Environmental Sustainability and Human-Centred Design: Making a Case for Sustainable Tourism Facilities in Nigeria

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Abstract

The intersection of environmental sustainability and human-centred design is becoming increasingly crucial in the development of tourism facilities. As global awareness of environmental issues rises, there is growing pressure on the tourism industry to integrate sustainable practices. Simultaneously, human-centred design, which emphasises user needs and experiences, is recognised for enhancing the functionality and appeal of tourism infrastructure. Hence, this study explores key environmental and human-centred design features of successful tourism facilities worldwide and examines their applicability to Nigeria. It investigates Nigerian leisure-seekers' perceptions and preferences regarding these design principles and assesses the role of policy and regulatory frameworks in promoting sustainable and user-centric tourism development. By employing a mixed-methods approach, including surveys and case studies, the research analyses data from 400 respondents and 11 selected local and international tourism facilities. The findings highlight the importance of aligning tourism facility design with environmental sustainability and human-centred goals. The study concludes that integrating these principles, supported by robust policy frameworks and community engagement, is vital for enhancing the sustainability and attractiveness of Nigeria's tourism sector. Recommendations include developing supportive policies, building local expertise, and fostering community-based design initiatives. This research contributes to a deeper understanding of how tourism facilities in Nigeria can achieve greater sustainability and user satisfaction.

Keywords: Tourism facilities in Nigeria, environmental sustainability, human-centred designs, sustainable architecture

1. Introduction

In tourism facility design, integrating human-centred design with environmental sustainability is crucial. Human-centred design focuses on visitor needs and experiences, while environmental sustainability aims to minimise ecological impacts (Suyono 2024). Effective tourism development requires a holistic approach incorporating environmental conservation, social responsibility, and economic viability (Mironova 2024). This ensures facilities are not only aesthetically appealing and functional but also environmentally and socially responsible.

Sustainable tourism encompasses dimensions such as eco-friendly design, environmental management, and public health protection (Katsoni & Koliopoulos 2020). It involves fostering environmentally responsible behaviour through advertising, training, and education (Fei & Dongxia 2024). The development of tourism facilities should be economically feasible, environmentally sound, and socially acceptable (Kurniawan *et al.* 2023). Incorporating sustainability certifications and eco-friendly practices into facility design is essential. Enhancing the visibility of these practices and implementing green policies and corporate social responsibility strategies ensure adherence to sustainable practices that benefit the environment and local communities (Güngör 2023; Wirananta *et al.* 2020). Evaluating environmental impacts and carrying capacity is crucial for aligning development with ecological integrity (Wibowo *et al.* 2022). Effective impact assessment and mitigation measures are necessary for managing the environmental consequences of tourism activities (Gutiérrez 2015).

Adopting innovative, eco-friendly practices and sustainable business models can further support long-term sustainability in tourism (Garcia *et al.* 2012; Ridho 2024). By integrating these principles, the tourism industry can create facilities that serve visitors while promoting environmental and social responsibility. The integration of human-centred design and environmental sustainability is increasingly crucial in tourism facility design, particularly in developing countries like Nigeria. As Africa's largest economy, Nigeria has substantial potential to

leverage tourism for economic growth through its cultural and natural resources (Omodero 2019; Salawu 2020). Incorporating human-centred design ensures facilities meet visitor needs while maintaining environmental sustainability (Adebayo & Ayeni 2023).

Challenges in Nigeria's tourism sector include the need for robust regulations that promote sustainability and growth (Bello & Bello 2020). Effective regulation can enhance tourism's economic benefits by ensuring safety and sustainable practices (Oguchi & Luo 2021). Community involvement is also essential, as it ensures cultural sensitivity and environmental stewardship (Rudwiarti & Setiadi 2021). Infrastructure development, including sustainable design in airports and tourist facilities, supports tourism by improving safety and minimising environmental impact (Katsoni & Koliopoulos 2020). Enhancing transportation systems is critical for improving tourism performance and connectivity (Salisu 2023). Economic research highlights tourism's potential to boost Nigeria's economy through job creation and infrastructure investment (Matthew *et al.* 2018).

Indeed, integrating human-centred and sustainable design in Nigeria's tourism facilities can drive economic growth, protect cultural heritage, and safeguard the environment. By focusing on sustainability, community engagement, and innovative infrastructure, Nigeria can enhance its tourism sector and position itself as a leading sustainable destination in Africa. In the context of Nigeria, a nation rich in cultural and natural resources yet facing significant environmental and infrastructural challenges, the need for tourism facilities that are both environmentally sustainable and human-centred is particularly acute. Nigeria's tourism sector has the potential to boost local economies and enhance cultural exchange, but it must address sustainability concerns to ensure long-term viability and positive impact. Hence, this study aims to explore how human-centred design principles can enhance the sustainability and attractiveness of tourism facilities in Nigeria. By employing a mixed-methods approach that includes surveys and case studies, this research will contribute to a nuanced understanding of how to align tourism facility design with both environmental and human-centred goals, ultimately aiming to enhance Nigeria's tourism sector's sustainability and attractiveness.

1.1 Research Questions

1. How can human-centred design principles enhance the sustainability and attractiveness of tourism facilities in Nigeria?

2. What are the perceptions of leisure-loving Nigerians regarding environmental sustainability and human-centred design in Nigerian tourism facilities?

3. What are the key environmental and human-centred design features of successful tourism facilities globally, and how can these be adapted to the Nigerian context?

4. What are the perceived roles of policy and regulatory frameworks play in promoting environmental sustainability and human-centred design in Nigerian tourism facilities?

2. Literature Review

2.1 Human Centred Design in Architecture

Human-centred design in architecture has garnered substantial attention in recent years as a means to address contemporary architectural challenges. This approach underscores the significance of human experiences, motivations, and interactions with the built environment (Jelić *et al.* 2016). By shifting focus towards human-centred design, architects strive to move away from the dominance of vision and intellectualisation in traditional designs, aiming instead to create spaces that are more embodied and engaging for users (Jelić *et al.* 2016). However, the practical implementation of these principles often encounters resistance from entrenched architectural norms and the inertia of established practices. For instance, therapeutic architecture exemplifies a people-centred approach by integrating spatial features that promote physical and mental well-being (Ekhaese 2023). This approach illustrates the potential of human-centred design to contribute significantly to the overall well-being of users. Yet, it raises questions about the extent to which architectural practices can consistently incorporate such holistic considerations, given the varied and sometimes conflicting demands of functionality, aesthetics, and cost.

In the realm of socio-technical systems, a human-oriented architecture design approach has been proposed to ensure that systems are designed with a focus on human needs and interactions (Moghaddam 2021). This perspective underscores the critical importance of human factors in the design of complex systems to enhance usability and user experience. However, integrating these principles into practice often requires overcoming

significant technical and organisational barriers, as well as fostering interdisciplinary collaboration.

Human-centred design principles have also been applied in educational settings, such as mathematics education, to empower teachers as designers and enhance the learning experience for students (Garreta-Domingo *et al.* 2018). This application highlights the versatility and broad applicability of human-centred design. Nevertheless, the challenge remains in consistently tailoring these principles to diverse educational contexts and needs, ensuring they effectively address the unique characteristics of each learning environment.

Moreover, the integration of personas, scenarios, and body-environment research in architectural design has been shown to improve the understanding of users' perspectives and enhance the user-centred design process (Tvedebrink & Jelić 2018). By incorporating insights from user research, architects can create more tailored and user-friendly spaces that meet the needs and preferences of diverse user groups. However, the reliance on personas and scenarios can sometimes oversimplify complex user behaviours and interactions, potentially leading to designs that do not fully capture the richness of human experience.

Conclusively, Human-centred design in architecture emphasises the importance of considering human experiences, needs, and interactions throughout the design process. By prioritising the well-being and experiences of users, architects can create more engaging, inclusive, and functional spaces that enhance the quality of life within built environments. Despite its potential, the widespread adoption of human-centred design faces significant challenges, including overcoming established architectural norms, balancing diverse and sometimes conflicting demands, and ensuring a comprehensive understanding of complex human behaviours and interactions. The future of architecture lies in the successful integration of these principles, necessitating a continued emphasis on interdisciplinary collaboration and a commitment to genuinely understanding and addressing human needs.

2.2 Environmental Sustainability and Sustainable Architecture

The intersection of architectural design and environmental sustainability has garnered significant attention in recent years. Sustainable architecture aims to create buildings and structures that are not only environmentally friendly but also socially and culturally adapted to their contexts. This comprehensive approach addresses the social, economic, and environmental dimensions of a location, striving to minimise negative impacts and promote sustainable development (Azizibabani 2017).

The role of architecture in advancing sustainable development cannot be overstated. Sustainable architecture seeks to mitigate the environmental impacts of buildings by enhancing efficiency in material use, energy consumption, and space utilisation. By advocating for such principles, architecture can contribute significantly to the overarching goals of sustainable development (Azizibabani 2017). However, focusing solely on ecological and energy efficiency aspects is insufficient. There is a growing recognition of the need to incorporate social sustainability into architectural design, which involves creating spaces that enhance community well-being, foster inclusivity, and support social cohesion (Ceylan & Soygenis 2019).

The concept of sustainable architecture has evolved to encompass a broader understanding beyond energy efficiency and climate change mitigation. It now includes the economic performance of buildings, the involvement of experts and users, and the cumulative impacts on the urban fabric. This holistic approach ensures that buildings are environmentally sustainable, socially beneficial, and economically viable (Moore & Karvonen 2008). Education plays a critical role in this evolution. By incorporating sustainability into architectural curricula, future architects are equipped with the knowledge and skills necessary to integrate sustainable design principles into their practice (Taşci 2015).

Vernacular architecture offers valuable insights into sustainable design principles. These traditional or indigenous architectural styles often utilise local materials and technologies suited to the natural and cultural environment (Salman 2019). By studying vernacular architecture, contemporary architects can learn sustainable practices that have been environmentally and culturally sustainable over time. A notable example is Islamic architecture, which increasingly embraces sustainable design principles. The emphasis within Islamic teachings on respecting the environment and conserving resources has led to the development of buildings that integrate natural environments with built structures (ElSayed 2023). This fusion results in sustainable, green, and environmentally conscious architectural solutions, highlighting the religious and cultural motivations driving sustainable practices.

Nevertheless, the aesthetics of sustainable architecture remain a topic of debate, particularly regarding the relationship between ethics and aesthetics. While traditional sustainable architecture often features green roofs and natural materials, contemporary designs incorporate high-tech systems like solar panels and building

automation (Daugelaite & Gražulevičiūtė–Vileniškė 2021). This shift underscores that sustainable architecture's aesthetics are not just about visual appeal but also ethical considerations and environmental benefits.

It is pertinent to note that psychological acceptance of sustainable architecture is crucial. The design and aesthetics of sustainable buildings significantly influence their perception and acceptance by users (Daugelaite 2023). Hence, understanding how people interact with sustainable architecture can help designers create buildings that meet environmental standards and resonate psychologically and emotionally with users. In line with this, cultural identity is another critical consideration in sustainable architecture. Buildings that integrate cultural elements can reflect the identity and values of a community, contributing to the preservation and promotion of cultural heritage (Dash & Shetty 2020). Sustainable architecture, therefore, is not only about environmental sustainability but also about maintaining cultural identity and heritage.

Thus, the field of architectural design and environmental sustainability requires a multifaceted and holistic approach. By considering social, economic, cultural, and environmental factors, architects can create structures that minimise negative impacts and contribute to the sustainable development and well-being of communities. Sustainable architecture transcends energy efficiency and green technologies, focusing instead on creating spaces that are environmentally responsible, socially beneficial, culturally sensitive, and aesthetically pleasing. Through the integration of sustainability principles in practice and education, architects can significantly advance sustainability goals and develop a resilient, inclusive, and sustainable built environment for the future.

2.3 Tourism Facilities

Tourism facilities are critical components that significantly enhance the tourism experience for visitors. These facilities encompass a wide range of services and amenities, such as accommodations, transportation, dining options, and recreational activities, all of which cater to tourists' needs during their travels (Lohmann, Panosso Netto & Rodrigues 2016; Mandić *et al.* 2018). The availability and quality of these services are essential for the success and sustainability of tourism destinations (Cao & Liu 2022; Dethan *et al.* 2020; Fafurida *et al.* 2018; Fitriani & Suasti 2018; Tao & Jin 2023; Widaningrum *et al.* 2020;). Well-developed tourism infrastructure not only improves the overall visitor experience but also fosters economic growth within local communities, highlighting the interconnectedness of tourism and local development (Biagi *et al.* 2015; Soviana 2023).

Research indicates that the availability and quality of tourism facilities significantly influence tourist behaviour and destination choices (Fafurida *et al.* 2018; Noonan 2022). For instance, cultural amenities such as landmarks, museums, and entertainment venues have been shown to positively impact tourism demand (Noonan 2022). This suggests that beyond basic infrastructure, the presence of cultural and recreational facilities plays a vital role in attracting tourists. Additionally, strategies to develop tourism support facilities, including improvements in accessibility, human resource capacity building, and promotional efforts, are crucial for unlocking the tourism potential of various regions (Citra *et al.* 2023).

Moreover, the spatial distribution of tourism facilities, alongside investments in tourism resources and reception infrastructure, significantly shapes the spatial patterns of tourism development (Cao & Liu 2022). This indicates that strategic placement and development of tourism facilities can lead to more balanced regional development. Furthermore, the quality and availability of tourism amenities influence local economies by affecting housing prices and income distribution, underscoring the economic ripple effects of tourism infrastructure (Biagi *et al.* 2015; Porto *et al.* 2023).

However, the development of tourism facilities must be approached critically. While enhancing tourism infrastructure can drive economic growth, it also poses challenges such as environmental degradation, cultural erosion, and socio-economic inequalities. Sustainable tourism development requires a balanced approach that considers the long-term impacts on local communities and environments. Integrating sustainable practices into the planning and management of tourism facilities is essential to mitigate these challenges and ensure that tourism contributes positively to both the economy and the environment.

2.4 Tourism facilities and Tourism in Nigeria

Tourism facilities are crucial for the development and success of the tourism industry in Nigeria. Various studies have underscored the importance of well-developed facilities in key tourism regions such as Lagos, Yankari, Jos, and Abuja (Awaritefe 2007). For instance, Salisu (2023) emphasised the negative impact of inadequate transportation infrastructure on tourism performance in Lagos State, highlighting the necessity of proper facilities to enhance tourism experiences. The lack of robust infrastructure can deter potential tourists, thereby affecting the overall performance of the tourism sector.

Additionally, research has explored the potential of sacred groves and natural sites for tourism in local Nigerian communities, stressing the importance of preserving these sites for tourism purposes (Ejikeme & Okonkwo 2022). This underscores the dual role of tourism facilities in not only providing amenities but also in conserving cultural and natural heritage. The preservation of these sites can attract niche markets of eco-tourists and cultural tourists, thereby diversifying the tourism offerings and potentially increasing tourism revenue.

Further discussions have focused on how tourism can spur economic growth by improving basic amenities in underdeveloped areas of Nigeria. This highlights the role of tourism facilities in supporting tourism-driven development (Matthew *et al.* 2018). Well-developed tourism infrastructure can lead to improved living standards for local communities, creating a symbiotic relationship where tourism development and community well-being reinforce each other. Rural tourism entrepreneurship has been identified as a strategy for economic development in Nigeria, accentuating the necessity of appropriate facilities to support entrepreneurial ventures in the tourism sector (Ayinla & Adeola 2016). This perspective suggests that tourism facilities are not only necessary for accommodating tourists but also for supporting the ancillary services and businesses that contribute to the overall tourism value chain. Facilities such as training centres, marketplaces, and information centres can foster entrepreneurship and enable local communities to benefit economically from tourism.

Furthermore, policies also play a significant role in the performance of Nigerian heritage sites. Adetola (2024) highlights the need for comprehensive policy frameworks to ensure the provision of adequate facilities for heritage tourism. Effective policies can facilitate investment in tourism infrastructure, ensuring that facilities meet international standards and attract a global audience. Policy support is crucial for sustainable tourism development, providing the regulatory backbone that ensures the balance between development and conservation.

3. Methodology

To comprehensively address the research questions, this study employed a mixed-methods approach, combining both qualitative and quantitative approaches. This design allowed for the triangulation of data from surveys and case studies, providing a robust analysis of the subject matter. Data collection included surveys targeting leisure-loving Nigerians, such as domestic tourists, potential tourists, and stakeholders in the tourism industry. As the study cannot cover all the regions of the country, the South-Western and North-Central regions were selected as area frame. Within the regions two states were purposively selected for data collection due to availability of tourist attractions (Kwara and FCT-Abuja for North-Central region; Lagos and Ogun for the South-Western region). Purposive sampling technique also ensure quality data was gathered from relevant leisure-loving Nigerians and tourists. A structured questionnaire was developed, focusing on respondents' perceptions and preferences regarding environmental sustainability and human-centred design in tourism facilities. The survey instrument was tested for reliability and was found to be reliable with a Cronbach's Alpha coefficient of .953. The instrument was equally face-validated by other researchers. As data on the population of the targeted respondents was unavailable, the study takes 400 as the sample size, which is significant for any population at the 95% confidence level and 5% margin of error. The survey was distributed both online and offline to reach a diverse audience, utilising online platforms such as social media, and tourism websites, as well as offline distribution at tourism hubs, hotels, resorts, and parks. From this process, 400 valid questionnaires were selected for analysis.

Additionally, the study included case studies of tourism facilities from various parts of Nigeria and the world at large, known for their environmental sustainability and human-centered design. For this, primary data were collected through field report and secondary data were collected from industry reports (www.archidaily.com), and official websites of the selected facilities. At the end, 11 tourism facilities, including both local and international cases, were selected and analysed.

For data analysis, quantitative data from the surveys were analysed using descriptive statistics to summarise the demographic characteristics of respondents and their perceptions and preferences. A comparative analysis of the case studies was conducted to identify best practices and potential adaptations for the Nigerian context. This mixed-methods approach provided a comprehensive understanding of how to enhance sustainability and attractiveness in Nigerian tourism facilities through human-centered design and environmental sustainability principles.

4. Results

This section contains the results of the survey and case studies conducted to examine the nexus of environmental sustainability and human-centred design in enhancing sustainability and attractiveness of tourism facilities in

Nigeria. Hence, the section highlights the demographic profiles of respondents, their perceptions and preferences on tourism facilities, as well as best practices and potential adaptations for the Nigerian context. The section is divided into five parts, with the first part providing the demographic profile of the respondents while the other four answers the research questions.

4.1 Demographic Analysis

The respondents' demographic profile for this study is presented in frequency and percentage format in Table 1.

4.1.1 Age Group Distribution: The majority of respondents are in the 45-54 age group (28.2%), indicating a mature audience for the survey. The 18-24 age group represents a significant portion as well (23.8%). This suggests that the survey results may reflect perspectives from both younger and more experienced individuals, potentially influencing opinions on tourism facilities and design.

4.1.2 Gender Distribution: The gender distribution is relatively balanced, with females comprising 54.3% and males 45.7%. This balance ensures that the survey results are not skewed towards one gender, providing a more representative view of the population.

4.1.3 Education Level: A substantial majority of respondents have tertiary education (74.3%), with a notable percentage holding postgraduate degrees (14.8%). This high educational level may suggest that respondents have a well-informed perspective on sustainability and human-centered design in tourism facilities.

4.1.4 Occupation: The largest groups of respondents are business owners/entrepreneurs (31.5%) and students (28.2%). Government employees (24.0%) also represent a significant portion. The varied occupational background provides diverse insights into tourism preferences and perceptions. The relatively small number of retired (1.0%) and unemployed (0.5%) respondents may limit the representation of these groups' perspectives.

4.1.5 Travel Frequency: A majority of respondents travel occasionally (51.2% travel 2-3 times a year), while a smaller segment travels very frequently (2.8%). This distribution indicates that the survey captures the views of both regular and infrequent travellers, which can provide a broad perspective on tourism facility design.

4.1.6 Tourism Facility Usage: Most respondents use tourism facilities occasionally (45.3%) or rarely (28.7%), with a smaller number using them very frequently (2.8%). This suggests that the majority of respondents may have varied experiences with tourism facilities, which could influence their opinions on design and sustainability features.

Table 1. Respondents' Demographic profile

Demographic profile	Frequency	Percentage
Age group		
18-24	95	23.8
25-34	79	19.8
35-44	87	21.8
45-54	113	28.2
55-64	22	5.5
65 and over	4	1.0
Total	**400**	**100**
Gender		
Female	217	54.3
Male	183	45.7
Total	**400**	**100**
Education Level		
Primary school	9	2.3

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Secondary school	35	8.8
Tertiary education (e.g., university, polytechnic)	297	74.3
Postgraduate education	59	14.8
Total	**400**	**100**
Occupation		
Business owner/Entrepreneur	126	31.5
Government employee	96	24.0
Professional (e.g., doctor, lawyer, engineer)	59	14.8
Retired	4	1.0
Student	113	28.2
Unemployed	2	.5
Total	**400**	**100**
Travel Frequency		
Occasionally (2-3 times a year)	205	51.2
Often (4-6 times a year)	49	12.3
Rarely (once a year or less)	135	33.8
Very frequently (more than 6 times)	11	2.8
Total	**400**	**100**
Tourism Facility Usage		
Occasionally	181	45.3
Often	93	23.3
Rarely	115	28.7
Very frequently	11	2.8
Total	**400**	**100**

4.2 Research Question 1: How can human-centred design principles enhance the sustainability and attractiveness of tourism facilities in Nigeria?

The data collected provides a comprehensive view of how human-centred design principles are perceived to impact the sustainability and attractiveness of tourism facilities. According to Table 2, a substantial majority of respondents believe that incorporating human-centred design principles can significantly enhance the sustainability of tourism facilities. Specifically, 63.0% of respondents believe it can improve sustainability very much, and 34.5% believe it can do so extremely. This indicates a strong consensus that human-centred design is crucial for advancing sustainability in tourism. The high percentage of respondents who view human-centred design as extremely beneficial for sustainability suggests that they recognise its role in integrating sustainable practices with user-centric approaches. Human-centred design principles often emphasise efficient use of resources, reduced environmental impact, and enhanced functionality, which align well with sustainability goals.

Table 2: To what extent do you believe that incorporating human-centred design principles can improve the sustainability of tourism facilities?

	Frequency	Percentage
Not at all	3	.8
Slightly	7	1.8
Very much	252	63.0
Extremely	138	34.5
Total	**400**	**100**

Table 3: Importance of human-centred design principles in enhancing the attractiveness of tourism facilities

Items	**Not Important**	**Slightly Important**	**Very Important**	**Extremely Important**
Accessibility for all types of visitors	2 (.5%)	2 (.5%)	126 (31.5%)	270 (67.5%)
Integration with the local culture and environment	1 (.3%)	2 (.5%)	151 (37.8%)	246 (61.5%)
Comfort and convenience for visitors	1 (.3%)	2 (.5%)	136 (34.0%)	243 (65.3%)
Safety and security measures	1 (.3%)	3 (.8%)	153 (38.3%)	243 (60.8%)
Opportunities for visitor engagement and interaction	1 (.3%)	2 (.5%)	269 (72.3%)	108 (27.0%)

Furthermore, Table 4 reveals the perceived benefits of applying human-centred design principles. A large majority (63.7%) perceive increased visitor satisfaction as extremely important. This suggests that respondents believe that focusing on user needs and experiences leads to higher satisfaction, which is crucial for repeat visits and positive reviews. Meanwhile, 72.0% of respondents regard improved environmental sustainability as very important. This aligns with the earlier findings, reinforcing the notion that human-centred design is effective in promoting sustainable practices. With 62.0% rating greater cultural relevance as extremely important, it is evident that integrating local culture into the design is highly valued by respondents. Also, 64.0% view enhanced accessibility as extremely important, emphasizing the need for designs that cater to a diverse range of visitors. Lastly, 61.0% perceive positive impact on local communities as extremely important, highlighting the importance of designs that benefit local communities and contribute to their development.

The findings suggest that human-centred design principles are perceived as highly beneficial for both the sustainability and attractiveness of tourism facilities in Nigeria. Respondents overwhelmingly agree that such principles enhance sustainability by integrating efficient and eco-friendly practices while also improving the overall attractiveness through features like accessibility, cultural relevance, comfort, and safety. These insights underscore the importance of adopting human-centered design approaches to meet both environmental and user-centric goals in tourism facility development.

Table 4: Perceived significance of the benefits of applying human-centered design principles to tourism facilities

Items	Not Important	Slightly Important	Very Important	Extremely Important
Increased visitor satisfaction	3 (.8%)	2 (.5%)	140 (35.0%)	255 (63.7%)
Improved environmental sustainability	2 (.5%)	2 (.5%)	288(72.0%)	108 (27.0%)
Greater cultural relevance	-	1 (.3%)	151 (37.8%)	248 (62.0%)
Enhanced accessibility	-	1 (.3%)	143(35.8%)	256(64.0%)
Positive impact on local communities	2 (.5%)	1 (.3%)	153(38.3%)	244(61.0%)

4.3 Research Question 2: What are the perceptions of leisure-loving Nigerians regarding environmental sustainability and human-centered design in Nigerian tourism facilities?

The study also provides valuable insights into leisure-loving Nigerians' attitudes towards environmental sustainability and the current practices in tourism facilities. Table 5 indicates a high level of concern among respondents regarding environmental sustainability when choosing a tourism facility. A substantial majority (60.5%) of respondents are very concerned about environmental sustainability. This reflects a significant awareness and prioritisation of environmental issues among leisure-loving Nigerians. Additionally, 38.5% are extremely concerned. This high percentage highlights a strong sentiment that environmental sustainability is a crucial factor in selecting tourism facilities. The overall data suggests that environmental sustainability is a major factor influencing respondents' decisions, indicating that tourism facilities in Nigeria need to align with sustainability principles to meet consumer expectations and preferences.

Table 5: Level of concern about environmental sustainability when choosing a tourism facility

	Frequency	Percentage
Not concerned at all	1	.3
Slightly concerned	3	.8
Very concerned	242	60.5
Extremely concerned	154	38.5
Total	**400**	**100**

Furthermore, Table 6 provides feedback on the perceived effectiveness of current environmental sustainability practices in Nigerian tourism facilities. A significant majority (77.3%) rate the environmental sustainability practices as poor. This suggests a widespread perception that current practices are inadequate and not meeting the respondents' expectations for sustainability. Similarly, a small percentage (2.3%) rate the practices as very poor, further underscoring the dissatisfaction with the current state of sustainability. However, 19.3% rate the practices as fair, indicating that while there are some efforts, they are not considered sufficient by a majority of respondents. Meanwhile, very few respondents rate the practices as good (0.8%) or excellent (0.5%). This

minimal positive feedback indicates that there is significant room for improvement in the sustainability practices of tourism facilities.

These results reveal that leisure-loving Nigerians are highly concerned about environmental sustainability when choosing tourism facilities. A large majority of respondents express significant concern about the environmental impact of tourism facilities, indicating that sustainability is a critical consideration for them.

Table 6: Rating of the current environmental sustainability practices of tourism facilities you have visited in Nigeria

	Frequency	Percentage
Very poor	9	2.3
Poor	309	77.3
Fair	77	19.3
Good	3	.8
Excellent	2	.5
Total	**400**	**100**

4.4 Research Question 3: What are the key environmental and human-centered design features of successful tourism facilities globally, and how can these be adapted to the Nigerian context?

Tables 7 and 8 offers insights into the perceived importance of various environmental design features and the challenges associated with implementing these features in Nigerian tourism facilities. Table 7 highlights the perceived importance of several key environmental design features in enhancing the success of tourism facilities in Nigeria:

- Energy-Efficient Lighting and Air-Conditioning: This feature is rated as very important by 49.0% and extremely important by 50.2% of respondents. This indicates a strong consensus on the need for energy-efficient systems to enhance both the sustainability and operational efficiency of tourism facilities.

- Waste Management Systems: Waste management is considered very important by 72.0% and extremely important by 26.8% of respondents. Effective waste management is seen as crucial for maintaining environmental cleanliness and sustainability.

- Use of Renewable Resources: 74.8% of respondents view the use of renewable resources as very important, with an additional 25.3% rating it as extremely important. This suggests a high value placed on sustainable resource use.

- Water Conservation Practices: Water conservation is rated as very important by 74.0% and extremely important by 26.0%. This highlights the significance of implementing water-saving measures to reduce environmental impact.

- Eco-Friendly Construction Materials: This feature is seen as very important by 74.5% and extremely important by 25.5%. The emphasis on eco-friendly materials reflects a concern for reducing the environmental footprint of construction practices.

Table 7: Importance of environmental design features in enhancing success of tourism facilities in Nigeria

Items	Not Important	Slightly Important	Very Important	Extremely Important
Energy-efficient lighting and air-conditioning	2 (.5%)	1 (.3%)	196 (49.0%)	201 (50.2%)
Waste management systems	1 (.3%)	4 (1.0%)	288 (72.0%)	107 (26.8%)
Use of renewable resources	_	_	299 (74.8%)	101 (25.3%)
Water conservation practices	_	_	296 (74.0%)	104 (26.0%)
Eco-friendly construction materials	_	_	298 (74.5%)	102 (25.5%)

Furthermore, Table 8 presents perceived challenges in implementing successful environmental and human-centred design features from global examples in Nigerian tourism facilities:

- High Costs of Implementation: A significant majority (60.0%) strongly agree that high implementation costs are a major challenge. This suggests that financial constraints are a significant barrier to adopting advanced design features.

- Lack of Local Expertise: A predominant 94.5% disagree that lack of local expertise is a challenge, indicating that respondents believe there is sufficient local knowledge or capacity to implement these features.

- Insufficient Infrastructure: Approximately 50.5% agree and 49.5% strongly agree that insufficient infrastructure is a challenge. This highlights concerns about existing infrastructure being inadequate to support advanced design features.

- Cultural and Contextual Differences: A notable 74.3% agree and 23.5% strongly agree that cultural and contextual differences pose challenges. This suggests that adapting global design principles to fit local cultural and contextual needs is crucial.

- Regulatory Constraints: 72.0% agree and 25.0% strongly agree that regulatory constraints are a challenge. This indicates that existing regulations may hinder the implementation of certain design features.

This indicates that key environmental design features such as energy-efficient systems, waste management, renewable resources, water conservation, and eco-friendly materials are considered highly important for enhancing the success of tourism facilities in Nigeria. The strong emphasis on these features aligns with global best practices for sustainability. However, challenges such as high implementation costs, insufficient infrastructure, cultural differences, and regulatory constraints are significant barriers to adopting these practices. Despite a general agreement that local expertise is not a major issue, addressing these challenges is essential for successfully integrating advanced environmental and human-centred design features into Nigerian tourism facilities.

These are in line with the deductions from the case studies (See details in Table 9). The case studies provide a wealth of insights into optimising the design of tourism facilities by integrating both environmental sustainability and human-centred principles. Utilizing natural features such as trees, water bodies, and rocks on-site not only enhances the facility's visual appeal but also harmonizes it with its surroundings, creating a more immersive and aesthetically pleasing experience for visitors. Including amenities like barbing salons and car rentals within the facility can elevate the visitor experience while simultaneously generating employment opportunities, thus contributing to the local community's economic growth.

Table 8: Possible challenges in implementing successful environmental and human-centred design features from global examples in Nigerian tourism facilities

Items	Strongly Disagree	Disagree	Agree	Strongly Agree
High costs of implementation	_	_	160 (40.0%)	240 (60.0%)
Lack of local expertise	_	378 (94.5%)	16 (4.0%)	6 (1.5%)
Insufficient infrastructure	_	_	202 (50.5%)	198 (49.5%)
Cultural and contextual differences	4 (1.0%)	5 (1.3%)	297 (74.3%)	94 (23.5%)
Regulatory constraints	3 (.8%)	9 (2.3%)	266 (72.0%)	100 (25.0%)

Sustainable practices, such as advanced recycling techniques and resource conservation—encompassing water, air, and energy—are essential for minimizing waste and mitigating environmental impact. Thoughtfully designed social spaces like lounges, gardens, and pools encourage social interaction and strengthen community ties, enhancing the overall social fabric of the facility. For thermal comfort, incorporating shading devices, whether passive or active, helps regulate temperature and improve guest comfort.

Integrating green elements, including indoor gardens, green walls, and rooftop gardens, provides multiple benefits, such as reducing stress and promoting relaxation among tourists. The physical environment's sensory aspects—such as colour therapy, soundscapes, and tailored lighting—play a pivotal role in shaping guests' emotional well-being, fostering a sense of calm and relaxation.

Designing for both active and quiet areas, such as separate rooms for exercise and meditation or versatile spaces that can shift functions throughout the day, ensures that diverse visitor needs are met. The use of environmentally friendly materials, like low VOC paints and finishes, supports a healthier indoor environment. Additionally, addressing maintenance needs proactively prevents potential downtimes, while incorporating accessibility features, such as ramps for wheelchair users, ensures inclusivity.

Overall, these findings underscore the importance of merging environmental sustainability with human-centred design to create tourism facilities that are not only ecologically responsible but also responsive to the needs and well-being of visitors. This approach not only enhances the facility's appeal but also fosters a more positive impact on both the environment and the local community.

Table 9: Case study analysis

Facility	Appraisal	
	Merit	Demerit
Local Cases 1. Whispering Palms Resort (Location: Badagry, Lagos)	• Adequate parking space • Well-furnished accommodation interior • Good maintenance techniques utilised • Use of biophilic design elements such as green plant, water features and natural light connecting nature with the artificial space hence aids relaxation	• Less consideration for natural ventilation in areas needed in the accommodation spaces of the facility • Limited spaces that encourage and necessitate socialisation in the relaxation spaces i.e accommodation • Use of natural materials such as wood and stone for aesthetic purposes in building's interior and exterior are not incorporated
  2. Yankari National Park (Location: Bauchi)	• Yankari National park has an aesthetically pleasing environment. Natural resources existence on site was properly utilised • Proper zoning of the building spaces in terms of noise production • Proper use of natural materials and integration of green areas • Well finished interior and exterior spaces • Proper drainage for run-off waters • Application of strategies to minimize their environmental impact and become more sustainable such as Energy Efficiency approach, water conservation, waste reduction and recycling etc.	• Too much hardscape element around the accommodation area • Insufficient parking space • Minimal incorporation of shading devices. • Site location is characterised by weak soil during rainy season which makes accessibility uneasy when it rains

  3. Eko Hotel and Suites (Location: Lagos)	• Very beautiful landscape environment with natural feature. • Well planned layout. • A befitting site location due to nearby attractions like cinemas, Eko Atlantic and beach views. • Dedicated car hire service and adequate security. • Good site accessibility. • High level of maintenance strategies considered in the design stage thus minimises periodic maintenance in post occupancy stage which could be tiring • Good internal movement circulation. • Well defined and sufficient car parking spaces.	• No shading devices used along longer faces • Minimal introduction of natural ventilation
  4. Sheraton Hotel Nigeria (Location: Abuja)	• The hotel covers a considerably large area with well landscaped exterior and a botanical part for guests/tourists waiting within the complex. • Easy accessibility and adequate facilities provided for the guests. • Good lobby and planning which is self-descriptive. • The hotel has very good and well-planned exterior circulating system with adequate parking spaces. • Materials used for finishing are very durable and attractive giving the hotel a nice approach façade. • Most modern planning techniques were used in providing services, including waste disposal,	• Natural ventilation not adequate in some rooms and restaurants • Corridors are not provided with Natural lighting as a lighting alternative

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	• refuse disposal and air conditioning. • Long faces of the building have vertical and horizontal shading device introduced	
5. Transcorp Hilton (Location: Abuja)	• It is easily accessible • Its space encourage socialization which drives at forming positive and supportive society to enhance environmental sustainability • Proper site zoning and use of greenery forming a good landscape • Proper planning for human movement and circulation • Well-lit interior spaces to aid relaxation • Sufficient parking space • The adopted form for the structure is aesthetically pleasing • The entrance also caters to physically-challenged people	• Less consideration to shading device in the exterior part of the building, Glare control in the interior space might not be achievable in its cases • Use of natural materials for finishes is not sufficient.
International Cases		
 6. Burj Al Arab Hotel (Location: Dubai)	• The hotel is one of the world's leading hotels, being the first 7-star hotel • Ingenuity of concept and constructional details • Special lighting effects transforms the hotel to beautiful master piece at night, An advanced approach to aesthetically pleasing appearance. • The hotel floats on a private artificial island • Elaborate restaurants and dining • Has capacity to earn foreign income.	• Maintenance features are enormous, thus leading to high cost of maintenance. • Difficulty in accessing some parts of the structure for maintenance purpose. • Maintenance and cleaning is year round and some facilities have to be shut to tourist occasionally for maintenance.

Image		
7. The Cliff Hotel Jeju (Location: South Korea)	• Well landscaped environment • Good exterior and interior wall finishes. • Inventory around site is an advantage adding value to surrounding display • Interior spaces adopt use of natural finishes for floor and wall to enhance relaxation mood	• Well landscaped environment • Good exterior and interior wall finishes. • Inventory around site is an advantage adding value to surrounding display • Interior spaces adopt use of natural finishes for floor and wall to enhance relaxation mood
8. Wilmina Hotel (Location: Berlin, Germany)	• Vast use of green architecture on the surrounding area • Aesthetically pleasing facade • The structure provides possibility for socialization with respect to spaces introduced to enable gathering such as lounge.	• It is hidden so it's not easily accessible • Too much introduction of artificial lighting and less consideration of natural lighting in most spaces
9. Sunyata Eco Hotel (Location: India)	• Application of strategies to minimize their environmental impact and become more sustainable such as Energy Efficiency approach, water conservation, waste reduction and recycling etc. • Introduction of soundscape in the interior space such as calming Nature sound to provide soothing and peaceful environment • Use of low voc (volatile organic compound) paint for interior finish • Use of biophilic design elements such as green plant, water objects and natural light connecting nature with the artificial space hence aids relaxation	• Maintenance and cleaning is year round and some facilities have to be shut to tourist occasionally for maintenance. • Natural ventilation not adequate in some rooms and restaurants.

10. Parkroyal Collection Hotel (Location: Malaysia)	• The use of natural element such as wood for floor finishes befits the relevance of the facility in terms of relaxation considering human-centred design • Good scent in the interior due to adoption of odour therapy • Aesthetically pleasing facade • Well drained environment • Colour therapy is adopted in quiet relaxation spaces	• Waste reduction, Recycling and pollution control measure is not noted • Natural lighting is not considered • Natural ventilation is not considered
11. BomBom Boutique Hotel (Location: South Korea)	• Well landscaped environment • Good exterior and interior wall finishes. • Artificial light is thrown into the interior space • Interior spaces adopts use of natural finishes for floor and wall to enhance relaxation mood	• No glare control In the interior space • Use of natural materials for finishes is not in abundance

4.5 Research Question 4: What are the perceived roles of policy and regulatory frameworks play in promoting environmental sustainability and human-centred design in Nigerian tourism facilities?

The study reveals a strong consensus on the critical role of policy and regulatory frameworks in enhancing environmental sustainability and human-centred design in Nigerian tourism facilities. A substantial majority of respondents, 74.0%, consider such frameworks to be very important, with an additional 25.0% viewing them as extremely important. This reflects a clear recognition of the need for well-defined guidelines and regulations to effectively guide and enforce sustainable and human-centred practices within the tourism sector.

Table 10: Perceived importance of policy and regulatory frameworks including specific guidelines for human-centred design in tourism facilities

	Frequency	Percentage
Not important	2	.5
Slightly important	2	.5
Very important	296	74.0
Extremely important	100	25.0
Total	**400**	**100**

In terms of specific measures that could support the development of these facilities, respondents highlight several key areas where policy interventions would be beneficial. There is broad support for providing incentives for adopting green technologies, with 72.5% agreeing and 26.5% strongly agreeing on the importance of such incentives. This suggests that financial or other incentives could significantly encourage the integration of environmentally friendly technologies in tourism facilities.

Respondents also show strong support for training and certification programs for designers and builders, with 35.5% agreeing and 64.5% strongly agreeing on the need for these programs. Similarly, there is a consensus on the necessity of enhanced regulations and standards, with 35.5% agreeing and 64.5% strongly agreeing. These findings indicate that robust training and stringent standards are seen as essential for ensuring that tourism facilities meet high environmental and human-centered design standards.

Support for community-based design initiatives is also emphasised, with 35.5% agreeing and 64.5% strongly agreeing on its importance. This reflects a recognition that involving local communities in the design process can enhance the relevance and effectiveness of tourism facilities. Additionally, public awareness campaigns are seen as crucial, with 73.0% agreeing and 27.0% strongly agreeing on their significance. This suggests that raising awareness about the benefits of sustainable and human-centred design can foster greater public support and participation.

Overall, the data underscores the perceived necessity of comprehensive policy and regulatory frameworks to drive the development of sustainable and human-centred tourism facilities in Nigeria. By implementing supportive measures such as incentives, training programs, enhanced regulations, community involvement, and public awareness campaigns, policymakers can play a pivotal role in advancing these design principles and promoting a more sustainable and inclusive tourism industry.

Table 11: Suggested measures to be taken by policymakers to support the development of sustainable and human-centred tourism facilities in Nigeria

Items	Strongly Disagree	Disagree	Agree	Strongly Agree
Incentives for adopting green technologies	2 (.5%)	2 (.5%)	290 (72.5%)	106 (26.5%)
Training and certification programs for designers and builders	-	-	142 (35.5%)	258 (64.5%)
Enhanced regulations and standards	-	-	142 (35.5%)	258 (64.5%)
Support for community-based design initiatives	-	-	142 (35.5%)	258 (64.5%)
Public awareness campaigns	-	-	292 (73.0%)	108 (27.0%)

4.6 Discussion of Findings

The research findings underscore the significance of integrating human-centred design with environmental sustainability in tourism facility development, reflecting the insights of Suyono (2024) and Mironova (2024). Human-centred design, which prioritises visitor needs and experiences, complements environmental sustainability efforts aimed at minimising ecological impacts. This alignment is crucial for developing tourism facilities that are not only functional and appealing but also environmentally responsible.

The data indicates that leisure-loving Nigerians are highly concerned about environmental sustainability when choosing tourism facilities. A substantial majority of respondents express significant concern, yet current environmental practices within these facilities are perceived as inadequate. This finding highlights a critical gap in the sector, consistent with the observations of Katsoni & Koliopoulos (2020), who stress the importance of incorporating eco-friendly design and environmental management into tourism facilities. Addressing this gap

through enhanced sustainability practices is essential for meeting the expectations of environmentally conscious consumers and ensuring that facilities contribute positively to ecological conservation (Fei & Dongxia 2024).

Globally, effective tourism facilities incorporate key design features such as energy-efficient systems, waste management, and green construction materials. However, adapting these features to the Nigerian context presents challenges, including high costs, lack of local expertise, and regulatory constraints. These challenges are in line with the issues discussed by Kurniawan *et al.* (2023) and Wibowo *et al.* (2022), who highlight the need for tailored strategies to address local conditions. Supporting local expertise through training and providing incentives for green technologies, as suggested in the data, can help overcome these barriers and facilitate the adoption of best practices in Nigerian tourism facilities (Güngör 2023).

The findings on the perceived roles of policy and regulatory frameworks align with the literature that underscores the importance of robust policies in promoting sustainable and human-centered tourism development. Respondents view policy and regulatory support as essential for advancing these principles. Suggested measures, including incentives for green technologies, training programs, and public awareness campaigns, reflect the broader need for comprehensive policy frameworks to support effective tourism development (Bello & Bello 2020; Adetola 2024). These measures are consistent with the recommendations of Oguchi & Luo (2021), who emphasise the role of regulation in ensuring safety and sustainability within the tourism sector.

Overall, the integration of human-centred design and environmental sustainability in tourism facility planning is essential for addressing visitor expectations and environmental concerns. The research findings corroborate existing literature on sustainable architecture and tourism development, highlighting the need for a holistic approach that balances economic, social, and environmental factors (Azizibabani 2017; Ceylan & Soygenis 2019). By focusing on these principles and addressing the identified challenges, Nigeria can enhance its tourism sector's sustainability and attractiveness, contributing to economic growth and cultural preservation while meeting the needs of its diverse stakeholders.

5. Conclusion and recommendations

This study highlights the crucial need for integrating human-centered design with environmental sustainability in Nigerian tourism facilities. The findings reveal that leisure-loving Nigerians place significant importance on environmental sustainability when selecting tourism facilities, though current practices fall short. Successful tourism facilities globally incorporate eco-friendly features and human-centred design, yet adapting these to Nigeria faces challenges such as high costs and regulatory constraints. The study underscores the necessity for Nigerian tourism facilities to enhance their environmental sustainability practices and adopt human-centred design principles. This alignment is essential for meeting consumer expectations and contributing to ecological conservation while boosting the sector's growth and local economic development. Therefore, the study advanced the following recommendations:

1. Policy Support: Implement comprehensive policies that provide incentives for green technologies, support training and certification programs, and enhance public awareness campaigns.

2. Capacity Building: Develop local expertise through targeted training programs for designers and builders to overcome technical and knowledge barriers.

3. Enhanced Regulations: Establish and enforce robust regulations and standards that promote sustainable and human-centred design in tourism facilities.

4. Community Involvement: Encourage community-based design initiatives to ensure cultural sensitivity and local engagement in tourism development.

By addressing these recommendations, Nigeria can advance towards more sustainable, user-friendly, and economically beneficial tourism facilities.

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