ASSESSING ENVIRONMENTAL DEMANDS AND STRATEGIES FOR IMPLEMENTING SUSTAINABLE BUILDING CONSTRUCTION PRACTICES IN ENUGU STATE

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Abstract
This study assessed the environmental demands and strategies for implementing sustainable building construction practices in Enugu State. The study was carried out in Enugu State, Nigeria. The study adopted a descriptive survey research design. Two research questions guided the study. The population of the study involved 1,024 respondents consisting of 316 Architects and 708 Civil Engineers. A sample of 288 respondents comprising of 121 Architects and 167 Civil Engineers, were drawn using simple random sampling technique. The sample size of 288 respondents was gotten using the Taro Yamane formula for sample size. A questionnaire consisting of 22 items titled: Questionnaire on Assessing Environmental Demands and Strategies for Implementing Sustainable Building Construction Practices (Q.A.E.D.S.I.S.B.C.P) was used to elicit information from the respondents. The questionnaire was validated by three experts. The five-point Likert type scale of Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), & Strongly Disagree (1) was employed in the design of the instrument. Cronbach alpha was used to determine the reliability of the instrument which yielded 0.972 coefficients. The result of the study was analyzed using Mean Statistics. The study identified that minimizing building construction waste, training and retraining of building practitioners in line with latest practices in sustainable construction will promote sustainable building construction practices in Nigeria. The study recommended among others that government should do more to market incentive schemes across the construction industry in order to increase the awareness of sustainability for building stakeholders.
Keywords: Building Construction, Sustainable Construction, Sustainable Construction Practices and Environmental Demands.

Introduction

The building construction sector has been very significant in the development of the economy of many nations around the globe. Housing which is a major component of the building construction sector has been relevant to all activities of man from time immemorial. As noted by Adeagbo (2014), housing is a key input in economic, social, and civic development because many housing-related activities contribute directly to achieving broader socio-economic development goals. It is a major driver of economic growth worldwide because housing construction also creates job opportunities. According to Greg (2016), building construction is the art or business of assembling materials into a structure. Building construction is the process of adding structures together in order to create a real property or infrastructure (Sattar, 2018). Building construction is the use of technical processes, technological methods or knowledge in assembling structures for making buildings which could serve different purposes for mankind such as offices, schools, residents, healthcare, recreation facilities and more.

The basic steps involved in building construction include; planning, preparation of construction sites, foundation construction/substructure construction and superstructure construction. Planning in building construction involves, developing the building plan, analyzing the finance and selecting the construction team (Lafarge, 2015). Analyzing the finance includes calculating the material cost, construction cost, labour cost and miscellaneous cost. Site preparation includes carrying out necessary excavations, leveling, and filling of the soil (Mohamed, Shimaa, & Mahmoud, 2018). Other steps involved in building construction include the excavation of utilities, power lines, water lines, installation of temporary storage facilities on site, substructure and superstructure construction.

Substructure construction is the excavation of the soil to construct the foundation (Kissick, Fenwick, Kapatoes, Mackie, & Soisson, 2006). Superstructure involves the construction of the roofs or siding, installation of heating, ventilation and air conditioning, installation of electric and water connecting lines (Adeagbo, 2014). Superstructure also involves the plaster and finishing of the walls, flooring, exterior and interior painting of the finished building. All these steps are mostly carried out by professionals and stakeholders who are specialized in the building construction sector/industry.

The building construction industry encompasses all who plan, develop, produce, design, build, alter or maintain the built environment. The building construction industry also includes manufacturers and suppliers of construction materials, clients, contractors, consultants and end users of facilities (Abidin, 2010). The industry is a very important element of the economies of many nations and has had a significant impact on the environment. By virtue of its size, building construction is one of the largest users of energy, material resources, and water, and also a formidable polluter of the environment (Solaimani & Sedighi, 2019). The consumption of material and energy has increased all over the world in the past two decades, especially in the built environment. Building construction currently consumes between 70-80% of raw materials worldwide (Alli, Alli & Akolade, 2018). With major development in the building sector, the pressure on limited resources is getting higher. In response to these impacts, there is growing consensus among organizations committed to environmental performance targets that appropriate strategies and actions be optimized to make building construction activities more sustainable (Ergungor, 2016). With respect to such significant influence of the building construction industry, the sustainable building approach has a high potential to make a valuable contribution to sustainable development. Studies show that awareness of sustainable development goals (SDGs) and its many progenies, such as sustainable construction, is vital to ensure realization (Olatunde & Olabode, 2021).

Sustainability means the processes that help to strengthen the relationship between the environmental, social and economic resources in the society. With reference to the building sector, sustainability is about ensuring that a building is environmentally friendly, economically feasible as well as that it provides a healthy and quality indoor environment to its users (Alli et'al, 2018). Sustainable construction can be viewed as a subset of sustainable development applied to the construction industry. It is the creation and responsible management of a healthy built environment based on resource efficient and ecological principles (Grumman, 2018). Sustainable building construction refers to various methods applied for implementing construction projects that involve environmental preservation, increased reuse of waste for the production of construction materials, actions fruitful to the society, and profitable aspects for the construction companies (Kibert, 2013). Sustainable Construction focuses on the adoption of materials and products in buildings and construction that will consume fewer natural resources and increase the reusability of such materials and products for the same or similar purpose. In other words, the adoption of sustainable approach in building construction should be widely encouraged among building stakeholders.

Approach is the ability to apply certain processes to maintain a standard or to improve the quality, appearance, and condition of something. Sustainable building construction approaches involves the design and management of built structures, the performance of materials across all scales and throughout their whole use-cycles; and the use of renewable energy resources as well as their attendant technologies in building, operation, and maintenance to reduce global greenhouse gas emissions (Lafarge, 2015). In the United States, the Environmental Protection Agency (EPA) (2018), described sustainable building construction approaches as "the practice of creating building structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from sitting to design, construction, operation, maintenance, renovation and deconstruction. Stainz (2019) maintained that sustainable building construction approaches strives to minimize the consumption of energy and resources for all phases of the life-cycle of buildings - from their planning and construction through their use, renovation and to their eventual demolition. It also aims to minimize any possible damage to the natural environment.

According to Jiang Huang and Zhou (2019) sustainable construction can be achieved by applying the following principles during the entire building process: lowering the energy demand and the consumption of operating materials, utilization of reusable or recyclable building products and materials, extension of the lifetime of products and buildings, risk-free return of materials to the natural cycle,

comprehensive protection of natural areas and use of all possibilities for space-saving construction--these are sustainable approaches to building construction. Gatley (2019) listed some approaches to sustainable construction which include: using renewable and recyclable resources; reducing energy consumption and waste; creating a healthy, environmentally-friendly environment; protecting the natural environment--these are sustainable approaches to building construction. The implementation of sustainable construction approaches in building construction involves good planning measures that can considerably improve the overall economic efficiency of buildings (costs of construction, operation, use, environment, health as well as non-monetary values). It is important that contractors optimize construction approaches for sustainable construction in order to make more gains, become more efficient organizations and take advantage of the financial benefits, as well as having a more positive impact on the environment and society in general.

The gains of sustainable building construction involve the transition from a linear to a circular economy of renewable energy generation, material and waste recycling, water harvesting and preservation. It also involves transferable technologies, and the adaptability of structures to changes in use; innovative financing models premised on an economy of means that yields more with less; and the reinvestment of returns back into the common domain for collective benefit (Ganiyu, Fapohunda, & Haldenwang, 2015). Similarly, Gatley (2019) listed some of the gains of sustainable construction to include; the promotion of socially-viable living and working environments, including occupational health and safety standards for labor forces and users; and the democratization of all processes pertaining to the production and use of the built environment as a common wealth.

In spite of the many gains associated with sustainable building construction practices, there are some setbacks to its full adoption especially in Enugu State. Owusu, Chan and Ameyaw (2019) reported that in some cases in Enugu State, building projects lack sustainable designs and are not executed in accordance with latest sustainable construction practices. Sustainable construction approaches that will improve the safety of builders are not employed in many cases (Aghimien, Adegbembo, Aghimien, & Awodele, 2018). Most buildings lack good access roads, poor indoor environmental quality and poor landscaping (Daniel, Oshineye. & Oshodi, 2018). Others are riddled with poor drainage systems, poor lighting, and lack of good pipe borne water, poor ventilation and poor room space among others. In recent time, most building projects in Enugu State are not properly monitored and supervised by professional builders consequently resulting in building failure and collapse (Ekpo, 2019). Moore, (2019) attributed the poor or non adoption of sustainable construction practices to human errors or negligence; ranging from absence of soil tests, structural designs by quacks, uncoordinated activities between professional bodies, non-adherence to specifications, poor and bad construction practices, use of substandard materials, lack of proper supervision, illegal conversion of buildings, poor monitoring of work force, foundation failures, bad designs. Studies also shows that poor adoption of sustainable construction practices in Enugu State could also be as a result of poor-performance on the part of the construction team including the; architect, quantity surveyor and the civil/structural engineer. Although, like the developed countries, government and professional bodies in Nigeria have in place specific rules and regulations to maintain required and acceptable standards as regards building projects.

However, Dalibi, Feng, and Danja, (2017) noted that due to weak accountability and political will, these rules are not enforced nor properly monitored and consequently results in omission of performance; as such, the menace is growing in alarming rate in many cities in Nigeria including Enugu State. The consequences of poor or non adoption of sustainable construction practices could lead to non-performance of buildings which could result to incalculable losses, not only in that of human lives and injuries, but also in loss of materials and investments not recoverable by the client. Also, professional bodies such as Architects Registration Council of Nigeria (ARCON), Council of Registration of Engineering in Nigeria (COREN) and government bodies as stated by Ergungor (2016) are not doing enough by ensuring that building stakeholders adopt sustainable construction practices. This really call for concern, as all professionals (architects, engineers, builders, quantity surveyors) in the building industry are supposed to work together from the inception stage of a building project to the completion stage and through the defect liability period before the final handing over. Short of this collaboration, and corporation, the adoption of sustainable building construction will be a mirage.

Statement of the Problem

Every aspect of building planning process from the architectural designs through to the mechanical, electrical, structural engineering, construction and maintenance require proper supervision and quality input by professionals and stakeholders in the building industry. The involvement and input of professionals in the building industry from the design to the construction of the buildings; including the supervision at every stage is vital if sustainable building construction practices is to be well implemented. And the absence of these, results into failed projects and poor functional performance of buildings.

However several reports shows that sustainable construction practices is yet to be fully accepted, adopted and practiced among building professionals in Nigeria, especially in Enugu State. Reports indicate that in most cases in Enugu State, building projects lack sustainable designs and are not executed in accordance with latest sustainable construction practices. Sustainable construction approaches that will improve the safety of builders are not usually employed in the construction phase most cases. Studies show that most buildings lack good access roads, poor indoor environmental quality and poor landscaping. Others are riddled with poor drainage systems, poor lighting, and lack of good pipe borne water, poor ventilation and poor room space among others. Studies also show that most building projects in Enugu State are not properly monitored and supervised by professional builders consequently resulting in building failure and collapse. These could be attributed the poor or non adoption of sustainable construction practices to human errors or negligence; ranging from absence of soil tests, structural designs by quacks, uncoordinated activities between professional bodies, non-adherence to specifications, poor and bad construction practices, use of substandard materials, lack of proper supervision, illegal conversion of buildings, poor monitoring of work force, foundation failures, bad designs. Studies also shows that poor adoption of sustainable construction practices in Enugu State could also be as a result of poor-performance on the part of the construction team including the; architect, quantity surveyor and the civil/structural engineer. The consequences of poor or non-adoption of sustainable construction practices could lead to non-performance of buildings which could result to incalculable losses, including that of human lives and injuries, loss of materials and investments. It is on the premise of these issues that the study assessed the environmental demands and strategies for implementing sustainable building construction practices in Enugu State. Specifically, the study seeks to ascertain the following:

1. The environmental demands associated with the adoption of sustainable building construction practices in Enugu State.
2. How to achieve sustainable building construction practices in Enugu State.

Research questions

The following research questions guided the study

1. What environmental demands are associated with adopting sustainable building construction practices in Enugu State?
2. How can sustainable building construction practices be achieved in Enugu State?

Research Hypothesis

The following hypothesis was tested at 0.05 level of significance:

There is no significant different on the mean responses of architects and civil engineers on the environmental demands associated with the adoption of sustainable building construction practices in Enugu State**.**

Literature Review

Gains Associated with Sustainable Construction Practices

Naturally, adopting sustainable construction methods will reduce construction impact on the environment. As contractors involved in construction, an understanding of new materials and construction techniques may be required in order to be part of the most lucrative and innovative projects. The truth of the matter is that green buildings do come with lower operating costs. In fact, research suggests that the use of the latest sustainable technologies in construction processes could potentially deliver a remarkable €410bn a year in savings on global energy spending (Du Plessis, & Landman, 2016). There are also direct savings available for organization; by reducing waste, especially via reduction in the fees charged by waste management companies. By adopting more efficient vehicles, people will save on fuel costs. Sustainable construction can help organization's reputation by demonstrating a sense of corporate social responsibility. Other gains of sustainable construction include the following:

a. Enhanced environmental protection: Sustainable construction practices can help protect the environment by reducing pollution and waste, and by using resources more efficiently.

b. Improvement in social and economic conditions of the built environment: Sustainable construction practices can help improve social and economic conditions in construction-related industries and communities by providing improved safety for workers on site. It could also provide a secure environment for the occupants, create more jobs and provide more training opportunities for building workers (Grumman, 2018).
c. Improved resistance to Environmental threats: Sustainable construction practices can help increase the resistance of buildings and infrastructure to climate change and other environmental threats such as winds, snow, rain and sunlight etc.
d. Improvement in occupant's general well-being: due to the improved indoor air quality and increased natural light in sustainable building construction, occupant health and general well-being are improved.
e. Improvement in the method of construction: Sustainable construction practices often result in the use of healthy construction practices. A healthy and improved construction practice often leads to more efficient and effective construction processes, as well the use of less harmful construction materials (Koko & Bello, 2020).
f. Construction management: The adoption of sustainable construction practices can lead to improved construction management. This can be achieved by improving communication and coordination among construction professionals and by adopting the use of more efficient construction methods and materials among building construction stakeholders.
g. Improved building performance: Better performing buildings that make use of less energy, less waste of water and other resources, and generation of less pollution could also come from sustainable construction practices.
h. Reduction in Lifecycle Costs and maintenance: Due to the improved energy and water efficiency, buildings designed and constructed through sustainable principles often have lower operating and maintenance costs than conventional buildings (Ganiyu et al, 2015).

Challenges of Sustainable Construction Practices

Adoption of sustainable construction methods among building stakeholders takes a significant amount of time to come into fruitarian. The clients' attitudes and available budget will be the most significant constraint or enabling factor. There will always be pressure on contractors to reduce costs where possible, but there are still concerns that sustainable construction methods will cost an organization more. The World Green Building Trends 2018 Smart Market Report reveals that almost 40% of UK firms reported that affordability was the greatest challenge presented by adopting sustainable construction practices (Blaxter, Hughes, & Tight, 2018). Almost 50% of firms stated that they expected green buildings to incur higher first costs. Coupled that with 34% of firms reporting that they face client demand for greener buildings, many construction firms fear that they will be caught in the middle of demand and high costs (Blaxter et al, 2018). Owners of a green building feel they are worth 7% more than a traditional one, which is likely due to the reduced operating costs that result from building energy-efficient structures (Bourassa, Donald, Patric, & Martin, 2012).

In Nigeria, continuous professional development required by the engineers, builders, quantity surveyors, and other building construction professionals could be very challenging and expensive. However, once these building professionals are able to up-skill and upgrade their skill and expertise then it could become a driving force in adopting sustainable construction practices for the industry (Drew & Herbert, 2012). The poor state of sustainability in the building environment is predicated on a lack of awareness of the benefit among building stakeholders in Nigeria. One unique challenge of sustainable buildings in Nigeria according o Al-Sanad, (2015) is the lack of awareness. This implies that a lack of awareness of the benefits of sustainable construction practices is the reason for the people's low level of acceptability of the concept. Also Koko and Bello, (2020) found that development finance and government apathy to sustainability are challenges that affect the engagement with the concept in Nigeria. The lack of understanding, insufficient governmental support and lack of legislation and finance are issues that bedeviled adopting sustainable building construction practices. Accordingly, the study of Ugochukwu and Onyekwena, (2014) reports that the challenge of sustainable construction practices in developing countries included blending local materials with sustainable new building innovations. Thus, built environment participants must begin to savour the benefits of local building materials in promoting sustainability. Aghimien et al, (2018) found that the challenge to sustainable construction practices in developing countries like Nigeria included the absence of capacity of the construction sector, uncertain economic environment, poor data accuracy, poverty and lack of interest by the stakeholders in sustainability

and poor research to the adoption of modern techniques.

According to Beracha and Johnson (2012) most Nigerian builders are reluctant to change as they are not ready to adapt to latest development around the world especially in the building construction industry. Lack of expertise and professional knowledge; lack of strategy to promote sustainable construction; Lack of demand; Lack of legislation, enforcement and monitoring; and Lack of government incentives are considered to be significant barriers affecting the growth of sustainability in Nigeria. Daniel, Oshineye and Oshodi, (2018) submitted that the most prevalent barrier was the lack of information that would allow practical implementation of practices, clarify the reasoning behind the need for these practices and the benefits to the trade. Ljiljana and Elain, (2015) stated that professional builders should be encouraged to upgrade their knowledge, skill and expertise on latest sustainable practices such as: net zero operational carbon net, zero embodied carbon, sustainable water cycle, sustainable connectivity and transport. Others include; sustainable land use and biodiversity, good health and wellbeing, sustainable communities and social value sustainable life cycle cost.

Methodology

This study adopted descriptive survey research design to elicit information from registered building construction stakeholders (architects & civil engineers) in Federal Ministry of Lands, Housing and Urban Development Enugu State Branch. Akadiri (2012) stated that descriptive survey is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire population. The population of the study involved 1,024 respondents consisting of 316 Architects and 708 Civil Engineers. A sample of 288 respondents comprising of 121 Architects and 167 Civil Engineers, were drawn using simple random sampling technique. The sample size of 288 respondents was gotten using the Taro Yamane formula for sample size.

The researchers developed a well-structured 22-item questionnaire titled: Questionnaire on Assessing Environmental Demands and Strategies for Implementing Sustainable Building Construction Practices (Q.A.E.D.S.I.S.B.C.P) as an instrument for data collection. Three experts from the Department of Industrial Technical Education, Faculty of Vocational and Technical Education, University of Nigeria Nsukka, validated the research instrument. The validates' responses and corrections were used to improve and create the final instrument that was used for data collection. Cronbach alpha reliability method was used to determine the internal consistency of the questionnaire items and 0.972 was obtained. The researchers distributed copies of the questionnaire with the help of three research assistants to the respondents. The five-point Likert type scale of Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1) was employed in the design of the instrument. The statistical package for social sciences (SPSS) version 23 was used for the data analysis. The result of the study was analyzed using Mean Statistics. Any item of the questionnaire with mean of 3.50 or above was considered agree; while any item of the questionnaire with mean value below 3.50 was considered to be disagree. The hypothesis was tested at 0.05 level of significance. The null hypothesis was accepted when the p-value (t-calculated) is greater than 0.05 level (t-critical) but the null hypotheses was rejected when the p-value (t-calculated) is less than 0.05 level value of the t-critical.

Results

Data for answering research questions 1 to 2 were presented in table 1 to 2

Table 1: Mean responses and standard deviation of respondents on the environmental demands associated with the adoption of sustainable building construction practices in Enugu State.

N = 288

S/N	Item Statements	$\bar{X}$	SD	P-values	Remarks	SIG
1	Consumption of significant low amounts of the earth's resources, especially energy needed to maintain comfortable living conditions	4.38	0.82	0.15	Agree	NS
2	Decreased energy consumption translates to fewer fossil fuels being burned and reduced to carbon emissions.	4.13	1.04	0.13	Agree	NS
3	Generation of lower polluting toxins and waste to the environment	3.95	0.86	0.17	Agree	NS
4	Creation of little or no conditions leading to a loss of soils and biodiversity	4.04	1.09	0.16	Agree	NS
5	Creation of little or no interference with life support systems such as the water cycle, soil systems and air quality	4.52	0.54	0.15	Agree	NS
6	Drastic reduction in urban sprawl	4.46	0.50	0.17	Agree	NS
7	Drastic reduction in traffic pollution					
8	Drastic reduction in social inequities and alienation	3.54	1.09	0.14	Agree	NS
9	Recycling of waste that reduces the amount of waste that ends up in landfills	3.56	1.14	0.18	Agree	NS
10	Recycled wastes translate to reduction in the need for new raw materials	4.04	1.09	0.16	Agree	NS
11	Emission of fewer greenhouse gases in the atmosphere	4.14	1.29	0.14	Agree	NS
	Grand Mean	**4.05**	**0.12**	**1.16**		

Key: $\bar{X}$ = Mean, SD =Standard Deviation, NS-Not significant.

Data in Table 1 reveal that all the 11 items have their mean values ranging from 3.95 to 4.52. This shows that the mean value of each item was above the cut-off point of 3.50, indicating that 11 items were agreed by the respondents as the environmental demands associated with the adoption of sustainable building construction practices. The SD ranged from 0.50 - 1.09 which showed that the respondents are not too far from each other in their responses. This also indicates that the respondents acknowledge the items as the environmental demands associated with the adoption of sustainable building construction practices.

On the other hand, the hypothesis showed that all the 11 items in table 1 have their p-values greater than 0.05 level of significance. The null hypothesis was therefore accepted meaning that there is no significance difference in the mean responses of the architects and the civil engineers on the items suggested as the environmental demands associated with the adoption of sustainable building construction practices in Enugu State. Therefore, the hypothesis that there is no significant different on the mean responses of architects and civil engineers on the environmental demands associated with the adoption of sustainable building construction practices in Enugu State was accepted.

Table 2: Mean Responses of Respondents on how sustainable building construction practices will be achieved in Enugu State. ***N = 288***

S/N	Item Statements	$\bar{X}$	SD	Remarks
12	Strict adherence to use of quality building materials in project execution.	3.73	1.16	Agree
13	Engagement of professionals and competent workforce during the design and construction phase of every project	4.67	0.47	Agree
14	Training and retraining of building practitioners in line with latest practices in sustainable construction	3.82	0.99	Agree
15	Passing and signing the national building code in line with sustainable construction practices	4.03	1.13	Agree
16	Using non-toxic and sustainable construction materials	3.97	1.06	Agree
17	Reducing and reusing resources	4.17	1.08	Agree
18	Minimizing building construction waste	4.67	0.47	Agree
19	Making use of sustainable building materials such as recycled glass, recycled plastic, bamboo, recycled steel, pervious concrete	3.82	0.99	Agree
20	Making use of green construction methods	4.03	1.13	Agree
21	Making use of innovative construction technology such as installation of water heaters, rooftop solar panels and smart windows that block ultraviolet rays from the sun	3.97	1.06	Agree
22	Making use of sustainable design elements such as green roofs, cool roofs that can mitigate urban heat island effect.	4.62	0.47	Agree
	Grand Mean	**3.92**	**0.72**	

Key: $\bar{X}$ = Mean, SD =Standard Deviation

Data in Table 2 reveal that all the 11 items have their mean values ranging from 3.73 to 4.17. This showed that the mean values of each item was above the cut-off point of 3.50, indicating that all the 11 items were agreed upon by the respondents as how sustainable building construction practices will be achieved in Enugu State. The SD ranged from 0.47 - 1.16 which showed that the respondents are not too far from each other in their responses. This shows that the respondents recognize the items as ways through which sustainable building construction practices will be achieved in Enugu State.

Discussion of the Findings

The findings from Table 1 indicate that the environmental demands associated with the adoption of sustainable building construction practices in Enugu State are: consumption of significant low amounts of the earth's resources, especially energy needed to maintain comfortable living conditions and recycling of waste that reduces the amount of waste that ends up in landfills. The findings are supported by Ergungor (2016) who said that sustainable construction allows for reduced operation and utility costs, reduced maintenance costs, and an overall improvement in the buildings performance and efficiency. Also, the findings are also supported by Blaxter et al, (2018) who revealed that sustainability in building can promote energy cost savings; water cost savings; mechanical equipment downsizing.

The findings from Table 2, shows how sustainable building construction practices can be achieved in Enugu State. Some of them include that, there should be strict adherence to use of quality building materials in project execution and making use of innovative construction technology such as installation of water heaters, rooftop solar panels and smart windows that block ultra violet rays from the sun. The findings are supported by Grumman (2018) who stated that application of sustainable construction practices leads to improved social and economic conditions: Sustainable construction practices can help improve social and economic conditions in construction-related industries and communities by creating jobs and providing training opportunities. Also sustainability will have a big positive effect on the building construction industry by improving the safety of builders and building occupants and ensuring easy maintenance of building facilities. Also, Ganiyu et al, (2015) backed up the findings by stating that houses that are designed and constructed using sustainable principles often have lower operating costs than conventional buildings. This is due to the improved energy and water efficiency of sustainable buildings.

Conclusion

The study assessed the environmental demands and strategies for implementing sustainable building construction practices in Enugu State. The study found that some of the environmental demands associated with adopting sustainable construction practices include; consumption of significant low amounts of the earth's resources, especially energy and traffic pollution. The study also shows that some strategies for implementing sustainable building construction practices in Enugu State include: making use of sustainable design elements such as green roofs, cool roofs that can mitigate urban heat island effect. The adoption of the use of sustainable construction materials such as recycled plastics, rubbers and other building materials for future construction works. The Nigerian construction industry is still far from adopting sustainable construction practices. In order to help achieve a faster adoption of sustainable construction practices amongst Nigerian construction stakeholders, the awareness and benefits of sustainable construction practices must be propagated.

Recommendations

Based on the findings, the following recommendations were made;

1. Stricter government legislation, enhanced education and communication are needed to ensure compliance by all building stakeholders. The government needs to do more to market incentive schemes across the construction industry in order to increase the awareness of sustainability for building stakeholders.
2. The government needs to do more in driving sustainable construction in terms of law and legislation to enforce a sustainable construction industry so as to get the contractors operating in the sector to operate in a sustainable manner.

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Conflict of Interest

The authors declare that they have no conflicts of interest.

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