GREEN BUILDING AND SUSTAINABILITY: PROSPECTS AND CHALLENGES

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Several growing countries like Nigeria are being challenged with an incremental rate of housing accommodation go along with great power, water, as well as material consumptions etc., which resulted from population increase, households as well as rise in urbanization. The industries that basically construction oriented are equally guilty because some of their activities have negatively affected the environment habited by human. Notwithstanding all these evident challenges, green building as well as sustainable practices are sluggishly embraced, and the rate of practiced in the Nigeria's construction industries is low. This is irritating and is as a result of some notable factors. It is against this that this paper seeks to highlight the potentials of going green in building construction. It also has in comparison the major dissimilarities between orthodox and green construction project with other countries. This is done using journal and articles that are relevant to the topic. It also noted common challenges that are encountered in managing green building construction, their effect on performances of project, and make credible recommendations that will improve the strengths from adopting green construction projects in Nigeria.
Keywords: Green Building, Environment, Sustainability.

INTRODUCTION

In the world over, changes in climate as well as energy security have been two major thought-provoking issues. With complementing attentiveness of the current problems of the world, sustainability in construction is progressively receiving globally attention. Green building has the capacity of saving the use in energy from 24% to 50%, emission of CO_2 33% up to 39%, use in water at 40% as well as solid waste up to 70% [Turner and Frankel, 2008]. Erecting green building is among the procedures to lessen considerable impacts of the performance of building towards the environment, the economy and the society. If a building has met the provisions in Green Building Index (GBI), it is considered green. This entails that the building should be both efficient in energy and water, has an improvement in the indoor environmental excellence , has sustainable site planning as well as the management, alongside green material as well as resources selection [GBI, 2015]. Regardless of its numerous definitions, a green building basically means a building that is efficient in both energy as well as resources, and has slight effect to the environment. The knowledge, mindfulness and practicing green building construction Nigeria is

not yet given satisfactory consideration. Well-informed project managers' bump into obstructions in executing at large such green projects. Thus, the work is to further showcase the great value of going green in construction, has in comparison the main dissimilarities between conventional and green construction projects, identify some common challenges that are met in managing green building construction, their influence on project performances and to propose credible recommendations that will improve the strengths from adopting green construction projects in Nigeria..

Green Building

Green building is a term that has often been used in togetherness with such term as sustainable building, and as a result the former has occasionally been agreed as a sub-part of the latter. The definition of green building is seen as (1) having an increase in the efficiency on how buildings as well as their sites make use of energy and water as well as materials, and (2) building impact reduction on the health of human being and also the environment, via healthier siting, its design and construction, operating it, maintaining it, and its removal, that is the total life cycle of the building. On the other hand, green building is seen as a practice of structure forming and the application of processes that are responsible to the environment and also resource-efficient all through a building's life-cycle starting from siting it to design it, as well as its construction, its operation, its maintenance, its renovation as well as its deconstruction. This is a practice which actually increases as well as balances the conventional design in building as it concerns the economy, the utility, the durability, and also the comfort.

Moreover, the origin of construction which is sustainable is Green building (GB). This denotes an erection that is efficient in the utilization of resources in relations to being economical, convenience, permanence, and comfortable (U. S. Green Building Council,2012; Environmental Protection Agency ,EPA, 2012); Green buildings are environmentally sensitive, reduction in the of Resources as well as energy utilization, Effect on people, impact on Finance, as well as global (Greg ,2003); Green Buildings are friendly to the environment as is applies to the energy utilization, water usage, as well as the storm-water and the re-use of wastewater (Zane, 2009); the efficiency in water systems and energy is combined in Green Buildings, the strategies in Day Lighting, the systems of Indoor Environmental Quality (IEQ) and well-organized Building Enveloping system towards providing comfort and also providing confident impact to the residents and to environment (Salisu, 2012). Constructional Sustainability entails touring the route practices that are suitable in relation to materials choice, their origins, methods of construction, as well as

the philosophical design with the aim of performance improvement, reduction in the burden to the environment by the project, reduce waste and also be eco- friendly (Abolore, 2013). It improves to the environment against undesirable effect of the activities of constructional (Dahiru, Bala & Abdul'Azeez ,2013); a perfect health response, economical and challenges to the environmental (Karolides, 2002); make the most of the resource reserves, safeguard the environment, lessen pollution, offer people big efficient space that is comfortable, healthy, and harmoniously exist with the nature" (MOC, 2006; LI & CURRIE, 2011; Yujun, 2012). There is no exact definition for "green building", or "sustainable building", however, there is frequent use of those terms. (Berardi, 2013). This has really shown clearly that green building major responses is to make sure that globally there is sustainable environment in industrial construction. Developed countries like, USA, Germany, China, United Kingdom, Korea, Japan, etc., however, have adopted fully green building concept; whereas other countries are making it a significant feature for integration with buildings; while other countries, as a result of reasons, are sluggish in adopting the concept.

Prospects and Challenges

Green building Construction involves adapting a building and its site to suite the local climate, the site conditions, the cultural as well as the community so as to lessen consumption of resource, supplement the supply of resource, and have the quality of life boosted and diversify, while at the same time enhancing all of them in an unified design (Dahiru, Bala & Abdul'Azeez ,2013);. In the other hand, it is a method of total superiority management to building in other to make sure that the design which is as a result of synergy is achieved over and done with teamwork of interdisciplinary origination (Dahiru, Bala & Abdul'Azeez, 2013); it is not an assemble of the components of the environmental , and not also a modification of a fragmentary of a previously designed building that is standard, but instead, is a kind of philosophy in building features that are natural and efficient in resources are integrated in a building (Karolides, 2002). To accomplish concerted effort in Green Building, all the planning, design, and construction professionals involved in the building must actually be involved earlier enough (at the stage of design), for professional contribution of the Green Building design from the commencement to carry out the analysis of the Site as well as Environmental Impact Assessments etc. (Dahiru, Bala & Abdul'Azeez ,2013). Every single project or whatever development originates with its exclusive profits, trials as well as certain factors that make its success to be hindered; In Nigeria the development of Green Building is not an omission. "In other to be sustainable, buildings ought to have useful long life span for generations. This entails

having some knowledge of the climate in the future and the available resource for the operational maintenance, particularly the energy utilization, of the buildings" (Byrd & Leardini, 2011). The practice has lasted for about two to three decades, though with the data about the costs being insufficient and nonexistence of the performance data of the building that is measured from presently functioning buildings with sustainable designed (Building Design and Construction (BD&C), editors, 2003; ENSAR Group ,2003; Carmona , Isabel & Tadj, 2004). The professionals in industries, in the field of design as well as construction, are by and large sluggish to adjustment, have a tendency to being risk-adverse, deficiency in comprehensive knowledge, know-how, and knowledge of eco-friendly applications to design and construction; besides, the benefit of the environment or the economy of several approaches of green building scientifically has not been quantified (Zhiyong, 2013). Lisa and Morris (2004); harangued that the regularly asked question about sustainable design is: what is the cost of "green"? Which typically seeks to know whether is expensive or not. This brings about the question: much more than what? Is it more expensive in comparing with other buildings? Is it more expensive than the funds available? Or is it going to cost more without the features of sustainable design? Due to deficiency of solid data, to get answers to those questions have been therefore far-off indescribable. (Hankinson & Breytenbach, 2012). According to Morris (2007), in his argument is that increase in the initial cost is the most shared reason mentioned in studies for not integrating green elements in building, (Lisa & Morris (2004). Whereas the report of Davis Langdon in 2007 specified that "there is no particular answer that fits to all the question of the green cost" (Peter 2007). Nevertheless, the thankfulness of the importance of issues that are non-technical has developed, offering recognition to the concern of Economic and Social sustainability and Cultural inheritance of the Green Building as being important equally as well as make available additional challenges (Abolore, 2013). In Abuja FCT, Nigeria, various housing estates developments do not reveal the favorite housing requirements of the final users, the developers' and or the clients' absence of all-inclusive data for about all the financial requirements with respects to combining the features of green into revamp or projected projects with influence on the entire cost of development which thereabout has effects on final users / the occupants inform of the value of the Rental , the Sales value, Envisioned savings owing to green components, the asset value of the green building in the future etc. (Salisu , Hadiza & Jamilu (2016)]. Interest mismatch between stakeholders initiated constructional conflicts and disputes (Fenn, Lowe & Speck, 1997). During the cause of preparing green specifications, its constructions and the later maintenance, it is very important to have combined efforts of several

stakeholders interest (Berke, 2002). The design and construction of green building projects is recent in Nigeria and the problem of inadequacy in the perception shared and the objectives agreement as well as success and or failure of the green building projects by stakeholders is the problem the green building is characterized of (Salisu & Hassan 2016); also Dissimilar Criteria set for success and or failure for the project (Kumo, 2012) etc. Thus every single stakeholder remarks the accomplishment with respect to a grading of proportions, which is in compliance with their individual agenda. Sustainability was initially emphasized on issues of Technical origin including the materials, the components of the building, method of construction and design which is energy related (U. S. Green Building Council, 2012; Environmental Protection Agency, EPA, 2012). The progress of Sustainability in world is depending on relentless Economical, Societal, Traditional, and Technological advancement (Shelbourn, Bouchlaghem, Anumba, Carillo, Khalfan, & Glass, 2006). These four key factors which are basically on Economical, Societal, Traditional and Technical factor, each and every one of them is discovered to significantly have influence towards embracing the technology in Green Building (Nuruddeen & Usman 2015). The overall public awareness of green building will formulate the power driven by the market for its developments with reference to urban area. Yet, the technical hitches include: Nonexistence of rudimentary data for Green Building evaluation system usage, Lack of professionals, real estate developers' absence of interest and the problem of associated with agreeing on a combined valuation standards of green building etc. (Qian, 2008). Building materials are indispensable to the construction industry, nothing like conception of any engineering field if they are not in use (Akanni, 2006; Udosen, & Akanni, 2010). Building material cost is a great challenge to construction industry and individuals aiming at owning houses (Anosike, 2009; Mekson, 2008; Mohammed, 2008; Njoku, 2007). In Nigeria's housing efforts, the obstruction perceived was centered on the expensive nature of imported constructional materials (National Housing Policy 1991; Iwuagwu, & Eme-anele 2012; Oloruntoba & Ayodele, 2013). A UNCHS (1993) report discovered that building materials are the most indispensable input in developmental project; with Green Buildings, almost of the material constituents are locally not produced and or manufactured here in Nigeria e.g. Solar energy panels, Switchable varnishing, appliances that conserve water as well as grey systems for water etc. (Ibn-Homaid, 2002; United Nations Centre for Human Settlement, 1993).

STRENGHT FROM ADOPTING GREEN BUILDING

There is enormous environmental influence of buildings. In conventional buildings, huge quantity of land, energy, raw materials and water, are used for their operation and

construction. They emit enormous greenhouse gas (GHG) as well as other air pollutants that are harmful. They give rise to huge amounts of waste from construction and demolition as well as affects negatively plants and wildlife. The scope of the problem is being demonstrated by these issues analysis.

Buildings' Energy utilization: Globally, huge amounts of energy is consumed by buildings. According to the report of the United Nations Environment Programme, 30–40 percent of entire global energy produced primarily is utilized in buildings (U.N. Environment Programme, 2007). In 2008, the International Energy Agency publically declared according to their estimate that buildings in existence are accountable for consuming more than 40 percent of the globe's whole primary energy as well as 24 percent of CO2 emissions in the world (International Energy Agency, 2008)

Emissions of Greenhouse Gas and Pollution of Indoor Air

Certainly large amounts of energy is used by buildings, and as stated that the majority of these energy comes from fossil fuels burning, it is not astonishing that annually in United States, buildings are accountable for the emission of several millions of tons of Green House Gas. United States buildings, as estimated in 2006, released greenhouse gas in the tone of six hundred and thirty,[630] million metric tons, which on the approximate equivalent to the collective releases of the France, United Kingdom, and Japan (Annual Energy Outlook 2008). Buildings in U.S. except that of china emits more GHGs than any other global country (Kinzey, 2000). In the country's total emissions, on a percentage basis, GHGs accounts roughly 40 percent (U.S. Environmental Protection Agency, 2004). Regrettably, buildings emit other harmful pollutants apart from greenhouse gases. The level of Indoor air pollution may perhaps significantly surpass its level outdoor. Indoor air pollution is principally significant given that most of our time is spent indoors. Most of our time is spent indoors. The estimate of Environmental Protection Assessment on levels of indoor pollution is likely to be higher by two to five times , and intermittently higher by more than 100 times , than the level of outdoor air pollution (Baum, 2007) . The sources of this pollution is several. Replacing frequently the indoor air by outdoor air is of course a single way to lessen the occurrence of these toxins and ensuring that there is proper filtration for this outdoor air. Regrettably, there is often poor ventilation of buildings and as such there is insufficient filtration of recirculated air, bringing about air that is harmful potentially to the health of the building occupants. According to estimates, the cost annually of sickness relating to building is $58 billion. A main green buildings consideration is the health as well as the comfort of the people occupying them. Several buildings that are old suffer usually from what is stated as "sick building syndrome." According to the Environmental Protection Agency, EPA, "sick building syndrome" is a situations

in which acute health and comfort effects that appear to be linked to time spent in a building is experienced by people living in the building, but specifically no identifiable illness or its cause (Indoor Air Facts No. 4 Revised, 2008) Sick building syndrome is caused typically by inadequacy in ventilation, Indoor and Outdoor chemical contaminants sources, and also contaminants that are biological as the mold. The initial step in abolishing sick building syndrome causes is cautiously selecting the building materials. Volatile organic compounds (VOCs) that have zero or level that is low which are harmful to humans and have the ability of vaporizing at room temperature in a process called "off-gassing" should be chosen for materials for construction and interior finish products.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, in Nigeria there is insufficient available approach to green building projects management. Anytime green building is to be constructed in Nigeria there must be an environment management program adoption which is centered to green building index, GBI, for construction of sustainable projects. Green Building Index requirements which includes the energy efficiency (EE), environment quality of indoor (EQ), materials and resources (MR), Site planning and management (SM) that are sustainable, water efficiency (WE) and innovation (IN) must as well be met . The challenges as well solutions faced when managing green building was examined by this work, and it is discovered that there is interrelationship among the challenges. Generally, absence of government involvement in green building projects fetches up public limitations where green buildings benefits lack adequate presentation. Therefore, there should be public education on the benefits of erecting green building and its part in environmental sustainability towards creating an environment that is good even for the future. Besides, is equally of great important to have stakeholders educated towards enhancing their interest as well as their participation in the projects of green building construction. In the same vein, consultants show very important role in opining that in projects of green building there should be return of investment due to the fact that project managers are prevented from adopting green practices because of high capital cost. Establishing R&D to educate the public on the advantages of going green and proffering solutions to green building problems in Nigeria, by making it compulsory that GBI must be adhered to by new and existing building is believed as the best answer to ensuring the construction of green buildings. Initiatives also need to be provided by the government with a view of offsetting the green building projects cost that is on the high side for the development of the country, and increase the level of knowledge and awareness by demonstrating green buildings benefits.

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