



## Original Research Article

### Factors Inhibiting Green Building Practice in the Nigerian Construction Industry: A Case of Lagos State, Nigeria

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#### ABSTRACT

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*As a result of various environmental problems caused by construction operations and the potential benefits linked with green building practices, green building is quickly becoming a major drive in the construction sector. However, there are various obstacles that hinder the adoption of green building in developing countries' construction sectors. The goal of this study was to determine the variables that hinder green building in Nigeria. The research used a quantitative approach. In Lagos State, Nigeria, questionnaires were delivered to a carefully selected group of construction stakeholders. The pool of stakeholders, which included 58 contractors, 41 consultants, and 38 clients working in Lagos State, received a total of 137 questionnaires. The data collected from the survey was analyzed using descriptive and inferential statistics. The survey found that 'expertise and higher costs,' 'lack of government backing to push the process,' and 'lack of awareness and acceptability of green technology among construction players' were the top three barriers to green building practice in Nigeria's construction industry. The findings revealed the reasons that stymie green building practices in the construction industry. Understanding these characteristics can assist the construction industry and government in developing the strategies needed to minimize the barriers to green building practice.*

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## 1. INTRODUCTION

The adverse impact of construction activities on the environment has led to a loud cry for improved construction practice (Amuda-Yusuf et al., 2020). The challenge of adoption and implementation of ecological principles to the entire construction projects lifecycle is as a result of such agitation and it has

been linked to the development of a relatively new and evolving idea termed “green building” (Nduka and Sotunbo, 2014). According to Nduka and Sotunbo (2014), green building has been remarked as an important practice for minimizing the negative impact of construction activities on the environment. Therefore, green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s lifecycle including designing, construction, operation, maintenance, renovation and deconstruction (Buys and Hurbissoon, 2011). According to Bombugala and Atputharajah (2010), the concept of green building places emphasis on saving water, energy and material resources in construction and maintenance of buildings that can reduce or eliminate the adverse impact on the environment and occupants.

A good number of researchers have identified different benefits of green building in different countries in the recent time. For example, the studies by Ismaila et al. (2021) found that preservation of natural resources, health and productivity, and economic and financial benefits were the top most three important benefit of green building. Anet and Toit (2015) revealed that experts in the property sector agreed that the concepts applied in green buildings lead to long-term financial savings. According to Buys and Hurbissoon (2011), reduction in energy and water use is regarded as the most emphasised advantage of green building. Amuda-Yusuf et al. (2020) stated that green building reduces consumption of energy by 26%, and consumption of water by 54%; and that green building has the capacity to reduce wastage of solids by 70% and provides health and safety to building occupants. According to Ragheb et al. (2016), green building is not a simple development trend; it is an entrance to building suited to the demands of its time, whose relevance and importance will only continue to increase.

Countries like China, USA, UK, Germany, Japan, Korea, Australia, Canada and other developed nations have fully embraced the concept of green building (Dalibi et al., 2017). However, the level of awareness and knowledge of the adoption green building technologies as a requirement for sustainable building development is low in the developing countries (Amuda-Yusuf et al., 2020). For instance, as reported recently by Ismaila et al. (2021), green building development and sustainable practices are not practiced in Nigeria. This indicates that, there could be factor(s) preventing the practice of green building in the country. Therefore, the current study aims to investigate the factors inhibiting green building practice in the Nigerian construction industry.

## 2. METHODOLOGY

The problems impeding green building practices in the Nigerian construction industry were investigated using a field survey method. To determine the barriers to green building practice, a comprehensive literature review was done. In order to fulfill the research goal, the list of factors preventing green construction practice was used to create a survey questionnaire. The purpose of this survey was to gather feedback from stakeholders in the Nigerian building sector. Architects, builders, quantity surveyors, engineers, and contractors were contacted to participate in the study, as were five other groups of stakeholders in the Nigerian building industry. A pilot study was undertaken before administering the questionnaire to the respondents to determine the accuracy and comprehensiveness of the survey instrument. The acquired data was analysed using Statistical Packages for Social Science (SPSS 23). Because the Cronbach Alpha Scores against the tested item are 0.78 in the reliability test, the results obtained are judged reliable and consistent.

The sample representative for questionnaire dissemination was chosen using the purposeful sampling method. The research was conducted in Lagos State, Nigeria. Lagos State was chosen since it is the economic and commercial hub of Nigeria. Lagos State is a densely populated area with numerous facilities such as highways, estates, bridges, government buildings, skyscrapers, and various private developments such as schools, theaters, cinemas, hospitals, and retail malls. The questions in the questionnaires were designed using the Likert scale, in which respondents were asked to rate the importance of each variable of issues preventing green building practice on a range of 1 to 5, using the following scale: Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), and Strongly Agree (SA) are the five levels of disagreement. A total of 167 questionnaires were distributed among the sampled respondents, with 113 (or 67.7%) of them being

properly filled out and returned. Frequency, percentage, mean, relative importance index (RII), and ranking were employed to analyze data in this study. The relative importance of factors evaluated in this study was determined using the relative importance index (Equation 1). The mean scores for each variable were determined by adding the values of the different individuals (Equation 2).

$$RII = \frac{\sum_{i=1}^5 w_i x_i}{A \times N} \quad (1)$$

$$Mean = \frac{\sum_{i=1}^5 x}{N} \quad (2)$$

where RII = relative importance index, w = weighting given to each factor by respondents (ranges from 1 to 5), x is the rating used per column, f = frequency of response given for each factor, A = highest weight (i.e. 5 in this case) and N= total number of participants.

It is valuable to understand that the closer the value of the related importance index of the known factor is unity (1) or 100 percent, the more important it is the greater influence on the remaining variables.

### 3. RESULTS AND DISCUSSION

#### 3.1. Characteristics of Survey Participants

Table 1 shows a breakdown of the participants' background information. The survey participants' highest academic qualification revealed that the majority of them held a bachelor's degree. The following is a breakdown of the academic qualifications: Master's degree = 28 (25%) and bachelor's degree = 45 (40%).

Table 1: Characteristics of survey participants

Characteristics	Frequency	Percentage (%)
<b>Highest academic qualification attained</b>		
B.Sc./B.Tech. (Bachelor's degree)	45	40
HND	25	22
M.SC (Master's degree)	28	25
PhD	15	13
Total	113	100
<b>Professional background of respondent</b>		
Architect	19	17
Quantity Surveyor	27	24
Builder	38	33
Civil Engineer	29	26
Total	113	100
<b>Experience in the construction industry</b>		
5 – 10 years	16	14
11 – 15 years	43	38
16 – 20 years	33	29
More than 20 years	21	19
Total	113	100

According to Table 1, the participants' professional backgrounds include architects (19%), quantity surveyors (24%), builders (33%), and civil engineers (29%). (26%). This indicated that the builders had the greatest participation rate. The vast majority of survey respondents (86%) had more than ten years of

construction experience (see Table 1). The survey participants were found to have sufficient experience to add to the subject, indicating that their competence to participate in the survey was excellent.

### **3.2. Factors Preventing Green Building Practices**

The mean of the elements obstructing green building practice were analyzed using the relative importance index and ranked independently to find the factors inhibiting green building practice. Table 2 summarizes the findings. Table 2 reveals that three of the seventeen issues impeding green construction practices in Nigeria have a "very high" level of relevance ( $RII > 0.80$ ). The level of relevance, however, rated "expertise and higher cost" first, with  $RII = 0.942$ . With a  $RII$  of 0.894, "lack of government backing to push the process" was ranked second, while "lack of awareness and adoption of green technology among construction industry actors" was ranked third. These findings corroborated the findings of Assylbekov et al. (2021) and Onososen et al. (2019). This research has shed light on the variables that stymie green building practices. Understanding these characteristics can aid construction industry stakeholders in developing strategies to reduce the barriers to green building techniques.

Table 2: Factors inhibiting green building adoption identified by different studies

Factors	Mean	RII	Rank
Low level of awareness	3.53	0.706	7
Expertise and higher cost	4.71	0.942	1
Reluctance arising from the need to avoid risk	2.94	0.588	17
Inadequate green products	3.23	0.646	14
Absence of government support to drive the process	4.47	0.894	2
Lack of green building tools	3.52	0.704	8
Low demand towards green's products and services	3.76	0.752	5
Tough challenge to get cooperation from construction industry players in the application of the green technology	3.47	0.694	10
Lack of local expertise in green technology	3.18	0.636	15
Lack of research and development activities	3.51	0.702	9
Transfer technology and knowledge in green technology fields	3.29	0.658	13
Lack of understanding and acceptance of green technology among the construction industry players	4.41	0.882	3
Lack of incentives for promoting green building	3.33	0.666	12
Inadequate cost data for green buildings	3.47	0.694	10
Inadequate information regarding the financial and economic benefits and opportunities of green buildings	3.18	0.636	15
Lack of enforcement	3.65	0.730	6
Lack of institutions to formulate policies and set guidelines	3.82	0.764	4

### **4. CONCLUSION**

The obstacles preventing green building practices in the Nigerian construction sector were studied in this study. Despite the numerous advantages of green building, this study revealed that several obstacles in the Nigerian construction industry are impeding green building practices. The research identified the following top three barriers to green building practices in the Nigerian construction sector: expertise and higher costs, a lack of government backing to push the process, and a lack of awareness and acceptance of green technology among construction industry stakeholders. This research has made a significant contribution to the literature on the barriers to green building practice in the construction sector. The findings provide in-depth insight into the obstacles preventing green building practices in the Nigerian construction industry, which can aid the sector and government in developing strategies to address the issues.

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## 6. CONFLICT OF INTEREST

There is no conflict of interest associated with this work.

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