

Critical Review of Factors Inhibiting the Adoption of Green Building Design in Nigeria¹

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ABSTRACT

Green Building (GB) is one of the recent developments used to improve the energy efficiency and environmental impacts of buildings. It has been widely embraced in other parts of the world but little can be said in the case of Nigeria. Hence, this study aims to conduct an extensive literature review on its level of adoption and incorporation into the Nigerian building system. The study discusses the factors that necessitated the development of the building concept. It also discussed briefly on the available ratings in different countries and projects in which the green building initiative was adopted in Nigeria. The study came to a discovery of some major factors which is inhibiting the adoption of green building design in Nigeria and also proffered viable solutions.

Keywords: Greenhouse gases; Green building; Sustainability

INTRODUCTION

Green building became an object of mention due to the deteriorating effect of greenhouse gases on human lives and the atmosphere, and these gases are being emitted into the atmosphere on daily basis. These greenhouse gases and Ozone layer depletion are currently a household word following the summit in Rio, 1992 (Sood *et al.*, 2001). The green building initiative was conceived to help cushion the effect of the gas emissions and to help prevent further increase in the greenhouse gases and ozone layer depletion, notwithstanding providing an environmentally friendly building (Brian-Theodor, 2016). As nearly 40% of Green House Gases emissions are attributed to the design, construction, and operation of buildings (US Green Building Council, 2010) also, Yan *et al.* (2010) corroborated that the construction of buildings has a very important impact on the environment, and the process of manufacturing and transporting of building materials,

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installing and constructing of buildings consumes great energy and emits large quantity of greenhouse gas (GHG). As the majority of Green House Gas emissions are from fossil fuel use, reversing climate change requires the reduction of building energy use and transition to renewable energy sources (Brian-Theodor, 2016).

Therefore, the saying “No man is an Island”, this statement asserts that we all share a common humanity and a universe which we all should deliberately and consciously protect to ensure our continuous human survival. In today’s increasingly complex and interrelated world, not only is no man an island but, similarly, no building stands alone. Every building exists within an environmental context upon which it not only acts but which also has an impact upon the building. Because of today’s increased complexity and interrelatedness, no building can be constructed as a microcosm. Every building has its own consequential effect on the environment, so professionals in the construction industry should be increasingly informed about the consequences each project will have on the environment, thereby arousing the need for Proper Environmental Impact Assessment to be carried before project commencement and at various stages of the building lifecycle (Zolfagharian *et al.*, 2012). “Going Green” is also a section of call towards sustainable but not limited to Green Buildings only but in all spheres of human activity which in one way or another constitutes a challenge to human sustainability.

Sustainability is also an issue that comes to mind when discussing green building. Sustainability is collection of policies and strategies employed by companies to minimize their environmental impact on future generations. It involves using the environment in such a way to ensure its continual usability and availability for use by generations yet unborn. Environmental Sustainability was defined by Morelli (2011), as the maintenance of natural capital. Sustainability concept encapsulates varying concepts from sustainable building, design and operations.

Green building and reduction in gases emission is aimed at ensuring human and environmental sustainability. Sustainability is a social concept in that it considers the needs of the unborn. It is an environmental concept in that it addresses the effect of pollution and resource management (or lack thereof) on Earth’s ecological systems. Further, it is an economic concept in that it seeks to quantify the tolerable limits for consumption such that we can live on Earth’s interest instead of depleting the principal, further, it is a perspective which focuses on systems and relationships instead of objects.

According to Kolawole and Anigbogu (2005), the friendliest way to handle the environment is not to build. However, without construction, life can be miserable and threatened. For shelter is needed, among other things, for protection against the inclement weather and for healthy living. Hence, this study seeks to carryout critical review on factors inhibiting the adoption of green buildings in Nigeria.

GREEN BUILDING

Green Homes/Building is a type of building designed with the aim of working towards human sustainability by bringing together important factors which include: Human Satisfaction, Environmental friendliness and notwithstanding cost-efficient homes for the large population of prospective and current homeowners and dwellers. A green building is sometimes referred to as a high-performance building whose energy, economic, and environmental performance is substantially better than one designed by standard practice, design or specifications. Also, green building is a construction activity that conserves raw materials and energy and reduces environmental impacts. It refers to a structure and a process that is environmentally responsible and resource-efficient throughout a building's life-cycle: From siting to design, construction, operation, maintenance, renovation and demolition.

The Green Building practice expands and complements the classical building concerns of economy, utility, durability, and comfort (Ng'andwe *et al.*, 2015). It is a building that is healthy to live and work in and that has a relatively low negative impact on the environment in that it is designed to adapt to the environmental condition. A green building is also referred to as one whose construction and lifetime of operation assures the healthiest possible environment while representing the most efficient and least disruptive use of land, water, energy, and other resource (Linda Adler, 2006). This incorporates the idea of producing building materials and Home Products which are more environmentally friendly and recyclable materials which will not constitute hazard to home dwellers and which on the other hand is favorable to the environment as well.

GREEN BUILDING RATING TOOLS

Green rating tools are available in different countries to measure greenhouse gas emission and to provide the standard for green building design and materials in tune with international standards regarding sustainability. Different acronyms for the tools differ from country to country, some of the popular green rating tools include UK's BREEAM, USA's LEED, Japan's CASBEE, Australia's GREENSTAR, Singapore's GREENMARK and Malaysia's Green Building Index (Yusuf *et al.*, 2013). But in Nigeria there is yet to be developed a green building rating standard which is used for rating the green building materials and Buildings. This is one of the deterrent factors for Green Building development in Nigeria.

Green Building Features

This study will prove incomplete if it fails to enumerate characteristic features of Green Building itemized by UK Cooperative Extension Service, University of Kentucky:

- A central core that makes best use of natural lighting while keeping out heat
- Passive orientation in buildings to minimize sunny exposure

- Fitting existing topography in order to minimize earth removal
- Exterior blinds
- Water saving devices
- Sensor controlled compact energy efficient fluorescent lighting
- Photovoltaic (Solar) cell arrays
- Building Design and Materials Suited and Derived from Natural Sources.

GREEN BUILDING ADOPTION IN NIGERIA

In Nigeria, over the years due to increased awareness, green building materials are being systematically introduced into new buildings during Retrofit and Renovation works e.g. use of wooden floors, Recycling household waste water, Use and Installation of Solar Powered Devices and Panels for household electricity. Also, in big industrial buildings it sufficiently noted that the use of reflective glass walling is being adopted as replacement for the conventional block or concrete walling, this is advantageous due to the recyclable nature of glass. Also, another part worthy of note is the use of energy star lighting bulbs which are known to consume a lower amount of energy (15-25W) and brightens the building more effectively. In the wake of call for sustainability, the government of the country is also striving for compliance with environmental act and regulations by setting up different committee and organizations to ensure strict adherence to Environmental Use Act.

Notwithstanding, the Country still has to do much more towards reducing Gas flaring in refineries and Oil Spillages especially in the Niger-Delta region of Nigeria which equally has a devastating effect of the Ecosystem. It is also a major setback to note that Nigeria has not developed its own home-grown Green Building Rating. Worthy of note is the Green Housing Estate proposed by the FCMB (First City Monumental Bank) to be built in Lagos, the project was initiated in 2012 to cost \$500 million but the project has been literally abandoned due to the economic hardships faced by the country and possibly other restraining factors discussed in this article.

BENEFITS INHERENT IN GREEN BUILDING

Asides serving as a means of reducing of green-house gas emissions and improving the chances of Human Sustainability, it also has other inherent advantages derived from the adoption of green building design, these includes:

- Results in a high-quality, healthy living environment

- Lowers residents' utility costs
- Enhances residents' connection to nature
- Protects the environment by conserving energy, water, materials and other resources
- Advances the health of local and regional ecosystems
- Reduction of Life-Cycle Building and Running Costs.
- Proper Harnessing of the Natural Resources (Sunlight, Ventilation)

Furthermore, due to the peculiarities associated with the Nigerian Society, there seems to be some other advantages to be derived from going green. Due to the erratic power supply situation in the country, a regular supply of Electricity is needed and this can be provided by Solar-Paneled Roofing Sheets incorporated in Green Building Designs.

CHALLENGES OF ADOPTING GREEN BUILDING IN NIGERIA

According to the study carried out by Dahiru *et al.* (2014), the study carefully enunciated the extent of exposure of the Nigerian Society to the green building concept. The research hinged on responses provided through structured questionnaires given to different categories of respondent ranging from the developers: government and private bodies, Construction Professionals, the artisans and the public at large. It was found that about 70% of the Respondent Developers and Professionals were conversant with the Green Building Concept but only a minimal percentage of 5% of the respondents have worked or planning to adopt the Design because of obvious constraints as discussed in this paper. While the artisans and the General Public exhibited and stated their lack of awareness of the design and its attendant advantages and benefits, not considering the limitations to be encountered. The study also showed that lack of awareness ranked as the 1st factor hindering the adoption, followed closely by Financial Incapacitation while other factors like: Nature of Economy, Technical and Technological issues etc. also posed as challenges to the Adoption of the Green buildings. Notwithstanding, no amount of challenges experienced should dissuade a country from pursuing the green initiative as it is Hope of Human Sustainability. Some of the challenges to be outlined in this article include:

- **No Enabling Environment:** The result of investigation shows that there is no enabling environment in the form of policies, legislations or other forms of incentives in enabling easy practice of Green Building. Quite unlike what is obtained in the developed nations in which government lead by example – through the construction of some public building using the concept of Green Building (Dahiru *et al.*, 2014). As most policies are formulated and adopted by the

Legislative Arm of the Government in which the Building Profession do not have adequate representation for the purpose of policy formulation. Even some of the policies already formulated do not have effective enforcement. Environmental Sustainability issues rarely constitute agenda differentiation of political parties or political leadership, except as occasioned by the recent protests in the Niger-Delta in which individuals have clamored for cleaning up of different oil spillage sites starting with the Ogoni-land Clean-up.

- **Unpredictable Nature of the Economy:** Nigeria as a developing country in Nigeria and runs an import-based economy, in which the economy of the country is greatly affected adversely based on the economy of her Trade Partners. Though concise efforts are ongoing for stabilization of the economy, this is yet to grossly have impact on the overall view of the economy. Moreover, the private sector has a narrow market base and a large chunk of the project embarked on is funded by the Government at different levels. This also constitutes a challenge because the government relies majorly on its oil revenue. Also, there has been reduced government spending to encourage fiscal prudence, this has caused major projects funded by the Government has experienced cash crunch. According to Dahiru (2009), many indigenous firms have suffered financial ruin and bankruptcy because of delays in payments, which are common with government contracts.
- **Lack of Sustainable Agenda on Awareness:** In Nigeria, an average property developer and even some building industry professionals do not have an elaborate knowledge of what Green building entails (concept, method of construction and materials). Even those aware do not have the will and desire to carry on the initiative because of several dissuading factors. As important as Environmental Impact Assessment plan of Environmental Impact Statement (EIS) it is demanded from developers as a criterion to development plan approval, but most developers have their way around it without following due process.
- **Technical and Technological Barriers:** As already discussed, Nigeria depends majorly on exports for its Equipment and some Materials used in Construction, some of these equipment and materials are most times not suited to the climatic and topographical terrain of the country, so it cannot be effectively used. Nigeria needs knowledge and technology that are better adapted to its natural resources than those which are obtained from industrialized countries. For example, the use of earth and timber construction that predated colonialism has been abandoned and no longer popular. Also, the construction industry is traditionally very indifferent to change, especially when it comes to the construction methods and building materials used.

- **Lack of Integrated and Sustained Research:** Research into developing building materials and Equipment over the years has not been carried out in a planned and systemic manner in which a meaningful result cannot be achieved. Much of the research in building technologies and planning is not done in a holistic approach. The research institutions, development agencies and other organizations address each issue individually and independently of other issues to which it is linked. It has therefore not yielded a substantial result, even those that were established with a planned vision often times, lose out on their dreams due to policy changes, lack of administrative and fiscal policies.
- **Cost Implication of “Going green”:** Going green is relatively a new concept, therefore the needed machineries, facilities and materials, if available have not yet been fully developed to carry serve as the already existing ones. As known that materials which are relatively scarce and not locally produced come with a relatively higher price which sometimes discourage developers from adopting the Green Building concept. Apart from the materials, the processes and activities involved in adhering to the Green Building Rating/ Standard is a break from the norm and thereby expertise may be unavailable or difficult to access thereby resulting in a higher cost of building development. As Opined by a Royal Institute of Chartered Surveyors study, that found that green buildings attracted 3% in higher rental premiums and sold at 16% more than non-green buildings of the same type, size and location.

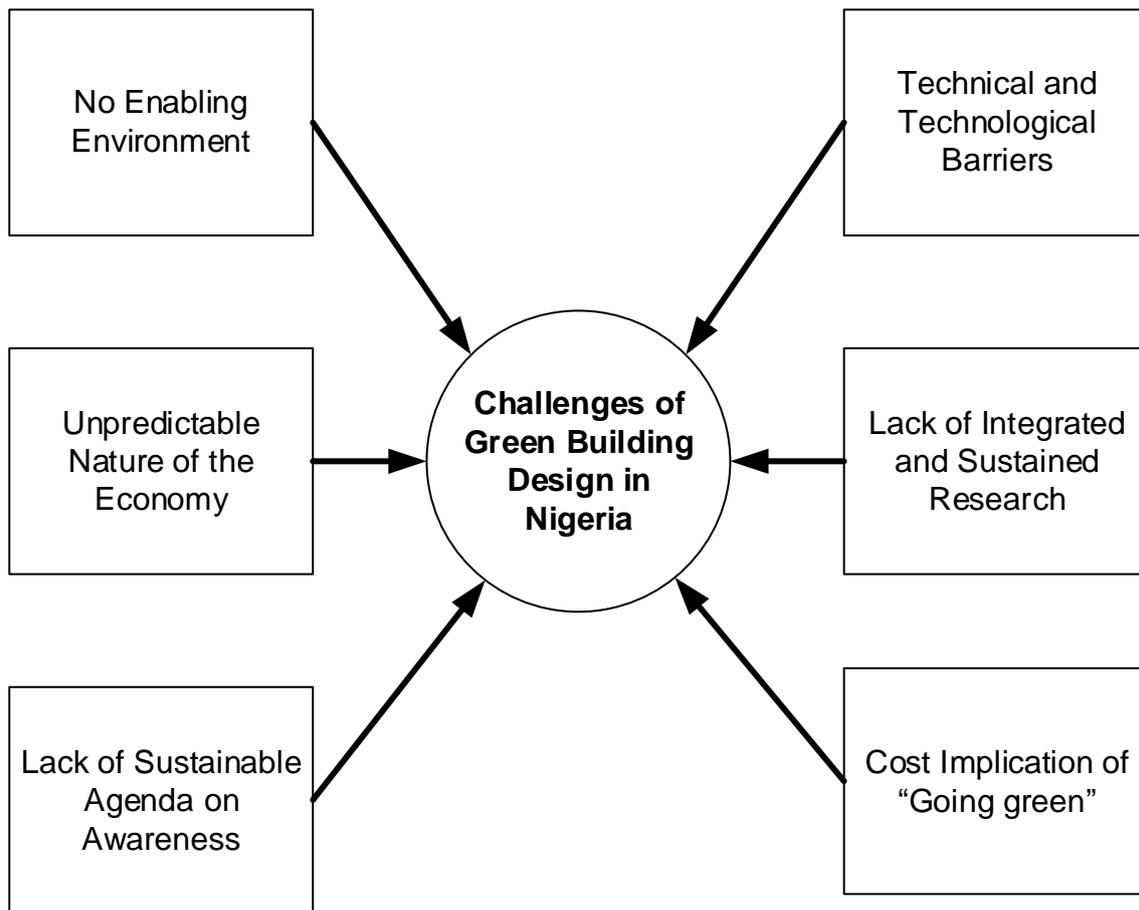


Figure 1: Challenges of GB in Nigeria

CONCLUSION AND RECOMMENDATION

Having established and enunciated the challenges been faced in the implementation of Green Building in Nigeria, therefore the study will be inconclusive without proffering some of the solutions which can help to reduce the effect of the constraints on the Nigerian Society. Some of these Solutions and Recommendation are outlined below:

- Public enlightenment and Awareness should be vigorously embarked on by government and professional bodies through Continuing Professional Development (CPD). Non – Governmental Organization, NGO should also assist in this respect through enlightenment campaign.
- Government and Planning Authorities should strictly adhere to the rule of provision of Environmental Impact Analysis and other environmentally inclined Certifications before any building development is approved. Furthermore, the Government

should take proactive steps towards enforcement of ban on use on building materials which are hazardous environmentally e.g. Asbestos, Polythene etc.

- The Government and other financial institutions should cooperate with the industry's professional bodies and private individuals establish a construction bank that will empower the both the professional and producers of building materials to encourage environmentally friendly design and Material. Also, manufacturers of construction materials should use life cycle considerations as the basis of product development and should cooperate with designers in the development environmentally friendly construction materials. Also, they should form partnerships with research firms by providing funds for research and development and implementation.
- Government should importantly integrate the teaching of Sustainability in to the curricula of various Tertiary Institution for proper and thorough training of Professionals.
- The major corporations operating in the country, most especially oil companies should be encouraged to use the concept of Green Building in the construction of their major offices. They should also sponsor researches on Green Building and also encourage the construction of Green Building for major public buildings and provide incentive for those that want to construct Green Building.

Without further ado if these recommendations can be systematically carried out and effected in the Nigerian Construction space and in Africa generally, there is light at the tunnel for human sustainability and Green Building Design Adoption in Nigerian Construction Industry. All hands must be on deck to improve the level of Green Building Design adoption in Nigeria, so as to ensure continued human sustainability and environmental preservation. Moreover, there is great pressure on developing countries to align with the set standards for green building and the clamor for "going green" is louder now than ever as the effects of climate is now evident as there are major shifting in the climate and weather of different countries with extremes of cold in Arid/Temperate regions and heat waves in erstwhile cold regions in certain periods of the year coupled with excessive flooding, erosion and increased occurrence of natural disasters like landslide, earthquakes, tsunamis and typhoon among others. All these tend to the need for the adoption, incorporation and institutionalization of green building into the construction process.

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