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Integrating Biophilic Principles in Resort Design: a Case Study of Abuja, Nigeria.

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Abstract

This study explores the integration of biophilic design principles in Abuja resorts, aiming to enhance guest well-being and sustainability. Using an explorative qualitative approach, data were collected via interviews and analyzed through inductive thematic analysis. Findings indicate positive professional perceptions of biophilic design but highlight significant implementation barriers, including space, cost, and limited stakeholder awareness. Recommendations include awareness campaigns, scalable design solutions, and policy support for biophilic urban planning in Nigeria.

Keywords: Adoption, Biophilia, Implementation, Reintegrate, Resort, Sustainability, Urbanization, Well-being.

1. Introduction

Urbanization and industrialization have led to a growing disconnect between people and nature, resulting in urban areas becoming "concrete jungles." Despite this, humans have an inherent need to connect with nature, a connection rooted in evolutionary history rather than built environments (Abah, 2019). The design approach influenced by biologist Edward O. Wilson's concept of "Biophilia," promotes the integration of natural elements into architecture to improve occupant well-being. This concept has gained prominence in architecture, revolutionizing how we interact with our surroundings. This natural affinity for nature is reflected in people's preferences, such as seeking homes with scenic views, enjoying park walks, and drawing inspiration from natural surroundings. These behaviours demonstrate the deep connection between humans and nature (Abbas and Jawwid, 2017). Biophilic design aims to reintroduce nature into built environments to enhance well-being and performance. People desire more than functionality in their spaces; they want environments that provide comfort, inspiration, and energy. In response to environmental concerns, the field of architecture has increasingly focused on biophilic design, although questions remain about how to conceptualize and apply 'nature' in both research and practice (Zhong *et al*., 2021). Sustainable development principles, including biophilic design, emphasize the efficient use of resources and materials, contributing to cost-effectiveness and environmental responsibility (Pranjale1 and Hejiib, 2020). The incorporation of natural elements in urban settings not only improves environmental performance but also fosters a connection between humans and nature. This connection is especially important in cities, where people spend much of their time in compact, stressful environments, contributing to stress-related illnesses (Terrapin Bright Green, 2017). Kellert *et al.*'s (2018) work on biophilic design provides a comprehensive guide to implementing these principles, emphasizing the importance of creating spaces that resonate with humans' innate affinity for nature. In design of resorts, biophilic principles are particularly important as these spaces offer a refuge from urban life. The integration of natural elements in resorts enhances the guest experience, fostering well-being through sensory connections with nature (Kellert and Calabrese, 2017). This approach not only improves aesthetics but also contributes to a sustainable and ecologically conscious design, making resorts exemplars of biophilic architecture.

Studies such as Ulrich's (2004) groundbreaking work on the therapeutic effects of nature views further support the benefits of biophilic design in resort environments. The incorporation of nature into resorts can reduce stress, improve mood, and provide guests with a transformative experience. The multisensory engagement provided by biophilic elements, such as water features, greenery, and natural materials, enhances guests' overall well-being (Browning *et al*., 2014). Thus, biophilic design in resorts meets the evolving expectations of guests seeking both physical and emotional rejuvenation. Urbanization and industrialization have significantly transformed natural landscapes, creating a notable disconnect between humans and nature (Kellert *et al*., 2008). This disconnect is particularly evident in urban environments dominated by concrete and artificial structures (Beatley, 2011). Abuja, the rapidly growing capital city of Nigeria, exemplifies this trend. As the city expands, it becomes increasingly important to incorporate natural elements into its urban design, especially in leisure and hospitality sectors like resorts (United Nations, 2019; Nigeria National Tourism Development Corporation, 2020).

Biophilic design, which integrates natural elements into built environments, offers a promising solution (Terrapin Bright Green, (2014). Applying biophilic principles can enhance guest well-being, promote sustainability, and create aesthetically pleasing environments that foster a deeper connection with nature (Heerwagen, 2000; WHO, 2016). Despite these recognized benefits, there is limited research on biophilic design's application in resort development in Abuja, Nigeria (Africa *et al*., 2019). This study seeks to assess the level of familiarity and application of these Biophilic design Principles as well as it's barriers and perceived impact.

2. Literature Review

2.1 Biophilia in Architecture

The term Biophilia was introduced by Edward O. Wilson in 1984, who coined it to describe an innate human desire to connect with nature. This concept has significant implications for psychology, architecture, and urban planning, emphasizing the need to reconnect with nature to enhance well-being and reduce stress. Rapid urbanization since the Industrial Revolution has distanced humans from natural environments, which ancient architecture integrated harmoniously (Sinharay *et al*., 2022). Sustainable architecture, particularly through biophilic design, seeks to reintroduce natural elements into modern buildings, promoting health and well-being by incorporating natural light, air, water, plants, and views of nature (Hidalgo, 2015, Söderlund and Newman, 2015). Biophilic design is crucial in contemporary architecture for enhancing human well-being, promoting sustainability, and creating aesthetically pleasing environments. Its adoption in resorts worldwide, including in Nigeria, demonstrates its effectiveness in improving guest experiences by reconnecting them with nature.

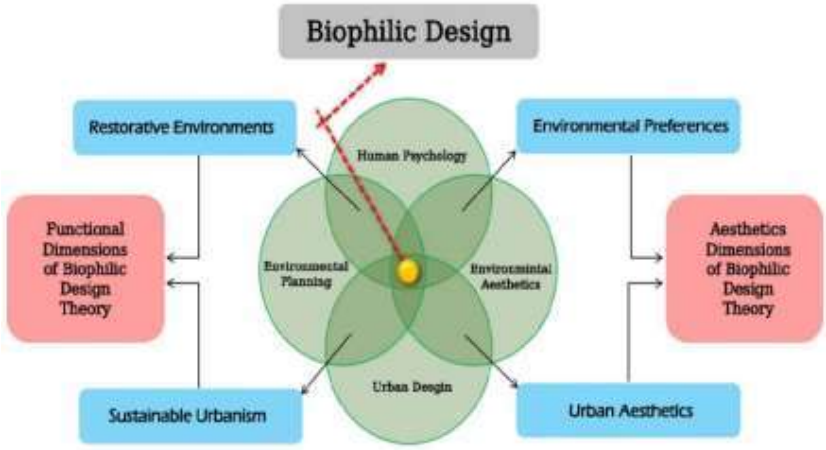

Figure 1: An illustration of the concept of biophilia in Architecture
Source: ResearchGate (2023)

2.2 Biophilic Principles

Biophilic design principles include Direct experiences of nature, Indirect experience of Nature, and Experience of Space and Time characterized by elements such as natural light, fresh air, water features, plants, and natural materials (Ryan *et al*., 2014; Soderlund, 2019). These elements improve mood, productivity, and cognitive function while reducing stress (Kellert *et al*., 2008).

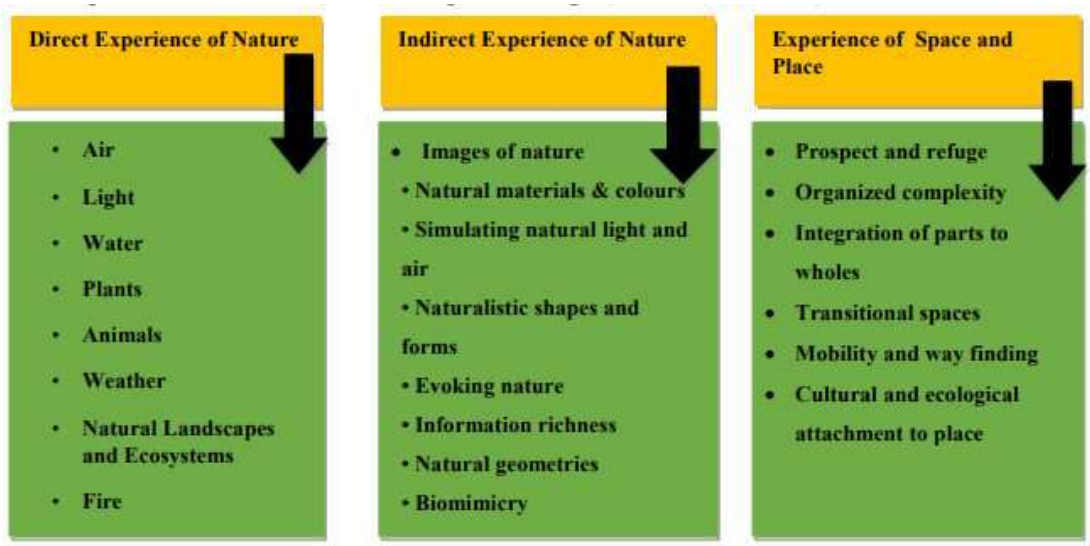

Figure 2.2: Characteristics of the three principles of Biophilic Design
Source: The practice of Biophilic design (Kellert, 2015).

2.2.1 Direct Experience of Nature

Direct Experience of Nature in Biophilic design refers to the incorporation of natural elements that people can physically interact with or directly observe within built environments. This principle is grounded in the idea that exposure to natural stimuli can enhance human well-being, reduce stress, and improve cognitive function. The direct experience of nature includes elements such as natural light, air, water, plants, animals, and natural landscapes (Pranjale1 and Hejiib 2020). It is the incorporation of plants, water, and animals into the built environment, especially with movement (Söderlund and Newman, 2015). The principle of Direct Experience of Nature in biophilic design involves the intentional integration of natural elements and processes directly into the built environment. This approach leverages human affinity for nature (biophilia) to improve well-being, enhance environmental quality, and promote sustainability. The elements involved in direct experience can include natural light, vegetation, water features, natural landscapes, and the use of natural materials" (Ryan *et al*., 2014; Soderlund, 2019).

Platee 3: Plate an interior of the Changi Airport showing the rain vortex at the core of the building with a lot of vegetation and natural elements

2.2.2 Indirect experience of nature

The principle of indirect experience of nature in biophilic design involves integrating natural elements that evoke a connection to nature within built environments. This is achieved using natural materials like wood and stone, nature-inspired colors, patterns, and shapes such as fractals or biomorphic forms, as well as visual representations of nature.

These design features, such as leaf-mimicking flooring or tree bark-like wall textures, create a calming atmosphere, promoting mental relaxation

Plate 2: The use of Bamboo and wood to make a Bar at Ulaman Retreat (Hotels and Tourism)
Source: ArchiDaily (2024)

Figure 5. Vertical Farm, Biomimicry Analysis.
Students: Nita Hasimja and Nita Lionçari, 2018. Course: Architectural Design 5.
University of Prishtina, Department of Architecture. Kosovo

Plate 3: A student project adopting the concept of Biomimicry in Biophilic Design
Source: Pinterest (2024)

2.2.3 Experience of Space

The principle of Experience of Space and place in biophilic design emphasizes the importance of creating environments that foster a connection to the surrounding space and the unique characteristics of a place. This principle is based on the idea that humans have an innate desire to connect with their environment in meaningful ways, which can enhance well-being, comfort, and a sense of belonging (Kellert *et al*, 2013; Salingaros, 2015). This is achieved through various design strategies:

i. **Spatial Variability:** Incorporating a mix of open and enclosed spaces mimics natural environments, offering areas for socializing, reflection, and engagement. The Salk Institute in California exemplifies this with its open courtyard and ocean views that enhance the connection to the surrounding landscape (Kellert *et al*, 2013).
ii. **Place-Based Design:** Reflecting the cultural and ecological context of a location fosters a sense of community and identity. The High Line in New York City, an elevated park built on a former railway line, exemplifies this by blending industrial history with green space for public enjoyment (Lindsey, 2013).

iii. **Prospect and Refuge:** Providing views (prospect) alongside sheltered, intimate spaces (refuge) enhance psychological comfort. Frank Lloyd Wright's Fallingwater house balances openness with enclosed spaces, offering both views of nature and private areas

iv. **Wayfinding and Orientation:** Clear sightlines, intuitive layouts, and strategic use of lighting and landmarks make spaces easier to navigate, reducing anxiety. The Seattle Public Library by Rem Koolhaas achieves this through color-coded floors and transparent elevators (Weisman, 2014).

v. **Transition Spaces:** Gradual transitions between indoor and outdoor spaces, such as courtyards and atriums, blur boundaries and enhance the spatial experience. The Chandigarh Capitol Complex in India, designed by Le Corbusier, uses large open spaces and transitional zones to connect different buildings harmoniously (Jencks, 2015).

Plate4: A plate showing a part of Changi Airport interior giving visitors an awesome experience of space
Source: Google images

Globally, resorts like Alila Villas Uluwatu in Bali and Six Senses Qing Cheng Mountain in China integrate biophilic principles to enhance guest experiences and well-being (Kellert, 2018; Terrapin Bright Green, 2014). In Nigeria, resorts like Obudu Mountain Resort and La Campagne Tropicana Beach Resort incorporate natural landscapes and materials to promote relaxation and connection with nature (Ogunbiyi and Balogun, 2019). Biophilic design in architecture leverages natural elements to foster human well-being, reduce stress, and promote sustainability. By incorporating features like natural light, ventilation, water elements, plants, and natural views, biophilic architecture creates healthier and more aesthetically pleasing environments. This approach is increasingly adopted in global and Nigerian resorts, demonstrating its practical benefits and potential for enhancing urban living spaces.

3. Methodology

For this study, Explorative qualitative research approach is employed to provide a deep understanding of the subject through observations and Semi-Structured Interviews with architects, resort developers/urban planners, and government officials will provide detailed accounts of the familiarity, perceived impact, barriers, and application. A purposive sampling technique was adopted in which case, the participants were selected based on their participation, experience and expertise in Resorts development.

3.1 Sample size

The sample size was focused on depth rather than breadth, whereby approximately 20–30 participants are to be selected to participate in this study ensuring a manageable yet diverse pool of respondents. Qualitative research often emphasizes the depth of insights over sample size, a smaller, well-targeted sample can provide in-depth data essential for understanding the awareness and implementation of biophilic architecture (Gentles *et al.*, 2015).
Architects: 10– 15 participants.
Resort Developers/Urban Planners: 5–10 participants
Government Officials/Regulatory Agencies: 3–7 participants

3.2 Data Collection

The data for this research will be collected through a literature review, and Semi-structured interviews. The semi structured interviews will allow the flexibility in interviewing the participants. The Questions were developed from the objective of the study and were validated by experts in the field to ensure that the required data would be achieved based on their lived experience. For this study, questions would likely start broadly and become more specific, aiming to elicit participants' experiences, beliefs, and challenges regarding biophilic principles in architecture. These questions cut across variables as follows:

a. Awareness/familiarity with Biophilic design
b. Perceived impacts/Benefits of applying Biophilic Principles
c. Barriers to implementation of biophilic design
d. Application of biophilic principles (e.g., green spaces, water features)

3.3 Data analysis

Thematic Analysis was used to analyse the data collected. An inductive thematic analysis is often chosen for research when the aim is to derive themes directly from data rather than imposing pre-existing frameworks or theories, making it ideal for exploratory studies. This method allows researchers to uncover rich, nuanced insights from participants' perspectives, especially in qualitative research, as it enables themes to emerge from raw data without prior assumptions (Braun & Clarke, 2006). By not predetermining themes, researchers can identify patterns that may reflect the unique experiences and perceptions of participants, making it suitable for analyzing complex, subjective topics like perceptions of biophilic design.

4. Results and Discussion

4.1 General information

The dataset contains a total of 23 survey responses from a proposed (20-30 participants). The survey Has 14 Architects, 5 urban planners and 4 other stakeholders. Respondents provided constructive feedback and concerns regarding biophilic design.Some comments emphasized the need for greater awareness and education among the Architects and general public and within the architecture/construction industry to promote the benefits of biophilic design. A few respondents highlighted the cultural shift required to embrace more natural elements in urban spaces, suggesting that public demand for biophilic design could drive its adoption more effectively. While some felt that while biophilic design is beneficial, it needs to be practical and scalable to different types of projects, from large-scale developments to smaller personal spaces. The qualitative analysis reveals a positive perception of biophilic design among professionals, particularly in architecture and urban planning. However, significant barriers exist that limit its implementation in practice. These barriers are primarily related to space, cost, and a lack of awareness among clients and stakeholders. While there's a strong understanding of the health and well-being benefits of biophilic design, more efforts are needed to bridge the gap between theory and application. Educating clients, increasing public awareness, and finding cost-effective ways to implement biophilic principles could enhance its adoption in the built environment.

4.2 Familiarity with Biophilic Design

Most respondents have a moderate to high level of familiarity with biophilic design. Several respondents (mostly architects and urban planners) reported being "very familiar" or "somewhat familiar" with the concept of biophilia. The majority 63% of these respondents were introduced to biophilic design through academic studies, indicating that formal education plays a crucial role in disseminating knowledge about this design principle, 19% through media (TV, magazines, online articles) and 18% through independent research or professional experience showing that awareness extends beyond formal education, though to a lesser degree.

4.3 Perception Impact

Respondents generally perceive biophilic design as beneficial, particularly for well-being. Many respondents highlighted the therapeutic and well-being benefits of biophilic design as ascertained by (Kellert & Calabrese, 2017) indicating an understanding that these principles have positive effects on health and psychological comfort. A few mentioned that while they believed in the potential of biophilic design, its impact is often overlooked due to the emphasis on cost-efficiency and functionality in most projects. Some comments reflected the view that biophilic design could create more sustainable environments which is in alignment with the claim of (Pranjale1 & Hejiib, 2020), and a few participants expressed frustration over its lack of broader adoption despite its known benefits.

4.4 Barriers

Numerous barriers inhibit the practical application of biophilic design in resort development projects in the study area, several respondents cited the fact that Cost is a great barrier owing to about 35%, the perception that biophilic design requires more resources than traditional design approaches. space limitations are also a barrier which is a peculiar phenomenon in urban environments, taking about 30%. This is a common theme among urban planners and architects working in densely populated areas. Another significant barrier is lack of sufficient awareness and understanding of the long-term benefits of biophilic design, particularly among clients standing up to about 27.5 Other barriers included regulations, technical difficulties, and sometimes the lack of support from the broader design and construction community holding up to about 2.5%.

4.5 Application

The application of biophilic design is limited, but interest is strong. A majority of respondents indicated that they had incorporated or would consider incorporating biophilic design principles in their work or personal spaces. This shows a positive attitude towards its application when possible. However, the practical use of these principles seems to be more limited due to the aforementioned barriers. While interest exists, actual implementation varies. Some respondents reported feeling constrained by project limitations that prevented them from fully applying biophilic elements, even if they were personally inclined to do so. While biophilic design is embraced in theory, its practical application is often constrained by external factors, suggesting a gap between intent and execution. More education and advocacy may be needed to overcome these barriers.

5. Conclusion

The qualitative analysis of the dataset reveals a positive perception of biophilic design among professionals, particularly in architecture and urban planning. However, this familiarity has remained largely theoretical in resort development in Abuja with minimal application limited to greens. Also, Significant barriers exist that limit its implementation in practice. These barriers are primarily related to space, cost, and a lack of sufficient awareness among clients and stakeholders.

While there's a strong understanding of the health and well-being benefits of biophilic design, more efforts are needed to bridge the gap between theory and application in resort development in Abuja.

This implies that there are no strong regulatory policies enough to enforce the implementation of Biophilic principles in the design of resorts in Abuja, Nigeria. It is now left in the hands of developers, and other stakeholders to choose as whether to embrace it or not which makes the concept of Biophilia more of theory rather than practical in the urban context of Abuja.

6. Recommendation

i. Develop scalable solutions: Creating more adaptable biophilic design strategies for different project sizes and budgets.
ii. Partnership with local government agencies to integrate biophilic design policies into urban planning will create a pathway for increased adoption and application of Biophilic Design Principles in resort designs in Abuja, Nigeria.

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