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# An Overview of the Sustainability and Green Architecture Innovation: Towards Identifying Impediments to Its Practice in Nigeria

**Ndandok, Christy Thyeno[1]; Mustapha, Muhammed Aliyu[2] & Arc. Zemo, Stephen Audu[3]**

*Department of Architecture, College of Environmental Studies, Kaduna Polytechnic.*

## *Abstract*

*Sustainability is the solution to combating the negative environmental impacts in our environment. In Nigeria the practice of sustainability via green architecture in our built environment is a necessity in fighting the environmental concerns of the Nation. This is because green Architecture remains the foundation of sustainable construction, it refers to a structure that is resource-efficient in terms of economy, utility, durability, and comfort. Nigeria has all the necessary potential to support the implementation and practice of green architecture concepts, however, this practice is very scarce and discouraged by problems like huge power, water, & processed material consumptions due to increased urbanization, and limits of the knowledge of the Professionals in the construction industry. Literature review is used in this study to appraise sustainability and green architecture existence in Nigeria so as to identify the obstructions to its practice. The study was able to identify the impediments to the practice of green buildings in Nigeria and concluded that the sustainable environment will continue to be an illusion if the construction industry and other stake holders fail to overcome these categorized impediments.*

***Keywords:*** *Sustainability, Green Architecture, Green Buildings, Built Environment and Environmental impact.*

## Introduction

Sustainability has come about as a response to the growing environmental concerns in the world (Stasinopoulos 2005). This implies that there are negative environmental impacts that affect every part of the world in one way or the other and sustainability is a viable solution or way forward to combat these issues. Sustainability could simply be defined as the process of meeting the needs of the present time without compromising the ability of future generations to meet theirs. In other words, available resources should not be depleted faster than they can naturally be generated (Wikipedia 2019).

Ibrahim, (2008) suggest that Sustainability as a concept has often been linked to green architecture, environmentally responsible design and ecological design. Okeke F. O et al (2018) further explained that Green building (GB) is the foundation of sustainable construction and refers to a structure that is resource-efficient in terms of economy, utility, durability, and comfort. With these insights it can be understood that green architecture is sustainability realized in the built environment, and more specifically, buildings.

The built environment has been known to have an impact on the environment, Kim (1998) enumerated the effects of the built environment, which he said manifests in the form of alteration of the ecological environment. It is with this view that Okeke F. O et al (2018) informs that the designs of architects are very important in mitigating environmental problems. This is why green architecture is very important. The application of green designs involves a particular framework for considering environmental issues, the application of relevant analysis and synthesis, methods and a challenge to traditional procedures for design and manufacturing. Sadly Okeke F. O et al (2018) informs that although In Nigeria some buildings embody one of the various verifiable characteristics of green design. Buildings with holistic approach to green architecture are yet to be seen.

**PROBLEM STATEMENT**

Sustainable energy potential and sustainable building materials potential in Nigeria encourages the adoption of green architecture concepts (Okeke F. O et al 2018). This indicates that Nigeria should be

among the world leaders in green architecture.

Unfortunately, the popular architecture in tropics like Nigeria are now unadulterated transplants from temperate countries in the name of international style (Bay and Ong, 2004). This has incorporated mostly unsustainable construction materials in its operations as compared to the old tropical traditional concept of architecture that were practiced. Many developed countries have made substantial progress in embracing the Green architecture movement. A study by Potbhare *et al*, (2009), noted that there is a great need to promote the development and adoption of Green building guidelines in developing countries.

Our environment is distressed as a result of certain human activities. Developing countries like Nigeria are faced with the growth of residential housing sector accompanied by huge power, water, natural and processed material consumptions due to increased urbanization. This increasing urbanization is associated with loss of arable land, material and water crisis, and serious environmental problems like air pollution, noise pollution and waste generated from buildings. Pawlowski (2007) suggest that a starting point to a sustainable solution for the environment should be considered and people must begin to respect the natural laws of environmental balance.

Ibrahim (2008) however observed that although architects acknowledge the importance of sustainability, one of the major setbacks to the practice has been the limits of the knowledge of the architects. Several buildings in Nigeria are found to embody one of the various verifiable characteristics of green design. Nevertheless Okeke F. O et al (2018) submits that Buildings with holistic approach are yet to be seen in our country.

Despite all these glaring challenges and drastic measures, Green Building developments and sustainable practices are embraced very slowly and practiced at slow pace in the Nigeria's construction industry. This is why an overview into the study is required.

## AIM

This study aims to appraise sustainability and green architecture existence in Nigeria based on literature review in order to identify the impediments to its practice.

## OBJECTIVES

To identify what sustainability and green architecture are to the built environment.

To determine the extent of sustainability and green architecture practice in Nigeria
To establish Impediments to the practice of green architecture in Nigeria

## RESEARCH QUESTIONS

1. What is sustainability and green architecture in the built environment?
2. To what extent has sustainability and green architecture been practiced in Nigeria?
3. Are there hindrances to the practice of sustainability and green architecture in Nigeria?

## RESEARCH SCOPE AND LIMITATIONS

This study is limited to the opinions and perceptions of various practicing experts working in the
Nigeria's Built Environment through their written literature. Such professionals mainly include the Architects.

## RESEARCH METHODOLOGY

Secondary sources of data such as journals, conference / seminar / workshop papers, textbooks, newspapers, magazines and internet sources etc. were used to review literatures, which helps in identifying and narrowing the various factors that hindered Green building developments.

## LITERATURE REVIEW

### Significance of Sustainability of the built environment

Environmental impact, whether positive or negative, is the result of man's actions and it often leads to changes in the environment that affect the availability of resources (Emuze F.A. et al 2012). The world's population continued growth has led to the implementation of resource-efficient measures in all areas of human activities especially in the built environment which has a significant impact on all resources while also affecting the air quality and transportation patterns of communities; both the present and the future generations (EUROSTAT 2011, Bauer M, Mosle P, Schwarz M, 2007, Dalibi S.G. 2012).

The building and construction industry consumes great quantities of raw materials and energy that approximate to about 24% of global raw materials

(Bribian et al. 2011). Howe, (2010), informs on The International Energy Agency publication that reveals that existing buildings are responsible for more than 40% of the world's total primary energy consumption and for 24% of global carbon dioxide emissions, accounting for roughly a quarter of the world greenhouse gas emissions.

The UN's Intergovernmental Panel on Climate Change (IPCC) explored the likely global warming of 1.5 degrees, its effects and how it might be mitigated. It however warned that, without urgent change, the impact is likely to be far greater. Meanwhile the Emissions Gap Report 2018 has suggested we are already 10 years behind the targets set out in the Paris Agreement just a few years earlier.

It must be emphasized that all countries of the world are under this environmental threat and These observations pointed out above indicate our desperate position revealing that it is imperative that we make sustainable living a part of our lives.

**Green Architecture / Building**

The friendliest way to handle the environment is not to build. However, without construction, life can be depressing and threatening (Kolawole, J. and Anigbogu 2005, Dahiru D, Bala K and Abdul'Azeez AD, 2013). What is needed is a dynamic equilibrium without any form of threat especially to the environment (Zubairu, S. 2012). The combination of these challenges gave birth to a new concept in design, construction/renovation, operation and maintenance of buildings in conformity with "sustainable practices for buildings" known as Green Buildings (Dalibi S G, 2014).

A green building is defined as one whose construction and lifetime of operation assure the healthiest possible environment while representing the most efficient and least disruptive use of land, water, energy and resources. Okeke F. O et al (2018) opined that the holistic design approach is more like an interconnected web. Intimate knowledge of the design strategies and interrelated impacts of each category on one another is critical to effectively achieve green building design and beyond.

Building a green building is not just a matter of assembling a collection of the latest green technologies or materials. Rather, it is a process in which every element of the design is first optimized and then the impact and interrelationship of various different elements and systems within the building and site are re-

evaluated, integrated, and optimized as part of a whole building solution. This is why It is critical to make the decision to build a green building early in the design process in order to maximize the green potential, minimize redesign, and assure the overall success and economic viability of the green elements of the building project.

The five major elements of green building design are as follows:

1. Sustainable Site Design;
2. Water Conservation and Quality;
3. Energy and Environment;
4. Indoor Environmental Quality;
5. Conservation of Materials and Resources.

These elements also affect direct solar loads and overall energy performance for the life of the building. Without considering these issues early in the design process, the design is not fully optimized and the result is likely to be a very inefficient building. This same emphasis on integrated and optimized design is inherent in nearly every aspect of the building from site planning and use of on-site storm water management strategies to envelope design and detailing and provisions for natural ventilation of the building. This integrated design process mandates that all of the design professionals work cooperatively towards common goals.

**Sustainability and Green Architectural Practice in Nigeria**

In recent years, Nigerian Architecture is characterized by the post-modern buildings of the 1990's and a sprawling new design concept and engrossed with new building materials mainly imported from China. This is mostly because Green Buildings projects design and construction is relatively new in Nigeria and is characterized by the problem of scarcity of technical knowhow among the professionals in the building industries. Stakeholders are yet to approach Green Building from a holistic angle but only apply certain aspects of Green buildings in their projects. This implies that education of professionals is necessary. The awareness of green building by the general public is also lacking, this is necessary because it will form the market-driven power for such developments especially in the urban area.

Other difficulties include the Lack of basic data of using Green building assessment system, Lack of professionals, Lack of interest from real estate

developers and Difficulty of having a unified Green building assessment standard etc.

Despite all these glaring challenges, Green building developments and sustainable practices are embraced very slowly and practiced at slow pace in the Nigeria's construction industry. Industry professionals, in both the design and construction disciplines, are generally slow to change, tend to be risk-adverse, lack sound knowledge, experience, and understanding of how to apply ecology to construction design; moreover, environmental or economic benefit of some green building approaches has not been scientifically quantified (Zhiyong Wang , Z. 2013).

This is worrisome and may be due to some factors affecting the sustainable practices within its built environment.

**Impediments to green Architectural Practice in Nigeria**

Every project or development comes with its unique benefits, challenges and factors that hindered its success; Green Building developments in Nigeria are not an exception. "To be sustainable, buildings should usefully last for many generations. This requires some knowledge of the future climate and the resources available to maintain the operations, in particular the energy consumption, of buildings" ( Byrd, H and Leardini, P , 2011).

Okeke F. O et al (2018) summarized Listing of Hindrances to Green Building Developments in Nigeria as follows

a) The Perception of green building as Expensive Concept (Perceived Increased cost for incorporating green building features etc.)
b) Green building Technical Know How (green building requisite knowledge among the Built environment Professionals & the scarcity of green building certified professionals)
c) Divergent interests and views of success factors and success criteria of green building developments among stakeholders
d) Shortage of green building cost data and other performance related.
e) Green building as a new change ( which comes with its associated risks)
f) Green Buildings awareness
g) Insufficiency of Locally or a single unified/standard green building assessment system
h) Lack of local green building material and other components and High cost of Imported green building materials

## CONCLUSIONS

This study identified several hindrances to Green building developments in the Nigeria's Built Environment, out of which, the training or education of the building industry professional is the major Hindrance to Green Building developments.

The impact of these Green Building hindrances is important because it is only when they are fully comprehended and restricted that can Green Building projects can increase in Nigeria. The study also established that unless the design professional is trained, a sustainable environment remains a mirage

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