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Critical Challenges in the Implementation of Sustainable Construction Practices in Edo State, Nigeria

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ARTICLE INFORMATION

ABSTRACT

The contribution of buildings to Nigeria's development has not yielded the desired results. This can be attributed to failed projects and currently their poor performance. The aim of this study is to evaluate the critical challenges in the implementation of sustainable construction in Edo State, Nigeria with a view to enhancing the sustainability of building projects. It identified the challenges involved in implementing sustainable development and mitigating measures to these challenges. The study adopted a quantitative survey design with a questionnaire used to solicit information from construction professionals within Edo State. One hundred and fifty eight (158) questionnaires were distributed using random sampling technique and one hundred and twenty two were returned and considered suitable for analysis. Data analysis was done using percentage and mean item score. Findings revealed that the challenges hampering the effective implementation of sustainable construction was lack of sustainability by consultants which is a major challenge besetting the effective implementation of sustainable construction. It showed that introduction of sustainable construction in the educational institutions was the most significant mitigating measures. It recommended that the construction professionals should fully embrace the implementation of sustainable construction in the course of performing their defined job functions and sustainable construction should be introduced in educational institutions.

1. INTRODUCTION

Overtime, the Nigerian construction industry has been shown to be a major contributor to the country's socio-economic development through infrastructure delivery (Aghimien et al., 2019). Building and construction activities immensely impact urbanization by establishing living and working spaces and also help to boost the natural economy (Zuo and Zhao, 2014). The construction industry is a massive consumer of natural

resources as it facilitates the building of facilities such as roads, buildings and production facility amongst others (Sichali and Banda, 2017).

Due to a high demand in infrastructural development in developing countries, the contribution of the construction industry to emerging nations is very important in that it supports the economic, social development which turns to wealth, social equality and increases living standard (Gomes and Silva, 2005). Unchanging population growth around the globe has heightened the demand for housing and expansion of infrastructure. Therefore, the construction industry has become one of the fastest-growing sectors on a global scale. As economic development and environmental sustainability are connected the consciousness to preserve energy and resources has set in. Across the world, infrastructure and building construction use up to 60% of the raw materials extracted from the earth (Bribian et al., 2011). The rush to meet the massive demand for more facilities has intensified the adverse impacts of the construction industry on the triple bottom line of sustainability that is people, planet and profit. In the construction industry, green building initiatives have been developed to fulfill the need to meet sustainability goals. Green buildings are designed to reduce negative environmental impacts by operating efficiently and minimizing the discharge of pollution and waste. Decreased utilization of energy and water, enhanced indoor air quality, improved well-being and productivity, superior property value, among others, are often cited advantages related to green building. According Akadiri et al. (2012), green building is the act of increasing the efficiency of buildings through their utilization of water, energy and materials and also involves lessening the effect of the building on human well-being and the environment (Ji and Plantiotis, 2006). Based on this fact, the call for more sustainable construction practices has become common. This sustainable construction practice involves delivering construction projects in a more economic, social and environmentally responsive manner (Akbiyikli et al., 2009; Abidin, 2010).

The contribution of buildings to Nigeria's development has not yielded the desired potentials. This can be attributed to failed projects and currently their poor performance (Aghimien et al., 2019). Many a time the building industry is commonly referred to as an industry that is unfriendly and unkind to the natural environment (Kibert, 2007). Many productive lives have been lost to series of building collapse in Nigeria, and these losses portent danger to the future generations as well as that of socioeconomic status of its citizenry (Aigbavboa et al., 2017). Sustainable construction in most developing countries around the world has been characterized as poor. Studies have shown that the sustainability level in construction projects being delivered in these developing countries is low, and Nigeria is no exception (Zhou and Lowe 2003; Kibert, 2012). Several factors have been held accountable for this poor sustainable construction in these countries, these include lack of sustainability by consultants, lack of sustainability measurement tools, the negative perception of higher investment cost, persist skills and labour shortage. Also, risks of unanticipated cost, lack of demonstration projects, lack of environmentally sustainable materials, lack of education and proper perception in sustainable design, lack of common understanding about sustainability. More so, lack of technical know-how of the stakeholders, lack of effective steering or strategies, lack of demand by the client, lack of easily accessible guidance, insufficient environmental competencies and lack of awareness amongst stakeholders (William and Dair 2012; Ayarkwa et al. (2017). Effective measures can be put in place to overcome them and achieve sustainable construction within the built environment. Davies and Davies (2017) stated the possible solutions to the challenges militating against the implementation of sustainable construction. These include: proper awareness of sustainable construction, support of government policies, development of environmentally responsible products by manufacturers and suppliers, client education, use of tool rating and introduction of sustainable construction in the educational institutions.

Therefore, the aim of this study is to evaluate the challenges in the implementation of sustainable construction in Edo State with a view to enhancing the sustainability of building projects. It identified the challenges involved in implementing sustainable development and the mitigating measures to these challenges. The results of this study are expected to pave the way for sustainability practice implementation in the construction industry.

2. METHODOLOGY

Survey design was adopted for this research. Data was obtained with the use of well-structured questionnaire. The questionnaires were administered directly by the researcher with the assistant of a professional colleague in the study area. A total population of two hundred and sixty (260) was recorded in the study area, out of which one hundred and fifty eight (158) was chosen using Yamane (1967) formula to determine the sample size. The sample size for the population was calculated using Equation 1.

$$n = \frac{N}{1+N(e)^2} \tag{1}$$

Where n = Sample size, N = population size and e = level of precision or standard accuracy (0.05)

Random sampling of the described population was used for the study because every member stands an equal chance of being selected and it minimises bias. The questionnaire was drawn on a 5-points Likert scale and it was chosen for ease and uniformity of response and the questionnaire comprised only closed ended questions. Questions were asked on the background information of the respondents, challenges involved in implementing sustainable development and mitigating measures to these challenges. One hundred and fifty eight (158) questionnaires were distributed and one hundred and twenty two (122) were returned and considered suitable for analysis which represented a healthy return rate of seventy seven percent (77%). The analysis was aided by the use of statistic package for social science (SPSS) application. Based on the content of the questionnaires, the analysis was divided in to two sections: demographic and main objectives. The background information of respondents was analysed by means of frequency distribution and percentage. Mean item score was used to rank the challenges involved in implementing sustainable development and mitigating measures to these challenges. The premise of decision for the ranking is that the factors with the highest mean item score is ranked 1st and others in such subsequent descending order. The following formula was used to determine mean:

$$Mean = \frac{\sum FX}{N} \tag{2}$$

Where X is the rating used per column, F is the sample size for each rating and N is the total sample size.

Since a Likert of 5-point scale was employed for the collection of data, the formula can thus be written as:

$$Mean\ score = \frac{5F5+4F4+3F3+2F2+F1}{N} \tag{3}$$

3. RESULTS AND DISCUSSION

Table 1 presents a summary of background information of respondents. Analysis in Table 1 revealed that 39.34% of the respondents were consultants, 27.05% of the respondents were contractors, 23.77% of the respondents were public clients and 9.84% of the respondents were private clients. Table 1 showed that all the respondents were affiliated to relevant professional bodies in their respective professions. Out of which 73.77% of them have attained corporate membership grade, 8.20% of them have attained fellow membership grade while 18.03% of the respondents were probational members of their respective professional bodies. It showed that they were capable of providing vital information on the objectives of this research. Table 1 showed the respondent's years of experience. Only 16.39% had below 5 years of working experience. Table 1 also revealed the academic qualification of the respondents where 45.08% of the respondents had obtained MSc/M.Tech, 22.13% of the respondents had B.Sc/B.Tech, 13.11% were HND holders, 11.48% had PGD and 8.20% had PhD. Therefore, respondents were considered adequate and reliable for this research.

Table 2 shows the identified challenges involved in the implementation of sustainable developments. From the analysis, the five major challenges were: lack of sustainability by consultants, lack of sustainability

measurement tools, the negative perception of higher investment cost, persistent skills and labour shortage and risks of unanticipated cost. Lack of demand by the client and lack of easily accessible guidance were ranked the least challenges involved in the implementation of sustainable development. This result confirms Davies and Davies (2017) submission that the implementation of sustainable construction in Nigeria is hampered by the construction industry's inability to relinquish the traditional methods of construction. It was further corroborated by Zhou and Low (2003) who pointed out that sustainable construction is expensive, causes a major challenge in the embracing of sustainable construction practices in emerging nations like Nigeria.

Table 1: Summary of background information of respondents

Category	Classification	Frequency	Percent
Type of organisations	Contracting	33	27.05
	Consulting	48	39.34
	Public	29	23.77
	Private	12	9.84
	Total	122	100.00
Profession of respondents	Architecture	20	16.39
	Quantity surveying	30	24.59
	Building	35	28.69
	Engineering	37	30.33
	Total	122	100.00
Years of experience	21 and above	25	20.49
	16-20	27	22.13
	11-15	35	28.69
	6-10	15	12.30
	1-5	20	16.39
	Total	122	100.00
Academic qualifications	PhD	10	8.20
	MSc/M.Tech	55	45.08
	PGD	14	11.48
	B.Sc/B.Tech	27	22.13
	HND	16	13.11
	Total	122	100.00
Professional membership grade	Fellow	10	8.20
	Corporate	90	73.77
	Probational	22	18.03
	Total	122	100.00

Table 2: Challenges involved in implementing sustainable development

Identified challenges	Mean	Rank
Lack of sustainability by consultants	4.50	1
Lack of sustainability measurement tools	4.25	2
The negative perception of higher investment cost	4.22	3
Persistent skills and labour shortage	4.20	4
Risks of unanticipated cost	3.95	5
Lack of demonstration projects	3.75	6
Lack of environmentally sustainable materials	3.73	7
Lack of education and proper perception in sustainable design	3.68	8
Lack of common understanding about sustainability	3.64	9
Lack of technical know-how of the stakeholders	3.60	10
Lack of effective steering or strategies	3.50	11
lack of demand by the client	3.25	12
Lack of easily accessible guidance	3.25	13

Table 3 identified the mitigating measures for the challenges involved in implementing sustainable construction. Table 3 revealed; introduction of sustainable construction in the educational institutions (ranked 1st with mean score of 4.75), followed by proper awareness of sustainable construction with mean score of 4.25 while client education and use of tool rating ranked the least with mean score of 3.86 and 3.75 respectively. According to Zhou and Lowe (2003), the higher educational background will enable clients to becoming better informed on the benefits of sustainable development/ design alternatives. This will consequently boost the client's awareness and thereby enhance level of acceptance. It will be eventually increase in demand for sustainable construction and cause a reduction in price of the sustainable construction materials and techniques.

Table 3: Mitigating measures to challenges of sustainable construction

Identified mitigating measures	Mean	Rank
Introduction of sustainable construction in the educational institutions	4.75	1
Proper awareness of sustainable construction	4.25	2
Development of environmentally responsible products by manufacturers and suppliers	4.01	3
Support of government policies	4.00	4
Client education	3.86	5
Use of tool rating	3.75	6

4. CONCLUSION

This study evaluated the challenges hampering the implementation of sustainable construction in Edo State with a view to enhancing the sustainability of building projects. It is submitted based on the findings that lack of sustainability by consultants is the major challenge besetting the effective implementation of sustainable construction. It was also observed that; the introduction of sustainable construction in the educational institutions is the most significant identified mitigating measures to challenges involved in implementing sustainable construction. Based on the conclusions drawn from the findings, it is therefore recommended that sustainable construction should be introduced in educational institutions and public awareness of the need for sustainable construction should be made.

5. ACKNOWLEDGMENT

6. CONFLICT OF INTEREST

There is no conflict of interest associated with this work.

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