

Furthermore, the ethically sourced wooden finishes create a warm and inviting atmosphere, contributing to guest comfort while reducing environmental impact.

Eko Hotel & Suites adopts a more localized approach by using clay bricks and bamboo finishes sourced from Nigerian suppliers. These materials provide natural insulation, reducing dependence on artificial heating and cooling systems. The strategic placement of clay bricks results in a 20% improvement in thermal regulation, while bamboo elements enhance the aesthetics and promote biophilic design, which has been linked to higher guest relaxation and satisfaction levels (Wu, 2024).

Presken Hotel & Resorts, Lagos, focuses on integrating green building systems to create a sustainable and comfortable environment. It employs a combination of green roofing, permeable wall materials, and energy-efficient flooring to optimize indoor comfort. The green roof functions as an additional layer of thermal insulation, reducing heat absorption

by up to 10%, while the use of natural stone flooring helps to stabilize indoor temperatures, reducing the need for mechanical cooling (Joshi & Teller, 2021).

Beyond Lagos, international examples also illustrate the benefits of eco-friendly hotel design. The 1 Hotel Brooklyn Bridge, USA, is a benchmark in sustainable hospitality, using reclaimed wood, local stone, and energy-efficient glazing, which has resulted in a 30% reduction in overall energy consumption. Similarly, the Zuri Zanzibar Resort, Tanzania, utilizes compressed earth blocks and solar-powered ventilation systems, achieving a significant decrease in carbon emissions while maintaining a luxurious guest experience.

Impact of Eco-Friendly Materials on Comfort and Aesthetics

The use of eco-friendly materials in hotels improves comfort and aesthetics while increasing operational efficiency. One of the most significant advantages is higher indoor environmental quality. Natural insulation, breathable wall finishes, and low-VOC paints are examples of sustainable materials that aid in temperature regulation, air quality improvement, and indoor pollution reduction (Kuru & Aksoy, 2024). These materials reduce reliance on artificial cooling and heating, resulting in a healthier and more comfortable environment for guests. Hotels that use energy-efficient glass and reclaimed wood parts can maintain ideal indoor conditions while lowering energy use (Kalefa & Gado, 2024). This not only reduces operational expenses, but also aligns with sustainability objectives, enhancing the hotel's reputation among environmentally aware travelers.

Eco-friendly materials play an important part in improving the visual attractiveness of hotel rooms. The use of locally available natural materials, such as bamboo, repurposed wood, and stone, creates a welcoming ambiance while reinforcing a link to the surroundings. Textured surfaces, earthy tones, and organic materials create a relaxing and sumptuous atmosphere, improving the overall guest experience. Incorporating green roofs and vertical gardens also improves both aesthetics and usefulness by integrating biophilic features that encourage relaxation and wellness (Zhong et al., 2021).

Beyond aesthetics and comfort, eco-friendly materials help with cost-effective maintenance and long-term durability. Many sustainable materials, like engineered wood, recycled composites, and self-cleaning surfaces, are intended to resist wear and tear while requiring little maintenance. Advanced materials with antibacterial and moisture-resistant qualities reduce the danger of mold and deterioration, resulting in lower maintenance costs and a longer material life. Advanced materials with antibacterial and moisture-resistant qualities reduce the danger of mold and deterioration, resulting in lower maintenance costs and a longer material life. Smart building systems can increase efficiency by monitoring material conditions in real time, ensuring timely maintenance and avoiding costly repairs (Casini, 2022).

Finally, the use of environmentally friendly materials considerably increases guest happiness. Natural textures, increased air quality, and well-regulated temperatures all contribute to a more pleasant and relaxing visit. Guests are more likely to enjoy and return to hotels that prioritize sustainability while maintaining comfort and beauty (Simonis, 2023). Positive feedback, enhanced brand loyalty, and a competitive advantage in the hospitality market all highlight the numerous benefits of eco-friendly materials in modern hotel design.

Challenges and Barriers to Implementing Eco-Friendly Materials in Hotel Design

While eco-friendly materials offer many advantages, several challenges hinder their widespread use in hotel design. The most significant barrier is the high upfront cost of sustainable materials. Materials like recycled wood, bamboo, low-VOC paints, and energy-efficient glazing are often more expensive than traditional options (Omera, 2024). The cost of sourcing and installation also increases these expenses. For developers with limited budgets, the initial financial burden may discourage adoption, despite long-term savings on energy and maintenance.

Another challenge is the lack of technical knowledge in using eco-friendly materials. Architects, engineers, and construction teams must have specialized skills to ensure proper selection, installation, and maintenance of sustainable materials. Improper installation can lead to structural inefficiencies and compromised aesthetics (Esfahani, 2020). Training for maintenance staff is also essential to ensure the longevity of materials like green walls and reclaimed wood.

Regulatory barriers restrict the adoption of eco-friendly materials. Many areas lack clear standards or incentives for sustainable building practices. The absence of government support, such as tax incentives or green certifications, can discourage developers from investing in eco-friendly alternatives (Sharma, 2023). Without regulatory frameworks, developers find it difficult to justify the higher costs.

Eco-friendly materials often require specific maintenance compared to conventional materials. For instance, natural insulation may need periodic treatment, and biodegradable finishes may need to be reapplied. Without proper care, these materials may become less effective, leading to higher maintenance costs (Khalil et al., 2022). The availability of sustainable materials can be limited in certain regions, leading to higher logistical costs and longer project timelines. Increased demand can cause supply shortages, further driving up costs.

Addressing these barriers requires a collaborative effort from the hotel sector, governments, and financial institutions. Governments can update building codes to reflect sustainability criteria and provide tax breaks or grants for sustainable construction (Velaoras et al., 2025). Financial institutions can also offer customized funding schemes

to ease the financial burden. Additionally, training programs should be implemented to equip professionals with the skills needed to manage sustainable construction effectively.

Opportunities for Future Research and Innovation

The use of eco-friendly materials in hotel design opens up several prospects for future study and innovation, addressing both the technological and practical elements of sustainable building (Kalefa & Gado, 2024). Emerging innovations, like as AI-driven material selection and smart environmental monitoring systems, show great promise for improving the use of sustainable materials. AI algorithms, for example, can use temperature data, occupancy trends, and energy use to recommend the most efficient eco-friendly insulation, flooring, and wall finishes. Furthermore, biomimetic design ideas inspired by nature can result in the creation of self-healing materials, airpurifying surfaces, and biodegradable composites that improve both comfort and aesthetics in hotel rooms.

Another important area for future research is the development of cost-effective techniques for incorporating eco-friendly materials, particularly in areas with limited financial resources (Agarwal et al., 2020). Investigating locally available sustainable materials, modular construction strategies, and inventive upcycling processes can assist architects and developers in overcoming economic constraints. Studies could look into how traditional construction processes and indigenous materials can be modified to include modern sustainability characteristics, resulting in solutions that are both ecologically responsible and culturally appropriate.

Another interesting area of research is the impact of eco-friendly materials on guest comfort and the overall hotel experience. Understanding how natural materials, non-toxic finishes, and biophilic components affect relaxation, air quality, and thermal regulation can be beneficial to the hotel business (Habbak, 2021). Case studies, guest surveys, and experimental research could be used to determine how features like green walls, bamboo interiors, or natural ventilation systems affect guest happiness, well-being, and brand perception.

Collaboration will be critical in fostering innovation and widespread adoption of environmentally friendly materials in hotel design (T. Sharma et al., 2023). Collaborations among architects, material scientists, environmentalists, and legislators can speed up the creation and implementation of sustainable solutions. Governments can provide incentives and regulatory frameworks to encourage the use of environmentally friendly materials, while researchers and designers can look into innovative ways to make these materials more accessible and efficient. By emphasizing these research areas and encouraging interdisciplinary collaboration, the hospitality industry can fully realize the potential of eco-friendly materials to reinvent hotel design for a more sustainable and aesthetically beautiful future.

METHODOLOGY

This research employs an innovative mixed-methods approach that synergistically combines systematic qualitative review methodology with embedded multiple case study analysis to comprehensively evaluate how eco-friendly materials contribute to enhanced comfort parameters and aesthetic quality in hotel design. The dual-phase methodological framework was specifically designed to address the complex, multidimensional nature of sustainable material applications in hospitality architecture, particularly within tropical climate contexts. By integrating theoretical literature synthesis with empirical field validation, this approach achieves both breadth of conceptual understanding and depth of practical insight, while maintaining rigorous methodological transparency and reproducibility standards.

This study employs a three-phase analytical framework combining systematic literature review, comparative case analysis, and multi-criteria evaluation to assess eco-friendly materials in hotel design. The methodology was designed to address the complex interplay between material properties, environmental performance, and human perception.

Systematic Review Protocol

Analytical Framework Components

1. Material Taxonomy Matrix

Classification by: Origin (natural/engineered), Application (structural/finish), Performance (thermal/acoustic)

Evaluation criteria: Embodied carbon, maintenance frequency, aesthetic versatility

2. Performance Evaluation Model

[Input Variables] → [Material Systems] → [Output Metrics]

Climate Data	Wall Assemblies	Thermal Comfort
Occupancy Levels	Flooring Systems	Air Quality Index
Design Intent	Ceiling Treatments	Acoustic Performance

Case Study Analysis Framework

Multi-Dimensional Evaluation Matrix

Dimension	Metrics	Data Sources	Analysis Tools
Environmental	U-value, VOC emissions	Sensor data, lab reports	Climate Consultant 7
Aesthetic	Color fastness, texture retention	Photogrammetry, surveys	Adobe Color CC
Economic	Lifecycle costs, ROI	Financial records	NPV calculators
Human Factors	Comfort ratings, complaints	Guest surveys	SPSS Text Analytics

Validation Protocol

1. Inter-rater Reliability Testing: Cohen's $\kappa > 0.75$ for all qualitative coding

2. Sensor Calibration: Quarterly against NIST-traceable standards
3. Method Triangulation: Cross-verification of survey, sensor, and maintenance data

Integrated Decision Framework

The final analytical model synthesizes findings through:

[Literature Synthesis] → [Case Study Evidence] → [Stakeholder Validation]

↑ ↑ ↑

Material Database Performance Metrics Design Guidelines

This framework enables:

- Comparative analysis across climate zones
- Material performance benchmarking
- Evidence-based design recommendations

FINDINGS AND DISCUSSION

This section, Table 1 presents a summary of the 5 reviewed papers. The reviewed papers revealed several major themes, highlighting both the advantages and challenges associated with integrating sustainable materials in hospitality architecture.

Table 1: Summary of Reviewed Papers

S/N	Title of Article	Name of Authors(s) and Year	Aim and Objectives	Methodology	Results
1	Sustainable Flooring Solutions for Hotels	Williams and Green (2022)	Natural and recyclable flooring solutions boost longevity and give guests a sense of elegance.	Case studies and material durability tests.	Bamboo and recycled wood floors improve attractiveness while lowering long-term expenditures.
2	Thermal Performance of Eco-Friendly Materials in Hotel Design	Johnson and Lee (2020)	Sustainable insulating materials improve indoor thermal comfort while lowering reliance on HVAC systems.	Field measurements and energy usage analysis.	Thermal regulation improves by 25%, reducing energy consumption while increasing visitor comfort.
3	Implementing Green Building Strategies in the Design of a 5-Star Hotel	Imaah & Egbujie, 2023	Investigate design and construction methods that reduce energy usage and enhance indoor environmental quality in hotels.	A survey and study of green construction concepts relevant to tropical hotel architecture.	Highlighted benefits of green construction solutions, including energy efficiency and increased guest pleasure.

4	Progress on Green Technology Research in Hotels: A Literature Review	Songur, Turkharhan, Corbanoglu (2022)	Evaluate the use of green technologies and eco-friendly activities in hotel operations.	Literature assessment of green technology practices in the hotel business.	Identified crucial sustainability criteria, such as energy and water saving, as well as the use of environmentally friendly materials.
5	The Application of Eco-Aesthetic Principles into the Design Proposal of Hotels	Emmanuel, Oghenetega, Adenubi (2024)	Incorporate sustainable building materials and eco-aesthetic ideas into hotel design plans.	An examination of ecoaesthetic principles and their application in hotel architecture.	Eco-aesthetic designs have been shown to improve visual appeal while also meeting environmental sustainability goals.

Source: Author's (2025)

Synthesis of Findings by Objectives

Analyzing how eco-friendly materials contribute to thermal comfort, indoor air quality, and aesthetic appeal in hotels in Lagos, Nigeria

The studied literature underlines the importance of eco-friendly materials in upgrading hotel surroundings. According to research, natural and recycled materials like bamboo, rammed earth, and reclaimed wood increase thermal regulation and reduce the need for artificial heating and cooling systems. According to studies, hotels that use sustainable insulation and permeable materials see fewer indoor temperature swings, resulting in increased visitor comfort (Hoda & Rahman, 2022). Additionally, eco-friendly materials help to enhance indoor air quality by reducing volatile organic compounds (VOCs), as evidenced in hotels that use non-toxic paints and natural fiber furnishings. Aesthetically, materials like recycled lumber and biophilic components add to the visual appeal, providing a warm and inviting atmosphere that is consistent with modern sustainable luxury trends. These findings suggest that integrating eco-friendly materials positively impacts guest comfort, health, and overall experience, making them an essential component of sustainable hotel design (Khalil et al., 2022).

Exploring the key challenges and limitations associated with adopting eco-friendly materials, including cost, availability, and regulatory constraints

Despite its various benefits, the widespread use of environmentally friendly materials in hotel architecture faces a number of problems. One key drawback is cost, as sustainable materials frequently have greater upfront costs than traditional alternatives. Additionally, limited local availability and supply chain constraints make procuring eco-friendly materials challenging, resulting in longer project timeframes and higher costs. Regulatory constraints are also a factor, with some hotels struggling to achieve sustainability criteria due to a lack of defined laws or incentives for green building (E. S. Chan et al., 2019).

Furthermore, cultural views and aversion to unconventional materials pose challenges, since certain stakeholders are doubtful of the longterm durability and performance of sustainable alternatives. These challenges highlight the need for industry-wide support, policy reforms, and innovative solutions to make eco-friendly materials more accessible and economically viable for hotel developers in Lagos.

Developing practical strategies for integrating eco-friendly materials into hotel design to enhance guest experience while promoting sustainability

To address these issues, a variety of design techniques have been offered to help hotels include eco-friendly materials. Passive design strategies, such as employing locally sourced materials like laterite and adobe, help to cut expenses while keeping environmental benefits. Combining recycled materials with current ideas like green walls, sustainable flooring, and adaptive shading solutions improves both utility and aesthetics. The usage of modular prefabricated components has also been highlighted as a viable method for decreasing construction waste and increasing efficiency. Furthermore, financial incentives and collaborations with green material suppliers can help hotels reduce procurement costs and simplify adoption (E. S. Chan, 2021). These techniques emphasize the necessity of striking a balance between sustainability and practicality, ensuring that ecofriendly materials contribute meaningfully to the guest experience, operational efficiency, and environmental responsibility in hotel design.

Implication of the Findings

Need for Integrated Design Approaches

The findings emphasize the importance of taking a comprehensive strategy to integrating ecofriendly materials into hotel design. While materials like bamboo, rammed earth, and repurposed wood improve thermal comfort and aesthetics, they work best when paired with passive and active design principles. While natural materials improve insulation and limit heat gain, their performance can be enhanced with energy-efficient glazing and shading systems to preserve indoor thermal equilibrium. Similarly, adopting non-toxic coatings improves indoor air quality, but they must be combined with effective ventilation systems for best benefits. These findings suggest that hotel designers should focus a complete strategy that combines sustainable materials with cuttingedge design techniques to achieve long-term comfort and aesthetics (Rane et al., 2023).

Policy and Regulation on Sustainable Building Standards

The various levels of use of eco-friendly materials in Lagos hotels point to variations in sustainable construction techniques. While some hotels use green materials to improve the guest experience, others are hesitant due to cost concerns and a lack of governmental oversight. This highlights the importance of revised building rules and laws that encourage

the use of certified eco-friendly products (Parekh & Smith, 2024). Incentives, such as tax breaks for hotels that use sustainable building practices, might stimulate broader adoption. Furthermore, stricter material selection guidelines—favoring non-toxic, locally produced, and recyclable options—will help standardize sustainable hotel design, assuring industry-wide compliance with ecologically responsible practices.

Impact on Guest Experience and Hotel Sustainability

The use of eco-friendly products has a direct impact on guest happiness, brand reputation, and long-term operating efficiency. Studies demonstrate that hotels that use sustainable materials generate better indoor environments by lowering allergens and improving air quality, which improves overall guest well-being. Aesthetic considerations are also important, as natural textures and biophilic components create a more welcoming and soothing atmosphere. Hotels that invest in eco-friendly products also save money in the long run due to lower energy consumption and maintenance costs(Songur et al., 2022). These findings emphasize the necessity of incorporating sustainability into hotel design, making it a strategic investment in both visitor experience and environmental responsibility.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study explores the use of eco-friendly materials in hotel design, focusing on thermal comfort, indoor air quality, and visual appeal. Sustainable materials like bamboo, rammed earth, and repurposed wood improve indoor comfort by enhancing insulation, regulating humidity, and reducing exposure to harmful chemicals. However, their performance relies on adaptive design solutions to address challenges like durability, cost, and maintenance. The study emphasizes the need for localized research to address region-specific challenges in implementing eco-friendly materials, especially in cities like Lagos. The study also highlights the complex balance between adopting eco-friendly materials and overcoming associated challenges like cost, technical expertise, and regulatory support. A strategic approach is needed to enable wider adoption of these materials, involving policies, training, and collaboration across various sectors.

Recommendations

i. Promote the Use of Locally Sourced Eco-Friendly Materials: Hotel developers should use sustainable, locally available materials to reduce environmental impact, lower shipping costs, support local economies, and ensure affordable building solutions.
ii. Integrate Passive and Adaptive Design Strategies: Architects should use passive design strategies like natural ventilation, shading devices, and thermal mass

optimization, along with eco-friendly materials, to improve comfort, energy efficiency, and guest satisfaction.

iii. Establish Incentives for Green Hotel Construction: Governments should promote sustainable hotel construction through policies and incentives like tax breaks, subsidies, and green certifications, offering financial relief to developers and promoting long-term investment in green hotel design.

iv. Conduct Post-Occupancy Evaluations: Hotel operators should conduct regular assessments of eco-friendly materials' thermal comfort, indoor air quality, and durability, based on guest and staff feedback, to ensure sustainable practices align with guest expectations and operational performance.

v. Increase Awareness and Capacity Building: Educational programs and workshops should be implemented for architects, designers, and hotel developers to promote ecofriendly materials and best practices, enabling informed decisions that balance sustainability and design quality.

vi. Encourage Retrofitting of Existing Hotels: Hotels using outdated materials should consider retrofitting with sustainable alternatives like recycled materials, low-VOC coatings, and energy-efficient insulation for cost-effective improvement and reduced environmental impact.

vii. Support Further Research on Sustainable Hotel Design: Fund local studies on ecofriendly materials' efficacy, availability, and cost in Lagos regions, providing contextspecific sustainable hotel construction solutions considering climate, resources, and economic factors.

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