



## ABSTRACT

The focus of this study is to determine the nature of green building development in Abuja, Nigeria, with a view to providing information that will enhance investment in green buildings. The study adopted the use of a quantitative approach and data were collected through a questionnaire survey from property developers. Also, 60 structured questionnaires were distributed to the respondents and SPSS software version 22 was used for data analysis. Therefore, the finding of this study reported that the major nature of green building development were economic rewards,

# THE NATURE OF GREEN BUILDING DEVELOPMENT IN ABUJA, NIGERIA

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## Introduction

The world commission on environment and Development has defined sustainable development as a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. Because of the mounting awareness that the conventional building/construction or development system does not guarantee sustainability and the attendant negative effects developers and other stakeholders did not only develop the impetus and indeed the imperative for alternative development strategy but the willingness the development of green building particularly Abuja FCT (Borowy, 2013). Traditional property investment is an economic activity that entails the creation, enlargement and protection of wealth by committing a capital lump sum for future benefit to be received in the form of income flow or capital gain. It is concerned with the economic benefit to invest. However, on the contrary, green investment is a concept that calls for investors to take into account economic, social and environmental issues otherwise known as the Tripple Bottom Line approach in their decision process (Janicke, 2012). The awareness and willingness of the populace particularly developers to key into green building development are getting popular in most developed countries with the impediment of implementation being overcome. The US EPA'S findings from the recent "lifecycle building challenge" indicate that 27% of existing buildings was replaced between 2000 and 2030 and that 50% of buildings in 2030 will have been since 2000. However, this concept and practice of green building are gradually being imbibed in developing economies such as Nigeria. However, the development is prompted by the awareness and willingness to the development



compliance with legislator, ability to command good resell value and Financial payback value and they were found to be high with mean values of (M= 4.8246, std. deviation = 0.71020), (M= 4.8070, std. deviation = 0.74255), (M= 4.8070, std. deviation = 0.78918) and (M= 4.8070, std. deviation = 0.71810) and were ranked from 1<sup>st</sup> to 4<sup>th</sup> respectively, while the least nature of green building development were strategy to promote green building and ease of operation of building facilities in Abuja. The study recommended that the government should put in place a policies that can add the interest of the developers and users to sustain the current trend and interest in the development of green buildings.

of green buildings, the business world etc are imbibing the features of green buildings as corporate social responsibility (CSR). In Nigeria, developers and property users are currently adopting the features of green buildings such as the use of energy-saving bulbs, solar energy, and artificial lighting. However, there is a need to develop rating standards and establish rating Agencies and more literature to remove impediments militating investment in green building in Nigeria (Khosla & Janda, 2019).

As a result of global acceptance of the green building concept, many research works have been conducted. Most of the studies focused on developed economic and other emerging economies. Chinyere, Ajani, Ojo, Maduka, Obasih and Mafiana (2017) examined the drivers/barriers to sustainable development; how these barriers could be overcome; the level of awareness of the public especially the stakeholder about green building and how they can be encouraged to adopt green features in their project. Meanwhile, the work did not consider the effect of awareness and willingness of Developers to the development of green buildings which is very important in the crusade for providing a sustainable built environment. Chinyere et al. (2017) evaluated the relationship between sustainability and the value of office buildings in Australia and New Zealand. The focus of the study is the impact of greeneries on property value and not the effect of awareness and willingness of developers to development of the green building. Majumday and Swain (2015) identified the barrier to green building popularity and factors leading to the more acceptability of the green product in India market. Other studies that focused on the concept of green buildings from users perspectives include, Majumday et al. (2015). The studies were from the user's/occupiers perspective, so, there is an urgent need for study from the developer's perspective by which the effect of awareness and willingness of developers on development of green buildings in Nigeria can be brought to the front burner. Furthermore, Akinwale, Ogundari, Adepoju and Akinbami (2019) in an effort to introduce a way for the development, implementation and propagation of green investment products for the property industry maintained that empirical work studying the interest and motivation of selected group of stakeholders regarding the issue of green building investment is rare. In view of this, increased educational and research work focusing on the effect of awareness and willingness of developers to the development of green buildings is imperative for developing economies like Nigeria.

Research works on green building and sustainability in Nigeria exists on the operational problems of existing building-related features systems (Olaleye, Ayodele & Komolafe (2015); Facility Performance and the Need for Building Sustainability in Nigeria Keke and Oladejo



(2017); Oladokun & Gbadegesin 2010; Ogunba, 2015) examination of sustainable property investment practice and investigation of the user's preference for green features in office properties in Lagos by (Komolafe & Oyewole, 2018). Past studies conducted in the country mainly focused on the awareness of stakeholders, the relevance of green building practices and users' preferences for green building. Therefore, this paper seeks to bridge the gap that exists in the literature by investigating the nature of green building development in Abuja, Nigeria.

## **Literature**

### **Concept of Property Investment**

Human activities and effects on the earth's ability to remain sustainable has even time being a major concern to man. Price and Ochieng (2016) reported, rapid development around the world has hastened environmental degradation and exacerbated resource problems. Whereby property development is part of the rapid development which is defined in section 91 of the Nigeria Urban and Regional Planning Decree No 88 of 1992 (NURPD) as the carrying out of any building, engineering, mining or other operations in, on, under or over land. Also defined by House (2018) as an act generating latent values in land or creating benefits there from by incurring cost in the form of labour, capital or management still. According to Santamouris (2016) buildings are responsible for almost 40% of the total world's annual energy consumption. The world commission on environment and development has defined sustainable development as a development that meets the needs of the present without compromising the ability of future generations to meet their own need.

### **Green Building Rating Systems**

Rating systems for the evaluation of green features of the building have been developed mainly in some developed and emerging economies. The examples of commonly-used green building rating systems are New Zealand; Green Star; Australia: Nabers and Green Star; United States: LEED, BREEAM; Canada: LEED Canada; Netherlands: BREEAM Netherlands; China: GBA. The aim of these rating systems is to provide an objective measure of how green building is, but they still have their problems. The two most widely used rating systems worldwide are "BREEAM (Building Research Establishment Environmental Assessment Method) and LEED (Leadership in energy and Environmental Design)". These have been adapted and used outside their country of origin to rate buildings though not without problems.

These rating systems have some important differences one, being that BREEAM schemes focus on the type of building (offices, schools, industrial etc.) while LEED focuses on the buildings being new or existing. Various assessment rating systems are coming up rapidly at the same time as their use is becoming more widespread among which is the development of LEED for Neighborhood Development (LEED-ND) by the USGBC which is a rating system that combines the principles of smart growth, new urbanism and green building into a rating system for green neighbourhood development. This recognizes that the location and context of a green building are important in terms of sustainability (Reddy, 2016).

Also of note is that some rating systems consider only specific aspects of building performance such as energy usage in energy star, while some take a holistic approach considering the design and operational criteria. An example of the latter is the Green Star



rating system launched by the New Zealand Green Building Council in 2007. According to the New Zealand Green Building Council, 50% of all major and new renovations in the New Zealand office sector are green building compliance and subjected to Green Star Certification System (New Zealand Green Building Council, 2009). The actions of governments around the world are a force to the green building trend by imposing mandatory green upgrades or providing an incentive to promote green building practices. And, the trend for government to demand minimum green standards for buildings they own or lease is also providing a market stimulus for constructing new green buildings and influencing factors to promote green building development. Oмардин, Abidin and Ali (2015) argues that environmental rating system such as BREEAM in the UK and LEED in the US is useful in guiding the industry toward best practice and improving the quality of buildings for occupants. This is in line with the UK government's strategy for sustainable construction (DETR, 2000). Indeed BREEAM rigorously evaluates parameters including health and wellbeing (BREEAM, 2011).

### **Green Building Features**

According to Bond (2009) elements of sustainability measured by Green star are energy, water, materials, emissions, land use and ecology, indoor,-environment quality (IEQ) and transport. Also, Oyewole and Komolafe (2018) and some other literature indicated seven areas of green building that must be included in an effective model green program for affordable housing including, "Energy system, Water conservation indoor air quality, Site selection, site design and landscape ecology, Building ecology, waste recycling". Each subheading shall be discussed below:

### **Energy system**

Oyewole and Komolafe (2018) stated that green design maximizes the use of material techniques for heating, cooling, ventilation and lighting a building while minimizing the external environmental impact on building occupants. Appliances responsible for 66.67% of the electricity used in homes sustainable lighting (USDOE, 1999); compact fluorescent light bulbs (CFEs) and energy-conserving appliances achieve substantial reductions in energy use and utility costs (Oyewole et al., 2018). A well-enveloped designed building can minimize the need for, air conditioners, furnaces and lights, cutting construction and operating costs (Global Green, 2006).

### **Water Conservation**

Environmental Sustainability requires that the use of fresh water in a building and the discharge of waste water be reduced to an optimum level (Bond). Buildings account for a substantial amount of fresh water usage (Zhang, Wang, Hu & Wang (2017) therefore employing water conservation measures can have great positive impacts. Therefore, significant water savings can be realized by specifying and installing water-efficient appliances and plumbing fixtures (Zhang et al., 2017). Features like installation of rainwater tanks on-site treatment and re-use of grey water (Bond).

### **Indoor Air Quality**

Many green building consultants refer to indoor air quality as the most important feature of green buildings (Oyewole, Ojutalayo, & Araloyin, 2019). Many of these studies have shown



indoor pollution as a high-environmental risk, with additional emerging risks identified on a regular basis. Oyewole et al. (2019) opined that the provision of natural ventilation improves fresh air supply and the minimal level of indoor air pollutants which translates to reduce sick leave and in some instances leads to increased employee productivity.

#### **Site selection, Site design and Landscape Ecology**

Sustainable designs and site planning reduces environmental site impacts enhance human health, minimize construction costs, increase energy, augment water and natural resource conservation, improve operational efficiencies and promote alternative transportation, resulting in stronger communities; more opportunities for residents and fewer sprawl-related transportation impacts (Lovell & Johnston, 2009). Neighbourhoods with proximity to services, such as those encountered on infill sites, encourage a healthy quality of life and lower dependence on cars (Lovell et al., 2009). Council (2008) suggest that the use of native and adaptive vegetation is important to creating positive, low-cost landscape ecology.

#### **Building Ecology, Waste and Recycling**

Building and construction have significant negative impacts on the environment; especially the amount of waste produced and material used (Lovell & Johnston, 2009). Reducing, reusing and recycling building materials conserve natural resources and reduce emissions associated with manufacturing and transporting raw materials (Council, 2008). Also, Council (2008) opined that implementing deconstruction and a waste management plan present excellent potentially profitable opportunities to minimize the environmental impact of development (Lovell & Johnston, 2009) suggested that many recycle content materials have additional benefits which yield better results and a stronger final product.

#### **Integrated Design**

It is the involvement of interdisciplinary in the whole system of approaches in green building strategy. This is very necessary.

#### **Benefits and Drivers of Investing in Green Buildings**

Various benefits of green buildings have been identified by studies such as Shen, Yang, Zhang, Shao and Song (2019). For instance, Shrubsole, Hamilton, Zimmermann, Papachristos, Broyd, Burman and Davies (2019) classifies green building benefits into three areas: environmental, economic and social as supported by many kinds of literature on sustainability. Shen *et al* (2019) emphasized the business case for green building. The identified benefits include lower operational costs and lower life cycle costs. They advocated that Green building investment will not only be an advantage to the buyers or consumers or investors but also provides a business opportunity for architects, developers, contractors and almost all stakeholders in the built environment. Similarly, enhanced daylight and reduced toxicity in the indoor environment increase employees' productivity by up to 16% absenteeism. Mao, Shen, Pan and Ye (2015) opined that Green buildings can be built at little or no additional cost as generally believed by researchers but practitioners often identify high initial costs as a barrier to adopting the green practice. However, this assertion confirmed the



study of Mao et al. (2015) on higher costs for green appliance design and energy-saving material at the design stage.

Shi, Zuo, Huang, Huang and Pullen (2013) identified operational savings, daylight and views, and air quality as the three best reasons frequently admonished by occupiers of Green buildings. There is a consensus that adopting green technology does not only help in branding the image of property developers but can also reduce administration costs when an efficient experience-sharing scheme can be established (Shi et al., 2013). Rating systems can be presented as a business case in terms of promoting a sustainable and eco-friendly image and for making a comparison in performances of similar buildings. It allows building owners to go above the requirements of government building codes, display the quality of their buildings to various interested stakeholders and demonstrate corporate social responsibility (Pitt, Tucker, Riley & Longden, 2009). Olubunmi, Xia and Skitmore (2016) studied the market perception towards sustainable buildings from the investment community and concluded that sustainable buildings investment would encourage financial case for green buildings can be proven with evidence.

According to Olubunmi et al. (2016), drivers for Green building other than financial performance include: Utility cost savings for energy and water, Maintenance cost reduction, Increase value from higher net operating income (HOI), due to higher rent and greater occupancy in certified buildings, Increased occupiers' productivity, due to improved health of tenants and reduced absenteeism, Marketing benefits, especially for developers, building owner and managers, Recruitment and retention of key employees and demonstration of commitment to sustainability and environmental stewardship. According to Warren-Myers (2012), in the United Kingdom, green real estate investment property is driven by a fiscal measure that includes legislation and regulation and market factors. In addition, Warren-Myers (2012) stated that the Australian government and other public sector bodies are leading by their example in their benefits for sustainable building, large progressive corporations in the private sector are also a leading driver for green buildings, because of strong environmental focus and sustainability policy at the core of their business and they occupy green buildings. Rising energy costs are one of the primary drivers of sustainable building in New Zealand. However, according to the Green Building Council of Australia (2008) tenants have become less interested in savings in operating costs rather in intangible benefits, such as staff attraction, productivity, retention and reduced sick leave and absenteeism. According to EPF (Economic Policy Forum) on emerging Economies Think Thank Alliance for High-Quality Growth, The benefits of green building are categorized into 3 main parts:

#### **Environmental Benefits**

Improved air and water quality, reduced waste, Conservation and restoration of natural resources and protect biodiversity and ecosystems.

#### **Economic Benefits**

With reduced operating costs, Creation, expansion and shaping of markets for green products and services, Occupants become more productive and Optimized economic performance over the building's life time.



### **Social Benefits**

Enhanced comfort and health for occupants and aesthetically pleasing. Jasimin and Ali (2014) estimated that the productivity benefit from environmentally sustainable building design is well more substantial than the energy savings from green efforts. In addition to this Jasimin and Ali (2014) report that the average initial investment needed to design and construct green buildings is as low as ten times the financial benefits. According to Jasimin et al. (2014), on a micro level, from costar study that was conducted that looked at occupancy and rental rates for commercial buildings, revealed that LEED and ENERGY STAR buildings command higher rental value, and hence lower vacancy rates and improved resale value, proving that consumers understand the value of green buildings. He added that on a greater scale, it has the ability to become an engine for economic regeneration. Green development practices provide an important basis for a stronger green economy where unnecessary spending-on energy, long commuter, waste disposal, producing new products when recycled or reused ones are just good, disaster relief from extreme weather events, and other problems caused by traditional development patterns - is reduced and resources are diverted and invest in education and new jobs, technologies, products and services that support new frontiers in sustainable development. Irrespective of the inherent risks of green building, several studies Lunstrum (2014), Cosbey (2011) have proven that in the long run, the benefits of building green far outweigh the risk and the sacrifice to be taken to ensure green success is worth it.

### **Research Methodology**

The study chose an exploratory and descriptive design because it will employ unbiased techniques to learn more about its origins and issues. Given that this paper collected and analysed numerical data, a quantitative technique is thought to be the most suitable. In this paper, a survey research approach was used to collect data using a questionnaire. The study was carried out in Abuja, the capital of the Federal Republic of Nigeria, where housing construction is continuing to keep up with the country's rapid population increase. Real estate developers, including both private and public developers, are the study's target respondents. Krejcie and Morgan's (1970) table for calculating sample size was employed to establish the sample size for this study. Since there are (60) active registered Estate Development Companies in this study's population.

### **Finding and Discussion**

A descriptive statistics measured the nature of green building development. The results in Table 1 showed the mean and standard deviation.

Table 1: Nature of green building development

SN	Nature of green building development	Mean	Std. Deviation	Ranking
1	Economic reward	4.8246	.71020	1
2	Compliance with legislation	4.8070	.74255	2
3	Ability to command good resell value	4.8070	.78918	3
4	Financial payback value	4.8070	.71810	4
5	Building cost	4.7719	.73235	5



6	Government level of commitment to green building	4.6842	.80529	6
7	Level of health safety risk	4.6786	.83355	7
8	Availability of demand	4.5789	.84404	8
9	Level of environmental friendliness	4.4561	.96492	9
10	Ease of information and database	4.4035	.82071	10
11	Strategy to promote green building	4.3333	.87287	11
12	Ease of operation of building facilities	4.3333	.78680	12

Table 1 showed the nature of green building development in Abuja. The result showed that the level of economic reward, compliance with legislation, ability to command good resell value and financial payback value, with their mean values of ( $M= 4.8246$ , std. deviation =  $0.71020$ ), ( $M= 4.8070$ , std. deviation =  $0.74255$ ), ( $M= 4.8070$ , std. deviation =  $0.78918$ ) and ( $M= 4.8070$ , std. deviation =  $0.71810$ ) were ranked from 1<sup>st</sup> to 4<sup>th</sup> respectively. The least level of green building development are ease of strategy to promote green building and ease of operation of building facilities with mean values of ( $M= 4.3333$ , std. deviation =  $0.87287$ ) and ( $M= 4.3333$ , std. deviation =  $0.78680$ ) ranked from 11<sup>th</sup> to 12<sup>th</sup> respectively. Therefore, the result is not agreed with that of Huang, Bai, Wang, Du, Shao and Li (2018) whose results show that government supervision, incremental cost, property management experience, and the awareness of environmental protection in green buildings are the critical influencing factors in promoting green building development. However, some factors related to contractors, designers and suppliers are not as important as perceived.

### Conclusion

The paper concluded that the major natures of green building investment in the study area were level of economic reward, compliance with legislation, and ability to command good resell value and financial payback value, then the least level of green building development were strategy to promote green building and ease of operation of building facilities. The paper recommended that the government should put in place a policies that can add the interest of the developers and users to sustain the current trend and interest in the development of green buildings. It is also recommended that the property developers should be considered the absence of indoor air pollutants and the availability of appropriate internal circulation as factors influencing green building investment. The study also contributes to knowledge by identifying the major nature of green building development in Abuja.

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