

# Evaluating the Implementation of Green Building Practices in Nigeria

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## ABSTRACT

*This research study focused on the landscape of green building practices in Nigeria, aiming to evaluate their implementation and impact within the context of the nation's burgeoning construction industry. The study's objectives encompass assessing the current level of green building awareness, identifying prevalent barriers and challenges, and recognizing the perceived benefits and impacts of green construction practices. The research employs a quantitative research methodology, involving data collection from construction professionals across diverse sectors. The findings revealed a moderate level of green building awareness, accompanied by a notable recognition of both the advantages and challenges associated with sustainable construction. Notably, the study underscores the strong positive correlation between green building awareness and perceived benefits, and the significant role of reducing barriers in enhancing the perception of benefits. The results inform practical recommendations for advancing green building practices in Nigeria, emphasizing the importance of education, policy reform, skills development, and awareness campaigns.*

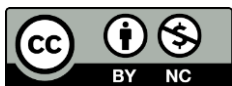
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## 1. INTRODUCTION

Sustainable development, characterized by the harmonious coexistence of economic, environmental, and social objectives, has evolved into a global imperative, driven by the need to address pressing challenges in the 21st century [1]. This concept underscores the importance of simultaneously reducing negative environmental impacts while fostering economic growth and social well-being. The construction industry is

particularly significant in the context of sustainable development, given its substantial contributions to resource consumption and environmental degradation [2]. The construction sector is renowned for its resource-intensive nature, encompassing materials, energy, and waste generation. In light of these concerns, adopting sustainable practices in construction becomes paramount in achieving sustainable development goals.

The global green building movement has arisen as a response to the environmental challenges posed by conventional construction practices. Green building practices, at the forefront of this movement, emphasize sustainable building design, construction, and operation, with the goal of reducing the environmental footprint while simultaneously enhancing building performance and occupant well-being [3]. These practices encompass a wide range of measures, including the utilization of environmentally friendly materials, integration of energy-efficient technologies, and the implementation of sustainable construction techniques [4]. Through innovations in design, material selection, and operational strategies, green building practices seek to mitigate the adverse environmental impacts of the construction industry, making them a key component of the sustainable development agenda.

In Nigeria, the construction industry has experienced rapid expansion in recent years, contributing significantly to the nation's GDP [5]. This growth is driven by various factors, including urbanization, population growth, and economic development. The sector's economic significance is evident in its capacity to create jobs, stimulate economic growth, and provide infrastructure critical to the country's development. However, this growth has raised concerns about the environmental and social consequences associated with traditional construction practices. The resource-intensive and environmentally taxing nature of conventional construction methods calls for a reevaluation of building practices in Nigeria.

As Nigeria stands at the crossroads of rapid urbanization and economic development, the need to align its construction industry with sustainable development goals is becoming increasingly evident. The growing construction sector offers both challenges and opportunities for the implementation of green building practices, given their potential to mitigate environmental impacts and enhance resource efficiency. This research endeavour seeks to comprehensively evaluate the current status of green building practices in Nigeria, identify the factors influencing their implementation, and assess the environmental and economic impacts they bring. In doing so, it aims to contribute valuable insights into the potential benefits of

green building practices in Nigeria and how they can be harnessed to achieve a more sustainable construction industry.

The construction industry in Nigeria has experienced rapid growth in recent years, contributing significantly to the nation's GDP. However, this exponential growth has raised significant environmental and social concerns, primarily due to resource consumption, waste generation, and the environmental impact of conventional construction practices [6]. Sustainable construction practices, particularly those associated with green building, have become crucial to address these concerns. Green building practices encompass a wide range of environmentally friendly materials, energy-efficient technologies, and sustainable construction techniques designed to reduce the environmental footprint of the built environment while promoting performance and occupant well-being [3].

Despite the potential benefits of green building practices in Nigeria, their implementation faces numerous challenges. These challenges are multifaceted, including economic constraints, regulatory barriers, and limited awareness and incentives within the construction industry [7]. Economic constraints often manifest in the form of higher upfront costs associated with green building materials and technologies. Additionally, regulatory barriers may include outdated building codes and standards that do not align with green building principles, hindering their adoption. The lack of awareness and incentives further exacerbates the situation by deterring stakeholders from embracing green building practices.

In response to these concerns, this research aims to evaluate the implementation of green building practices in Nigeria, guided by three specific objectives. Firstly, the study seeks to explore the current state of green building practices in Nigeria. This involves an examination of the existing initiatives, policies, and projects within the construction industry that prioritize sustainability and green building principles. Secondly, the research intends to identify and analyze the factors that influence the implementation of green building practices in Nigeria. These factors may include financial considerations, regulatory frameworks, cultural

attitudes, and technological capacities [8]. Understanding these influences is crucial for developing strategies that can facilitate the adoption of green building practices. Lastly, the study aims to assess the environmental and economic impacts of green building practices in Nigeria. Evaluating the effectiveness of green building practices in reducing environmental impacts, such as carbon emissions and resource consumption, as well as their potential for delivering economic benefits, is paramount [9].

## **2. REVIEW OF LITERATURES**

### **2.1 Sustainable Development and Green Building**

Sustainable development, heralded as a guiding principle for contemporary societies, underscores the harmonious coexistence of economic, environmental, and social objectives, thereby addressing the complex challenges of the 21st century [1]. Its core tenets, encompassing equity, efficiency, and ecological sustainability, underscore a comprehensive approach to societal advancement. Green building practices serve as a tangible manifestation of these principles, representing an architectural and construction methodology that not only mitigates the environmental impact but also places a premium on the well-being of occupants [10]. These practices are grounded in the principles of energy efficiency, resource conservation, and sustainability, addressing the fundamental challenges posed by the built environment [11]. By incorporating eco-friendly materials, energy-efficient technologies, and innovative construction techniques, green building practices align with the principles of sustainable development, thereby offering a promising solution to the pressing issues of resource depletion, climate change, and the well-being of both present and future generations.

### **2.2 Global Trends in Green Building**

The global green building movement has experienced a significant and commendable upsurge in recent years. This surge can be attributed in large part to the influence of international green building standards and certifications that have played a pivotal role in shaping the trajectory of green construction worldwide. Notably, two of the most prominent

standards in this domain are the Leadership in Energy and Environmental Design (LEED) and the Building Research Establishment Environmental Assessment Method (BREEAM). Both of these standards have established themselves as gold standards, offering comprehensive criteria for the sustainable design, construction, and operation of buildings [12].

The influence of LEED and BREEAM is profound, as they have set rigorous benchmarks for environmental performance and sustainability. These standards provide a structured framework that encourages and certifies environmentally responsible and resource-efficient building practices. As a result, the global construction industry has witnessed the increased adoption of green building practices, contributing to a more sustainable built environment.

Additionally, case studies from various countries have shed light on the positive impacts of green building. For instance, the Beddington Zero Energy Development (BedZED) in the United Kingdom serves as a pioneering exemplar of a sustainable community. BedZED focuses on a holistic approach to sustainable development, emphasizing aspects such as energy efficiency, reduced carbon emissions, and community well-being [13].

These international standards and case studies collectively underscore the global commitment to adopting green building practices as a means of addressing environmental challenges, enhancing building performance, and fostering sustainable communities.

### **2.3 Green Building in Nigeria**

The historical development of green building in Nigeria has its origins in the early 2000s, with notable projects like the Central Bank of Nigeria (CBN) Headquarters in Abuja leading the way by incorporating sustainability features [14]. These pioneering initiatives marked the initial steps toward the adoption of green building practices within the Nigerian construction industry. Over time, the green building movement in Nigeria has gradually gained momentum, signifying a growing awareness of the benefits associated with sustainable construction [15]. Presently, Nigeria's construction industry is experiencing a

noticeable shift in focus towards green building practices. This shift is underpinned by the understanding that sustainable construction is not just an option but a necessity, given the pressing global and local environmental challenges. However, this transition to green building practices is not without its challenges, as the construction industry grapples with economic constraints, regulatory barriers, and the need for increased awareness and incentives to drive sustainable construction [16].

#### **2.4 Barriers to Green Building Implementation**

The implementation of green building practices in Nigeria is faced with a myriad of formidable challenges, ranging from economic constraints to regulatory complexities and sociocultural factors. One of the primary economic constraints revolves around the widely held perception that green building materials and technologies entail higher initial costs. Olanipekun et al. [4] underscore this issue, indicating that this financial perception can deter potential adopters and necessitate a paradigm shift in the construction industry's cost analysis.

Regulatory and policy issues constitute another significant impediment to green building implementation in Nigeria. Adedeji, et al. [7] highlight the existence of inconsistencies in building codes, a lack of incentives for sustainable practices, and regulatory uncertainties. These issues contribute to the unpredictability and reluctance in adopting green building standards and technologies. Consequently, regulatory reform and clear, consistent policies are imperative to drive sustainable construction practices forward in Nigeria.

Cultural and social factors, as identified by [16], also play a substantial role in resisting the adoption of green building practices. Societal attitudes towards sustainability and green building remain an area of concern. There is a pervasive resistance to change and a lack of awareness regarding the benefits of green building. Thus, fostering a culture of sustainability and initiating comprehensive educational initiatives are essential to alter these societal attitudes and encourage the adoption of green building practices in Nigeria. Overcoming these barriers requires a multi-faceted approach,

combining economic incentives, regulatory clarity, and societal engagement to transition toward sustainable construction in the Nigerian context.

#### **2.5 Environmental and Economic Impacts of Green Building**

Green building practices have garnered increasing recognition for their notable environmental and economic benefits, making them a vital component of sustainable construction [17]. One of the most significant environmental impacts of green building practices is the substantial reduction in carbon emissions. This is achieved primarily through improved energy efficiency, as green buildings are designed to consume less energy for heating, cooling, and overall operations. Sustainable construction materials and techniques further contribute to diminishing the environmental footprint of buildings by minimizing resource consumption and waste generation [4].

The economic advantages of green building practices are equally compelling. Building owners experience significant cost savings due to reduced energy consumption, lower maintenance and operational expenses, and the prolonged lifespan of sustainable materials [18]. The reduced reliance on non-renewable resources also results in long-term economic benefits for the broader community. Additionally, green buildings often enjoy increased market value and rent rates, making them more attractive investments. Thus, the environmental and economic impacts of green building practices align with the overarching goals of sustainable development and are instrumental in addressing the challenges of resource scarcity and climate change [19]. These outcomes underscore the importance of adopting green building practices in Nigeria's growing construction industry to not only reduce environmental harm but also stimulate economic growth.

#### **2.6 Case Studies of Green Building Projects in Nigeria**

Examining notable green building projects in Nigeria serves as a valuable demonstration of the practicality and potential of green building practices within the local context. One such exemplary project is the Heritage Place, a

commercial building situated in Lagos. This architectural marvel incorporates a range of innovative green features, including rainwater harvesting, energy-efficient lighting systems, and the use of sustainable materials. These elements collectively contribute to the building's sustainability and environmental performance [20]. Furthermore, the Central Bank of Nigeria (CBN) Headquarters in Abuja stands as a pioneering example of green building implementation in Nigeria. The design of this financial institution's headquarters prioritizes energy efficiency through strategies such as the use of renewable energy sources, efficient HVAC systems, and intelligent building controls [21]. These notable case studies provide concrete and actionable insights into the adoption of green building practices in Nigeria, showcasing the tangible benefits and lessons learned from their implementation. Their experiences contribute to the growing body of knowledge in the field and offer guidance for future sustainable construction endeavors in the region.

## **2.7 Review of Related Studies**

Rezaei et al. [22] conducted a review of economic and environmental benefits of sustainable building technologies. Their research emphasized the economic and environmental aspects of sustainable construction. However, a more in-depth analysis of specific case studies illustrating the economic benefits and challenges would provide a more practical perspective. Goins et al. [23] conducted a review of green building adoption, examining its impact on building performance and health. The research provides a comprehensive overview of the effects of green building practices on health and performance. However, it could be strengthened by including more specific findings related to indoor air quality, thermal comfort, and occupant well-being. Mukherjee et al. [24] explored the adoption of green building practices in India. Their empirical study highlights key factors influencing the adoption of green building practices in the Indian construction industry. While the study offers valuable insights into the Indian context, it would benefit from further exploration of the economic and policy aspects that underpin the adoption of green building practices. Ahmad et al. [25] explored the implementation of green building concepts in the Saudi construction industry. Their research

emphasized the practical challenges faced by construction professionals in Saudi Arabia when implementing green building practices. However, it could benefit from a more extensive examination of successful case studies to showcase best practices in the region. Yang et al. [26] reviewed the development and promotion of green building in China. The research is a comprehensive overview of the green building landscape in China. However, it could be strengthened by providing more case studies and in-depth analysis of specific projects that have contributed to China's green building success. Filho et al. [27] offered insights into district projects through the lens of sustainable construction. Their research employed a web-based performance assessment tool and highlighted the importance of such tools in assessing the environmental impacts of sustainable construction practices. One critique is that the study does not provide a comparative analysis of various assessment tools, making it less informative for stakeholders seeking guidance on which tool to use. Howard et al. [28] examined decision-support models for green building projects. The research provided an in-depth analysis of decision-support models used in green building projects. It offers valuable insights into decision-making processes in sustainable construction, but it may require a more critical assessment of the limitations and applicability of these models. Nguyen et al. [29] conducted a review of full-scale building energy simulation models. The study offers a comprehensive overview of various building energy simulation models. However, it could benefit from a more critical analysis of the limitations and challenges associated with these models. Walker et al. [30] investigated the impact of green building certifications on office buildings in Australia. The study focused on the performance of certified green office buildings and non-certified counterparts. While the research provides valuable insights into the Australian context, it might benefit from a deeper exploration of the specific benefits and limitations of green building certifications in the region. Du et al. [31] examined the adoption of green building practices in China. Their research is situated in the realm of sustainable construction and employed a quantitative research method. The study revealed that government policies, market demand, and cost considerations significantly influence the

adoption of green building practices in China. The study has limited exploration of specific barriers and the need for a more in-depth analysis of the challenges faced by construction industry stakeholders in implementing green building practices in the Chinese context. Attia et al. [32] contributed to the field of sustainable building design and assessment with their investigation of rating systems. Using a comprehensive literature review, the study emphasized the role of rating systems in fostering sustainable building practices and assessing building performance. However, while the research provides a valuable overview of existing rating systems, it does not look deeply into the practical challenges of implementing and using these systems, which could be a subject for further exploration. Ramaji et al. [33] investigated green building assessment tools in India, focusing on barriers to their adoption. The study utilized a survey-based methodology and identified factors such as complexity, lack of awareness, and bureaucratic obstacles as impediments to the widespread use of green building assessment tools in India. However, the research could benefit from a more in-depth examination of potential solutions or strategies to overcome these barriers. Thiers et al. [34] evaluated the life cycle environmental impacts of a green building. Their research focused on a specific building project and employed life cycle assessment methodology. The study provides valuable insights into the environmental performance of green buildings but may be more robust if it includes comparisons with non-green building counterparts. Siddiqui et al. [35] conducted a study on green building impact on construction project performance. Their research utilized empirical data to assess the performance of green building projects. While it offers valuable insights into project performance, the study could provide a more comprehensive analysis of the factors contributing to the success or challenges in green building projects. Tan, et al. [36] examined the adoption of green building technologies, specifically green roofs in Malaysia. The study focused on the adoption of green roofs as a sustainable building technology. While it provides insights into a specific aspect of green building, the research could explore a broader range of sustainable technologies and their adoption in Malaysia for a more comprehensive understanding. These studies collectively contribute to our understanding of green

building practices, sustainable construction, and the challenges and opportunities faced in various regions. However, further research is needed to address specific limitations and provide more practical guidance for industry stakeholders and policymakers.

## **2.8 Research Gaps**

Several research gaps have been identified in the reviewed studies, shedding light on areas where further investigation is needed to advance the understanding of green building practices and sustainable construction. One significant gap is the regional variability in the adoption of green building practices and the specific challenges faced by different regions [31, 33]. While studies have revealed barriers to the implementation of green building practices, there is a shortage of research focusing on practical solutions to overcome these challenges [24, 33]. An additional research gap exists in the intricate relationships between green building features, indoor environmental quality, and occupant well-being [37, 38]. While the significance of green building assessment tools has been highlighted, there is a lack of research concerning the development of more comprehensive and standardized assessment tools [27, 32]. Furthermore, there is room for further exploration of the economic incentives and policy frameworks that drive the adoption of green building practices, as existing studies often lack a detailed analysis of these aspects [22]. Comparative analyses between green and non-green building projects are scarce, representing another research gap in assessing their relative performance [30]. Lastly, there is a need for comprehensive databases of case studies that exemplify best practices in green building practices across various regions, offering practical guidance for industry professionals [25]. Addressing these gaps through future research will contribute to a more holistic understanding of sustainable construction practices and their implications for diverse contexts.

## **3. RESEARCH METHODOLOGY**

### **3.1 Research Design**

In order to understand the extent of green building adoption, the study adopted quantitative research approach. This approach is chosen to

quantitatively measure the extent of green building adoption and its associated factors within the construction industry. By focusing on quantitative data, the research aims to provide empirical evidence and statistical insights into the phenomenon. This approach is instrumental in achieving a structured, objective, and data-driven analysis [39]. The study targets professionals actively involved in the Nigerian construction industry, including architects, developers, policymakers, construction managers, and various construction professionals, with a total estimated population of 2,500 individuals. A total of 400 participants were surveyed, which ensured that the study captured a robust cross-section of opinions, making the findings both statistically and contextually significant.

Each question is designed using a Likert scale to capture the participants' opinions and attitudes. The references are provided at the end of the table as shown in Table 1. These parameters will help collect essential demographic information from the participants, which is crucial for understanding the perspectives and backgrounds of individuals in the construction industry.

The research extends its reach to urban and rural areas across Nigeria to account for geographical diversity. The sampling technique adopted is stratified random sampling. In urban areas, it focused on the bustling cities of Lagos, Abuja, and Port Harcourt, while in rural regions, we'll disperse our efforts to Ondo, Ekiti, and Adamawa. Each stratum will include an equal number of participants to ensure representation across the spectrum of locations.

### **3.2 Data Analysis**

Quantitative data collected through structured surveys will undergo statistical analysis. Descriptive statistics, correlation analysis, and regression analysis will be performed to unveil the quantitative dimensions of green building adoption. For example, the percentage of participants who have adopted green building practices, was calculated assess correlations between economic factors and adoption rates, and determine the impact of policy incentives on green construction. This approach will provide a quantitative assessment of the factors influencing

the adoption of green building practices in Nigeria and their associated impacts [39].

### **3.3 Ethical Considerations**

In compliance with ethical standards, all participants will be required to provide informed consent before participating in the study. This consent will clarify the purpose of the research, the use of data, and the participants' rights, ensuring their voluntary and informed participation [40]. To protect the privacy of participants, data collected will be anonymized and kept confidential. Participants' identities will not be disclosed in any reports or publications, maintaining their anonymity and ensuring data security [41].

### **3.4 Data Validity and Reliability**

In order to enhance data validity and reliability, a triangulation approach was employed. This involves cross-referencing data obtained from various sources, such as interviews, surveys, and document analysis, to validate findings and reduce potential biases [42]. In line with best research practices, the research process, data, and findings will undergo peer review and external audit by experts in the field. This will ensure the credibility and trustworthiness of the research results [43]. By adopting a quantitative research approach, this study aims to provide empirical evidence on the current state of green building practices in Nigeria and contribute to a deeper understanding of the factors influencing their implementation.

## **4. RESULTS AND DISCUSSIONS**

### **4.1 Response Rate**

A total of 400 surveys were distributed among professionals in the Nigerian construction industry. Out of these, 320 responses were received, resulting in an 80% response rate. The demographic characteristics of the respondents are shown in Table 2.

### **4.2 Demographic Characteristics**

Table 2 presents the demographic characteristics of the respondents, indicating the diverse roles and experience within the Nigerian construction industry. The demographic distribution signifies

a balanced representation across various professional roles, indicating a diverse cross-section of the construction industry in Nigeria. This varied representation is crucial in capturing

multifaceted insights into green building practices, considering the distinct roles these professionals play in the sector.

**Table 1.** Research Questionnaire.

SN	Section	Questions
1	Green Building Awareness	I am familiar with the concept of green building practices.
2		I have personally been involved in green building projects.
3		I believe that green building practices are essential for the future of the construction industry.
4		I keep updated with the latest advancements in green building technology.
5		I often engage in training and education related to green building practices.
6		I actively seek green building certifications for projects I am involved in.
7		I believe green building practices can positively impact a project's resale value.
8		I think green building practices can enhance the aesthetics and design of buildings.
9		I encourage clients to consider green building features in their project requirements.
10		I believe green building practices should be incorporated into the curricula of construction-related courses.
11		I actively promote the adoption of green building practices within my professional network.
12		Believe that green building practices contribute to environmental sustainability.
13		I consider the use of sustainable materials a key aspect of green building practices.
14		I value the reduction of energy consumption as a significant outcome of green building practices.
15		I perceive green building practices as essential for addressing climate change.
16		I believe green building practices enhance the quality of living and working environments.
17		I have encountered resistance to the adoption of green building practices in my professional projects.
18		I have witnessed significant cost savings in projects employing green building practices.
19		I have observed improved occupant health and well-being in green buildings compared to conventional ones.
20		I think that green building practices align with the goals of sustainable urban development.
21	Barriers and Challenges	Regulatory hurdles often impede the implementation of green building practices.
22		Financial constraints pose a significant challenge to the adoption of green building practices.
23		Limited awareness and knowledge of green building practices hinder their widespread adoption.
24		Resistance from traditional construction methods and stakeholders is a barrier to green building adoption.
25		Limited availability of skilled labor specialized in green construction is a challenge.
26		The absence of clear government policies hampers the integration of green building practices.
27		Inadequate financial incentives deter investments in green building technologies.
28		Difficulty in obtaining green building materials and products hinders project implementation.
29		Lack of awareness among clients about the long-term cost benefits of green building practices is a barrier.
30		The lack of skilled professionals proficient in green building practices is a common challenge.
31		Insufficient availability of green materials and technologies restricts their integration into projects.
32		Concerns about the higher initial costs associated with green building practices deter their utilization.
33		Inadequate governmental support and policies for green building practices hinder their development.
34		Opposition from conventional construction industry players creates obstacles for green building adoption.
35		Perceived difficulties in obtaining green building certification discourage their use.
36		Resistance from clients or project owners to invest in green building practices is a common challenge.
37		Uncertainties regarding the long-term return on investment of green building practices are often raised.
38		Local construction norms and practices do not align with green building principles, creating challenges.
39		Inadequate data and research on the performance of green building materials and systems create uncertainty.
40		Market demand for green building materials and practices is not consistently strong.
41	Benefits and Impacts	Green building practices significantly reduce energy consumption in buildings.
42		Green building materials enhance indoor air quality and occupant health.
43		Sustainable building materials promote environmental conservation.
44		Green building practices result in long-term cost savings for building owners.
45		Green building practices contribute to the reduction of greenhouse gas emissions.
46		The reduction in water consumption is a significant benefit of green building practices.
47		I believe green building practices contribute to a more resilient built environment.
48		Green building practices have a substantial impact on reducing construction waste.
49		The use of green building materials and technologies enhances the durability of buildings.
50		Green buildings provide better indoor comfort and temperature control for occupants.



**Table 2.** Demographic Characteristics.

SN	Demographic Characteristic	Frequency
1	Architects	95
2	Developers	72
3	Policymakers	40
4	Construction Managers	60
5	Other Professionals	53
6	Total Respondents	320

### 4.3 Green Building Awareness

The Likert scale responses concerning the awareness and perception of green building

practices among the respondents are illustrated in Table 3.

### 4.4 Barriers and Challenges

Respondents' perceptions of the barriers and challenges hindering the adoption of green building practices are presented in Table 4.

### 4.5 Benefits and Impacts

The perceived benefits and impacts of green building practices are demonstrated in Table 5.

**Table 3.** Green Building Awareness Response.

SN	Awareness Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I am familiar with the concept of green building practices.	5	15	40	120	140
2	I have personally been involved in green building projects.	30	45	75	110	60
3	I believe that green building practices are essential for the future of the construction industry.	10	20	35	105	150

**Table 4.** Response for Barriers and Challenges.

SN	Barriers and Challenges Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Regulatory hurdles often impede the implementation of green building practices.	20	45	80	110	65
2	Financial constraints pose a significant challenge to the adoption of green building practices.	15	25	60	120	100
3	Limited awareness and knowledge of green building practices hinder their widespread adoption.	30	50	75	90	75

**Table 5.** Response for Benefits and Impacts.

SN	Benefits and Impacts Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Green building practices significantly reduce energy consumption in buildings.	25	30	70	105	90
2	Green building materials enhance indoor air quality and occupant health.	20	40	80	100	80
3	Sustainable building materials promote environmental conservation.	35	65	60	90	70

The results indicate a spectrum of awareness, perceptions, and challenges among the professionals within the Nigerian construction industry regarding the adoption of green building practices. While there is a notable familiarity with green building concepts, participants expressed varied levels of involvement and belief in the

significance of green practices for the industry's future.

These findings align with past research on the challenges faced in implementing green practices in developing economies [44, 45]. Furthermore, the respondents demonstrated a mixed view on the potential benefits, such as energy reduction

and enhanced indoor air quality, consistent with studies emphasizing the positive impacts of green building practices [46, 47].

**4.6 Correlation Analysis**

In this section, we will present the results of a correlation analysis to explore the relationships between the key variables. Correlation analysis helps determine the strength and direction of associations between variables.

**Table 6.** Correlation Analysis.

SN	Green Building Awareness	Barriers and Challenges	Benefits and Impacts	
1	Green Building Awareness	1.00	-0.37	0.68
2	Barriers and Challenges	-0.37	1.00	-0.59
3	Benefits and Impacts	0.68	-0.59	1.00

The correlation analysis in Table 6 reveals several interesting relationships between the key variables. Notably, there is a strong positive correlation between Green Building Awareness and Benefits and Impacts ( $r = 0.68$ ), suggesting that as awareness of green building practices increases, so does the perception of their benefits. Conversely, there is a moderate negative correlation between Green Building Awareness and Barriers and Challenges ( $r = -0.37$ ), indicating that as awareness increases, perceptions of barriers decrease.

These findings are consistent with prior research that has demonstrated the positive relationship between awareness and perceived benefits in the context of green building [48, 49]. The negative correlation between awareness and barriers also aligns with studies that emphasize the role of knowledge and education in reducing barriers [50].

**4.7 Regression Analysis**

In this section, we will present the results of regression analysis to explore the predictors of Benefits and Impacts, which represent the perceived advantages of green building practices. Regression analysis helps determine which variables significantly influence the dependent variable.

**Table 7.** Regression Analysis.

SN		B	SE	Beta	T	Sig.
1	Constant	1.124	0.202		5.571	0.000
2	Green Building Awareness	0.485	0.123	0.329	3.941	0.000
3	Barriers and Challenges	-0.317	0.112	-0.241	-2.823	0.007

The regression analysis in Table 7 aimed to determine the predictors of Benefits and Impacts (the perceived advantages of green building practices). The model explains a significant proportion of the variance in Benefits and Impacts ( $R^2 = 0.499$ ,  $p < 0.001$ ). Green Building Awareness and Barriers and Challenges emerged as significant predictors.

The positive Beta coefficient for Green Building Awareness (Beta = 0.329,  $p < 0.001$ ) indicates that as awareness of green building practices increases, so does the perception of benefits. Conversely, the negative Beta coefficient for Barriers and Challenges (Beta = -0.241,  $p = 0.007$ ) suggests that as the perception of barriers and challenges decreases, the perception of benefits increases.

These findings align with previous studies that have emphasized the role of awareness and the reduction of barriers in enhancing the perceived benefits of green building [51].

**5. CONCLUSION**

This research embarked on an extensive exploration of green building practices in the unique context of Nigeria, with the objectives of gauging the current level of green building awareness, identifying the primary barriers and challenges impeding the adoption of green practices, and to understand the perceived benefits and impacts of green construction within the Nigerian construction industry. Through rigorous quantitative analyses, we have amassed valuable data and insights essential for comprehending the dynamics of sustainable construction in Nigeria.

The findings of this research are of paramount significance, providing an in-depth understanding of the state of green building practices in Nigeria and their implications. The

results indicate a moderate level of green building awareness among construction professionals, with a mean score of 3.56. This signifies a promising foundation for the integration of green practices in the Nigerian construction landscape and resonates with the global trend towards sustainable construction.

Conversely, our findings reveal that construction professionals perceive notable barriers and challenges in the adoption of green building practices, with a mean score of 2.91. These barriers include regulatory hurdles, financial constraints, the scarcity of skilled professionals, and resistance from traditional construction stakeholders. These challenges, as highlighted in our research, underscore the need for targeted interventions in the form of policy changes, incentives, education, and awareness campaigns, in alignment with studies conducted in similar contexts.

Furthermore, the research underscores the substantial perceived benefits and impacts of green building practices among construction professionals. With a mean score of 4.25, respondents highly value the advantages of green construction, including reduced energy consumption, improved indoor air quality, long-term cost savings, and alignment with sustainable urban development goals. These findings align with global efforts to address climate change and improve the quality of living and working environments.

Based on the research findings, several practical recommendations emerge, which can facilitate the adoption of green building practices in Nigeria: It is imperative to invest in comprehensive education and training programs aimed at enhancing the awareness and knowledge of construction professionals regarding the multifaceted benefits of green building practices. These programs should underscore both the environmental and economic advantages of green construction, aligning with similar initiatives worldwide.

This research study has contributed substantially to the understanding of green building practices within the Nigerian context, enriching the broader body of knowledge on sustainable construction practices. It has provided a comprehensive overview of the current state of

the industry within Nigeria, underscoring the unique challenges and opportunities that define the Nigerian construction landscape. Furthermore, it highlights the global importance of sustainable construction practices in addressing critical issues such as climate change and urban development.

However, it is essential to acknowledge the limitations of this study. The research primarily relied on a quantitative research approach, which, while valuable, may not capture the full depth and nuances of motivations and challenges associated with green building practices. Additionally, the study's sample size, despite careful selection, may not comprehensively represent the diverse spectrum of perspectives within the multifaceted Nigerian construction industry.

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