

STAKEHOLDERS PERCEPTION ON THE AWARENESS OF GREEN BUILDING RATING SYSTEMS AND ACCRUABLE BENEFITS IN CONSTRUCTION PROJECTS IN NIGERIA

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ABSTRACT

The construction industry has been relying on the government building codes to plan and execute most construction projects. Numerous researchers have shown how green building rating systems have various intrinsic advantages, and offers solutions to many environmental related problems, relative to the convectional practices. The study investigates the construction professional's perception on the awareness of green building rating systems and the accruable benefits in construction projects in Nigeria. The study objective include assessing the awareness status of green building rating systems as well as the most preferred rating system for possible adoption in Nigeria. A structured questionnaire was used to collect information from various respondents who were construction professionals. Random sampling techniques were used to select one hundred- fifty (150) respondents out of which ninety-one (91) were used for data analysis. The results indicate that most of the building industry professionals in Nigeria are familiar with green building rating systems and preferred Leadership in Energy and Environmental Design (LEED) for possible adoption in Nigerian construction projects. The findings have important implications for policy and practice. The study recommends full establishment of Green Building Council of Nigeria (GBCN) that will be responsible for awareness creation, introduction of guidelines, tools and techniques that will drive green practices for future project.

Keywords: Awareness, Construction professionals, Construction projects, Green building rating systems, Green Building Council of Nigeria (GBCN), Leadership in Energy and Environmental Design (LEED), Nigeria.

INTRODUCTION

The negative environmental impact of buildings on the environment has led to a clamour for improved practice. The challenge of implementation of ecological principles to the entire construction projects lifecycle is as a result of such clamour and it has been linked to the evolution of a relatively new and evolving concept termed “green building”. Green building has been recognized as an essential practice for improving negative environmental outcomes of buildings. The building sector has been accounted to be responsible for about 25- 40% of energy usage, 30- 40% of material resources consumption, 30- 40% of waste production and 30-40% of green house gases released to atmosphere globally (Umar and Khamidi, 2012). It is further revealed that about 30% of recently built or retrofitted buildings suffer from sick building syndrome which in turn exposes occupants to unhealthy environmental conditions. However, the imperative of environmental performance of building calls for systems that can assess the environmental impact of buildings.

Green building rating system is a concept that emerges in the construction industry in the early 1990’s. According to Portalatin et al. (2010) the idea of green building rating system emerged in the United Kingdom known as British Research Establishment Environmental Assessment Method (BREEAM) in 1990. This was followed by Leadership in Energy and Environmental Design (LEED) in the United States. Green building rating system has been defined as voluntary mechanisms used to rate and certify the environmental performance of buildings (UN-HABITANT, 2010). It also provides benchmark against which a building is rated and also offers a score or descriptive rating for the building (Adegbile, 2013). The importance of green building assessment tools have been documented in various studies (Ali and Al Nsairat, 2009; UN-HABITANT, 2010; Portalatin, et al. 2010; Adegbile, 2013) among others. In particular, Ali and Al Nsairat (2009) emphasized on the need of developing technical services and resources for determining the ‘greenness’ of a building based on appropriate green rating system thereby making green building practices easier to implement. It is thus important for project stakeholders to consider green building assessment as construction project moves through design and construction phase in order to prevent high energy consumption, solid waste generation, global green house emission, environmental damage and resource depletion.

Green building rating systems are developed to prevent the above problems from occurring. Also, different sustainability and green building literatures (Ali and Al Nsairat, 2009; Portalatin, et al. 2010; Adegbile, 2013) have documented further benefits of green building rating systems in terms of raising awareness of buildings negative environmental impact to players in design and construction sectors; setting benchmarks for building environmental practices to safeguard the minimum performances standard; inspiring new designs, ideas and technical solutions; creating healthier and more productive places, and reducing building operations cost. Some of these benefits could also be harnessed in construction projects in Nigeria if green building rating systems and practices were to be integrated into our construction system. Fortunately, construction professionals are gradually becoming aware of the concepts of green building principles. Several studies (Ameh, Isijiola and Achi, 2007; Nwokoro and Onukwube, 2011; Abolore, 2012 and Waniko, 2014) on sustainability have been conducted in Nigeria by some researchers. These studies focused in assessing the level of awareness of green building practices and its accruable benefits in construction projects in Nigeria. A recent study of (Waniko, 2014) also revealed that construction professionals are aware of green building concepts and rating systems but do not have a documented corporate philosophy for

dealing with green building issues in their organizations. These results suggest a non existence of rating system for implementation of green building principles in projects, which is a cause for concern.

The study of Otegbulu (2011) decries the Nigerian designers and contractors negligence in incorporating green concepts, sustainability and environmental issues when designing a new building or retrofitting existing one. The report reveals that First bank office located in Marina, Lagos was designed and constructed without considering the tropical climatic condition of Lagos, Nigeria. Lack of natural ventilation and lighting in the building makes the entire working space uncomfortable when power from main grid fails or when electricity generators develops operational challenge. Furthermore, the survey reported a short fall in users satisfaction, functional space planning and service type in institutional, residential and commercial buildings. The present study has therefore been undertaken to investigate construction professionals' perception on awareness of green building rating systems and the accruable benefits in construction projects in Nigeria. The objectives of the study are to determine the awareness status of green building rating systems as well as the most preferred rating system for possible adoption in Nigeria. This study is significant in that it provides to current literature and knowledge on sustainability practice.

CONCEPTS OF GREEN BUILDING RATING SYSTEMS IN CONSTRUCTION PROJECTS

Building design, construction, operation and maintenance require innovation in both engineering and management dimensions. The lifespan of a building consists of series of interrelated actions starting from initial conception, through construction and the maintenance operations to eventual deconstruction .Within these cycles, significant requirements are generated, from considerations of economic, environmental and social issues for efficient savings in building systems, compliance with building codes and standards. In lieu of the above, building assessment schemes are gaining popularity to serve as a standard to evaluate the environmental performance of new and existing building design. Documentations on green building suggest that green building has been used worldwide. According to Reed, Bilos, Wilkinson, and Schulte (2009) developments on green building practices are traceable to UK's Building Research Establishment (BRE) that pioneered the first assessment scheme called Building Research Establishment Environmental Assessment Method (BREEAM) in the year 1990 followed by USA Green Building Council's Leadership in Energy and Environmental Design (LEED) in 1996.

As this concept has taken a global phenomenon, most developed and developing countries have resulted in adopting it of which Nigeria is no exception. Research conducted in the Nigeria suggests that Nigeria is faced with the challenge of evolving performance standards, systems, codes and the regulatory means to mitigate, forestall and to develop the built environment (Adegbile, 2013). Nwokoro and Onukwube (2011) study identified the prevailing laws promulgated by Federal Government of Nigeria to safeguard the Nigerian environment. These laws include: Federal Environmental Protection Agency Act of 1988 (FEPA), National Policy on Environment (NPE) of 1989 and Environmental Impact Assessment Act of 1992 (EIA Act). Also, there were concerted efforts by professional bodies and private organizations indicating their commitments towards sustainable buildings. Shaba and Noir (2014) document the existence of Green Building Council of Nigeria (GBCN) at prospective membership level with World Green Building Council. The report revealed that the newly established council is yet to produce any rating tool thus necessitating willingness by Green Building Council of South Africa

(GBCSA) to allow the adoption of Green Star SA in rating Nigerian buildings pending when Green Building Council of Nigeria (GBCN) will establish and has the capacity to develop and operate its own rating system.

UN-HABITANT (2010), highlights several countries that have instituted green rating standards and tools to include Building Research Establishment Environmental Assessment Method BREEAM (UK); Leadership in Energy and Environmental Design LEED (USA); Green Star (AUSTRALIA); Green Mark (SINGAPORE); Green Globe (CANADA); Greenship (INDONESIA); Comprehensive Assessment System for Building Environmental Efficiency CASBEE (JAPAN); Greenhomes (INDIA) and Hong Kong Building Environmental Assessment Method HK-BEAM (HONG KONG). These rating schemes identified have different criteria and assessment which depends on critical issues emanating from the country of origin and regulations. Furthermore, the Green Building Council (GBC) permits the use of existing tools in other countries with minimal changes to reflect their local context or create new customized tools specifically for its market. Nwokoro and Onukwube (2011) highlights the lack of established institutional structures that promotes green building awareness on the part of clients, tenants, professionals in construction industry and other stakeholders, professional capacity to incorporate green building issues and opportunities and financial resources to undertake green building design, construction and upgrade. In the African continent, only South Africa has established green building council known as Green Building Council of South Africa (GBCSA) and a rating system, Green Star SA.

Portalatin et al (2010) also identify the four (4) most prominent rating systems to include: Building Research Establishment Environmental Assessment Method (BREEAM). Leadership in Energy and Environmental Design (LEED), Green Globe and Green Star and eleven (11) additional rating systems used around the world namely; Building Environmental Assessment Method (HK-BEAM), Ecology, Energy Saving, Waste Reduction and Health (EEWH), Green Building Certification System (GBCS), Comprehensive Assessment System for Built Environment Efficiency (CASBEE), Green Mark, Green Building Standard SI-5281, LiderA, Haute Qualité Environnementale (HQE), 3-Star, Green Rating for Integrated Habitat Assessment (GRIHA), German Sustainable Building Certificate. Furthermore, Adegbile (2013) undertook a study on assessment and adaptation of an appropriate green building rating system for Nigeria where some of the assessment schemes were selected as the well known green building rating systems. This study provides insight into the strengths and weaknesses of various rating system. The identified rating system include: Building Research Establishment Environmental Assessment Method (BREEAM); Comprehensive Assessment System for Built Environment Efficiency (CASBEE); Green Star, IGBC Green Homes Rating System; Hong Kong Building Assessment Method (HK BEAM) and Leadership in Energy and Environmental Design (LEED). Adegbile (2013) draws on Nguyen & Altan, (2011) and WBDG sustainable committee (2009) suggestions on various rating system currently in use and this study aligns with the seven (7) identified rating systems by Adegbile (2013) for its investigation. Data obtained represents the perspectives of stakeholders to green building rating systems on construction projects in Nigeria.

AWARENESS ON GREEN BUILDING PRACTICE IN CONSTRUCTION PROJECT

According to Umar and Khamidi (2008) awareness on green building refers to ideal strategic model and promotion exercise which aids people to understand why a particular issue is essential and the desires of goals and what is necessary to accomplish a task. Furthermore, Abolore (2012) infers that awareness of green building depends on the understanding of the

individual actions, quest for knowledge and absolute involvement and commitment to the principle. The primary meaning of awareness in the communication industry is to create a base audience for a product, service or issue. Hence, the primary goal of awareness is to achieve enlightenment to the people. In advertising and communication industry, it has been shown that people must be exposed to messages several times before the message becomes successful. The innovation in technology has contributed in a positive means of delivering and collecting information for example, the internet, sign and print media. However, the green building concept must be disseminated in layman's terms to assist in general public acceptance.

Formal knowledge and awareness for built environment professionals is an important mechanism for developing green building knowledge and skills, a number of studies (Ameh, et al. 2007; Alnaser and Flanagan 2007; AlSanad, Gale, and Edward 2011; Susilawati and Al-Surf 2011; Waniko, 2014) have being conducted by researchers on awareness of green building in the recent time. The study of Ameh, et al (2007) affirm that built environment professionals in Nigeria are aware of sustainability principles and sources of information on sustainable building practices are mostly drawn from personal research. Alnaser and Flanagan (2007) focused on implementing building –integration PhotoVotaic (BIPV) or Wind energy (BIWE) in the kingdom of Bahrain. This indicates the willingness of decision makers to set legislation for sustainable buildings. It was pointed out that policy makers are more concerned about the possible reactions from investors as they do not have adequate knowledge and awareness of positive impact of building-integration PhotoVotaic (BIPV) or Wind energy (BIWE) on the long term. In the same hand, Architects and Contractors in Bahrain are also interested and keen in sustainable building project but require more knowledge and training in building–integration PhotoVotaic (BIPV) or Wind energy (BIWE) installation.

AlSanad, Gale, and Edward (2011) explore the present knowledge, level of awareness and acceptability of the Kuwait's construction industry stakeholders to adopting the concept of green building. This study found out that the level of awareness of sustainability and green construction is considered to be in the 'moderate to good' range. However, the study recommends that more actions are required to be taken by the stakeholders through education programmes such as training courses, conferences, seminars, study tour, public announcement and workshops in order to increase the level of awareness and knowledge. Similarly, Susilawati and Al-Surf (2011) investigate public knowledge and public awareness regarding this issue in the Kingdom of Saudi Arabia where a higher percentage of the respondents are not fully aware of green building practices. Conversely, Waniko (2014) assess Nigerian built environment professional's familiarity with green building (Architects, Quantity surveyors and Engineers). It is reported in this study that a higher percentage of the respondents are aware of the green practices.

BENEFITS ACCRUABLE TO GREEN BUILDING RATING SYSTEM IN CONSTRUCTION PROJECTS

A number of research studies have identified different benefits of green building in different countries in the recent time. Such countries include USA (Wedding and Craw-Brown, 2007); Nigeria (Udechukwu and Johnson, 2008); Hong Kong and Singapore (Chan, Qian, and Lam, 2009); Canada (Issa, Rankin and Christian, 2010); UK (Alwaer and Crawford- Croome, 2010); China (Zhang, et al., 2011); Malaysia (Umar and Khamidi, 2012); USA and Hong Kong (Ahn, Pearce, Wang & Wang, 2013). From these studies Udechukwu and Johnson (2008) classify green building benefits into three areas:

environmental, economic and social as supported by many literatures in sustainability. Chan et al (2009) laid emphasis on business case for green building development in Asian cities. The identified business reasons include lower operational costs and lower life-cycle costs. They advocated that investment in green building will not only benefit the buyers or consumers but also provides business opportunity for architects, developers, contractors and almost all stakeholders in the built environment. Similarly, enhanced day light and reduced toxicity in indoor environment increases employees productivity up to 16% and absenteeism.

Issa, Rankin and Christain (2010) infers that green buildings can be built at little to no additional cost as generally believed by researchers but practitioners often identify high initial cost as barrier to adopting green practices. However, this assertion reinforced the study of Zhang et al. (2011) on higher costs for green appliance design and energy saving material at design stage. Umar and Khamidi (2012) identify operational savings, daylight and views, air quality as the three best reasons frequently admonished by occupiers of green building. There is a consensus that adopting green technologies does not only help in branding image of property developers but can also reduce administration cost when efficient experience sharing scheme can be established (Zhang, et al. 2011; Abolore 2012; Afolabi, Graeme and Runming, 2013). Rating systems can be presented as a business case in terms of promoting a sustainable and eco-friendly image and for making comparison in performances of similar buildings. It gives building owners the opportunity to go above the requirements of government building codes, demonstrate the quality of their buildings to various interested stakeholders and also demonstrate corporate social responsibility. Udechukwu and Johnson (2008) study on the input of green building on valuation approaches concludes that valuers familiar with sustainability will be able to recognize that improvement on facility according to green concepts are appraised differently and may be more valuable than those that are not designed and constructed using such concepts. Conversely, the authors identified cost of certifications and lack of perceived value as hurdles to green practice certifications (UN-HABITANT, 2010; Portalatin, et al. 2010; Adegbile, 2013).

RESEARCH METHODOLOGY

A literature review was first undertaken to determine issues around green building concept, green building rating systems and awareness of green building practice in construction projects in Nigeria. Research instrument used is the questionnaire that was designed to elicit information on respondent's views on issues such as the awareness/knowledge base of green building rating systems and most preferred rating system for possible adoption, perceived benefits to adopt green building concepts in construction projects in Nigeria among others. A questionnaire survey was adopted because it can be used to gather information from large samples. This is similar to methods used in earlier studies (Ali and Al Nsairat, 2009; Adegbile, 2013; Ahn, et al. 2013). Questionnaire survey was the preferred option, because it can be used to gather information from large samples and result can be used for further statistical analysis. The study took place in Lagos State in Nigeria being the economic, financial and commercial nerve centre of Nigeria. Population of the study includes construction industry professional's (Architects, Builders, Civil and Services Engineers, Estate Surveyors, Town Planners and Quantity Surveyors) in public, private and academic institutions. The study adopted random sampling techniques were questionnaires were delivered directly to respondents and filled questionnaires were retrieved two weeks after the administration.

In all, one hundred and fifty (150) questionnaires were distributed to various respondents selected for study. Ninety one (91) responses were retrieved for data analysis. According to Moser and Kalton (1971), the result of a survey could be considered as biased and of little value if the response was lower than 30-40%, the response rate for the research is 61% which indicate an unbiased and higher value of survey. Tables were used for representing descriptive result. The five-point Likert scale (1= not preferred and 5=most preferred) was used to calculate the mean score for each green building rating which was then used to determine its relative ranking in ascending order of agreement. Also, the Likert scale (1=strongly disagree and 5=strongly agree) was used to calculate the mean score for each benefit of green building rating systems which was then used to determine its relative ranking in ascending order of agreement. The averaging statistical analysis was also used to calculate straightforward totals, percentages and averages.

RESULTS AND DISCUSSIONS

The result of the study will be discussed under the following headings:

Characteristics of Respondents that Participated in the Study

Characteristics of respondents that took part in the study are presented in Table 1. From the results presented, it is shown that for the type of business of respondents, 32% of the respondents are Contractors, 31% are in Academia, 12% are in Engineering firm, 8% are in Architectural firm, 7% are in Facility Management firm, 4% are in Consultancy services, 3% are in Government Agencies, 2% are owner/developer and the remaining 1% of the respondent are in Project Management firms. This reveals that the respondents job description fall closely in line with built environment professions. Also, for the ownership status of respondents organization 7% of the organisations operate as Expatriate firm while 93% operate as Indigenous firm. Further results presented in Table 1 regarding the designation of respondents show that 20% of the respondents are Site Engineers and another 14% are Lectures in their various higher institutions, 13% of the respondents are Architects, 11% of the respondents are Quantity Surveyors and NSE- Technicians. 9% of the respondents are Construction Managers and 7% of the respondents are Project Managers and Consultants. 3% of the respondents are Site Managers and Facility Managers while the remaining 2% of the respondents are maintenance Officers. Since most respondents were Site Engineers and Lectures, it suggests that they must have good knowledge of green building practices in construction projects. Moreover, results in Table 1 on academic qualification of respondents indicate that 46% of the respondents have M.sc degrees, 44% possess HND/BSC certificate and degrees, 5% have PGD degrees while 3% and 2% have PhD and OND respectively. Since most respondents have M.sc and HND/BSC degrees, they are academically qualified to provide vital and relevant information about awareness level of green building practices and the accruable benefits in construction projects in Nigeria. Further results from Table 1 indicate that 43% have 5 -10 years of experience, 31% of the respondents have below 5 years experience, 12 % of the respondents have 11-15 years of experience while 7% have 16-20 years of experience and more than 20 years experience respectively. It can be inferred that most of the respondents have a reasonable level of experience. In terms of the professional affiliation of the respondents in Table 1 , it indicates that that 24% of the respondents belong to Nigerian Society of Engineers and Nigerian Institute of Building, 20% of respondents of the belong to Nigerian Institute of Architects, 17% of the respondents belong to Nigerian Institute Quantity Surveying, 7% of the respondents belong Nigerian Society of Estate Surveyors and Valuers, 6% belongs to other professional bodies like Project Management Institute and

NSE-Technicians while remaining 2% belong to Nigerian Institute of Town Planners. Since all the respondents belong to various professional bodies in the built environment, they must have gotten enough insight into the practice of green building through their various meetings.

Table 1: Characteristics of respondents that participated in the study

	Frequency	Percentage (%)
Types of business		
Architectural firm	7	8
Contractors	29	32
Owner/developer	2	2
Government agency	3	3
Facility management firm	6	7
Consultancy firm,	4	4
Project management firm,	1	1
Engineering firm	11	12
Total	91	100
Designation of Respondents		
Architects	12	13
Construction managers	8	9
Site managers	3	3
Site Engineers	18	20
Project managers	6	7
Quantity Surveyors	10	11
lecturers	13	14
Facility Manager	3	3
Consultants	6	7
Maintenance officers	2	2
Others(NSE-Technicians)	10	11
Total	91	100
Academic Qualification		
OND	2	2
HND/B.sc	40	44
PGD	4	5
M.Sc	42	46
Ph.D	3	3
Total	91	100
Years of experience		
below 5	28	31
5 -10	39	43
11-15	11	12
16-20	6	7
Above 20	7	8
Total	91	100
Professional affiliation		
Nigerian Institute of Building	22	24
Nigerian Institute Quantity Surveying	15	17
Nigerian Institute of Architects	18	20
Nigerian of Engineers	22	24
Nigerian Society of Estate surveyors and Valuers	6	7
Nigerian Institute of Town Planners	2	2
Others(PMP, NSE Technicians)	6	6
Total	91	100

Awareness on Green Building Rating System in Construction Project

To identify respondent's awareness and knowledge relating to green building rating systems, the awareness and knowledge of some well-known green building rating systems were analysed. The results in Table 2 indicate that 61% of the respondents are aware and also have knowledge of leadership in energy and environmental design (LEED), 47% of the respondents are aware of the building research establishment's environmental assessment method (BREEAM), 33% of the respondents are aware of comprehensive assessment system for building environmental efficiency (CASBEE), 27% of the respondents are aware of green globes while 22% of the respondents for Green homes (IGBC) and the least of 20% are aware of for Green Star. These results suggest that most of the building industry professionals in Nigeria are familiar with identified green building rating systems. However, there is need to bridge knowledge gaps among built environment practitioners in Nigeria as this is major obstacle to incorporating green building and sustainable design and construction practices. Stakeholders at all levels require urgent and effective large scale capacity building and awareness program including technical knowledge needed to deliver solutions.

Most Preferred Assessment Systems in Construction Project

To investigate further the respondents were asked to rate a list of green building rating system for possible adoption in Nigeria using a Likert scale (1 = Not preferred and 5 = most preferred), thus providing a means to rank them on average response. Survey respondents in Table 3 indicate that the green building rating system LEED was most preferred with MS= 4.06 and ranked first, BREEAM was ranked second in order of preference with MS= 3.73, CASBEE ranked 3rd with MS= 3.54, while green Globes and Green homes were ranked fourth with MS= 3.43 and finally green star was least preferred with a MS= 3.13 and ranked fifth. It was also found that Leadership in Energy and Environmental Design (LEED) is the most preferred green building rating system for possible adoption. Literatures clearly support these findings. Similar results in Nigeria showed that Leadership in Energy and Environmental Design (LEED) is the most preferred rating system preferred by built environment professionals (Adegbile 2013) and also validated by this study.

Table 3: Most preferred green building rating systems

Assessment Systems	Mean score	Over-all ranking
LEED	4.06	1
BREEAM	3.73	2
CASBEE	3.54	3
GREEN GLOBES	3.43	4
GREEN HOMES	3.43	4
HK-BEAM	3.24	6
GREEN STAR	3.13	7

Benefits of Adopting Green Building in Construction Projects

The various benefits that drive green building on the construction projects are summarized in Table 4. Respondents who participated in this study were asked to rank their level of agreement of green building benefits in possible green construction projects. The results of the survey study indicated that the most perceived benefits of green building by study participants were pursuing active recycling (MS =4.84) ranks first, conserving natural resources (MS=4.56) ranks second and preventing global warming (MS =4.50) ranks third. These results suggest that that the most important benefits of adopting green building practices in construction projects lies in conservation of environment. Another important benefits were decreasing environmental damage cost (MS= 4.30) ranks fourth, improving productivity (MS= 4.15) ranks fifth, maintaining integrity of environment (MS=4.04) sixth while improving quality of life for individuals and society as a whole (MS=4.00) seventh. These results indicate that respondents' believe that buildings should be constructed with appreciation on the importance of providing high quality interior environments for all occupants and users. Other benefits of green building were using renewable natural resources (MS=3.99) ranks eighth, reducing energy consumption and cost (MS=3.97)ranks ninth, protecting air, water and land ecosystem (MS=3.93) ranks tenth, minimizing waste production and disposal and decreasing health cost (MS=3.88) ranks eleventh, improving health and comfort and well-being (MS=3.77) rank twelfth, improving economic growth(MS=3.68) ranks thirteenth, reducing water consumption and cost (MS=3.60) fourteenth while reducing water consumption and cost (MS=3.51) ranks sixteenth. These results suggest that they are as well important benefits of green building practice in the built environment. In addition, respondents also identified lowering infrastructural cost (MS=3.48) ranks seventeenth , raising real income and improving return on investment (MS=3.42) ranks eighteenth, understanding the importance of social and cultural capital (MS 3.20)ranks nineteenth, Alleviating poverty (MS 3.19) ranks twentieth and understanding the multi-disciplinary communities (MS 3.12) ranks twenty-first. The other less recognised benefits of green building practices were decreasing absenteeism from work (2.99) ranks twenty-second, minimizing cultural disruption (2.85) ranks twenty-third , while providing education services (MS=2.83) ranks twenty- fourth. It must also be noted that all the identified benefits had almost mean scores above 3.00, this shows that they all are significant in the present study. Furthermore, it also showed that green building produces functional results by improving productivity and minimises negative environmental impact created by construction activities.

Table 4: Benefits of adopting green building rating systems in construction projects

Perceived benefits	Mean score	Over-all ranking
pursing active recycling	4.84	1
conserving natural resources	4.56	2
preventing global warming	4.50	3
decreasing environmental damage cost	4.30	4
improving productivity	4.15	5
maintaining integrity of environment	4.04	6
improving quality of life for individuals and society as a whole	4.00	7
using renewable natural resources	3.99	8
reducing energy consumption and cost	3.97	9
protecting air, water and land ecosystem	3.93	10
minimizing waste production and disposal	3.88	11
decreasing health cost	3.88	11
improving health, comfort and well-being	3.77	13
improving economic growth	3.68	14
satisfying human needs	3.60	15
reducing water consumption and cost	3.51	16
lowering infrastructural cost	3.48	17
raising real income	3.42	18
improving return on investment	3.42	19
understanding the importance of social and cultural capital	3.20	20
Alleviating poverty	3.19	21
understanding the multi-disciplinary communities	3.12	22
decreasing absenteeism from work	2.99	23
minimizing cultural disruption	2.85	24
providing education services	2.82	25

Implications of the Study for Policy, Theory and Practice

The study is aligned to previous research (see Ali and Al Nsairat 2009; Adegbile 2013) and provides further evidence that the knowledge base of built environment professionals are on the increase. It can be inferred from the results of this study that the more knowledgeable the built environment professionals are the more the adoption of green practices in construction projects in Nigeria. Implication of these findings for policy makers in government and practitioners is in the full development of assessment scheme for rating buildings. The findings of this study also provide evidence to support the green building benefits that pursing active recycling, conserving natural resources and preventing global warming all enhance sustainability practices.

CONCLUSIONS

The negative environmental impact of buildings and the accruable benefits of green building rating systems have been presented at the introduction and literature sections of this study. Thus, raising awareness of green building rating systems

and practices among construction professionals in construction projects has been linked to the better understanding of the goals of green building or sustainable development. The practice of green building should be embraced not only because of its humanity concerns and environmental legislation but also because of its capability to increase financial profit and long-term competitiveness of buildings. A survey instrument was developed and responses from ninety-one (91) respondents were collected. Seven (7) well-known green building rating systems and twenty-five (25) perceived benefits of green building factors were identified from literature review.

Based on the findings emanating from this study it can be concluded that Nigerian built environment professionals are aware of the green building rating systems applicable to construction projects. The result seemed to be consistent with results of other similar studies though there might be differences in methods. The study recommends the full establishment of Green Building Council of Nigeria (GBCN) that would introduce guidelines, tools or techniques that will drive green building practices for future project. This would encourage investors and practitioners in the built environment in adopting green building practices as a way of mitigating negative environment impacts of buildings to the environment.

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