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GREEN BUILDING CERTIFICATIONS AND SUSTAINABLE DEVELOPMENT IN OSOGBO, NIGERIA: THE ISSUES AND CHALLENGES

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Abstract

The quest for sustainable development in Nigeria faces substantial challenges, particularly in urban centers like Osogbo Metropolis. Green building practices has emerged as a vital tool for addressing these challenges by promoting resource efficiency, environmental responsibility, and long-term economic benefits. This study examined the impact of green building certification on sustainable development in Osogbo, an emerging city in Nigeria, analyzing its perspective effectiveness in term of its level of awareness, policy gap and cost factor, energy efficiency potentials and improved residents' quality of life. Drawing on relevant literatures on sustainable construction and green building adoption in Nigeria, the study explores key issues as lack of policy gap, financial constraints and limited public awareness among others, through the adoption of a mixed method approach to achieve the research objectives. Findings indicate that, while green certification frameworks like Leadership in Energy and Environmental Design (LEED) and Nigeria's Green Building Council initiatives have the potentials to drive sustainable urban development, their implementation in Osogbo remains hindered by regulatory inconsistencies and high costs. The study therefore, recommends enhanced government incentives, increased stakeholder engagement, and public education to facilitate the adoption of green building practices. By addressing these challenges, Osogbo and other similar cities can leverage green certification to achieve more sustainable urban growth, aligning with global sustainability goals.

Keywords: *Green Building Certification, Sustainable Development, Osogbo Metropolis, Environmental Policy, Urban Sustainability*

Introduction

Sustainable development has recently become a typical issue of global priority, particularly in urban areas with rapid, unabated and unregulated population growth rate combined with unfettered construction activities engendering environmental degradation. The Brundtland Commission (1987) defined the concept of sustainable development, as a process that emphasizes on the meeting of the present needs without necessarily compromising the ability of the next generations in meeting their needs. Ogunba, (2015) opined that, achieving sustainable urban development in Nigeria is a herculean task due to infrastructure deficiency, feeble regulatory framework, and mounting environmental pressures, thus posing serious challenge to national developmental efforts. Hence, a major option of the emerging strategies that can adequately address these barriers is the adoption of green building certification. This process guarantees the meeting of the environmental, social and economic sustainability criteria of buildings. Several frameworks have been introduced to stimulate and enhancing energy efficiency and other building practices that are environmentally friendly. The most common green building framework certifications are among others include Building Research Establishment Environmental Assessment Method (BREEAM), the Nigerian Green Building Council's (NGBC) and the Leadership in Energy and Environmental Design (LEED) initiatives.

According to Kibert (2016), green buildings reduce resource consumption and lower carbon emissions, making them a critical component of sustainable urban planning. However, despite their benefits, green building certifications are yet to gain widespread adoption in Nigeria, particularly in medium size cities like Osogbo. Study by Olubunmi, Oke and Adeneye (2016) suggested that financial constraints, lack of technical expertise, and limited government support generally hindered the adoption of sustainable building practices in the country. Akinjare, Olaleye, and Amole (2011) further posited that the poor waste management system, inadequate drainage systems, and the increasing demand for energy contributes to the current unsustainable urban development in most Nigerian cities. To resolve issues as this, the adoption of Green Building Certification has been advocated to be a viable solution through which the construction of energy-efficient buildings that minimize environmental impact can be ensured. Dwaikat & Ali, (2016) observed that, Green Building Certification implementation in developed nations has been successful culminating in the improved energy efficiency, reduced carbon footprints, and enhanced indoor air quality. For instance, the adoption of Green Certification in the United States of America

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has in no small measure led to significant reductions in energy consumption and operational costs (USGBC, 2018). Also, Darko & Chan, (2017) asserted that, countries in Africa, like Ghana and South Africa have made giant strides in Green Building adoption, with government-backed incentives playing a major role in their successes. Nigeria, however, still lags in adopting these practices due to institutional barriers and lack of effective enforcement mechanisms.

Osogbo, the Osun state capital, is currently experiencing unprecedented rapid urbanization, leading to urban expansion, significant environmental and infrastructural challenges. However, the implementation of Green Building Certification in Osogbo is constrained by several factors, including high initial costs, weak policy enforcement, and limited awareness among developers and the general public (Adebayo & Akinlolu, 2020)

It could therefore be inferred from the above assertions that, despite the various clear benefits of green building practices, it's adoptions in an emerging city as Osogbo, Nigeria, could face momentous barriers. Overcoming the barriers could require a multifaceted approaches, ranging from a localized certification systems, increased stakeholders' awareness, to the implementation of a stronger supportive government regulatory framework. Efforts as these are necessary to promote sustainable urban development in an emerging Nigerian city as Osogbo Metropolis. This study therefore examines the impact of green building certification on sustainable development in Osogbo Metropolis, highlighting its potential benefits, challenges, and possible policy interventions or gaps. By analyzing existing literature and real-world case studies, the research aims to provide insights into how Osogbo can integrate green certification into its urban development strategies. Understanding these dynamics is crucial for policymakers, urban planners, and stakeholders seeking to promote sustainable development in Nigeria, particularly, Osogbo metropolis.

Literature Review

The Need, Issues and Challenges

The integration of green building certification within the Nigeria's construction industry has garnered increasing attention in recent years, reflecting national and regional shift towards sustainable development. The practice does not only enhances property aesthetics, but also contribute to the promotion of resource efficiency and urban development sustainability through

the maximization of environmental footprint of buildings. Green Building Certification Systems, as Leadership in Energy and Environmental Design (LEED) and Excellence in Design for Greater Efficiencies (EDGE), often serve as primary frameworks for the assessment and recognition of buildings that meets the specific environmental performance standards. These systems aim at promoting resource efficiencies, reduction in environmental impact, and the enhancement of occupant well-being throughout the lifecycle of a building. The advantages of Green Building practices include but not limited to environmental conservation, economic savings, and social well-being. Abdulsalam, Bello and Okonkwo (2024) identified major benefits of Green Building practices to include natural resources conservation, reduction in maintenance costs, and enhancement of property aesthetics and values.

However, the penetration and adoption of green building practices in Nigeria is limited and still at its nascent stages. Though, the Green Building Council Nigeria (GBCN), was established in 2010, and has been at the forefront of advancing and advocating for environmentally friendly and responsible building practices in the country. The mission of GBCN is to lead the transformative agenda of the Nigeria's built environment by promoting buildings and communities that are environmentally responsible, profitable, and healthy for occupants, through advocacy, education, standard development, and certification processes aimed at fostering sustainable construction practices across the country. The introduction of EDGE certification system in Nigeria, aiming at providing a fast, simple, and affordable procedures for encouraging companies to invest in sustainably designed buildings was considered to be a move in the right direction, specifically, as it presents a robust step towards mainstreaming buildings that are resource-efficient. The system comprises of complementary software that enables professionals in the built environment to assess the most cost-effective means of incorporating energy and water-saving techniques in building designs, thereby promoting the construction of green buildings that are sustainable, environmentally friendly and economically viable. Nevertheless, previous literatures have shown that, green building certification system in Nigeria has faced and still facing reasonable setbacks, particularly, in the area of awareness and understanding of the basic green building principles among stakeholders. Nwogu and Emedosi (2024) identified green building impeding factors to include but not limited to the weak governmental policies, inconsistent assessment framework, and inadequate stakeholder interest. Other factors as economic challenges as high initial costs and limited financial incentives, further deter its implementation efforts. In the same vein, Dahiru,

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Dania and Adejoh (2014) argued that, the lack of awareness and the absence of enabling policies are critical factors hampering green building practices in Nigeria. Their study recommended the need for public enlightenment and government intervention as crucial mean to overcome the observed challenges. Adeogun (2022) evaluated the level of awareness and perception of green building among occupants of certified office buildings in Lagos, Nigeria. The study found that, there exist a developing practice of green building in the state, but impeded by the absence of enabling government regulatory policies, low professional participation, and restricted adoption in practice. Furthermore, Simon-Eigbe, Adewale and Ogunleye (2022) observed that, variables as cultural barriers and inadequate professional participation are other critical factors inhibiting green building practices in Lagos, Nigeria. The findings of their study underscore the need for region-specific strategies that could promote green building practices.

Despite all the impeding factors, Adebowale, Asa, Omotehinse,, Ankeli and Daniel, (2017) posited that, for any nation to succeed in the implementation of sustainable built environment, there is the need for such a nation to embrace the concept of green building, which forms the larger part of the concept of "sustainable development". Their research acknowledged the fact that Green or sustainable building design and construction are concepts that are increasingly documented as a clear answer to health, economic and environmental challenges, as large and growing number of government and private entities are requiring sustainable practices in their projects by incorporating green features into structures they are conceiving, designing, specifying, estimating, constructing planning or maintaining. Similarly, Wahab and Jegede (2023) and Ebekozien, Ogboma and Okon, (2022) advocated for the idea of developing a specific green building rating model tailored towards emerging nations as Nigeria. The scholars believe that, such an innovative idea as developing localized green building rating model, enhance government-backed incentives and increasing green building certification awareness, could improve the sustainability performance of buildings in Nigeria, considering the country's unique environmental and socio-economic contexts. This further underscores the need for more robust policy frameworks and increased stakeholders' engagement to drive the adoption of sustainable building practices.

In spite of these advancements, the adoption of green building certification in cities like Osogbo remains limited. Factors such as financial constraints, lack of technical expertise, and limited government-backed support continue to impede progress. Addressing these challenges requires a multifaceted approach, including the development of supportive policies, investment in capacity-

building initiatives, and the promotion of public awareness campaigns to highlight the benefits of green building practices. Despite the recent strides towards the adoption of green building certification in Nigeria, significant challenges persist, particularly in cities beyond major urban centers like Lagos. Overcoming these obstacles necessitates concerted efforts from government agencies, professional bodies, and other stakeholders to create an enabling environment for sustainable building practices to thrive.

Methodological Approach

The methodological approach adopted for this study is the mixed-methods research design, integrating both quantitative and qualitative methods to provide a comprehensive detail of the need for green building certification for sustainable development in Osogbo Metropolis. This approach ensures a more holistic understanding of the challenges and opportunities related to green building adoption, as recommended by Creswell and Creswell (2018). The study employed a descriptive survey research design to measure participants' perceptions, the level of policy challenges and awareness regarding green building certification. According to Bryman, (2021), this research design model is extensively adopted in sustainability studies to explore environmental practices and policy implementation. The targeted respondent for the study are policymakers, residents, real estate developers, construction professionals as quantity surveyors, architect, builders, and planners on whom structured questionnaires were administered. The researchers engaged two research assistants who assisted in questionnaire administration and retrieval.

An in-depth semi-structured interviews was further conducted with selected urban planners, policymakers, and members of the Nigeria Green Building Council (NGBC) to gain expert insights into the implementation of green certification in Osogbo, the Osun state capital. This aligns with Yin (2020), suggestion that, qualitative interviews are useful instrument for understanding complex policy challenges and Kvale (2007), who emphasized that, semi-structured interviews are ideal for gaining in-depth knowledge about participants' experiences and perceptions. As part of the secondary data, the study embarked on the review of relevant government reports and policy documents, and the postulations of previous scholars on sustainable construction practices in Nigeria to understand the regulatory frameworks and institutional barriers impeding GBC implementation in the study area. This is consistent with Darko and Chan (2017) assertion that secondary data play significant role in the evaluation of developing nations' sustainability policies

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and Yin (2020) whose study underscored the need for document analysis as a crucial method that could provide contextual understanding and background information on a topic, predominantly, when examining government policy and industry practices.

The study, however adopted purposive sampling technique in the selection of key respondents who are directly involved in the construction and building industry, and government officials. This is considered appropriate when specific participants with relevant experience or knowledge are needed to answer the research questions effectively. Additionally, random sampling was adopted in the selection of Osogbo residents for the survey in order to understand public awareness and perceptions of green building certification. This become necessary as it ensures a broader representation and captures diverse range of opinions within the three months of this research exercise (from January to March, 2025). Hence, aligned with the recommendations of Saunders, Lewis and Thornhill (2019). Cochran's formula was used for the determination of the sample size and adjusted for a finite population of less than 10,000. The formula used is presented as:

$$n = \frac{z^2 p(1-p)}{e^2} \quad (1)$$

where: n = sample size, z = 1.96, p = 0.5 and e = 0,05. Then, the adjusted formula is

$$nf = \frac{n}{1+\frac{n}{N}} \quad (2)$$

nf = Adjusted sample size

N = Total population of respondents estimated at

A structured survey questionnaire was developed to assess the perceptions, awareness, and attitudes of both the construction professionals and the residents of Osogbo toward green building certification. This approach is consistent with research by Kothari (2019), who argues that, surveys provide a systematic way to collect data on attitudes and perceptions across a broad population. The survey was designed to capture data on respondents' familiarity with green building concepts, the challenges faced in the adoption of these practices, and the perceived benefits of certification. The data obtained from the respondents were analyzed using descriptive and inferential statistics to identify the opportunities and challenges of GBC. Descriptive statistics allow for a clear summary of respondents' demographics and responses, while inferential statistics help determine if significant patterns or relationship exist in the data (Field, 2022). Thematic analysis was used to analyze the qualitative data that involve the identification and the interpretation of themes in the data (Braun and Clarke, 2021). Through this, the researcher understand more of the obstacles to

the implementation and the available benefits of green building certification. The interview responses were coded and categorized into key themes, such as policy gaps, financial constraints, and public awareness. Furthermore, content analysis of the policy documents was conducted to scrutinize how existing regulations and government ingenuities either encourages or deter the acceptance of green building certification. Bowen (2009) argued that the application of a method as this is mostly suitable when evaluating policy documents and understanding the wider institutional context. The study employed data triangulation to cross-verify data from multiple sources through the matching of qualitative interview responses with quantitative survey data. This according to Flick (2018) and Creswell and Creswell (2018) could help in augmenting the credibility and depth of the findings.

Results and Discussion

Data gathered regarding the demographic profile of respondents, awareness, financial constraints, and perceived benefits, barriers to green building adoption and certification, and policy gaps for the study were presented, analyzed and discussed in this section. The data were derived from both quantitative surveys and qualitative interviews with respondents in Osogbo Metropolis, Nigeria. The findings are analyzed and backed up by relevant previous literature to contextualize the results.

The Sample Size used for the Study

The stratified random sampling technique used for the study ensures representation from the different stakeholder groups. The sample was proportionally allocated as presented in Table 1 using the adjusted formula.

Table 1: Sample Size of Respondents

Category	Sample Population	Proportion (%)	Sample Size (nf)
Construction Professionals	1,000	50	217
Green Building Advocates	1,000	50	217
Residents/Developers	3.000	50	606
Total	5,000	-	1040

Source: Field Survey (2025)

Demographic Profile of Respondents

The survey questionnaires was administered on 217 construction professionals, 217 green building advocates and 606 residents in Osogbo Metropolis. The demographic breakdown is presented in Table 2.

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Table 1: Demographic Profile of Survey Respondents in the Study Area

Category	Construction Professionals (N =217)	Residents (N =217)	Green Building Advocates (606)
Gender			
Male	200	207	560
Female	17	10	46
Total	**217**	**217**	**606**
Age Group			
18 – 30	80	90	186
31 – 45	97	107	350
46 + years	40	20	70
Total	**217**	**217**	**606**
Educational Background			
School certificate/National			
Diploma	-	137	-
BSc/HND	154	70	464
M.Sc/M.TECH	60	10	139
Ph.D	03	-	03
Total	**217**	**217**	**606**

Source: Field Survey (2025)

Table 2 shows the demographic profile of the respondents who are predominantly male respondents across all the groups, with a higher proportion of highly educated professionals in the construction industry. This clearly shows the level of men dominance in the construction industry and the high level of professionalism. Notably, 96% of construction professionals hold at least qualifications above school certificates/national diploma. This reflects the education gap between construction professionals and the general population, which is crucial in understanding the level of awareness of green building practices in the study area. The age distribution suggests that both young adults (18-30 years) and middle-aged adults (31-45 years) are the most engaged in green building discussions. This findings align with previous studies of Darko & Chan (2017) that identified younger, educated professionals as more likely to be aware of sustainability initiatives. It could therefore be inferred from the Table that the respondents were primarily young (18 - 45

years) and male, with construction professionals being more educated than the general public, which contributed to a higher level of awareness about green building certification system.

Awareness of Green Building Certification

The survey further assesses the rate of green building certification awareness and found that 96% of construction professionals and 57% of residents are aware of green building certification.

Table 3: Awareness of Green Building Certification

Group	Frequency	Response Rate (%)
Construction Professionals	208	96
Residents/Developers	85	39

Source: Field Survey (2025)

The low awareness of green building certification, particularly among residents (39%), reflects the lack of adequate education and public awareness campaign on sustainability in construction. This supports the findings of Ebekozien, Ogunsemi and Akinade, (2022), who argued that lack of adequate public campaign on issues of sustainability is a major barriers to sustainable construction adoption in developing nations. The higher level of education and awareness among construction professionals (96%) indicates that professionals are more exposed to green building principles and certification programs. Thus, highlighting the need for a more outreach and training initiatives for residents/developers and the general public.

Financial Constraints in Green Building Adoption

The respondents' perceptions on financial barriers hindering the adoption of green building certification was tested as shown in Table 4.

Table 4: Financial Constraints to Green Building Adoption

Financial Constraints	frequency	Response Rate (%)	Rank
High Initial investment cost	864	83	1
Administrative bottleneck	520	50	4
Lack of government-backed support	603	58	3
Lack of incentives	624	60	2

Source: Field Survey (2025)

In the survey, 864 respondents representing 83% of respondents cited high initial costs as the most significant barrier to adopting green building certification. While 624 respondents representing

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60% mentioned the lack of government-backed incentives to be the second most critical factor in the study area. The finding that high initial costs are seen as the major obstacle to green building adoption aligns with the postulations of previous scholars. For instance, Dahiru et al. (2014) observed that financial constraints, as the high cost of green building materials and construction have deterred several real estate developers and property owners from implementing sustainable building practices. Furthermore, the lack of government-backed incentives (60%) ranking second most critical factors reflects policy inadequacies, which contribute tremendously to the financial burden of real estate developers and property owners. The absence of supports, as tax reliefs, availability of low-interest loans for green building projects among others ranking third most critical factor which support the assertion of Nwogu and Emedosi (2024) who further underscores the importance of governmental financial support to mitigate costs and promote sustainability in the built environment.

Perceived Benefits of Green Building Certification System

Several perceived benefits of adopting green building practices were highlighted and ranked by the respondents using Relative Importance Index (RII) showing mean score and standard deviations as revealed in Table 5.

Table 5: Perceived Benefits of Green Building Green Building Certification system

Variables/benefits	Mean Score	Standard deviations	RII	Rank
Improved indoor air quality and health benefits	4.45	0.85	0.890	2
long-term savings in energy and maintenance costs	4.25	0.88	0.850	4
Energy efficiency and cost savings	4.56	0.78	0.912	1
Increased property values	4.32	0.90	0.864	3
Job creation and economic growth	4.12	0.94	0.824	5
Government incentives and tax benefits	4.05	0.97	0.810	6
Aesthetics and modern design appeal	3.97	1.02	0.794	7

Source: Field Survey (2025)

The overwhelming majority of respondents acknowledged the energy efficiency and particularly in terms of stability and cost savings with RII = 0.912 and ranked highest. This indicate that, the

respondents strongly agree with the fact that green buildings significantly reduce energy consumption, ensures energy stability and reduced operational costs. The finding is consistent with previous studies of Abdulsalam, Bello, and Okonkwo (2024) which among other factors stressed the effect of reduction of operational costs over time due to green building practices. A major problem of real estate developers/property owners and residents in the study area is energy availability and billing (estimated billing and persistent increase in energy tariff). Improved indoor air quality and health benefit ranked second most critical factor with an RII = 0.890; hence, showing the widespread recognition of their long-term advantages. This support Simon-Eigbe et al. (2022), who note that green buildings enhance indoor air quality and promote healthier environments for occupants. Aesthetics and modern design (RII = 0.794) and government incentives and tax benefits (RII = 0.810) were ranked lowest, indicating that these factors are perceived as less immediate concerns compared to the other benefits

Barriers to the Adoption of Green Building Certification system

The result of the responses obtained from the field on green building impeding factors is presented in Table 6.

Table 6: Barriers to Green Building Certification System Adoption

Barrier	Frequency	%Rate	Rank
Financial Constraints	707	68	1
Lack of governmental incentives	572	55	3
Low capacity building initiatives	468	45	5
Regulatory and Policy gaps	499	48	4
Low Awareness and poverty	603	58	2
Lack of expertise	364	35	6

Source: Field Survey (2025)

As previously discussed, financial constraints as high initial costs and lack of incentives are primary barriers. The survey found that 707 respondents representing 68% identified high initial costs as the most significant barrier, followed by 58% mentioning low level of awareness and poverty. However, the regulatory and policy gaps (48%) indicate a need for better governance. Both policy documents and interviews suggest that the near absence of a national certification system and lack of enforceable policies hinder the widespread adoption of green building practices

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in the country. These findings corroborated the postulation of Ebekozien et al. (2022) and Nwogu and Emedosi, (2024) who highlight the need for a comprehensive regulatory framework that includes clear green building standards and local adaptations.

Policy Gaps in Green Building Certification

The study further collected qualitative data through the conduct of interviews with policymakers and green building experts. Several policy gaps were identified, which include but not limited to the absence of a national green building certification system and the lack of policy enforcement. The identified gaps are presented in Table 7

Table 7: Key Policy Gaps Identified by Stakeholders

Policy Gap	Description
Absence of National Certification	There exist no comprehensive and enforceable regulations for green building certification system
Lack of Effective Policy Enforcement	The few haphazard available policies on green building implementation are not enforceable
Need for Local Adaptation	The few available policies on green building certification does not address the nation's specific need

Source: Field Survey (2025)

The policy gaps identified by both survey respondents and interviewees are consistent with the findings of Nwogu & Emedosi (2024), who argue that the lack of a unified regulatory framework and policy enforcement is a significant barrier to green building adoption. The findings suggest that policy reform is essential for overcoming these gaps and promoting green building certification in Nigeria.

Conclusion and Recommendations

This study accentuates the significance of green building practices adoption for sustainable development in Osogbo Metropolis. Despite, the need for green building adoption, several pressing issues will need to be addressed in order to achieve successful implementation. The primary obstacle to green building implementation in the country identified are low level of awareness and poverty, financial constraint, and policy and regulatory gaps, reinforced by lack of governmental incentive, support and weak green building practice enforcement mechanisms. The probable benefits for the adoption of green building that could motivate its adoption and implementation was highlighted in the study. Hence, findings of the study underscore the critical and urgent need

for governmental incentives and support, policy reforms, enhanced public enlightenment campaigns to promote green buildings and their certification in Nigeria. With the expected potential of green buildings contribution to nation building, environmental sustainability and economic growth, specifically in emerging city as Osogbo, addressing the obstacle is paramount for the nation to meet sustainable development goals agenda. To facilitate the adoption of green building certification in Osogbo Metropolis, the study recommend the need for adequate financial support and government incentive as subsidies, low-interest loans, and tax breaks for developers and homeowners who adopt green building practices, urgent need for a local national green building certification system tailored towards Nigeria's unique needs, a more pragmatic public awareness campaigns aimed at enlightening both residents and developers about the benefits of green buildings, ensure that building codes and sustainability standards are strictly adhered to, with penalties for non-compliance among others.

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