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Perception of Professionals in Built Environment Regarding Awareness of Sustainable Development in Nigeria

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***Abstract*:** The built-environment is a major consumer of non-renewable resources, producer of substantial waste, and a formidable polluter of air and water. The limited supply of natural resources is causing increased prices, depletion of the reserves, and destruction of natural environment. Building sector in Nigeria consumes 60% of the total energy utilization in the country and the resources are not efficiently utilized. The goal of the study was to examine the perception of building owners and built environment professionals (architects, engineers and facility managers) regarding awareness of sustainable development issues, policies and constraints to sustainable development. The sample consisted of 80 respondents randomly selected building owners, architects, engineers and facility managers in Abuja, Nigeria. Descriptive statistics was used to analyze the data. Findings revealed that majority of those surveyed are aware of and highly involved in sustainable development efforts. The study also revealed that governmental implementation of environmental laws and government policies are not successful. Inferences were made to improve awareness education through creation of guideline for improving awareness, advocacy and enlightenment programmes, and by empowering regulatory agencies to enforce and strengthen existing regulations.

***Keywords*:** Awareness, constraints, green building, intelligent building, sustainable development.

1. Introduction

Serious concerns have been expressed about environmental degradation since the occurrence of energy crisis in the early 1970s (Kalogirou, 2004). The built-environment, comprising of buildings, civil and heavy engineering works, has also been identified as a major consumer of non-renewable resources, producer of substantial waste,

and a contributor to land and air dereliction (Wallbaum and Buerkin, 2003). According to Woolley (2000), the construction industry is the largest destroyer of the natural environment, and buildings are the major contributor to greenhouse gas (GHG) emissions such as carbon dioxide (CO_2), suphur-dioxide (SO_2), nitrogen oxides (NO_2) particulates and carbon monoxide (CO) (Horvath, 2004; Hudson, 2005; Aganga 2010). Sev (2001) stated that all building operations involve the use, redistribution and concentration of some elements of the earth's resources such as water, energy and materials. It is estimated that at least three billion tonnes of materials are used in buildings every year, which is equal to about 40% of total global material flows.

The primary goal of sustainability is to reduce humanity's environmental or ecological footprint on the planet by reducing the negative impact of buildings on the environment and enhancing efficiency through the use of strategies, techniques, materials, and practices that are clean, resource efficient, and less pollution producing from the point of extraction of raw materials to the demolition and disposal of the built products. A Green building is a structure designed to meet certain life cycle based objectives, so that the building can be designed, built, renovated, operated, or reused in an ecological and resource efficient manner. Most green building practices fall into five basic categories: 1.) energy saving by relying on the use of natural light and ventilation or solar power, 2.) land saving, 3.) storm water runoff-reducing rainwater harvesting system, 4.) material conservation during construction is reduced or recycled, and 5.) pollution reduction (ECO Northwest, 2001; Gyadu-Asiedu, Scheublin, and Van Egmond, 2013).

There are several certification systems for green buildings such as LEED (Leadership in Energy and Environmental Design) and HK-BEAM (Hong Kong Building Environmental Assessment Method) (Paumgartten, 2003). According to Yin, (2005), the benefits of buildings constructed according to the standards demanded by the certification system such as LEED can save the equivalent of 250% of their initial costs over their useful lives of approximately 40 years through a 50% reduction in water consumption, average reduction of 9% in operating cost over the useful life of the building (in relation to water and energy), improved quality of internal environment (such as the increase in luminosity and reduction in air conditioning use), as well as average appreciation of 15% in the resale price of such properties (Green Building Council Brazil, 2012).

Nigeria as a country depends largely on crude oil and electricity for its energy supply. Nigeria's housing stock and the demand for energy for domestic uses is rising rapidly due to population growth and urbanization. The country has one of the highest annual urbanization rates in the world, estimated at about 3.7% and demand for new urban houses is growing rapidly (Babanyara & Saleh, 2010; Parnell & Walawege, 2011). The country is faced with environmental degradation, escalating cost of energy, erratic supply and distribution of electricity, and the need to develop a sustainable and efficient energy system. According to a survey in Nigeria, 60% of the total energy utilization is consumed by the building sector and 40% of these amounts are spent for hot

water production and space cooling (Sambo, 2009). In recent years, research shows that sustainability awareness level in the construction industry is still very low and ineffective in Nigeria (Adebayo, 2002; Dahiru, 2005; Dania, 2007; Kennedy, Smith and Wanek, 2002).

The goal of the study was to examine perception of professionals in the built environment regarding sustainable development issues, government policies and constraints limiting their involvement in sustainable development. The five research questions for the study are as follows: 1.) What is the current state of the art practice in the field of awareness for sustainable development around the world? 2.) What is the level of stakeholders' awareness regarding sustainability development issues in Abuja, Nigeria? 3.) How important, feasible, affordable and sustainable is green building development in Nigeria? 4.) What are the constraints limiting participation in sustainability practice in Nigeria? and 5.) What are the cultural specifics of Nigeria that will allow transferring the results to other countries and areas of the world?

2. Literature Review

Several studies identified the barriers to the adaptation or failure of green buildings. For example, Richardson and Lynes (2007) conducted a study on the Canadian context and identified lack of internal leadership between the interested parties, lack of goals that aims at sustainability, lack of recognition for environmentally more sustainable projects and the lack of communication between designers and top management as the four main barriers for the implementation of green building initiatives. Ikediashi et al. (2012) discovered that the main barriers to sustainable facilities management / green building in Nigeria include lack of training and tools, lack of relevant laws and regulation, and lack of awareness. Samari et al. (2013) surveyed 167 professionals in the Malaysian construction industry, to investigate barriers to green building in the country. They found that (a) the level of development of green buildings in Malaysia is not satisfactory, that the government plays a key role in the development of the green building sector; and (b) that the main barriers to green building development are lack of public/credit resources to cover the upfront cost, risk of investment, lack of demand, and higher final price for completed green building units. Bond (2011) used data from Australia and New Zealand in his investigation and found that the main barriers to adoption of green building practices in households are initial costs of sustainable features and lack of information about the benefits and savings of incorporating energy-efficient devices. Zuo and Zhao (2014) reviewed extensive literature on green buildings and found that: (a) green buildings help to improve urban biodiversity and protect the ecosystem by means of sustainable land use; (b) cost savings are associated with improved green building performance, such as energy savings; and (c) green buildings improve human well-being, such as thermal comfort and health.

3. Conceptual Framework for Sustainable Development

There is no universally acceptable definition of sustainable development (SD), virtually all definitions conceive of the term in terms of a tension between the goals of economic

development and environmental protection (Geisinger, 1999). According to WCED (1987, p. 308) ‘‘human survival and well-being could depend on success in elevating sustainable development to a global ethics’’. Jabareen (2008) claimed that critical review of the multidisciplinary literature on sustainable development revealed a lack of a comprehensive theoretical framework for understanding sustainable development and its complexities, that the definitions of sustainable development are vague; that there is a lack of operational definitions and disagreement over what should be sustained; the concept is unclear in terms of emotional commitment; and it “remains a confused topic”, “fraught with contradictions”.

The conceptual framework for this study is based on the analysis of seven identified distinct concepts, which composed the theoretical world of sustainability. These concepts are: a.) The concept of ethical paradox, b.) The concept of natural capital stock, c.) the concept of equity, d.) the concept of eco-form, e.) the concept of integrative management, f.) the concept of utopianism, and g.) the concept of political global agenda.

3a. The Concept of Ethical Paradox: Many scholars question the ethics behind the concept and argued that “sustainability is an empty term”, because the current model of development destroys nature’s wealth and hence is non-sustainable. (Geisinger, 1999; Jabareen, 2008). For example, Jabareen (2008) claimed that the paradoxical and dialectical relations between sustainability and development are related to a varied spectrum of ideologies, which ranges between two extreme ethical concepts: the ‘domination of nature’ and the ‘intrinsic right of nature.’ The former is represented by doctrines of ‘light ecology’ and the latter by doctrines of ‘deep ecology’. Between these concepts lie many approaches, which attempt to reconcile this paradox and to address the dialectical relations between development and sustainability. As a result, many approaches were developed around ethical concerns because the issues of values, rights and responsibilities were raised.

The term sustainability belongs originally to the field of ecology, referring to an ecosystem’s potential for subsisting over time, with almost no alteration. When the idea of development was added, the concept could no longer be looked at from the point of view of the environment alone, but from that of society (Reboratti, 1999, pp. 207–209) and the capital economy. This paradox is represented in the most frequently used definition of SD: that of Brundtland Report 1987), which deemphasizes the environment while underlining human needs to be realized through development. Accordingly, sustainability is seen as an environmental ‘logo’ and development as an economic one. The concept of SD aims to mitigate and moderate between the two. Sachs (1993) argued that SD has attracted such a large following because it seems to hold out the promise of bringing about a rapprochement between ecological (sustainability) and economic (development) interests. SD is accordingly deemed able to cope with the ecological crisis without affecting the existing economic relationships of power. Capitalism and ecology are no longer contradictory when brought together under the banner of SD (Baeten, 2000). The ‘limits to growth’

have become negotiable and manageable. The concept of SD is also articulated as a discourse of ethics, which specifies human conduct with regard to good and evil (Acselrad, 1999, p. 54).

3b. The Concept of Natural Capital Stock: The concept of natural capital stock represents the natural material assets of development. The term'natural capital stock' as the stock of all environmental and natural resource assets, from oil in the ground to the quality of soil and groundwater, from the stock of fish in the ocean to the capacity of the globe to recycle and absorb carbon. Natural capital includes all natural assets: humans can modify it, and humans can enhance its reproduction, but it cannot be created by humans. Natural capital stock is usually divided into three categories: non-renewable resources, such as mineral resources; the finite capacity of the natural system to produce 'renewable resources' such as food crops and water supplies; and the capacity of natural systems to absorb the emissions and pollutants which arise from human actions without suffering from side effects which imply heavy costs to be passed onto future generations

3c. The Concept of Equity: The most frequently quoted definition of SD—which comes from WCED (1987), emphasizes the equity issue between generations. The UNDP's definition of 'sustainable human development' is also broad in that it encompasses values such as equity, freedom and participation. The United Nations Conference on Environment and Development which convened in Rio de Janeiro, reaffirmed the decisions of the UN Declaration on the Environment from Stockholm 1972, and sought to build upon it with the goal of establishing a new and equitable global partnership and new joint international initiatives among states, key sectors of societies and people recognizing the integral and interdependent nature of the Earth. The Declaration states that all people should have equal rights to development. There are two types of equity according to the literature on sustainability: Inter-generational and intra-generational. Inter-generational equity refers to the fairness in allocation of resources between current and future generations.

3d. The Concept of Eco-form: This concept represents the ecologically desired form and design of the human habitat such as urban spaces, buildings, houses, and communities. A key strand of research into sustainability strategies has focused on ecological design and on defining the urban forms that enable built environments and buildings to function in more sustainable ways than at present. The debate over the ideal or desired urban form dates back to the end of the nineteenth century, since the appearance of Howard's Garden City. It appears that the literature on sustainable development revives the previous debate about urban form, supports existing approaches, and enhances them with environmental rationalization.

One of the predominant views among scholars, planners and policy makers is that 'energy efficiency' is a major consideration in design at the building, community, city and regional levels, considering the issue of global warming and GHG emissions. One of the most important contributions of the global discourse on sustainability is the rise of an international movement for sustainable habitats, which is working to create a new agenda for re-designing and managing habitats in order to

achieve sustainability, since it is viewed that environmental problems also result from a city's design.

3e. The Concept of Integrative Management: This concept represents SD's integrative view of aspects of social development, economic growth and environmental protection. Integrating social, economic and environmental concerns in planning and management for sustainable development has received considerable attention in recent years (UN Habitat Report, 2009; WCED, 1987)). It is believed that in order to achieve sustainability and ecological integrity, i.e. to preserve the natural capital stock, we need integrative and holistic management approaches.

WCED (1987) challenged the prevailing view that economic objectives, such as poverty alleviation and economic growth, should take precedence over environmental concerns, arguing instead that environmental health is a pre-condition of social and economic success. From a policy perspective, the concept of integrative management draws attention to the importance of maintaining a safe minimum standard for all living and non-living assets necessary to maintain ecosystem functions and life support systems, along with at least representative forms of all other living natural assets.

Four broad areas of work were identified: 1.) integrating environmental concerns and development at the policy planning and management levels; 2.) providing an effective legal and regulatory framework; 3.) making effective use of economic instruments and market and other incentives; and 4.) establishing systems for integrated environmental and economic accounting. It argued that an adjustment or even a fundamental reshaping of decision-making may be necessary in order to put the environment and development at the centre of economic and political decision-making. The integrative approach for achieving sustainability, according to Agenda 21, seeks to bring together all stakeholders. It argues that the responsibility for bringing about changes lies with governments in partnership with the private sector and local authorities, and in collaboration with national, regional and international organizations. In addition, national plans, goals and objectives, national rules, regulations and law, and the specific situations in which different countries are placed are the overall framework in which such integration takes place.

3f. The Concept of Utopianism: The utopian concept envisages human habitats (community, city, region and the globe) based generally on the concept of sustainable development. Commonly, utopias related to SD imagine a perfect society, where justice prevails, people are perfectly content, people live and flourish in harmony with nature, and life moves along smoothly, without abuses or shortages. The power of utopian thinking, properly conceived as a vision of a new society that questions all the presuppositions of present-day society, is its inherent ability to see the future in terms of radically new forms and values.

3g. The Concept of Political Global Agenda: This concept represents a new global discourse that has been reconstructed and inspired by the ideas of 'sustainable development'. Until the 1980s, Western environmentalists were usually concerned with local and national space (Sachs, 1999, p. 42). However, since the early 1990s, SD has

become the central adage of environmental policies around the globe, and the environmental discourse has been globalized and transcended national boundaries.

The Rio Summit in 1992 was a significant milestone that sets a new global agenda for SD, and reconstructed a new global environmental discourse. Since the Rio Summit, sustainability has increasingly been conceived of as a challenge for global management, with intelligent, scientific, and instrumental management of the earth perceived as one of the great challenges facing humanity. Notwithstanding the enthusiasm of the Rio spirit, the World Summit on Sustainable Development (WSSD) in Johannesburg (2002) reflected deep disputes between Northern and Southern countries.

3h. Discussion: the theoretical framework of sustainable development: The conceptual analysis identifies seven concepts which together synthesize and assemble the theoretical framework of 'sustainable development'. Each concept represents distinctive meanings and aspects of the theoretical foundations of sustainability. In addition, they have interwoven relations as shown in Figure 1. The concept of ethical paradox rests at the heart of this framework. The paradox between 'sustainability' and 'development' is articulated in terms of ethics. In other words, the epistemological foundation of the theoretical framework of sustainable development is based on the unresolved and fluid paradox of sustainability, which as such can simultaneously inhabit different and contradictory environmental ideologies and practices. Consequently, SD tolerates diverse interpretations and practices that range between 'light ecology', which allows intensive interventions, and 'deep ecology', which allows minor interventions in nature.

The concept of natural capital represents the environmental and natural resource assets of development and preservation. The theoretical framework of sustainability advocates keeping the natural capital constant for the benefit of future generations. The concept of equity represents the social aspects of SD. It encompasses different concepts such as environmental, social and economic justice, social equity, quality of life, freedom, democracy, participation and empowerment. Broadly, sustainability is seen as a matter of distributional equity, about sharing the capacity for well-being between current and future generations of people. Global Agenda Utopia Integrative Management Eco-Form Natural Capital Stock Ethical Paradox Figure 1. The concept of eco-form represents the desired spatial form of human habitats: cities, villages and neighborhood. 'Sustainable' design aims to create eco-forms, which are energy efficient and designed for long life. Its common principles could be explained through the concept of 'time-space-energy compression', which requires reductions in time and space in order to reduce energy usage. The concept of integrative management represents the integrative and holistic view of the aspects of social development, economic growth and environmental protection. It is believed that in order to achieve ecological integrity, i.e. to preserve the natural capital stock, we need integrative and holistic approaches to management.

Figure 1: The three ring design breaks up sustainability (Brundtland, G.H., ed., 1987)

The concept political global agenda represents a new worldwide political environmental discourse reconstituted around the ideas of sustainability. Since the Rio Summit, this discourse has extended beyond purely ecological concepts to include various international issues, such as security, peace, trade, heritage, hunger, shelter, and other basic services. However, the concept reflects deep political disputes between Northern and Southern countries, where the North demands 'no development without sustainability' and the South demands 'no sustainability without development'.

The concept of utopianism represents visions for the human habitats based on SD. Generally, such utopias envision a perfect society in which justice prevails, the people are perfectly content, the people live and flourish in harmony with nature, and life moves along smoothly, without abuses or shortages. This utopia transcends the primary ecological concerns of sustainability to incorporate politcal and social concepts such as solidarity, spirituality, and the equal allocation of resources.

The environmental aspect of sustainability involves taking care of our surroundings. This includes everything from picking up litter and reducing pollution to wildlife and rainforest conservation. This is the only planet we have, so we'd better take care of it. The social aspect of sustainability involves taking care of We should all aspire to treat ourselves and each other with fairness and respect. We don't have to like everyone we meet, but we all have to share the planet. The economic aspect of sustainability involves taking care of today's world. We need to live responsibly and within our means so that we aren't a burden on others. This is as true for you and me as it is for cities, states and countries around the world. No one can prepare for every situation, but we can still do our best to make sure we can support ourselves.

The interaction between environmental and social aspects of sustainability deals with how we interact with our environment. This can include how we plan and design our homes and cities, and how we take care of the resources we have available to us. We also have to

contend with the natural patterns of nature and how they can affect us.

The environmental and economic interactions focus on how the environment affects economics. Environmentally friendly products are becoming more common, making it easier to purchase goods with less packaging, cleaners that are less hazardous to us and our environment and foods can be grown in ways that are better for the environment. However, fossil fuels are becoming harder to come by, and the cost to purchase refined fuels will become more expensive as time goes on. Companies are looking for ways of harnessing renewable sources of energy and in time, these will become more common and less expensive. We need to develop ways to maintain positive economic development that can support itself without negatively impacting the environment.

The overlap between social and economic aspects deals with fair and equitable treatment of people everywhere. Purchasing fair trade goods, where the growers receive a livable wage for selling their crops, is a way to give people in developing areas of the world a chance to earn a better life. Boycotting companies who have an unfavorable environmental track record can send strong message that can result in positive change. Supporting local businesses helps your friends and neighbours to keep money in your local economy. Likewise, some large companies work to protect the environment and support communities around the world with donations and social betterment programs while providing employment for people all over the country or even around the globe.

Sustainability is made up of all three aspects, environmental, social and economic interactions. Striving to buy nothing but organically grown fair trade goods is laudable, but if you can't afford to do so, it's not economically sustainable. Likewise, spending millions of dollars on wetland and wildlife conservation will benefit the species that live in these protected areas, but if we don't have any resources to feed our own people then we're not being socially sustainable.

4. Research Methodology

The procedure involved design of the survey instruments, validating the survey instruments, identifying the population for the study, selection of the samples, conducting pilot survey, conducting the survey, analysis of the collected data, and writing and disseminating the report.

The study population consisted of stakeholders which include property owners, investors, developers, architects, engineers and facility managers in Abuja, Nigeria. Simple random sampling was used to administer question on the built environment professionals. The sample size was calculated using a simplified formula proportion as illustrated by Glenn (2013) as follows:

$$n = \frac{N}{1 + N(e)^2} \quad (1)$$

Where; n = Sample size, N = Population size in the sample unit, and e = Level of precision which is + 5% (0.05), at 95% confidence level.

The primary data consists of information obtained through questionnaire survey and structured interview, and the secondary data include data from literature review on governmental implementation of

environmental laws and government policies, including published articles/journals and research papers, academics' textbooks and the World Wide Web (internet). The study utilized a simple questionnaire approach in which a total number of 80 questionnaires were randomly distributed to various facilities owners and professionals in built environment in Abuja, Nigeria. Out of 80 questionnaires distributed, 75 questionnaires were successfully completed and returned, and analyzed showing a 93.75% return rate. The questionnaire provided information on respondent's profile such as profession, years of experience and educational qualification, in order to ascertain the reliability of the information provided.

A five degree Likert-type scale was adopted and arbitrary values of 1-5 were assigned to each of the degree of agreement, awareness, involvement, or participation, respectively. The ranking method is a form of statistical scale where subjects are ranked according to some specified criterion or on operationally defined characteristics or property. The method is suitable for a number of measures, which is above six and less than thirty (Morenikeji, 2006).

Each mean score was calculated by multiplying the frequency by the assigned value and dividing the total by the number of respondents. For example, the mean score for question number 1 in Table 4 was calculated as follows:

$$\text{Mean score} = \frac{1x1 + 3x2 + 11x3 + 41x4 + 19x5}{1x2\ x3\ x4x\ 5} = \frac{299}{75} = 3.987$$

Mean scores between 1.00 – 1.49 is categorized as 1, mean scores between 1.50 – 2.49 is categorized as 2, mean scores between 2.50 – 3.49 is categorized as 3, mean scores between 3.50 - 4.49 is categorized as 4, and mean scores > or = 4.50 is categorized as 5. The 3.99 mean score for question 1 falls under category 5 and can be interpreted to mean that on the average the respondents indicated that they are somewhat aware. The presentation of data obtained was presented using appropriate charts, tables and figures.

Table 1: Field Work Response Rate

Description	Numbers	Percentage
Total target population (stakeholders)	80	100
Undelivered survey (questionnaire)	5	6.25
Delivered questionnaire (stakeholders)	75	93.75

5. Results

Table 1 presents summary of the fieldwork response rate. As shown, out of the 80 respondents that received the questionnaire, only 75 (93.75%) actually returned completed questionnaire and five questionnaires were discarded for incomplete responses. As a result, only 75 questionnaires were considered for data analysis.

Table 2: Respondent's Age

Age (years)	Frequency	Percentage
26-30	7	9.3
31-35	17	22.7
36-40	20	26.7
Above 40	31	41.3
Total	75	100.0

Table 3: Respondent's Profession

Profession	Frequency	Percentage
Property owner	3	4.0
Architect	21	28.0
Builder	12	16.0
Q/surveyor	10	13.3
C/ M and E Engineer	18	24.0
Planner/Surveyor	10	13.3
Others	1	1.3
Total	75	100.0

Table 2 depicts the respondent's age groups. As shown, majority of the respondents 51 (68%) were in the 36 - 40 group and above 40 years of age. However, out of this figure 31 (41.3%) were above 40 years of age.

Table 3 shows respondent's profession. As shown, 21 (28%) of the respondents were architects, 3 (4.0%) respondents were property owners, and only one respondent works outside the built environment profession.

Table 4 reveals the respondents' level of awareness of sustainable development (green construction). The respondents were asked whether they have heard about the concept of sustainable development or green construction. As shown, the mean score of 3.99 can be interpreted to mean that on the average the respondents indicated that they are somewhat aware of the concept of sustainability. In addition, 41 of the 75 respondents (54.7%) indicated that they are very aware of the concept, and only one (1) respondent indicated that he or she is not aware of the sustainability concept.

The respondents were also asked whether they are aware that professionals in other fields are conversant about sustainable development issues in Nigeria. The mean score of 3.28 can be interpreted to mean that on the average the respondents indicated that they are aware of the concept of sustainability. As shown, 29 respondents indicated

that they are aware, 35 claimed that they are very aware, and 9 respondents claimed that they are very much conversant about sustainable development issues in Nigeria.

Table 4: Respondent's involvement with other professionals in creating awareness

	Frequency (Percentage)					
	Not Involved	Somewhat Involve	Involved	Very Involved	Extensively	Mean Score
	1 (1.00 – 1.49)	2 (1.50 – 2.49)	3 (2.50 – 3.49)	4 (3.50 -4.49)	5 (> or = 4.50)	
1. Have you been involved with other professionals in creating awareness about sustainable design and construction?	0	2	17	45	11	3.87
2. Have you ever been involved in any sustainable development projects before?	6	17	28	19	5	3.87
3. What was your level of involvement in sustainable development projects?	7	18	30	20	5	3.17

N = 75

Table 5: Green Rating Systems

Rating Systems	Frequency	Percentage
LEED, USA	41	54.67%
CASBEE, Japan	6	8.00%
Green Globe, Canada	8	10.67%
Green Star, Australia	12	16.00%
HQE, France	8	100.0

The respondents were further asked whether they are aware of the existence of any sustainable development (green building) projects in Nigeria. The mean score of 3.04 can be interpreted to mean that on the average the respondents indicated that they are aware of the concept of sustainability. As shown, 54 of the 74 respondents claimed that they are either aware or very aware that sustainable development projects exist in Nigeria.

Table 6: Respondent's involvement with other professionals in creating awareness

	Frequency (Percentage)					
	Not Involved	Somewhat Involved	Involved	Very Involved	Extensively Involved	Mean Score
	1 (1.00 – 1.49)	2 (1.50 – 2.49)	3 (2.50 – 3.49)	4 (3.50 -4.49)	5 (> or = 4.50)	
1. Have you been involved with other professionals in creating awareness about sustainable design and construction?	0	2	17	5	11	3.87
2. Have you ever been involved in any sustainable development projects before?	6	17	28	19	5	3.87
3. What was your level of involvement in sustainable development projects?	7	18	30	20	5	3.17

N = 75

Table 7: Respondent's perception regarding the importance of sustainable Development to Nigeria

	Frequency (Percentage)					
	Not Important	Somewhat Important	Important	Very Important	Extremely Important	Mean Score
	1 (1.00 – 1.49)	2 (1.50 – 2.49)	3 (2.50 – 3.49)	4 (3.50 -4.49)	5 (> or = 4.50)	
1. How important is sustainable design and your profession?	0	2	16	34	23	4.04
2. How important is sustainable development to the construction	0	1	16	41	17	3.99
3. How important is sustainable design and construction to Nigerian economy?	0	3	12	35	23	4.09

N = 75

Table 5 illustrates the respondents' familiarity with green building rating scales and whether they would recommend it to Nigeria. As shown, majority of the respondents (41 out of 75) indicated they are familiar with LEED rating scale and would recommend this to Nigeria.

Table 8: Respondent's Perception Regarding Feasibility, Affordability and Sustainability of Green Development

	Frequency (Percentage)					
	Does not Agree	Somewhat Agree	Agree	Strongly Agree	Very much Agree	Mean Score
	1 (1.00 – 1.49)	2 (1.50 – 2.49)	3 (2.50 – 3.49)	4 (3.50 -4.49)	5 (> or = 4.50)	
1. Do you agree that sustainable development is feasible in Nigeria?	0	3	11	49	12	3.93
2. Do you believe that Nigerians can afford sustainable buildings?	0	0	11	43	21	4.13
3. Do you agree that you can encourage Nigerians to adopt green construction instead of conventional construction?	6	3	24	30	12	3.52
4. Do you agree that sustainable development is practicable in Nigeria, considering the present economic level and the shortage of decent and energy efficient homes?	3	14	40	15		3.81
5. Do you believe that the Construction of green building will improve the standard of living in the nation?	0	0	15	40	20	4.07
6. Do you agree that it is important to give considerable attention to sustainable development effort at this point in our nation's development?	0	0	9	39	27	4.24
7. Do you agree that there is an urgent need for sustainable development in Nigeria?	0	0	13	36	26	4.17

8.	Do you agree that sustainable design and construction can help provide a healthier environment for living?	0	1	7	29	38	4.45

N = 75

Table 6 presents the respondents' involvement with other professionals in creating awareness about sustainable development. The mean score of 3.87 can be interpreted to mean that on the average the respondents indicated that they are very involved about the concept of sustainability. As shown, 2 respondents are somewhat involved, 17 involved, 45 respondents claimed that they were very involved and 11 are very much involved. None of the respondents claimed to have not been involved with other professionals in creating awareness about sustainable development.

Table 7 reveals the respondents' perception regarding the importance of sustainable development to Nigeria. The mean score of 4.04 can be interpreted to mean that on the average the respondents indicated that the respondents perceive sustainable development as being extremely important. As shown, the majority of the respondents perceived sustainable development as important 16 (21.3%), very important 34 (45.3%), or extremely important 23 (30.7%) to their profession, the construction industry, and the Nigerian economy. None of the respondents perceived sustainable development as not important.

Table 8 reveals the respondents agree that design and construction of sustainable building is feasible in Nigeria. A mean value of 3.93 suggests that the respondents strongly belief in the concept of sustainable development. As shown, majority of the respondents agree that sustainable development feasible, affordable, and will improve the standard of living in the nation. For instance, when asked whether sustainable development is feasible in Nigeria, 3 (4.0%) claimed that they somewhat agree, 11 (14.7%) claimed that they agree, 49 (65.3%) claimed that they strongly agree, and 12 (16.0%) claimed that they very strongly agrees that sustainable development is feasible in Nigeria. None of the respondents claimed that they do not agree that sustainable development is feasible in Nigeria.

Table 8 also depicts the respondents claim in the affordability of sustainable development by Nigerians. A mean value of 4.13 suggests that the respondents strongly belief that sustainable development is affordable in Nigeria. The respondents neither claimed that they believe nor somewhat believe that sustainable development is affordable by Nigerians, but 11 (14.7%) of the respondents claimed that they believe, 43 (57.3%) claimed that they strongly believe, and 21 (28.0%) claimed that they very strongly believe that sustainable development is affordable by Nigerians.

6. Discussion

Discussion of Research Question Number One: Research question one addresses the current state of the art practice in the field of awareness for sustainable development. Lack of public awareness and lack of institutional

structures for the promotion of sustainable development and environmental issues has been identified as barriers to the adaptation or failure of Green buildings in Nigeria (Ikediashi et al., 2012). Table 6 presents the popular Green Building Rating Systems that are recognized worldwide. In addition, the literature revealed that there is no universally accepted rating system for sustainable development. Instead, each country adopted a system that are based on their cultural diversity, equity, justice, and participatory democracy, involving collaborative process between geographically and culturally diverse group of civil society organizations (CSOs) and researchers, to develop indicators that are critical for sustainable development in that specific region. In addition, it was not established whether the built environment professionals surveyed had any training or certification such as LEED or a University degree in sustainable development. It is reasonable to suggest that the Nigerian government and housing finance institutions are probably to blame for the non-involvement of Nigerians in sustainable development projects. Despite the existence of several environmental laws and policies, most Nigerian legislations crumble at the implementation stage (Ikediashi et al., 2012) probably due to lack of managerial skills.

Discussion of Research Question Number Two: Research question two addresses the level of stakeholder awareness regarding sustainable design and construction in Nigeria. As shown in Table 4, high level of awareness of green construction exists and the majority of the respondents also indicated that they are capable of advising Nigeria to adopt green construction instead of conventional building. This is probably because they are aware that green construction is healthy, requires minimum maintenance, has little impact on the environment and they make use of natural resources. Casual observation revealed that the majority of the existing so called green buildings are not up to standard because they are neither designed nor constructed using acceptable rating systems and materials, and the contractors are not certified to construct green buildings It is expected that the creation of awareness about the importance of green construction would probably increase the demand for sustainability developments.

Discussion of Research Question Number Three: Research question three addresses the importance, affordability and feasibility of green development in Nigeria. Table 7 reveals respondent's perception regarding the importance of sustainable development in Nigeria, and Table 8 reveals the respondents believe regarding feasibility, affordability and sustainability of Green development in Nigeria. As shown in Table 7, majority of the respondents 34 (45.3%) agrees that sustainable development is very important, and 23 (30.7%) agree they are extremely important. In addition, Table 8 also shows that majority of the respondents claimed that the adaptation of green development principles is both feasible and affordable. However, considering the current state of housing conditions in the country and the government housing policy respondents' claim that green housing (sustainable development) is affordable and practical in Nigerians seems to be unrealistic and over ambitious. In fact, this could be a wake-up call for a re-

defining of the concept of sustainability in the developing countries and recognition of sustainable local materials and practices rather than the continuous use of western standards. In addition, there are no guidelines for improving awareness, adaptation, and implementation of green building practices in Nigeria. This calls for a rethink among built environment professionals regarding the way we design, construct, and operate building, to match our current realities with anticipated future challenges. The current effort is focused on reducing the energy intensity of buildings through the use of insulating materials, low energy lighting and natural ventilation, and neither on non-renewable energy nor potentially hazardous toxic materials.

Discussion of Research Question Number Four: Research question four addresses the constraints limiting participation in sustainability practice in Nigeria. The review of the literature revealed that even though there are environmental laws and regulations in the country, these laws are not being enforced on a consistent basis probably because of changing regime. The Nigeria Government also promulgated various laws and regulations, to safeguard the Nigerian environment such as the Federal Environmental Protection Agency Act of 1988 (FEPA Act), and Environmental Impact Assessment Act of 1992 (EIA Act). Other critical barriers identified in the literature include lack of government support and incentives, and lack of relevant building codes and standards. At the moment, the government is yet to pass a 2006 Building codes and standards into law. In addition, the majority of the built environment professionals lack technical knowledge such as professional and scientific training on complexities of the construction and operation of intelligent buildings, lack of government support and incentives, and lack of relevant environmental laws and regulations are some of the critical barriers.

Discussion of Research Question Number Five: Research question five addresses the cultural specifics of Nigeria that will allow transferring the results to other countries and areas of the world. According to the literature, the principle of building life cycle is universal and countries have different cultures that influence their behaviour and choices. As a result, transfer of the results should be limited to areas with similar culture.

7. Conclusion and Recommendation

This paper investigated the awareness, involvement, perception, and agreement of the respondents regarding green building and sustainability issues. Data collected indicated strong levels of awareness existing within the built environment professionals. The study revealed that the provision of sustainable development is important to the Nigerian construction industry, that sustainable development will improve the standard of living, provide healthier environment for living, and should be encouraged in Nigeria. Finally, review of the literature revealed that technical knowledge such as professional and scientific training on complexities of the construction and operation of intelligent buildings, lack of government support and incentives, and lack of relevant environmental laws and regulations are some of the critical barriers to sustainable development. At the moment, the country needs to develop building codes, setting the minimum

design standards for health, safety and welfare of occupant, and the 2006 Building Code that is yet to pass into law could be updated and passed.

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