

Comparative Study of Environmental Sustainability in Building Construction in Nigeria and Malaysia

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Abstract

Sustainability creation and awareness depends on the understanding of the consequences of individual actions, quest for knowledge and absolute involvement and commitment to the principle. This research is significant in that it compared the perception of the building professionals/developers of sustainability in building construction industry in Nigeria and Malaysia. Structured questionnaire was used to elicit information from the professionals in the built industry on the awareness level of sustainability concept and its practicability in the construction industry. The study revealed that in a developing country like Nigeria, there is a low awareness level. The situation in Malaysia as at 2009 is that there was a moderate awareness level of sustainable construction. This was evident in a similar study carried out by Nazirah Zanol Abidin in 2009 and published in a journal of World Academy of Science, Engineering and Technology. Another area of enquiry was the social, economic and environmental features that constitute the triple bottom line of sustainability. The response evidenced that building professionals define sustainability more in terms of effective protection of the environment other than inclusion of both economic and social features. The professionals in the building industry, developers, Investors, property occupiers, Government and Non-Government Organizations have been identified as major stakeholders, drivers and promoters towards boosting and strategizing for a sustainable built environment. The study recommended that to improve the understanding and awareness of sustainability concept, a lot has to be done in the area of educating the construction players through conferences, seminars, training, and workshops. A virile consultation and collaboration between the academicians and the practitioners is also canvassed. Similar responses and recommendations were also observed in Malaysia study earlier carried out.

Keywords: sustainability, sustainable construction, developers, Nigerian construction industry.

INTRODUCTION

Public awareness in recent times of natural resources and its compelling and conflicting use has fuelled the sustainable development as an important concept in the decision making process even beyond the construction industry. It has been gaining increasing popularity across various sectors since the Brundtland Commission Report in 1987. However, despite an overall increase in consciousness and efforts to pursue sustainability, the general scenario appears to be one of increasing commitment by a small group of supporters, rather than the emergence of a renovated mass culture. One of the reasons for this difficulty is that the philosophical underpinnings of sustainability may not be well understood by the population (Onwueme and Borsari, 2007)

Buildings and built environment as one of the by-products of the construction industry provides us with so much comfort and shelter in our homes, workplaces, place of leisure and places of learning and explanation. The built environment provides a synthesis of environmental, economic and social issues. It provides shelter for the individual, physical infrastructure for communities and is a significant part of the economy. Its design sets the pattern for

resource consumption over its relatively long lifetime (Prasad and Hall, 2004, p. 8). They at the same time constitute a negative impact on the natural environment throughout their entire life cycle: from the design through the obsolescent stage and the eventual demolition of the final product. When sustainable practices are put into place, it is evident that constructed buildings are healthier for the environment and healthier for people. As concerns on the condition for our natural environment increases, concept of sustainable practices has continued to gain more attention in virtually all sectors of human endeavour.

Thus, many world events have initiated and prompted some ideas and strategies that sent positive actions and plans to numerous countries to absorb and implement sustainability within their industries. For instance, integrating sustainability issues into property valuation by valuers (Lorenz, 2006), Planners advocating for sustainable cities development (Majdalani et al., 2006) and the builders are not also left out of crusade for sustainable construction. The pace at which individual profession and industry respond to this challenge varies depending on their awareness level and readiness to

yield to its lessons and benefits. Lorenz (2006) however, asserted that actors within the construction or property market are the slowest to react to challenges imposed by sustainable development. While there are several definitions for sustainability, most encompass one basic goal. The goal of sustainability is to guide the economic and social forces of the earth's nations to live within the goods and services provided by the ecosystems and naturally occurring sources of energy (solar, geothermal, tidal) without reducing the availability of these goods, services, and energy sources for future generations.

The Brundtland (1987) commission defined Sustainability as the ability to carry forward or support or maintain for a prolonged period approaching perpetuity. Sustainability means meeting the needs of today without compromising the ability of future generations to meet their needs. It is also perceived to be a goal that allows for the continuing improvement of standard of living without reversible damage to resources we need to survive as species (Lehrer 2001). Looking at each element separately, 'sustainability' means the capacity for an activity to be carried on indefinitely into the future, given the amount and type of resources available, whereas 'development' implies that society will change or grow in the same way. Hence, 'sustainability' suggests change and improvement that is compatible with environmental, social and other limits, both now and in the long-term future (Gray and Wiedemann, 1999).

Debate has been on-going among academics, consultants and corporate executives resulting in many definitions of a more human, more ethical and a more transparent way of doing business (Van Marrewijk, 2003). Hopwood, et al., (2005) advocated that the concept of sustainable development was the result of the growing awareness of the global links between mounting environmental problems, socio-economic issues to do with poverty and inequality and concerns about a healthy future for humanity. It strongly links environmental and socio-economic issues. Therefore, it is generally agreed that sustainability has environmental, social and economic dimensions, but some approaches focus only on the environmental or social or economic dimensions, while others attempt to treat all three aspects simultaneously.

Often the terms "sustainability" and "sustainable construction" are used interchangeably. However, there is an important distinction between sustainability and sustainable construction. Sustainable construction refers to the actual process that sustainability is achieved by. The term 'sustainable construction' was originally proposed to describe the responsibility of the construction

industry for attaining sustainability. Kibert (1999) defined sustainable construction as creating a healthy environment using sustainable-efficient, ecologically based principles".

Sustainability in construction is all about following suitable practices in terms of choice of materials, their sources, construction methodologies as well as design philosophy so as to be able to improve performance, decrease the environmental burden of the project, minimize waste and be ecologically friendlier. It also means cities and building that respond to the emotional and psychological environments, raising awareness of important values, inspiring the human spirit, and bonding societies, communities, and neighbourhoods. Sustainable construction has been understood by many nations as the way the building industry responds to achieve sustainable development, Lanthing (1995) further, qualifies sustainable construction as a special case of sustainable development targeting the specific group of construction industry. This group is to develop, plan, design, build, alter or maintain construction sustainably.

Construction industry, like other sectors of the economy, is at present an efficient and wasteful activity that create human habitat in a manner generally focused on profitability without consideration of its long-term impacts (Kibert 1999). For example, the land that is built on, the fuel to construct and maintain the building, water, and waste disposal are all provided by nature. At the same time, the construction process negatively impacts nature in several ways: disputing the balance of nature, destroying the habitat, generating waste, creating pollutants, and altering the balance of natural systems. The sure route to mitigate these destructive and damaging activities is to welcome the philosophy of sustainable construction. As the benefits of sustainability continue to change the Architecture/ Engineering / Construction Industry and the number of green projects rises in the developed countries due to market changes, more construction firms are gaining experience with this new way of building and changing their expectations for new lives from degrees – granting construction programs.

This is however, not the case in most African developing countries including Nigeria that claims the 'Giant of Africa'. Sustainable construction as an aspect of sustainable development has not received sufficient attention in the country and the continent over. The issue awaiting full and urgent attention is that building industry is having serious negative impacts on the environment and in practice is a major detractor from the objective of sustainable development.

The vast majority of building development are conceived, designed, permitted, constructed, operated

and managed without a comprehensive account of their consequences for sustainability. Most development in the Construction Industry in the past has been in the direction of cost reduction, high tech (energy intensive) materials, faster Construction and Mechanization (reduction in manpower). Other than actions which make economic sense, (like using demolition waste for filling), little has been done to make ecological sense. The imperative is a strong focus on the environmental impact of materials as well as the construction of the projects.

In the attainment of a mega-city status, the utilization of sustainable methods for infrastructure procurement, construction, installation and management in Nigerian cities including Lagos State remains crucial. Delivering this objective requires action and total commitment from all engaged in constructing and maintaining the building including those providing design, consulting and construction services. It involves readiness to investigate virgin areas in construction approach and preparation to apply new ideas, practices and new products. As interest in sustainability increases world-over at an alarming rate, Nigeria should not fall short in its attitude on sustainability and sustainable construction. Nigeria needs to display absolute acceptability by abiding to the messages that comes with concept of sustainability and strives to compete favourably in the global market. Nazirah (2009) observed that construction industry plays a significant role in the economic growth of Malaysia as it contributes between 3%-5% to the national GDP. He also confirmed the Government readiness to upgrade the country including the its construction industry by committing towards Vision 2020, which calls for a comprehensive quantum leap towards a knowledge based society.

The aim of this paper is to examine the level of knowledge and awareness of construction developers on sustainability and sustainable construction. Accordingly, objectives include the examination of the application of sustainable concept in past and current project; the future outlook of this application in the construction industry; the level of implementation of sustainable practices; and determination of whether they are socially, environmentally and economically accepted. A conclusive note outlining the consequences of unsustainable construction and challenges to be met by built environment practitioners in promoting sustainability in construction, facilities design and management concludes the paper.

Environmental, Economic and Social Sustainability

Several research projects have been initiated to investigate different aspects related to sustainability and the environment in general including real estate.

A recent estimate puts the world's wealth at \$48 trillion, of which approximately half is real estate (Lynch & Gemini, 2007 in Babawale and Oyalowo, 2011). Real property represents the commonest form of asset held by corporate bodies and individual investors (Babawale and Oyalowo, 2011). Its place in the economic growth and over well-being of any nation cannot be under estimated. Construction/real estate activities are thus expected to be enormous with its attendant's destructions and damages of the ecosystem. The construction industry and its process negatively impact nature contributing significantly in disrupting its balance, depletion of raw materials, destroying the habitat, generating waste, harmful gas emission thus, creating pollutants, and altering the balance of natural systems. (Addaee-Daphae et al; 2009). This lead to a growing realization around the world to alter or improve our conventional way of development into a more responsible approach which can satisfy our needs for development without harming the world we live in. The opportunity for improvement arrived when a new philosophy called 'sustainable development' was introduced in 1987 in Brundtland Report. Since that, many progressive global events had taken place to increase the awareness on environment and sustainable agendas such as Rio Earth Summit 1992, Maastricht Treaty 1992, Kyoto Conference on Global Warming 1997, Johannesburg Earth Summit 2002 and Washington Earth Observation Summit 2003 (Nazirah, 2005). This concept of sustainability and its practical implementation have been increasingly considered by policy makers to be one of the most critical tools of achieving a balance between economic, social and environmental objectives.

The concept of sustainability in building and construction has initially focused on issues of limited resources especially energy, and on how to reduce impacts on the natural environment with emphasis on technical issues such as materials, building components, construction technologies and energy related design concepts. The appreciation of the significance of non-technical issues (soft issues) has grown, giving recognition to economic and social sustainability concerns as well as cultural heritage of the built environment as being equally important. Presently, the concept of sustainable construction governs three main pillars: environmental protection, social well-being and economic prosperity

The basic principle of sustainability from an environmental perspective concerns the effective management of physical resources so that they are conserved for the future. In the last few decades, the physical limits of our planet, both as a provider of resources and as a sink for waste disposal, have been well established in theories, studies or concepts such as ecosystem biodiversity (Hawken, 1994), carrying capacity (Daly and Cobb, 1989), the limits to growth

(Meadows *et al.*, 1992) or natural capital (Lorins *et al.*, 1999). Operating under an environmentally sustainable perspective, organisations should use only natural resources that are consumed at a rate below that of natural reproduction, or at a rate below the development of substitutes. They do not cause emissions that accumulate in the environment at a rate beyond the capacity of the natural system to absorb and assimilate. Finally, they do not engage in activity that degrades eco-system services (Dyllick and Hockerts, 2002). Although builders have little influence over the extraction of natural resources, they can help discourage this activity by demanding less non-renewable natural resources, more recycled materials, and efficient use of energy and mineral resources (Addis and Talbot, 2001).

From Economic angle, the perspective initially emerged from economic growth models that assessed the limits imposed by the carrying capacity of the earth (Meadows *et al.*, 1992). The continued growth in population, industrial activity, resources use, and pollution could mean that standards of living would eventually decline. This led to the emergence of sustainability as a way of thinking about ensuring that future generations would not be disadvantaged by the activities and choices of the present generation. British economists such as Pearce *et al.*, (1989) and Kay (2004) have highly been influential in advancing the agenda for macroeconomics dealing with the understanding of sustainability. Zadek *et al.*, (2005) define the economic element as the creation of material wealth, including financial income and assets for the organisation.

Organisations that wish to align their strategies, operations and communications with some or all of the principles of sustainability for whatever reasons will need to be able to understand, manage, and communicate how their 'economic impacts', link to social and environmental outcomes. This need will be particularly marked for those organisations that have the most significant economic impacts.

Sustainability does not stop at economic or environmental dimensions. To live in a society, there is a need for efficient and reliable housing, transport, energy distribution, health-care, communications and utilities. This notion of 'institutional sustainability' typically relies on a government's long term environmental and social commitment. However, over the decade, a growing group of companies are acknowledging their role in addressing social problems through Corporate Social Responsibility (CSR) initiatives (Hoffman, 2000). Arguments in favour of CSR typically begin with the belief that it is in a business's long-term self-interest to be socially responsible. This view holds that, if business is to have a healthy climate in which to function in the future, it must take actions now that will ensure its

long-term viability (Carroll and Shabana, 2010). Social sustainability requires that firms embrace the economic, legal, ethical, and discretionary expectations of all stakeholders, not only financial shareholders (Carroll, 1979). CSR is a way of doing business that is based on ethical principles and structured management controls, and that takes into account social and environmental considerations alongside economic considerations when making business decisions, and attempts to create positive impacts on all stakeholders. However, they are faced with the problem of how to incorporate concept into practice.

A more practical definition of sustainability principles focuses on the "triple bottom line" concept, where organisations simultaneously consider their economic, social and environmental sustainability performance (Elkington, 2001). It suggests that corporate progress should be measured in terms of economic prosperity, environmental sustainability, and social responsibility. However, translating the triple bottom line concept of sustainability into actionable steps and investments has proven to be difficult for most organisations. Since each organisation possesses different capabilities and relationships they are likely to pursue sustainability in different means. Given this, leading organisations are adopting various approaches to implement sustainable business practices, however, with mixed success (Preston, 2001; Marshall and Brown, 2003; Laszlo and Zhexembayeva, 2011). Therefore, a question confronting most organisations that have implemented or planning to be implemented in the near future is: what does sustainability mean to them; what sustainability initiatives can be pursued; and how business should shift into a true sustainability framework yet remain within the confines of the dominant competitive market model (Laszlo and Zhexembayeva, 2011).

Even business interests who have shown significantly increased commitment to sustainable practices struggle to express the concept in less abstract jargon like "continuous improvement," or "social and environmental responsibility," or "corporate citizenship". For businesses, the lack of single agreed-upon definition of sustainability and its objectives has become a real blockage in understanding and implementing sustainability initiatives. Research on this issue is critical if we intend to advance our understanding of business decision-making processes that result in actions that reflect a more integrated notion of sustainability (Kallio and Nordberg, 2006). Even though few authors argue that it is crucial to understand the concept of sustainability there is little empirical research on the perceptions of the UK industrial sectors on the concept of sustainability – which is the core *raison d'être* of this paper.

Effective corporate sustainability strategies and responses are more likely to be achieved if decision-makers have a thorough understanding of the concept of sustainability.

Sustainable Development and Construction Industry- Of What Benefits?

Construction practitioners worldwide are beginning to appreciate sustainability and acknowledge the advantages of building sustainable. Thus, the contribution of buildings and of the property and construction sector to sustainable development could be immense. However, the major argument is not that sustainable behaviour in property and construction market should be pursued only because it is beneficial for humans, the environment and because environmental legislation requires us to do so, but because it significantly increases financial profit and long-term competitiveness. Following more sustainable property investment and management strategies is, indeed, a highly profitable exercise and refurbishing the existing building stock represents (across all industry sectors) the most cost-effective solution available for tackling the looming environmental crisis. There are no adverse side effects of applying sustainable development thinking to the investment in, development and management of property assets. Indeed, sustainable development thinking particularly lends itself to deal with the nature of property investments which traditionally require pursuing medium-to -long-term investment strategies.

Sustainability building squeeze the current maximum utility achievable for owners, users and the wider public, out of the lowest possible use of land and through put of energy and raw materials and leading to the lowest possible impacts and risks for the global and local environment. These buildings are not any more expensive to build from the outset than conventional ones (see for example, Mathiessen and Morris, 2007) but their ownership result in various benefit for investor, ranging from drastically lower operating cost to improved, longer useful life-spans, significantly increased occupant productivity and well-being as well as more stable cash-flows which in turn have economically quantifiable benefits. As a result, increasing economic return, sustaining the natural environment and protecting social values are not incompatible; at least not within property and construction markets. Hydes and Creech (2000), (as cited by Nazirah, (2009) asserted that green building costs lower than conventional buildings and saves energy. This was further supported by Barlett and Howard (2000) who added that sustainable buildings will contribute positively to better quality of life, work efficiency and healthy work environment. Yates (2001) explored the business benefits of sustainability and concluded that the benefits are diverse and potentially very significant. The approach of

sustainable construction will enable the construction players to be more responsible to the environmental protection needs without neglecting the physical, social and economic needs in striving for better living. Construction industry must inevitably change its historic methods of operating with little regard for environmental impacts to a new mode that makes environmental concerns a centerpiece of its efforts. Previously, the concern on environment is relatively a small part of most of construction development. However, with the growing awareness on environmental protection due to the depletion of non-renewable resources, global warming and extremity of destruction to ecology and biodiversity impact, this issue have gain wider attention by the construction practitioners worldwide. Many efforts are being directed to build sustainably in construction world. The direction of the industry is now shifting from developing with environmental concern as a small part of the process into having the development process being integrated within the wider context of environmental agenda. Thus, the activities of construction industry must work and comply with the needs to protect and sustain the environment.

As a more broadly and in a comparatively short period of time, sustainability has become a key driver of many business decisions, in part being guided by 'carrot and stick' forces – the halo effect which rewards alignment with popular environmental concerns, while in contrast the growing corporate accountability movement compels greater disclosure of environmental impacts (Nelson, 2007). As a consequence, sustainability is no longer a technical or moral issue, but an economic and financial imperative. There is increasing evidence that investors and occupiers are seeking premises with enhanced environmental performance and greater social amenity and, importantly, they are prepared to pay a premium in rental and capital terms for such space (Breslau, 2007).

Designers as well as owners are however realizing that with due attention and meticulous planning building can be designed to save energy, decrease impact on the environment, be more people –friendly and reduce lifecycle costs.

Sustainability in construction projects is generally achieved by:

- ❖ Defining clear goals sympathetic to sustainability issues.
- ❖ Concentrated effort at design stage to achieve these goals.
- ❖ Focusing on decisions like site selection, building layout, design etc.
- ❖ Choosing the right materials which are recyclable after their useful lives
- ❖ Choosing the right methods of construction in term of energy and resource efficiency

- ❖ Creating efficient and integrated building envelop harnessing the gift of nature
- ❖ Integrating HVFAC and electrical systems.

RESEARCH METHOD

From the literature review, it is evident that very little research has been conducted on sustainability generally in Nigeria among professionals including the builders, planners, developers and other real estate practitioners. The study population comprised of construction practitioners. Research instrument used is the questionnaire designed to elicit information on respondents' views on issues such as the knowledge/awareness rate; the nature of projects executed; the perception and interest rate; incorporation/application of sustainability concept in the past and current projects; instruments to improve the knowledge of sustainable construction; implementation and the present status of the subject matter in Nigeria amongst others. Sampling design was geared towards obtaining a truly representative view from respondents drawn from the construction industry.

A total of 120 construction practitioners (The builders, Civil Engineers, Architect, Planners, Estate Surveyors and Valuers) were distributed in all out of which 65 were duly completed and returned for analysis. This represents 54% return rate. The data gathered were analysed quantitatively. The averaging statistical analysis was also used to calculate straightforward totals, percentages and averages. Qualitative techniques were applied to make sense of meanings. Contextualizing strategy was used to correct statements, opinion and comments to provide a coherent picture.

It is pertinent to mention here that results of the similar survey conducted in Malaysia in 2009 by Nazirah in 2009 were not presented in table format. Results were however analysed in pictorial form and presented qualitatively. For this paper, the author has decided to present the Nigeria situation in tables and made use of charts/graphs in the comparison analysis between the two countries. The rationale for comparing Nigeria with Malaysia despite continental difference is that they are both developing nations even though the latter is stronger than the former in terms of economy and technological advancement. Nigeria is also three and five times higher than Malaysia in land size and population respectively (Babalola and Iyagba, 2012) and awareness level of sustainable construction in the later is moderate and the former requires to move to this level in her quest to attaining full sustainable construction status.

STUDY AREA

Lagos-Previously the capital city of Nigeria boasts about the most urban property market in Nigeria. It remains the nation's commercial capital with over

80% of businesses having their head offices or at least a branch office in the city. The strategic and economic importance of Lagos stem from both its national and political history.

At some point, it served as both the commercial and political capital of Nigeria until 1991 when the capital territory was moved to Abuja. The sprawling metropolis occupies 'a primate' position in terms of concentration of industrial and commercial activities; concentration of financial institutions, largest and most patronized sea port, airport and capital market; the highest concentration of professional offices, among others. On account of its prominence as the foremost property market in Nigeria, it is estimated that about 60% of building professionals and developers practice their trade in the city.

The latest directory of the Nigerian Institute of building (2005) showed that approximately 70% of registered firms of construction companies have their head offices or at least a branch office in Lagos. This suggests that a large proportion of both provider and the end users of buildings services are residents in the study area. The state commands 65% of Nigeria's commercial activities, 60% of national industrial investment and foreign trade, 40% of manufacturing value added, 48% of building and construction activities, and 55% of wholesale and retail trade. The metropolis' current population is estimated at 17 million which confer on it the status of a mega city and is projected to be the third largest city in the world by the year 2015 (Lagos State Government)

DATA PRESENTATION AND DISCUSSIONS

Personal Data of Respondents

In the first part of the questionnaire, questions relating to the personal data of respondents were obtained. Results are summarized in table 1. There were more male respondents than females at 81.5% and 18.5% respectively. A larger percentage of the respondents (44.6%) have a first degree, 23.1% are HND holders and 6.2% each are OND holders and PGD. In addition, 13.8% have obtained Masters' degree; while PhD holders accounted for 1.5%. An appreciable proportion of the respondents (49.2%) are member of Nigerian Institute of Building, while 51.8% are members of one professional body or the other in the construction industry. Most of the respondents have been in their present employment for between 15 to 19 years. (Please see Table 1 below)

Table 1: Personal Data of Respondents

	Frequency	Percentage
Gender		
Male	53	12
Female	12	18.5
Academic Qualifications		
OND	4	6.2
HND	15	23.1
B.Sc	29	44.6
PGD	4	6.2
M.Sc	9	13.8
MBA	3	4.6
Ph.D	1	1.5
Professional Qualification		
MNIOB	32	49.2
COREN	3	4.6
MNIA	7	4.8
MURP	9	13.8
NIESV	14	21.5
Longevity in the Present Employment		
<1 Year	3	4.6
1-3yrs	6	9.2
4-6yrs	13	20.0
7-9yrs	19	29.2
Above 10yrs	24	36.9

Source: Field Survey 2012

Table 2: Nature and Number of Project Executed, Project Cost cum Sustainability

	Awareness Level	
Nature of Project Development		
Residential Properties	41	63.1
Commercial Properties	10	15.4
Industrial Properties	7	10.8
Others	7	10.8
Number of project Executed		
1-5	14	21.5
6-10	12	18.5
11-15	12	18.5
16-20	10	15.4
Above 20	17	26.15
Project Costs		
1-5M	5	7.7
6-10M	13	20.0
11-15M	14	21.5
16-20M	22	33.8
Above 20M	11	16.9
Sustainability Awareness Level		
Very poor	5	7.7
Low	36	55.4
Moderate	10	15.4
Good	8	12.3
Excellent	6	9.2

Source: Field Survey 2012

Data from table 2 shows that majority of the project executed were residential properties (63.1%). This is followed by commercial property with 15.4% while both industrial and other property type were at par with 10.8% apiece. All these were further confirmed with the total number of projects executed so far being more than 20 with the project cost within the range of 5 to more than 20 Million Naira.

To articulate the level of knowledge among Nigerian construction practitioners/developers with regard to sustainability concept, the respondents were asked to

rate their knowledge on this subject matter based on their understanding on this subject. From number 1a below, most of the respondents considered themselves to have low knowledge of sustainability concept. This is however not the case in Malaysia where a good number of respondents have moderate or good knowledge of the subject (Nazirah, 2009). (See fig 1b also).

Table 3: Interest, Perception, Applicability and Issues of Sustainable Construction

Interest in sustainable construction	no	%
Very Interested	42	64.6
Slightly Interested	18	27.7
Not Interested	2	3.1
Others	3	4.6
Sustainability Perception		
Well Accepted	6	9.2
Doubtful of		
Implementation Capabilities	44	67.7
Not properly defined and structured	9	13.8
Others	6	9.2

Issues that matches understanding of the concept

Effective protection of the environment	48	73.8
Effective environment planning, management & control	9	13.8
Prudent Use of Natural Resources	2	3.1
Enhancement of quality of life And Customer's satisfaction	2	3.1
Social Progress	4	6.2

Source: Field Survey 2012

It is interesting to know that despite the level low level of knowledge as observed in the analysis above, most respondents display strong affinity and interest for sustainable construction with almost two-third confirming this. Although the same sets of respondents also believe that its implementation may be doubtful while very few lack confident in its structure and workability.

To examine further what the respondents understand about the concept of sustainable construction, they were asked to select issues that match their understanding about the concept of sustainable construction. The result is similar to what was obtained in Malaysia as reported by Nazirah in 2009. Issues that are related to environmental aspect of sustainability also received highest percentage (73.8%). From this result, it is deduced that the majority of the respondent understand that sustainability is about protecting the environment but many are still unaware that sustainability is also about balancing social and economy aspects of construction

Table 4: Improving Sustainability Knowledge and Level of Implementation of sustainability practices

Improving Sustainability Knowledge

Written materials such as

Journal proceedings, newspaper, website etc.	10	15.4
Education and higher learning	40	61.6
Seminar and conferences	7	10.8
In-house learning	8	12.3

Level of Implementation of sustainability practices

Very poor	39	60.0
Low	15	23.1
Moderate	5	7.7
Good	6	9.2

Both results on improving knowledge about sustainable construction in Nigeria and its sustainable practices are at variance with that of Malaysia. Majority of the respondent rely on education and higher learning to improve their knowledge about sustainable construction. This is however not the case in Malaysia where written materials (journals, proceedings, newspapers, website) constitute the medium in which knowledge of sustainable construction are improved. Other sources of knowledge are through seminar and conferences; in-house learning that is rated very low. It can be thus infer that most individual/companies do not promote this concept within their organization due to the low knowledge of the concept.

As depicted in the immediate table above, the level of implementation of sustainable practices is very poor in Nigeria as against that of Malaysia that revealed a moderate level. Although none of the respondents in both countries believed that the implementation of sustainable practices is excellent.

Table 5: Factors responsible for the current implementation level

Lack of enforcement	8	12.3
Lack of Government intervention	12	18.5
Education vs. Experience	31	47.7
Cost factor	8	12.3
Pointing fingers	3	4.6
Passive culture	3	4.6

This result on factors responsible for the current level of implementation further confirms the status of construction practitioners on the reliability of education and higher learning for sustainable construction knowledge improvement in Nigeria. The levels of education and experience have been regarded as utmost factors responsible for the level of implementation at the moment. This no doubt poses a challenge and opportunity for the academia in introducing sustainability concept in the curriculum

of Nigerian universities and other institutions of higher learning for all construction related courses. Other factors as highlighted includes: Lack of Government intervention which may be in the area of not promoting sustainable construction through appropriate policies and incentives. Cost factor is next to this as developers' financial positions determines whether or not the concept would be implemented as it may be perceived to increase their budget.

Table 6: Stages that Construction Sustainability should be considered and Its Current Status

Stages of construction that sustainability should be considered

Planning stage	47	72.3
Design stage	12	18.5
Development stage	6	9.2

Planning stage has also been identified as the most crucial stage to incorporate this concept in other to be meaningful and impact positively on the overall goal of the project. It is the earliest and initiation period in which all other relevant factors and constraints are expected to be discussed and analysed.

Current status of sustainability

Embracing sustainability

wholeheartedly	9	13.8
Starting to do so	21	32.3
Inexperienced but interested	35	53.8

More than half of the respondents (53.8%) are interested in the concept of sustainability but lack the required experience and expertise to practice it. Some are beginning to put it into action while very few confirmed embracing the concept wholeheartedly (13.8).

Table 7: Prospect of sustainable construction in the next 5years

The prospect level would be very poor	2	3.1
The prospect level would be low	49	75.4
The prospect level would be moderate	3	4.6
The prospect level would be good	11	16.9
The prospect level would be excellent	0	0

The respondents were asked to express their views on the prospect of sustainable construction application in Nigeria in the next 5 years. From fig 5a above, it is clear that the prospect would be low as 75.4% of the respondents were of the opinion that not much will change. 4.6% however believed that there will be some levels of improvement such that the prospect

level will be moderate while 16.9% of the respondents perceived the prospect to be good. Just very few saw the prospect to be very poor and none of the respondents could attribute excellent status to the concept.

The story is not the same with Malaysia as the prospect level is moderate. About 17% apiece of the respondents believed that the prospect will be good and low at the same time while a few people (3%) think that future of sustainable construction is very bleak.

From the submission above, the following reasons are seeing as responsible for the low opinions of the construction practitioners:

- ❖ The industry still lacks basic understanding of sustainable construction
- ❖ Lack of political will and awareness to construct sustainably.
- ❖ Individual commitment is lacking
- ❖ Lack of educational/institutional framework
- ❖ Economic benefits of sustainability are not communicated
- ❖ Developers are not convinced of the value added nature of sustainability and the need for them to prepare for additional cost
- ❖ There is no bye-law or regulation by the government to enforce the concept

The evidence of several sustainable projects being built in Nigeria from literature review shows negative signs that the concept of sustainable construction is yet to settle within the industry. However the survey revealed that the concept of sustainability has not been widely applied in many projects. This strengthens the argument that the construction industry is still at its infancy in this field. The findings indicated that generally, the respondents believed the level of knowledge on sustainability is below average. Perhaps, this perception derived from the lack of implementation of this concept in the construction industry. Other developers may have good knowledge on sustainable concept, but because they did not put it in practice or incorporating it in their projects, others will tend to believe that knowledge is not apparent. Knowing but not practicing is another major problem in sustainable concept implementation.

A lot more efforts are necessary to enhance the level of environmental awareness and civic consciousness among the people to build sustainably in the future. It is recommended to improve the understanding and awareness on this concept and initiate action to enable this concept be applied efficiently in future construction projects. There are many ways to this such as educating the construction players through conferences, seminars, training, workshops etc. since this concept is viewed as academic pursuit, perhaps,

the academicians should play a more active role in reaching to the construction players through collaboration and consultation works. Education should not be limited to construction players only. As the industry's supply is closely influenced by the demand for it, the education should be expanded to the wider stakeholders, which include the potential buyers as well. Raising buyers for sustainable houses for instance, will push the housing developers to improve the specification of their houses which include certain elements to attract buyers. Government has a major role to play in encouraging sustainable construction. Their support and incentives will prompt interest among construction players. It is also recommended that a full length study on the weakness of present legislation implementation to alleviate the problem of 'lack of enforcement' if at all it is in existence.

As this subject is a new territory in Nigeria, there are many angles in which research can be extended. Knowledge on present application, weaknesses and potentials can open avenues for further action towards performance improvement. Apart from that, producing guidelines to highlight the aspects of sustainability within construction process would be useful to enable those aspects be managed effectively and efficiently. Last but not the least, the challenges to build sustainably needs to be critically analysed and surmounted. Various techniques and tools existed that in the construction industry should be utilized to enhance the appreciation on sustainability in construction process.

CONCLUSION

Construction works and its related activities can continue to impact negatively on built environment to a large extent. The inability to return back the environment to its original state as result of construction and other urban activities calls for questioning and immediate actions. It was evident from the two countries that construction works are still being executed in conventional ways which do not take sustainability into consideration and are not environmentally friendly. The method is not able to strike a balance between environmental, social and economic considerations. The author of the related paper also supported this argument by concluding that construction, management, use, change and demolition of the built environment can damage the environment to a substantial extent. In the built environment, resources are taken from the environment and returned after use, usually in a degraded state. It is unfortunate that Nigerians are yet to realize the pitfalls of building unsustainably and the zeal to implement same is not there at the moment. The advantages of the sustainability practices have not been firmly seized due to the slow permeation of this concept among the construction practitioners both in Nigeria and Malaysia. Some of

the factors highlighted above as responsible for its implementation should be taken very seriously and pursued rigorously. Very importantly, the academics have a lot to do in this area as the present and future of sustainable construction crusade lies in them greatly by introducing the concept in the University curriculum and channelling their research focus towards sustainability concept.

It is believed that this study has contributed to the body of knowledge in this area, specifically with respect to the level of awareness of sustainability concept in the two countries considered for the study. Consequently, this study is hoped to help future research and larger reading community. Reasons for the current level of awareness of the subject matter in Nigeria and Malaysia were also adduced. There are possible avenues that can be explored in future research regarding the subject matter. As such, it would be interesting to see if future studies will be able to confirm and compare the findings in this study with other states in Nigeria.

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