

GREEN BUILDING CONSTRUCTION IN ABUJA: THE MATTERS ARISING

Rasheed Babatunde Isa, Paul Abayomi Bajere, Richard Ajayi Jimoh & Usman Shittu

Department of Building, Federal University of Technology, Minna

Recent trend in the international construction sector has witnessed the rise of green buildings in developing and developed countries. Although the concept and implementation of green buildings is on the rise worldwide, this is not the case in Nigeria hence, this paper assessed project stakeholders' level of awareness and extent of use of green concept in the Nigerian construction industry with specific reference to Abuja. The study adopted combination of physical observation and structured interview methods to elicit information; 3 active sites were visited and 13 interviews were conducted. Findings showed that awareness is not associated with implementation. The participants in the study recognised the benefits inherent in green buildings and affirmed moderate level of familiarity with the concept. To key into this, construction practices must be fully regulated and enforced in line with sustainability agenda in Abuja.

Keywords: Built Environment; Green Building; Nigeria; Stakeholders; Sustainability

batunde@futminna.edu.ng

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INTRODUCTION

Building construction and related activities consumes over 40% of the world's inert materials (U.S Green Building Council, 2014), and the built environment consume 32% of the global renewable and non-renewable resources during service life, produce 40% of CO₂ emissions, and used up to 12% of available water (GBCA – Green Building Council of Australia, 2013). These new discoveries have led to a paradigm shift in the thinking of the policy makers towards pursuing myriad of regulatory ideas to drive green building awareness and promote green building projects over the last decades. The recent Paris Agreement on Climate Change is a historic achievement for humanity particularly the built environment. In place is now a common legally binding agreement to hold global warming well below 2°C with aspiration to achieve 1.5°C integrated with frameworks for action on resilience and adaptation. And for the first time the Buildings and Construction sector, which is responsible for about 30% of global GHG emissions, 50% of global wealth, and provision of urban habitat for more than 60% of humanity, has been given a mandate and global framework for helping to achieve

these goals (UN, 2015). While stakeholders view on the sustainability mantra has grown to become global issues, and recently assumes the stature of a global sustainability development goals (SDG's) with a strong commitment among political actors to its successful implementation, the rate of green building uptake has been less than expected (Mukherjee and Muga, 2010).

While much has been written about the associated benefits of sustainable practices and to some extent green construction that make it worth pursuing for developing nations. Some reported benefits of these practices are; competitive advantage, meeting legislative framework, company reputation, improve productivity, client value creation, meeting client demand, overall financial incentive, good community relation and ultimately a balanced ecosystem in the face of sustained development (Othman, 2011; Suresh, Bashir and Olomolaiye, 2012; Madu and Kuei, 2012). The lack of awareness and implementation challenges have overtime shape the views of built environment stakeholders and often time made these – benefits – elude most industry stakeholders, and this is even more pronounce within the developing economy.

It is a common knowledge that most developing countries are socially challenged, politically troubled and technically lagging behind the developed markets that have hitherto taken serious steps towards sustainable construction (Mousa, 2015). These barriers, couples with the nature of construction industry that is fragmented, complex and project-based nature, have been a major hindrance to the adaptation and implementation of the sustainability concepts. The low awareness level and the lack of proper knowledge and understanding of the new concept has long been responsible for sustain associated benefits eluding the industry stakeholders in the developing markets, especially in Nigeria (Bygballe and Sward, 2014). As a result, the implementation has been below expectation and challenges continue to trail it practice within the region. For policy makers to be able to aptly respond to this problem, it must be able to first assess the industry posture towards sustainable development (green building) within the industry stakeholders so as to have a base for sustainable development within the built environment. The main question now is; *what is the stakeholders' level of awareness and extent of use of green building concept in the Nigerian construction industry?* In proffering solution to this question with specific reference to Abuja, the next section of the paper presents a succinct account of the state of green building and sustainability in the built environment. Thereafter the method used for obtaining the views on green building among the stakeholders is discussed before the findings are presented. The plausible answers to the questions and observations then form the concluding section of the paper.

LITERATURE REVIEW

The world is rapidly changing and the rising climate indicators are beginning to impact on every aspect of our environment. Regions hitherto known for moderate weather are now experiencing severe climatic conditions. In Nigeria, the temperature range now exceed 26°C in the Northern parts of the country where draught, flood and heat waves, is now a common phenomenon (NIMET, 2012). Since, patterns of development in the past have been largely neglected the reality of natural resources and environmental issues with its effects on the

socio-economic dimensions (Wackernagel and Rees, 1996). These affect the general cost of maintaining the climatic conditions within the 'comfort zone' and predictability of general operating environments that calls for awareness and knowledge based practices. The energy crisis, environmental pollution and the climate change in the 1970s alerted the world of the need for a balanced ecosystem (Ghosh *et al.*, 2014). Response to this new environmental phenomenon later gave birth to the world congress, which cumulated in the Bruntland's report for the World Commission on Environment and Development (WCED, 1987) that defines sustainable development as "a development which meets the needs of the present without compromising the ability of future generation to meet their own needs". Therefore, in order to lessen or probably reverse the destructive impact of construction on the natural environment, OECD brought together experts to develop sustainable management and operational practices ranging from planning, design, development, construction, ownership, financing, management and utilization of built properties (OECD, 2003). As the needed change must be informed by rigorous and targeted research that can be readily and rapidly applied to counter emerging climate change in order to develop more sustainable built environments. During the aforesaid processes, various concepts were proposed and developed overtime, such concepts as, green building, sustainable design and construction, green business, green economy and so on. Therefore, the modern day trend within the built environment stakeholders is to be well equipped to go green and initiate operational efficiency towards environmental responsiveness in construction industry. The international construction sector has hence witnessed the rise in its advocacy and implementation of the green building concepts worldwide in an attempt to sustain the industry.

In Africa, though considered as a low risk area because of the availability of green building potentials in inert resources, materials such as sun dried bricks, compressed earth blocks, lime stabilized earth blocks, laterite stones and pozzolana are in abundance but their use is so limited to have significantly increase global warming (Manu *et al.*, 2009). Green building philosophy has mostly been championed by pressure groups, and to a lesser extent, public institutions and organizations. Bangdome-Dery and KootinSanwu, (2013) report organizations such as Promoting Renewable Energy in Africa (PREA), South Africa Chapter of the Green Building Council (GBCSA), Holcim Foundation as well as Emerging Africa Infrastructure Fund (EAIF) are agencies in the forefront of sustainability in South Africa. In a related development, the South African Government, unlike the Nigerian Government, has made progress in establishing policy in favour of sustainable development through regulations guiding the built environment. At present, there are two South African National Standards which promote environmental sustainability and energy savings (Ashiboe-Mensah *et al.*, 2011). To this end, efforts should be made towards change in policy direction, incentives and disincentives that encourage sustainable urban and rural development, environmental education and the use of renewable energy and green building materials to attain a balanced ecosystem in the region particularly in Nigeria.

Most studies (Jacobs, 2011 and Wilreker 2011) have flag cost; lack of knowledge about sustainable practices; lack of knowledge about effects of non-sustainable practices in the environment; lack of training and education; availability / lack of availability of green resources; and attitude of professionals as barriers for sustainable design and construction in Sub-Saharan Africa. The absence of a legislative framework / policies on sustainable

development and political consideration – especially in public projects - in most developing countries also remain a major barrier. Jacobs (2011) and Nilsson *et al.* (2009) assert that improvements in the knowledge base of various stakeholders, coupled with the right policy formulation regulating the green building practice will impacts positively on the sustainable design and construction in the industry.

RESEARCH METHODOLOGY

This study employed an interpretative paradigm to add to what is known about the issues. By adopting a combination of physical observation and structured interview methods to elicit information; 3 active sites were visited and 13 interviews were conducted among stakeholders. The participants were selected using purposive sampling, as this was vital to the success of the interviews. Purposive sampling means that participants are selected according to a defining characteristic that makes them a role players of the data needed for the study (Nieuwenhuis, 2007). Interviews were between 15 to 30 minutes in duration. Each participant was asked about his/ her experience and perception of the numerous themes related to the phenomenon. All interviews were recorded and transcribed. The physical evidence on green technology were collected concurrently on three active sites with interview sessions with projects managers.

As mentioned earlier, thirteen interviewees participated in the study. The findings were further supported with available secondary data on completed projects from the Ministries of Works and Environment. The interviewees consisted of 4 women and 9 men between the ages of 33 and 52. The educational levels of the participants ranged from Higher National Diploma (HND)/Degree to PhD level, and work experience ranged from 5 to 29 years (see Table 1).

Table 1: The demography of interviewees

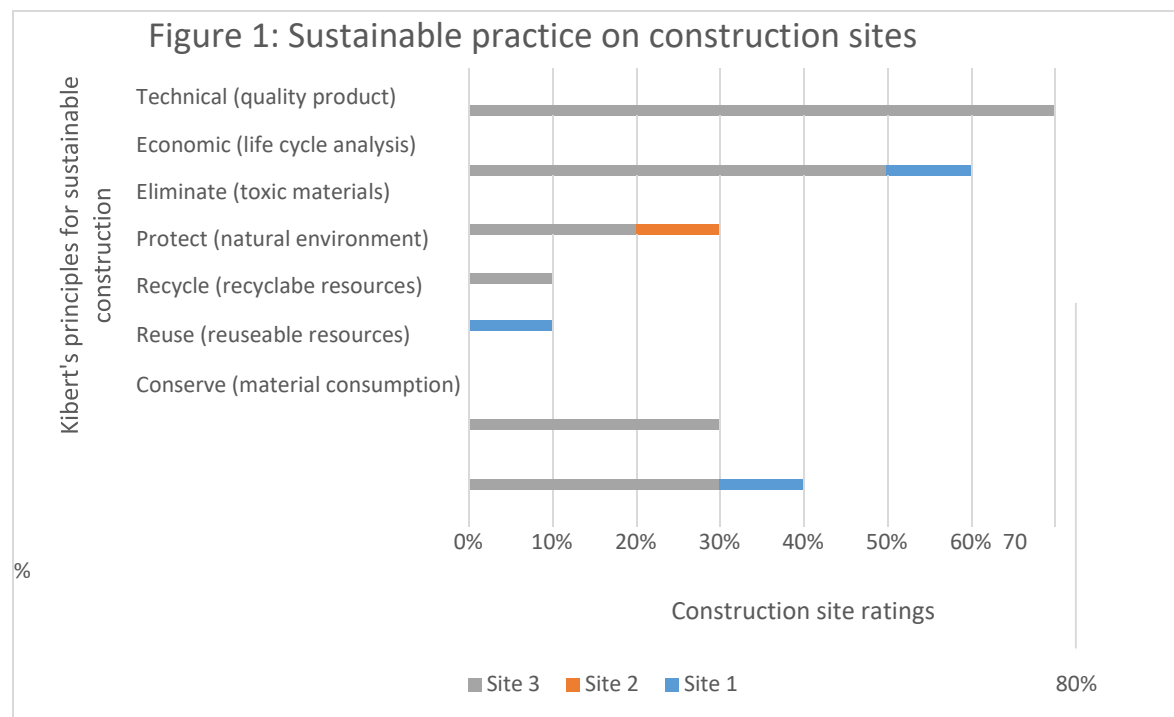
S/N	Highest Level of Education	Organisation	Designations	Years in Industry
	BSc	Ministry of Works	Project Director	16
	BSc	Consultant	Project manager	9
	HND	Ministry of Works	Site agent	5
	MTech	Consultant	Architect	21
	MSc	Ministry of Envir.	Deputy Director	23
	PhD	Academia	Senior Lecturer	15
	HND	Ministry of Works	Project Manager	11
	BSc	Project developer	Director	29
	HND	Project Managers	Director	18
	B Tech.	Consultant	Quantity surveyor	14
	M Eng.	Consultant	Civil engineer	9

PhD	Ministry of Envir.	Deputy Director	26
MSc	Academia	Lecturer I	10

RESULTS AND DISCUSSION

The results are presented based on the methods adopted in eliciting information. The first part was the observation carried out on the 3 active sites while the second part arranged in themes was the interview sessions conducted.

The three active sites were accessed based on the proposed Kibert’s 7 principles for sustainable construction practice (Kibert, 1994). These principles cover most aspects of the Triple bottom line (TBL) of economic, social and environmental dimensions of sustainability and the concept of “doing no further harm” to the built environment (Figure 1). Adopting these principles will ensure the reduction / elimination of adverse effects of construction activities on the built environment through efficient use of resources and its outcomes could be regarded as a vital ingredient of improved competitiveness in the construction industry (Opoku and Ahmed, 2015). As illustrated in Figure 1, most active sites visited perform below average when gauged against Kibert’s sustainable construction indicators.



Theme 1: Level of Stakeholder Awareness in Sustainable Design and Construction

The effectiveness of built environment infrastructure depends on meeting the demands of varying stakeholders, which is often, hinged on the level of their awareness of the activities

and knowledge of the sector. The sector awareness serves as a driver for their demands and the ability to benchmark own determinant for sustainable infrastructure (Emuze, Ntoi and Isa, 2015). Most of the interviewees confirm the knowledge of green design and construction but however quick to deny any involvement in such project. About a quarter of mostly consultants agree to at a point green projects. The physical observation shows most projects are of conventional design and construction with little reference to sustainability considerations. The designers allude to lack of demand from client as a major factor to the seemingly low state of green uptake in the built environment.

Theme 2: National Building Code (NBC) and Green Construction

National building codes are common laws for the regulation of construction activities in any nation. The Nigerian NBC was approved in 2006 after incessant collapse of buildings in Nigeria. This is meant to regulate the construction stakeholders by guaranteeing safety, efficiency and quality of building infrastructure to include sustainability concerns (Ogunbiyi, 2014). One-third of the interviewees affirmed that the code to have recommends green building rating system. Though recommending is one thing, compliance is another ball game entirely; the Nigerian NBC was greeted with fun-fare when it approved for use in 2006 but ten years down the lane, except Kano, Lagos (Form C- variant of NBC) and Abuja where compliance level has been on the increase Most interviewees were neutral on the subject as they have not digested the whole documents. A glance at the thirteen sub-heads of the NBC does not confer any major privilege to sustainability.

Theme 3: Rating System and Nigeria Construction Industry

The absence of home grown rating system guiding Nigeria construction industry was noted. Most interviewees advocated the development of Nigerian rating system, adopting the LEED standards with modifications to reflect our own reality. This resonate with the practices of most developed countries that are desirous of sustainable development. Developed nations overtime have develop rating system for regulating environmental and energy related issues in infrastructure development in their region. The British's Leadership in Energy and Environmental Design (LEED) is the front-runner and forms the bases for the establishment of various rating system globally to reflect zonal peculiarities. In Africa, the South African Green Building Council (GBCSA) Green Star SA rating tool is the only known attempt at rating system in the region (Ashiboe-Mensah *et al.*, 2011). Furthermore, the ability to develop, promote and implement such development within the industry stakeholders were argued for.

Theme 4: Feasibility of Green and Sustainable Construction in Nigeria

Most interviewees agreed with the feasibility and viability of green technology and sustainable practices in Nigeria, sitting the natural renewable resources endowment of the nation as a blessing to such development. Sustainable materials such as sun dried bricks, compressed earth blocks, lime stabilized earth blocks, laterite stones and pozzolana are in abundance, while their use is also so limited to have significantly increase global warming

(Windapo and Omeife, 2013). When confronted with low uptake of sustainability practice in the industry despite the known benefits that include but not limited to low energy consumption, improved productivity, and low running and maintenance costs. The interviewees are of the opinion that the current state is down to lack of appropriate law regulating the industry and awareness level within the stakeholder. On further prompting by the researcher on why sustainable concept and renewable materials were not deployed on site, the project managers are of the few that some of generic barriers; awareness and demand, cost implications, education and experience, policy issues are hindering the feasibility of such concept.

CONCLUSION

Sustainability issues to include green technology in the built environment is becoming more imperative, moving from local considerations that are evident in an emerging ecosphere to international socio-economic concerns. While some works have been carried out about this phenomenon globally, the understanding and implementation level of the concept in Nigeria is still emerging. The findings of this study resonate with previous work. It highlights the industry lack of sufficient grasp which has continually challenged the uptake of green building ethos in the industry. It can be said that most stakeholders have a moderate fore knowledge of sustainability and green technology concepts by recognizing the inherent benefits in them. The implementation level is however does not correlate with this level of awareness. To key into this for maximum benefits, construction practices must be fully regulated and enforced in line with sustainability agenda in Nigeria. Change strategy that equips the stakeholders with the right knowledge and awareness needed to do things differently seem to be a major factor for the promotion of green building concept in the built environment. However, it can be said that this paper is limited to Abuja role players perspectives hence it affects its generalization, the dearth of data and knowledge of stakeholders regarding the scope and the context of this study also calls for a wider study within Nigeria.

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