

Effective Procurement Practices In A Developing Economy for Sustainable Construction

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Abstract

In spirit with global demand on the construction industry's practitioners to attain environmental friendliness through Sustainable Construction (SC), the paper identified effective procurement practices in a developing economy, with a view to guiding construction practitioners' decision on accomplishing SC. Ontological philosophical approach was adopted; it employed an exploratory design as a stand-alone design using literature review. Finding identifies effective practices as: environmental impacts assessment, SC consciousness at predesign and design stage, SC strategy application at construction stage, and the application of ICT support system for sustainability evaluation. The study recommends: construction professionals to adhere to practices that will support SC, research activities on SC be encouraged, adequate research funding provided, and government to enforce the implementation of sustainable development.

Keywords: Developing economy, Effective Procurement, Practices, Sustainable Construction

Introduction

Since time immemorial, man has relied on procurement to acquire what he needs from others. His needs can be for a service, a product or both. In general parlance, procurement is defined as the process of obtaining goods and services from another for some consideration (Oxford Dictionary of English, 2010; Aqua Group, 1999). However, procurement is much more complex in the construction industry than in other industries (Ibrahim, 2008). when used in construction context, procurement is defined as a series of interdependent operations undertaken within a well-defined framework involving a matrix of organizations (client, consultants, contractors, suppliers, government, etc.) used in acquiring a construction project (Inuwa, 2014; Hughes, 2012; Ramus, Birchall & Griffiths, 2006; Rashid, Nasib, Ahmad, Taib, Ali, & Zainordin, 2006).

In addition to the aforementioned complexities is the global need and demand on the construction industry to exhibit procurement practices that will embrace a SC environment for sustainable development (Zubairu, 2012; Krigsvoll, Morbiducci, & Fumo, 2010). SC evolved as means for realising sustainable development; its aim is to produce construction structures that meet the needs of humans in the present without limiting the ability of future generations to meet their own needs (Brundtland Report, 1987). This is achieved by holistically addressing the impacts of the construction industry on the economy, environment and the society (Makuei & Oladapo, 2014; Krigsvoll, *et al.*, 2010; Ugwu, Kumaraswamy, & Wong,

2003; Nwokoro & Onukwube, 2011). These are properly addressed in practice by tailoring the complexities in construction procurement in an effective manner to curtail the consequences of construction activities on its host community by ensuring that all construction works fulfil functional and technical performance requirements, considering also its environmental, social and economic performances (Krigsvoll, Fumo, & Morbiducci, 2010).

The process, systems, matrix of organizations, and the task of exhibiting procurement practices that embraced sustainable development have made construction procurement more complex than other forms of general procurement. Hence the need for the management of the process to be undertaken by people with appropriate knowledge, skills, expertise and tools (Inuwa, 2014; Hughes, 2012; Ibrahim, 2008). The developed economies such as China, Japan, United Kingdom, Sweden and the United States of America, have for long recognized the global importance attached to sustainability by establishing different research programmes to investigate the problems and issues related to construction sustainability practice. In some cases, these have resulted in tools and systems for evaluating the sustainability of projects (Zubairu, 2012; Ugwu, Kumaraswamy, & Wong, 2003).

However, this is in disparity with the situation in a developing nation like Nigeria, where construction outputs are rising in the

face of limited national and institutional capacities to implement SC (Makuei & Oladapo, 2011; Nwokoro & Onukwube, 2011). Moreover, the numerous problems confronting the Nigerian construction industry (NCI), coupled with its inability to provide the enabling environment for sustainable development, as well as the requisite potentials to address the challenges of globalization, have remained a serious concern to all in the Nigerian economy (Idoro, 2014; Mbamali & Okotie, 2012; Odediran, *et al.* 2012; Aniekwu & Audu, 2010). Thus, the NCI is frequently criticized by clients and other stakeholders for poor procurement performance (Aniekwu & Audu, 2010; Idoro & Akande-Subar, 2008; Saleh, 2004). Zubairu (2012) confirmed that for the construction industry in a developing economy to attain SC, construction researchers must focus their thinking on sustainable development; this should be continued in practice so that every building professional will focus on sustainability in the construction industry. Hence, this paper aimed at identifying effective procurement practices in a developing economy, with a view to guiding construction procurement practitioners' decision on accomplishing SC in Nigeria.

Construction Procurement Professionals

The activities of construction procurement involve different professionals who include Architects, Surveyors, Civil Engineers, Quantity Surveyors, Mechanical Engineers, Structural Engineers and Interior designers (Inuwa, Wanyona, & Diang'a, 2014; Hussin & Omran, 2009 in Kehinde & Oluwakemi, 2014; Ameh & Odusami, 2010).

These professionals are responsible for managerial organization, financial, and technical performance of any construction procurement activities, as well as responsible for the research and developments of construction procurement practices.

The duty of construction procurement professionals in the procurement of a building facility is to oversee the whole building cycle from inception to the end of its economic life. This process according to Hussin and Omran (2009) in Kehinde and Oluwakemi (2014) involves various stages through which the construction professionals balance the often conflicting requirements of clients, users and the community. It is therefore the responsibility of construction professionals to exercise all reasonable skills, care and diligence, ensuring that their expertise measures up to professional standards and expectations of the modern building procurement arena. Consequently, impacts of the buildings they produce should bring environmental friendliness and socioeconomic benefits to bear on the host community (Diang'a, 2012; Brundtland Report, 1987).

Research Methodology

This study is guided by the philosophy of ontology; it is concerned with how scientist are made aware that an area exist for developing knowledge (Steup, 2014). Ontology, specifically deals with what we can learn; what is out there that can be known. It has to do with what is the nature of the world we experience (McNabb, 2009; Ibrahim, 2007). In light of the above, this study used an

exploratory design through literature review to: justify the existence of a problem worthy to be studied within the context of the experiences in the NCI; conduct a preparatory examination for gaining insights on SC concept and its need in developing economy; and identify SC practices (Inuwa, 2014; American Psychological Association, 2013; McNabb, 2009).

According to McNabb (2009) exploratory design rarely exists as a stand-alone approach; except when used to provide information either to find answer to a specific organisational question, or to provide information upon which to base a decision . Hence, this study used an exploratory design as a stand-alone approach, to provide answers to problems of developing economies' construction firms, on effective procurement practice for SC; and generate information upon which NCI can base their decision on adopting effective procurement practices for the attainment of SC in Nigeria. The study does not capture professional practices at tendering stage; it is delimited to construction practices at the pre-design to the construction stage.

The Concept of SC in the Construction Industry

The construction industry is of strategic importance to any nation due to the role it plays in the economy (Gollenbeck, 2009; Jinadu, 2007). It is responsible for the provision of infrastructure and contributes to a country's gross domestic product (Dada, 2012). The industry worldwide accounts for a sizeable proportion of a nation's economic activities and globally accounts for about 10%

of the world economy (Adindu, 2012; Freeman, 2011). The industry according to Hamilton (2006) can be used for the socio economic development of developing economies. This is because of its unique ability to facilitate development of a nation by providing directly for human needs, stimulating investment, and generating employment.

In spite of the importance of the construction industry, its operations and products exert enormous pressure on global natural resources, as well as on the economy and the society of its host community (Jatau & Wescot, 2011). This has brought about a new vision of need in the industry to achieve sustainable development through SC that ensures sustainable products, design and construction processes that meets the needs of the present without compromising that of the future (Krisgvoll, *et al.*, 2010; Diang'a, 2012). SC also known as green architecture is the practice of creating structures using processes that are environmentally responsible and resource efficient throughout a building's life-cycle: design, construction, operation, maintenance, renovation, and demolition. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

According to Makuei and Oladapo (2014), to better understand the concept of SC and its significance in sustainable development, it is necessary for one to acknowledge the impacts of the output of construction, the resources it consumes and its impact on the environment. Construction outputs provide capital formation that supports investment and generates

employment; it also provides infrastructures that support the health sector, education, transportation, agriculture, telecommunication, power and sanitation . Conversely, the construction industry is still argued to be the largest end user of natural resources, as well as the largest polluter of both the natural and the man-made environment (Ding, 2008 cited in Makuei & Oladapo,

2014). To attain SC that will ensure sustainable development, three pillars of sustainability (social, economic, and environmental) must be addressed in every sustainable construction issue . Table 1 summarises the impacts of the construction industry on the society, economy and the environment.

Table 1: Key Impacts of the Construction Industry on the Society, Environment and the Economy

Society (Social)	Environmental	Economic
Provides social infrastructures	Pollution and accounts for half of all energy use	Facilitates developments & generates employments
Provides cultural spaces	Responsible for 40% of resource use	Accounts for 70% of all man-made wealth
Creates the basis for social and manufacturing capital	Responsible for substantial amount of land use	Contributes to a nation's GDP

Source: Adapted from Jatau and Wescott (2011)

To better understand the concept of SC, Oyalowo (2014) reviewed SC definitions and observed that at least two out of the three globally accepted dimensions of SC (social, environmental/physical and economic dimensions) are recognised in most definitions. However, to Ugwu, *et al.* (2003) there are many epistemological arguments related to the definitions of SC, but acknowledged that a broader spectrum sustainability agenda has different trajectories and dimensions such as: environment, social, economic, transportation, resource utilization, and health and safety. The definitions of SC depicted in Table 2 supports Oyalowo (2014)

and Ugwu, *et al.* (2003) assertions. Moreover, Makuei and Oladapo (2014) reported that none of the definitions of the concept of SC has been found to be comprehensive enough and generally adopted; they share the following themes: SC involves triple bottom line that balances social, economic and environmental issues; SC involves a cradle to grave system which uses construction life cycle to address sustainability issues (from material extraction to deconstruction); SC incorporates local values and cultures into technology; and SC considers long, medium and short term needs of people and environment now and in the future.

Table 1: Definitions of SC

S/N	Definitions	Authors
1.	Creating a healthy built environment using resource-efficient, ecologically based principles	Kibert (1994 cited in Hill & Bowen, 1997)
2.	SC, in its own processes and products during their service life, aims at minimising the use of energy and emissions that are harmful to environment and health and produce relevant information to customers for their decision making	Huovila & Richter (1997)
3.	A way of building which aims at reducing (negative) health and environmental impacts caused by the construction processes or by building or by the built environment	Lanting (1998)
4.	A possible strategy to better meet the needs of clients and owners while ensuring success in an increasingly competitive and constrained operational environment	Augenbroe et al. (1998)
5.	A construction process which incorporates the basic themes of sustainable development	Parkin (2000)
6.	A way of designing and constructing buildings that support health (physical, psychological, and social) and which is in harmony with nature, both animate and inanimate	Hendriks (2001)
7.	The application of Sustainable development to the construction industry	Khalfan. (2002)
8.	It is a holistic process aiming to restore and maintain harmony between the natural and the built environments, and create settlements that affirm human dignity and encourage economic equity	The CIB Agenda 21: SC for Developing Countries (cited in Du Plessis, 2002)

Source: Makuei and Oladapo (2014, p. 241)

Drawing inference from the aforementioned definitions of SC, this study defines SC as an all-encompassing construction procurement exercise that addresses the adverse effects emerging from the realisation of a construction facility on the environment, as well as harness the economic and social benefits that can be derived from such construction facility, with the sole aim of delivering a facility that supports environmental friendliness, economic efficiency and social integration.

The Need for SC in A Developing Economy

A developing economy is a less advanced economy with weak knowledge and

poor industry base (Anigbogu, 2015). Countries with such economies are referred to as developing country and are characterised with poor level of industrialisation, less income per capita, low life expectancy, low rate of literacy and poor standard of living (Anigbogu, 2015; UNDP, 2015). The global indicator used to measure the level of a country's economy/development is the Human Development Index (HDI). The HDI is a statistic that aggregates a country's level of economy/development in a composite index; it considers level of industrialisation, income per capita, life expectancy (health measure), literacy level and standard of living (UNDP, 2015).

Going by the HDI measure, there are over 100 countries that fall under the list of developing countries; it captures the whole of Africa (Wikipedia, 2015, UNDP, 2015). By implication such countries lack the adequate infrastructures that will support industrialisation, capital formation and investment potentials, health, education and agriculture. According to Freeman (2011) the low level of investment in the construction industry in Africa brought about huge infrastructural deficit resulting in underdevelopment. Freeman (2011) looked at the global construction investment commitment and discovered that the developed economies account for 70% of construction investment, while African countries account for only 1%. In addition, Per capita investment in construction in the developed world is approximately \$2 500 per annum as against \$46 per annum in Africa. Inuwa (2014) confirms that Africa's underdevelopment is informed by its low level of investment in construction, and as such lacks the needed infrastructures that will support economic growth. Hence, he advised that more investment is needed in African countries construction industries so as to facilitate its development, as well as provide employment opportunity to its teeming population.

However, the provision of infrastructural facilities that can assist African countries in attaining the status of a developed economy according to Jatau and Wescott (2011), requires a strategy that must take into cognizance the concept of SC; necessitating all construction activities and facilities imbibe the issue of environmental protection, prudent

use of natural resources, economic growth and prosperity, and social progress. This according to Jatau and Wescott, is very necessary in developing countries where poverty alleviation, employment creation, capacity building, social integration and improved standard of living is of utmost importance in advancing their economies to the status of developed economies.

Effective Procurement Practices for SC in Nigeria

Synonymous with the words effective and practice within the realm of the construction industry in the Oxford Dictionary of English (2010) are: effective-successful in producing a desired or intended result; while practice- the carrying out or exercise of a profession. Thus, effective procurement practices can be construed as a professional exercise that produce a desired or an intended procurement result. The scope of a construction procurement process is extensive and covers every aspect of project delivery (Hughes, 2012; Rashid, *et al.*, 2006; Harris & McCaffer, 2005). The Construction procurement process is divided into phases and in each phase, the tasks to be done as well as the sequence on how the tasks are to be undertaken by the procurement professionals (clients, consultants and contractors) in building project procurement systems are described in further details (Hughes, 2012; Rashid, *et al.*, 2006; Harris & McCaffer, 2005).

According to Adio-Moses *et al.* (2014), Oyalowo (2014) and Ugwu *et al.* (2003), an effective procurement practice should implement practices that will

incorporate SC strategy in the whole process of construction procurement. These practices should address the impacts of construction on the economy, environment and the society, and its include: environmental impact assessment, SC consciousness at predesign and design stages, SC strategy application at the construction execution stage and the application of ICT support system for sustainability evaluation.

Environmental Impact Assessment

Environmental impact assessment (EIA) is a tool used for better environmental protection and management; in essence it is used to mitigate environment degradation resulting from deforestation, soil erosion, flooding, industrial pollution, and other adverse effects from construction activities on the environment (Olokesusi, 1998). Kehinde and Oluwakemi (2014) reported that EIA statement or report is used in identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. In Nigeria, all proposed construction projects are required to conduct an environmental impact assessment statement (EIA) in feasibility study (Olokesusi, 1998). Hence, it is imperative for construction practitioners during construction, to track their construction process in accordance with the EIA statement requirements, by planning and identifying the sequential effects of the project stage environmental degradation, and subsequently apply the necessary mitigant to avert or curb its effect on the environments.

SC consciousness at Predesign Stage

At the predesign stage, construction professionals are expected to exhibit practices that will assist clients: identify and select a sustainable building site that will take into consideration the environmental impact of the proposed development on surrounding flora and fauna; or in addressing the sustainability problems emerging from the environment, society and economic points of view of an already acquired proposed building site. Construction practitioners should note that, as a prerequisite for SC accomplishment, the siting of a proposed project that is capable of destroying rare species of flora and fauna, or that interferes with social and economic networks of existing communities should be discouraged.

However, where it becomes necessary that the siting of a structure will distort the environmental setting of its host community, Ugwu, *et al.* (2003) advised that the pressure-state-response model (PSR) should be used to assess its effects on the environment. The PSR model uses cause effect approach to assess pressures that lead to a certain state, which in turn introduces certain responses (i.e. measures) to reduce the pressure on the ecosystem. For instance, a construction project such as a dam whose siting results in deforestation (pressure), can lead to loss of a total forest area (i.e. a certain state), which may as a necessity require reforestation (i.e. response measure) to contain the pressure.

Design stage

At the design stage, designers (architects and engineers) are required to make efficient use of space as well as incorporate

and specify in their designs the use of natural materials (e.g. compressed earth bricks, hydroform blocks, bamboo, etc.) or materials that are non-synthetic and non-toxic (e.g. binary cement, stone dust, broken bricks/glass, recycled plastics, etc.) that ensures waste reduction; pollution prevention; recycled content; and embodied energy reduction (Anigbogu, 2015; Adio-Moses *et al.*, 2014; Kim & Graves, 1998).

Designers are expected to design modules (structures) with regular and less complex composite shapes so as to curtail waste and ensure efficient use of materials (Kim & Graves, 1998). Design modules must ensure that floor intervals and other design components coincide with the standard dimensions of building material members. This is to take advantage of the standard sizes of building materials in the design phase, to reduce waste produced from off cuts, as well as cut down the labour cost for installation (Kim & Graves, 1998). More so designers should incorporate in their designs efficient ventilation systems for heating and cooling; energy efficient lighting and appliances; water-saving plumbing fixtures; and planned landscapes to maximize passive solar energy (Adio-Moses *et al.*, 2014). In order to attain sustainability, all the above mentioned design considerations must take into cognizance the productive and functional requirements of occupiers, investors and general public, as well as considers the changing needs of both investor and occupiers over the lifecycle of the building (Adio-Moses, *et al.*, 2014; Oyalowo, 2014; Brundtland Report, 1987).

SC Strategy Application at the Construction Execution Stage

At this stage, professionals are expected to exhibit practices that will ensure the construction of sustainable structure; one that is constructed in a way that will be devoid of compromising the environment. Professionals should avoid the use of heavy equipment that emits gases that will pollute the environment, and should employ the use of alternative power sources (solar power or wind power) on sites (Anigbogu, 2015; Adio-Moses *et al.*, 2014). According to Kim and Graves (1998) locally produced building materials should be encouraged to shortens transport distances, thus reducing air pollution by vehicles. Often, local materials are better suited to climatic conditions, whereas their purchases support area economies. While noting that use of local materials might not be suited to all cases, Kim and Graves (1998) advised that, imported equivalents must be sourced selectively and in as small a volume as possible.

At the construction stage professionals must ensure that buildings are constructed using innovative construction techniques that promote the use of cost-saving, non-toxic, recycled, energy efficient and environmentally friendly building materials, with adequate consideration of the health and safety of building workers, occupants and the general public (Rohde & Lutzenkorf 2009 in Oyalowo, 2014; Zubairu, 2012; Ugwu *et al.*, 2003; Kim & Graves, 1998). The practice of disposing construction waste should be done using environmentally friendly, economically efficient and socially acceptable methods (Oyalowo, 2014; Kim & Graves, 1998).

Application of ICT Support System for Sustainability Evaluation

According to Nwokoma (2012) ICT literacy is a great potential for the attainment of sustainable development in developing countries. Several studies revealed that the adoption of ICT enable businesses to achieve the following strategic objectives: operational excellence; new products, services, and business models; customer and supplier intimacy; improved decision making; competitive advantage; and survival (Laudon & Laudon, 2006 cited in Aboagye, *et al.*, 2015; Inuwa, 2014; Alagbandrad, Asnaashari, & Nobakht, 2012; Inuwa, 2006; Oladapo, 2006). Hence, the adoption of ICT support system for sustainability evaluation according to Ugwu, *et al.* (2003), ensures operational excellence for the realisation of SC through the development and implementation of decision support frameworks for use in *designing for sustainability*.

Specific ICT roles in designing for sustainability embraces (Ugwu *et al.*, 2003): information modelling, data and user requirements extraction (i.e. developing sustainability ontology); persistent data and information storage using database management systems. Others are analytical tools for computational analysis and evaluation of the sustainability of design proposals; and system integration (i.e. data, tasks and process-level integrations) to enhance collaborative working and sustainability knowledge management in organizational contexts. Hence, being an ICT literate in all its ramification is an effective tool that will ensure construction practitioners' attainment of SC in developing countries.

Discussion and Conclusion

From a global review of some previous studies on SC are lamentations of the adverse effects of construction activities on the environment, as well as highlighted measures in integrating environmental, social and economic concerns of SC in attaining sustainable development in the construction industry. The lamentations of these studies (Anigbogu, 2015; Makuei & Oladapo, 2014; Oginni & Igwe, 2014; Oromobor, Das, & Emuze, 2014; Utiome, Drogemuller, & Docherty, 2014; Adio-Moses *et al.*, 2014; Oluwatayo, Ezema, & Aderonmu, 2014; Akinde, Jimoh, & Obaju, 2014; Ezema & Oluwatayo, 2014; Alabi, Oyalowo, & Oke, 2014; Kalua, Zhan, & Chang, 2014; Odunwole & Owoeye, 2014; Afolami & Fadaio, 2014; Oyalowo, 2014; Diang'a, 2012; Zubairu, 2012; Jatau & Wescott, 2011; Nwokoro & Onukwube, 2011; Krisgvoll, *et al.*, 2010; Panthi & Bhattarai, 2008; Ugwu, *et al.*, 2003; Kim & Graves, 1998) and the need they have associated with attainment of sustainable development through SC concur with this study. However, previous studies fall short of identifying effective procurement practices that will guide construction practitioners' decision on the accomplishment of SC in developing economy like Nigeria. In contrast with previous studies, this study identified effective procurement practices for SC in developing economy like Nigeria.

The study adopted an ontological philosophical approach; employed an exploratory design through literature review to identify the effective procurement practices in a developing economy for SC, in a view to

guiding construction practitioners' decision on accomplishing SC in a developing economy like Nigeria. The identified practices are: Environmental Impact Assessment, SC consciousness at predesign and design stage, SC strategy application at the construction execution stage and the application of ICT support system for sustainability evaluation. This study therefore recommends that, construction professionals should adhere to practices that will support SC; research activities on SC should be encouraged; and that government should provide adequate research funding, while enforcing the implementation of sustainable development.

References

- Aboagye, E. O., Ansong, M. O., Agbezube, E., & Antwi, H. A. (2015). Tertiary Institution Value Chain Management Through ICT: Evidence from Kumasi Polytechnic. *International Journal of Applied Science & Technology*, 5 (1), 131-143.
- Adindu, C. C. (2012). Developing Templates for Project Costing in Nigeria: Basic Considerations. *1st National Project Cost Reduction Summit. Abuja: QSRBN*.
- Adio-Moses, A. D., Adebayo, K., & Obizo, N. R. (2014). Green Architecture With Prefab Systems for Sustainable Urban Design. Proceedings of *CIB W107 Conference (611-626)*. Lagos: CIB W107.
- Afolami, A., & Fadairo, G. (2014). Water Availability in FUTA Environs, Akure, Nigeria. Proceedings of the *CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014). CIB W107.
- Akinde, S. B., Jimoh, R., & Obaju, B. (2014). Lean Implementation Strategy for Effective Low-Cost Housing Delivery & Sustainable Development in Nigeria. Proceedings of the *CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014. CIB W107.
- Alabi, A., Oyalowo, B., & Oke, M. (2014). Proceedings of the CIB W107 2014 International Conference, Lagos, Nigeria, 28th-30th January, 2014). Water Supply Methods for Residential Estates in Lagos Metropolis. CIB W107.
- Alaghandrad, A., Asnaashari, E., & Nobakht, M. B. (2012). Quantitative Analysis of ICT Utilization Problems in the Iranian Construction Industry. *The Construction, Building & Real Estate Research Conference*. Held in Las Vegas (USA), 11-13, September, 2012: RICS.
- Ameh, J. O., & Odusami, K. T. (2010). Nigerian Building Professionals' Ethical Ideology and Perceived Ethical Judgement. *Australian Journal of Construction Economics and Building*, 10(3), 1-13.
- Aniekwu, A. N., & Audu, H. O. (2010). The Effects of Management on Productivity: A Comparative Study of Indigenous and Foreign Firms in the Nigerian Construction Industry. Proceedings of *West Africa Built Environment (WABER) Conference*, 27-18 July 2010, (pp. 567-578). Accra-Ghana: WABER.
- Anigbogu, N. A. (2015, January 15). Determinants of successful sustainable

- building practices in Nigeria . Retrieved from Researchgate: http://www.researchgate.net/profile/Natalia_Anigbogu2/
- APA. (2013). *Publication Manual of American Psychological Association*, 6th edn. Washington, DC: American Psychological Association.
- Aqua Group. (1999). *Tenders and Contracts for Building*. 3rd edn. Oxford: Blackwell Science Ltd.
- Brundtland Report. (1987). *Our Common Future*. UN: World Commission on Environment and Development.
- Chitkara, K. K. (2012). *Construction Project Management: Planning, Scheduling & Controlling*. New Delhi: Tata McGraw-Hill.
- Dada, M. O. (2012). Predictors of Procurement Selection: An Investigation of Traditional & Integrated Methods in Nigeria. *Journal of Construction in Developing Countries*, 7(1), 69-83.
- Diang'a, S. (2012). *Regularizing Informal Settlements for Sustainable Housing Development: The Case of Nairobi, Kenya*. LAP-Lambert, Amtsgerecht Saarbrücken.
- Ezema, I. C., & Oluwatayo, A. (2014). *Densification as Sustainable Urban Policy: The Case of Ikoyi, Lagos, Nigeria*. Proceedings of the CIB W107 2014 International Conference, Lagos, Nigeria, 28th-30th January, 2014. CIB W107.
- Freeman, H. M. (2011). *A Review of the Performance of Botswana Citizen Building Contractors*. Nelson Mandela Metropolitan University: South Africa: MSc Thesis.
- Gollenbeck, L. (2008). *Planning of Construction Projects: A Managerial Approach*. Siegen: Ph,D Thesis Universitat Siegen.
- Hamilton, D. (2006). *Contract Staff Management Systems in the Construction Industry in Nigeria*. *Pakistan Economic and Social Review*, XLIV(1): 1-18.
- Harris, F., & McCaffer, R. (2005). *Modern Construction Management*. Accra: EPP Books Services.
- Hughes, W. (2012). *The Business of Construction Procurement: Selecting, Defining and Managing Procurement*. Proceedings of the 4th WABER Conference (pp. 24-26). Abuja-Nigeria: Laryea, S., Agyepon, S., Leiringer, R. & Hughes, W. (Eds).
- Ibrahim, A. D. (2007). *The development of a Procurement Strategy for Primary Health Care Facilities in Nigeria*. Doctoral Thesis Submitted to Loughborough University.
- Ibrahim, A. D. (3-8 November, 2008). *A Critique of the Operational Philosophy and Mechanism of Public Procurement Act 2007: Construction Industry Perspective*. 23rd Biennial Conference of NIQS. Kaduna: NIQS.
- Idoro, G. I., & Akande-Subar, L. O. (2008). *Clients' Assessment of the Quality Performance of Indigenous and Expatriate Construction Contractors in Nigeria*. A paper presented at COBRA: *The Construction & Building Research Conference of the RICS*. Held on 4-5 Sept. 2008, at the Dublin Institute of Technology: RICS.

- Inuwa, I. I. (2006). *Unit Rate Software Development for Effective Time Management for Construction Projects in Nigeria*. University of Jos-Nigeria: Unpublish MSc Thesis.
- Inuwa, I. I. (2014). *Project Planning In Construction Procurement: The Case of Nigerian Indigenous Contractors. Nairobi-Kenya*. PhD Thesis: Jomo Kenyatta University of Agriculture and Technology.
- Inuwa, I. I., Wanyona, G., & Diang'a, S. (2014c). Identifying Building Contractors' Project Planning Success Indicators: The Case of Nigerian Indigenous Contractors. Proceedings of the *3rd Applied Research Conference in Africa (ARCA) Conference* (92-107). Accra-Ghana: Nkum, R.K., Nani, G., Atepor, L., Oppong, R.A., Awere, E., & Bamfo-Agyei, E. (Eds).
- Jatau, A., & Wescott, A. (2011). Sustainable construction in Nigeria: methods of delivering sustainable. *Proceedings West Africa Built Environment Research (WABER) Conference*, 19-21 July 2011 (pp. 871-882). Accra: Laryea, S., Leiringer, R. and Hughes, W. (Eds).
- Jinadu, A. M. (2007). *Understanding The Basics of Housing: A Book of Study Notes for Students in Tertiary Institutions Rvsd Edn*. Jos: Jos University Press Limited.
- Kalua, A., Zhan, C., & Chang, C. (2014). A Review of Green Building Advocacy in Least Developed Countries. Proceedings of the *CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014). CIB W107.
- Kehinde, O. G., & Oluwakemi, O. (2014). Environmental Impact Assessment in Nigeria: Construction Professionals' Inputs. Proceedings of the *CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014 (764-775). Lagos: CIB W107.
- Kim, J., & Graves, J. (1998, January 15). Sustainable Architecture Module: Qualities, Use, & Examples of Sustainable Building Materials. Retrieved from University of Michigan National Pollution Prevention Center for Higher Education website: www.umich.edu/~nppc/pub/
- Krisgvoll, G., Fumo, M., & Morbiducci, R. (2010). National and International Standardization (International Organization for Standardization & European Committee) Relevant for Sustainability in Construction. *Sustainability*, 3777-3791.
- Makuei, A. M., & Oladapo, A. (2014). Stakeholder's Perception of Sustainability Construction in South Sudan. Proceedings of the *CIB W107 International Conference* (pp. 240-249). Lagos: CIB W107.
- McNabb, D. E. (2009). *Research Methods for Political Science: Qualitative and Quantitative Methods*. New Delhi: PHI Learning Private Limited.
- Nwokoma, A. (2012). Nigerian Indigenous Knowledge Application in ICT Development. *Journal of Educational and Social Research*, 2, 62-65.
- Nwokoro, I. & Onukwube, H. (2011). Sustainable or green construction in Lagos, Nigeria: principles, attributes and

- framework. Proceedings: *West Africa Built Environment Research (WABER) Conference*, 19-21 July 2011 (pp. 883-895). Accra: Laryea, S., Leiringer, R. and Hughes, W. (Eds).
- Odunwole, S. & Owoeye, O. (2014). Poverty & Environment Interface: A Challenge to Sustainability Conservation. Proceedings of *the CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014). CIB W107.
- Oginni, A. & Igwe, M. (2014). Architectural Sustainability-Design Techniques for the Tropics- Making A Case for More Retrofits in Nigeria. Proceedings of *the CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014. CIB W107.
- Oladapo, A. (2006). The Impact of ICT on Professional Practice in Nigerian Construction Industry. *The Electronic Journal on Information System in Developing Countries*, 1-19.
- Olokesusi, F. (1998). Legal and Institutional Framework of Environmental Impact Assessment Framework: An Initial Assessment. *Environmental Impact Assessment Review*, 159-174.
- Oluwatayo, A. A., Ezema, I. C. & Aderonmu, P. A. (2014). Adequacy of Sustainability Education in Architecture Curriculum. Proceedings of *the CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014. CIB W107.
- Oromobor, S., Das, D. & Emuze, F. (2014). An Explorative Look at the Challenges in the Design of Sustainable Buildings with the Aid of BIM in South Africa. Proceedings of *the CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014. CIB W107.
- Oxford Dictionary of English. (2010). *Oxford Dictionary of English*. Oxford: Oxford University Press.
- Oyalowo, B. (2014). Barriers and Drivers of Sustainable Building Construction in Lagos Metropolis, Nigeria. Proceedings of *the CIB W107 2014 International Conference*, 28-30 January, 2014 (pp. 653-659). Lagos: CIB W107.
- Pantheni, K. & Bhattarai, S. (2008). A Framework to Assess Sustainability of Community-Based Water Projects Using Multi-Criteria Analysis. *ICCIDC-1 conference*, 4-5 August, 2008. Karachi-Pakistan.
- Ramus, J., Birchall, S. & Griffiths, P. (2006). *Contract Practice for Surveyors*. Oxford: Butterworth-Heinemann.
- Rashid, R. A., Nasib, M. A., Ahmad, W. W., Taib, I. M., Ali, W. W., & Zainordin, Z. M. (2006, April 20). Effects of Procurement Systems on the Performance of Construction Project. Retrieved from www.osun.org
- Saleh, M. S. (2004). A Review of the Factors Affecting Contractor Efficiency on Building Projects. *ATBU Journal of Environmental Technology*, 3(1):62-68.
- Steup, M. (2014, November 6). Epistemology. Retrieved from Stanford Encyclopedia of Philosophy web site: <http://plato.stanford.edu/archives/spr2014/entries/epistemology>
- Ugwu, O., Kumaraswamy, M. H. & Wong, A. (2003). A Taxonomy of Measuring

- Sustainability of Construction Projects . 2nd International Conference in *Construction in the 21st Century (CITC-11)* '10-12 December, 2003 Sustainability & Innovation in Management and Technology,` (pp. 653-659). Hong Kong.
- UNDP. (2015, October 4). UNDP Human Development Reports. Retrieved from UNDP web site: hdr.undp.org
- Utrome, E., Drogemuller, R. & Docherty, M. (2014). BIM-Based Lifecycle Planning & Specification. Proceedings of *the CIB W107 2014 International Conference*, Lagos, Nigeria, 28th-30th January, 2014. CIB W107.
- Wikipedia. (2015, October 4). Developing Country. Retrieved from wikipedia web site: [www.kttps://en.wikipedia.org](https://en.wikipedia.org)
- Zubairu, S. (2012). The Importance of Evaluation and Sustainability in the Built Environment. Proceedings: *4th West Africa Built Environment Research (WABER) Conference*, 24-26 July, 2012 (pp. 9-13). Abuja: In: Laryear, S., Agyepong, S., Leiringer, R. & Hughes, W. (Eds).