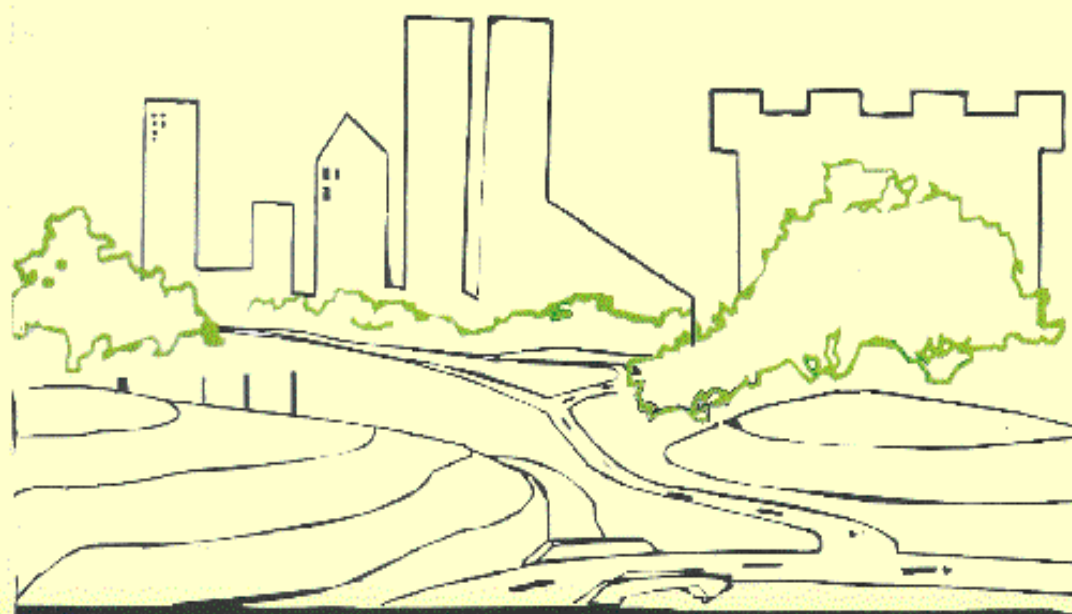


JOURNAL

OF ENVIRONMENTAL DESIGN (JED)

A Journal of Faculty of Environmental Studies, University of Uyo, Uyo, Nigeria
Vol. 16, NO. 1, February, 2021



JOURNAL **OF ENVIRONMENTAL DESIGN (JED)**

A Journal of Faculty of Environmental Studies, University Of Uyo, Uyo, Nigeria
Vol. 16, NO. 1, February, 2021

**Faculty of Environmental Studies,
University of Uyo, Uyo, Nigeria**

Journal of Environmental Design (JED) is published bi-annually by the Faculty of Environmental Studies, University of Uyo, Akwa Ibom State, Nigeria. The Journal of Environmental Design can be accessed online using **University of Uyo website**

All Right Reserved: No parts of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, photocopying, recording or otherwise without prior written permission of the proprietor of the copyright, also, where part of this Journal is adapted, credit must be given to the author(s) and original source and the sense of the original source must not be distorted.

ISSN: 1595-9229-15

Printed in Nigeria by:
Parvenu Technologies
parvenuonline@gmail.com
08027228272

EDITORIAL COMMENTS

Welcome to yet another volume of the Journal of Environmental Design. Volume 16 of the JED contains several thought-provoking well researched papers on the various dimensions of the built environment. It must be stated that environmental problems in general have become intricate phenomena requiring a wide range of interests and experts in their planning, management and design. The JED continues in its 16th volume to highlight the works of these experts and presents their informed views and cutting age research findings for the benefits of policy makers and students of environmental studies. The papers have been peer-reviewed and carefully selected to ensure intellectual balance and intelligent discourse.

The views expressed in the articles published in the Journal of Environmental Design (JED) are those of the authors and the Journal of Environmental Design does not hold itself accountable for such.

Professor Best Ochigbo

EDITORIAL COMMITTEE

Editor-in-Chief

Prof. Best Ochigbo
bestochigbo@yahoo.com
+ 2348035838077

Business Editor

Dr. Jacob Atser
jacobatser@uniuyo.edu.ng
+2348036758258

Associate Editors

Dr. Victor Umoren
Dr. Effiong Eyofiki
Dr. Paul Anih
Dr. Samuel Ebong
Dr. Ogwueleka C Amaka
Dr. Aniekan E. Eyoh
Dr. Isaac Ikediashi

JED Vol. 15, Number 2, August 2020

Department of Urban and Regional Planning University of Uyo, Uyo
Department of Fine & Industrial Arts University of Uyo, Uyo
Department of Estate Management University of Uyo, Uyo
Department of Architecture University of Uyo, Uyo
Department of Quantity Surveying University of Uyo, Uyo
Geoinformatics, University of Uyo, Uyo
Department of Building University of Uyo, Uyo

Consulting Editors

Prof. Felix Ilesanmi
Prof. Ekpo M. Osom
Dr. P. C. Nwilo
Prof. I. Ukpog
Prof. I. C. Ugwu
Prof. B. Agbola
Prof. Des Wilson
Prof. O. B. Ekop
Prof. Hilary Inyang

School of Environmental Sciences, Modibbo Adama Uni of Technology, Yola
Faculty of Agriculture University of Swaziland, Swaziland
Department of Surveying & Geoinformatics University of Lagos
Department of Geography University of Uyo, Uyo
Dept of Urban & Regional Planning Enugu State University of Science & Tech
Department of Urban & Regional Planning University of Ibadan, Ibadan
Department of Communication Arts University of Uyo, Uyo
Department of Urban & Regional Planning University of Uyo, Uyo
Global Institute for Energy & Environmental System, Uni of North Carolina, USA
Department of Fine & Applied Arts University of Nigeria, Nsukka
Department of English University of Uyo

Prof. O. K. Oyeoku
Prof. D. Eka

EDITORIAL STYLE GUIDE FOR AUTHORS

Please submit your manuscript double spaced in MS Word 2003 - 2007 version. Provide tables and figures in a separate file (or files) in MS Excel MS Word or EPS format. Maps should be supplied in EPS format. Because manuscripts will undergo a blind review, submit two title pages; the first showing the title of the manuscript, author name, title, affiliation, telephone number, email address and the date of the manuscript. The second title page should contain only the title of the paper. Third-person style is always preferred. If appropriate, authors may make limited use of first-person singular, but a single author should not refer to himself or herself as "we."

Biography: The manuscript should include; on a separate page or the "first" title page described above a sentence listing each author's name and affiliation.

Abstract: Include a one-paragraph abstract not exceeding 150 words and place it on the first page of the text. The abstract describes the issue(s) or question(s) the paper addresses and states the major findings, conclusions and recommendations.

Keywords: To help users reference the JED published research, keywords are included with journal articles. Please suggest at least two keywords for your manuscript.

Abbreviations: The definition of an abbreviation or acronym is given the first time it appears; afterward, only the abbreviation is used. However, an abbreviation that is defined in the abstract should also be defined in the article. An abbreviation that appears only once in an article should be deleted and the full wording used. If an abbreviation is first defined in the text, the abbreviation alone can then be used in subsequent footnotes or tables; however, if the abbreviation is first defined in a footnote or table, the abbreviation should be defined again when it first appears in the following text.

Text Headings: Headings are not numbered and are placed to the left. First-level headings are bold; second-level headings are italicized; and third-level headings are italicized and lead directly into text.

Tables and Figures: Use Arabic numerals to number tables-and figures consecutively in separate series in order of appearance. Include a brief descriptive title at the top of each. Tables and figures should be in separate page not integrated into the text. The text must contain a reference to each table or figure.

Equations: Make sure that all symbols in equations are clear and that all equations (except those in footnotes) are numbered. Single-letter variables should be italicized. Multiple-letter variables, abbreviations (e.g. AGE) and functions (e.g. expo min. In) should not be italicized neither should be numbered. Parentheses or mathematical operations, vectors and matrices should be in bold (not italicized).

References: The manuscript must include complete and accurate citations of all materials referenced in the manuscript that are not of your original authorship. Please double-check your references to ensure that names and dates are accurate, that Web pages are still active, and that there are no discrepancies between the text and the reference list. The APA style is strongly recommended.

TABLE OF CONTENTS

Title page	-	-	-	-	-	-	-	-	-	-	i
Journal of Environmental Design (JED)					-	-	-	-	-	-	ii
Editorial Comments	-	-	-	-	-	-	-	-	-	-	iii
Editorial Committee	-	-	-	-	-	-	-	-	-	-	iv
Editorial Style Guide for Authors	-	-	-	-	-	-	-	-	-	-	v
Table of Contents-	-	-	-	-	-	-	-	-	-	-	vi
Framework for Outsourcing Facilities Management Services in Public Hospitals: <i>Dubem Isaac Ikediashi and Amaka Ogwueleka</i>					-	-	-	-	-	-	1
Assessment of Compliance with Accessibility Policies for Wheel Chair users in Public Buildings: <i>Oloruntoyin Paul, Akinbogun S.P & Akinbogun O.T</i>					-	-	-	-	-	-	8
Characteristics of Mortars Produced with different Plastering Sands of Yola Metropolis, Nigeria <i>Yusuf, U.S., Khalil I.M., & Garba, M. M.</i>					-	-	-	-	-	-	17
Land Acquisition and Housing Development in Akwa Ibom State: <i>Udeme D. Isa, Timothy O. Adewuyi, Michael G. Oladokun & Jacob Atser</i>					-	-	-	-	-	-	25
Benefits of Digital Transformation of the Construction Industry under the fourth Industrial Revolution: <i>Michael Gbolagade Oladokun, Henry Okpo Asuquo & Adegbenjo David Adelakun</i>					-	-	-	-	-	-	44
Access to Housing Facilities as tools for shaping the Idea of Housing Quality in Benin City, Nigeria <i>Uyi Ezeanah</i>					-	-	-	-	-	-	55
Modelling the Effect of Corporate Governance on the Sustainability of Construction Firms using Structural Equation Approach: <i>Monday Otali & Usen Udoh</i>					-	-	-	-	-	-	65
Assessment of Factors Responsible for Low Level of Professional Registration by Building Graduates in Nigeria: <i>S. Muhammad, Z. H. Ishaq, and F. E. Afolabi</i>					-	-	-	-	-	-	76
Assessment of Builders' Risk Insurance Implementation in the Nigerian Construction Industry: <i>Fawziyya M. Oyeleke, Shehu Muhammad and Dikko Kado</i>					-	-	-	-	-	-	84
An Assessment of the Impact of Project Risk Factors on Project Completion Time in Nigeria: <i>Z. H. Ishaq, S. Muhammad, M. Abubakar and Y. S. Lawal</i>					-	-	-	-	-	-	93
Factors Affecting Valuation Accuracy For Secured Lending In Abuja, Nigeria: <i>Charles-Afolabi, Christianah Yetunde, Wahab Muktar Babatunde, Usman Jemila & Olaniyi Kafilat J.</i>					-	-	-	-	-	-	102
Maintenance Culture Of Public Properties In Nigeria: Case Study Of Ado-Odo/Ota Local Government Area, Ogun State: <i>Osuorji G.C., Esuabanga W.E., Igbokwe I.E., & Sodangi A.A</i>					-	-	-	-	-	-	112
Architectural Supervision: A Vital Tool For Checkmating Building Collapse: <i>Robert Walpole Nwanguma & Eneogwe, Innocent C.</i>					-	-	-	-	-	-	118
Uyo Urban Imageability And Implications For Environmental & Cultural Values: <i>Massodih Effiong & Jacob Atser</i>					-	-	-	-	-	-	127
Barriers and Drivers Towards Effective Use Of Insurance As A Risk Management Tool In Built Environment Sector In Calabar Metropolis, Nigeria: <i>Esuabanga W. Effiong; Osuorji G. Chukwuebuka; Sodangi A. Ahmed & Aboluwarin, T</i>					-	-	-	-	-	-	135
Articulating Cultural Interaction and Influences Shaping Contemporary Art Practices in Nigeria: <i>Joshua, John Oyedemi</i>					-	-	-	-	-	-	142

FRAMEWORK FOR OUTSOURCING FACILITIES MANAGEMENT SERVICES IN PUBLIC HOSPITALS

Dubem Isaac Ikediashi¹ and Amaka Ogwueleka²

¹Department of Building, Faculty of Environmental Studies, University of Uyo, Uyo

²Department of Quantity Surveying, Faculty of Environmental Studies, University of Uyo, Uyo

Abstract

The purpose of this paper is to develop an integrated framework model for outsourcing facilities management services using data from Nigeria's public hospitals. Four distinct phases are integrated using a flow chart methodology to depict various stages of the outsourcing process beginning at the upper end with decision support processes or activities down to lower end with the establishment of procedures for monitoring performance. Data for the field work component was collected using a cross sectional 2-strand questionnaire survey and case study and analysed using descriptive and inferential statistics as well as principal component analysis. Findings from the field work component reveals that 15 decision factors grouped into 5 broad categories were significant based on their factor loadings during analysis while 9 risk factors were selected based on their factor loadings from principal component analysis. These were integrated into the outsourcing framework. The framework is the first ever developed model based on empirical analysis of decision factors and risk factors that sets out pragmatic guidelines to enable stakeholders maintain healthy relationships through the process of negotiations and conflict resolutions.

Keywords: *Facilities management, framework, hospitals, outsourcing, service performance*

Introduction

Outsourcing as a procurement option has received much attention both among researchers and in practice over the years. It is a strategy that many public sector agencies are embracing as a way of improving value for money in providing public services. The clamour for change in the ways public resources are managed is not of recent origin. Since the mid-1980s, the so called vertical integration philosophy and service praxis of public administration have given way to the notion of a public service that should provide “value for money” (Kakabadse and Kakabadse, 2001; Ikediashi et al., 2012). Thus, the current economic globalisation and competition as well as growing demand for accountability and improved personal and community service have pushed public organisations to devise innovative solutions to complex social problems by acting more like market driven enterprises. Findings from previous surveys (Kakabadse and Kakabadse, 2001; E&Y, 2013) gave four main reasons for the growing popularity of outsourcing among public service organisations: to achieve best practice, to improve cost discipline skills of public service managers, to improve the quality of service, and to help managers focus more clearly on the core competences of the organisations.

Within the context of hospital management, FM has continued to live by its definition of creating the right enabling environment that supports the core mandate of rendering clinical and medical diagnostic services; which is why Shohet and Lavy (2004) considered healthcare FM as one of the key elements for the successful delivery of healthcare services. Essentially, one can contend that FM adds value to hospital through achievement of zero defects in the hospital's physical operations, especially in very delicate areas where very minute problems can have huge and devastating consequences and could be a matter of life and death. Other areas in which FM adds value to healthcare delivery in hospitals include management of infrastructure facilities such as estate and property, indoor air, structure and fabric, water supply, electricity and telecommunication management referred to as hard FM; and catering, cleaning, waste management, security and laundry services described as soft FM (Liyanage and Egbu, 2008). However, in a 2016 global outsourcing survey by Deloitte (2016), respondents from more than 25 different sectors of the global economy voted real estate (RE) and facilities management (FM) as the third most outsourced business function at 60%, behind information technology (IT) at 72%, and legal at 63%. Plausibly, this has attracted several interests among researchers and practitioners on account of the assertion that by bringing in external providers to manage FM services, there is improvement in cost transparency, strategic positioning, increased access to new technologies, skills, expertise and ideas (Li and Choi, 2009). The purpose of this paper is to propose an integrated framework model for outsourcing FM services in public hospitals. It is derived from theoretical analysis and findings from previous studies (Ikediashi and Ogunlana, 2015; Ikediashi and Okwuashi, 2015) carried out using a two-strand questionnaire survey and case study. It comprises four components developed as standard guidelines to assist public hospital administrators achieve sustainable best practice resource management at the long run.

Review of existing frameworks

The outsourcing literature is populated with studies on frameworks and models for outsourcing. However, only few of these are related to the concepts of outsourcing and facilities management services. The research of Hassanian and Al-Saadi (2005) developed a process model to analyse current outsourcing practice regarding asset management services. The framework defines the tasks that need to be undertaken within each process and illustrates how and what information need to be communicated between tasks. The model consists of 5 sequential processes, with a number of supporting activities attached to each. The model according to the authors is useful for standardizing process description, the activities that need to be undertaken and the methodology of how and what information needs to be communicated between activities. At the same time, Mohammed and Baba (2005) proposed a framework based on the premise that outsourcing transactions involve both social and formal relationships. According to the authors, the social relationship developed from model used by Goles (2001) consist of four components namely client capabilities, vendor capabilities, relationship characteristics and quality factors. The formal or contractual framework developed from literature consist of five operational activities namely service set-up, implementation, on-going service development process, review and project close. The *service set-up* includes all activities concerned with initialisation of the outsourcing contract. These include the description of services to be outsourced, statements on the expectations and requirements of the clients on one hand and the roles and responsibilities of the provider on the other. Also included are the price agreed between client and provider, performance expected measures and audit interval and procedures. The second operational activity in the framework is the *implementation*. This section spelt out all procedural guidelines involved in the actual implementation of the outsourcing contract. It includes service reports, standard tools for managing client-contractors-users relationships, communication channels, penalties for vendor underperformance, payment procedures and monitoring of work and performance. The *on-going development process* include all monitoring and control activities that ensures outsourcing contract conforms to laid down guidelines in the service set-up. Provision for renegotiation of outsourcing agreements and payments, mechanisms for unforeseen additional charges are part of the on-going development process. The *review* section of the framework deals with the periodic work level meetings for measuring performance and service to reaffirm outsourcing objectives. The final phase of the framework is the *project close*. Here, all issues relating to possible termination of service provider's service and fold-up together with the reasons, likely backlash and follow-up remedies are described in detail. The framework is helpful in guiding stakeholders on their contractual obligations towards outsourcing. However, it is entirely based on literature review without any evidence of testing of the framework through an empirical survey. Besides, there is no indication of any mechanism in the framework to guide stakeholders on the very important issues of decision making process and risk identification and management.

Kremic *et al.* (2006) work is an outsourcing decision flow chart model that places benefits and risks before an organisation that is considering outsourcing as a strategy. The model gives the firm two options of "yes" and "no". If the response is "no", then that is the end. However if the response is "yes", the next prompted activity is, to evaluate the organisation's functions for possible outsourcing using factors such as costs, environment, strategy, function, characteristics and so on. Next, is to select which functions to outsource. Once this is achieved, "Continue" is then prompted. Ghodeswar and Vaidyanathan (2008) framework provides a step further to the work of Kremic *et al.* (2006) by incorporating the post decision stage of the outsourcing process. The model was developed from the works of both Brown and Wilson (2005) and Gonalgoet *al.*(2005). In it, outsourcing process is broken down into two major stages namely outsourcing decision stage and outsourcing management stage. The outsourcing decision stage comprises the strategy, scope and negotiation. The strategic phase is the take-off for an outsourcing initiative. Here, all issues relating to objectives, scope and flexibility of the outsourcing contract as well as the estimation of total time, budget and other resources are decided. Under the scope of work, baselines and service levels expected from the vendors are established in addition to the clear delineation between the functions to be outsourced and the ones to be retained in-house. The negotiation stage culminates in the signing of contract between the host organisation and the selected vendor. The outsourcing management stage (post decision) has the implementation, management, completion and support as its components. All are coordinated to ensure effective and successful delivery of the contract initiative. For instance, management phase include monitoring performance, integrating delivery, managing partnerships and cost/budget administration while completion takes care of issues like delivery results, completing contract and end of contract. The

framework is cyclical in nature in that there is a provision for the possibility of renewal of contract at the completion after evaluation of the vendor's performance.

Kumar *et al.*, (2010) developed a close loop outsourcing decision model that deals with key enablers and barriers to successful in-sourcing (make) and outsourcing (buy). The model consist of actions, internal assessment and vendor assessment activities that will influence the decision to outsource. The actions, assessments and answers are all interconnected in a closed loop in such a way that each question is prompted by a "yes" or "no". The answer then becomes the action to take. The model is explicit enough and will go a long way in assisting organisation's decision making processes. However there is a worry that most of the posers are IT specific and does not seem to address some specific needs of the outsourcing of FM services in a public sector setting. Besides, there is no proper mechanism in the model to solve the problems of risks both at the proactive and reactive levels of any outsourcing transaction.

Development of outsourcing framework

From the review above, it is apparent that many researchers have investigated the concept of outsourcing and developed frameworks and models for it, many of which have proved to be very useful. However, none of the studies established a mechanism that fully integrates key constructs of decision support system and risk mitigation within the same framework while none incorporated a service level agreement (SLA) that clearly specifies the dos and don'ts of each party to any outsourcing contract. Four distinct phases are integrated using a flow chart methodology to depict various stages of the outsourcing process beginning at the upper end with decision support processes or activities down to lower end with the establishment of procedures for monitoring performance.

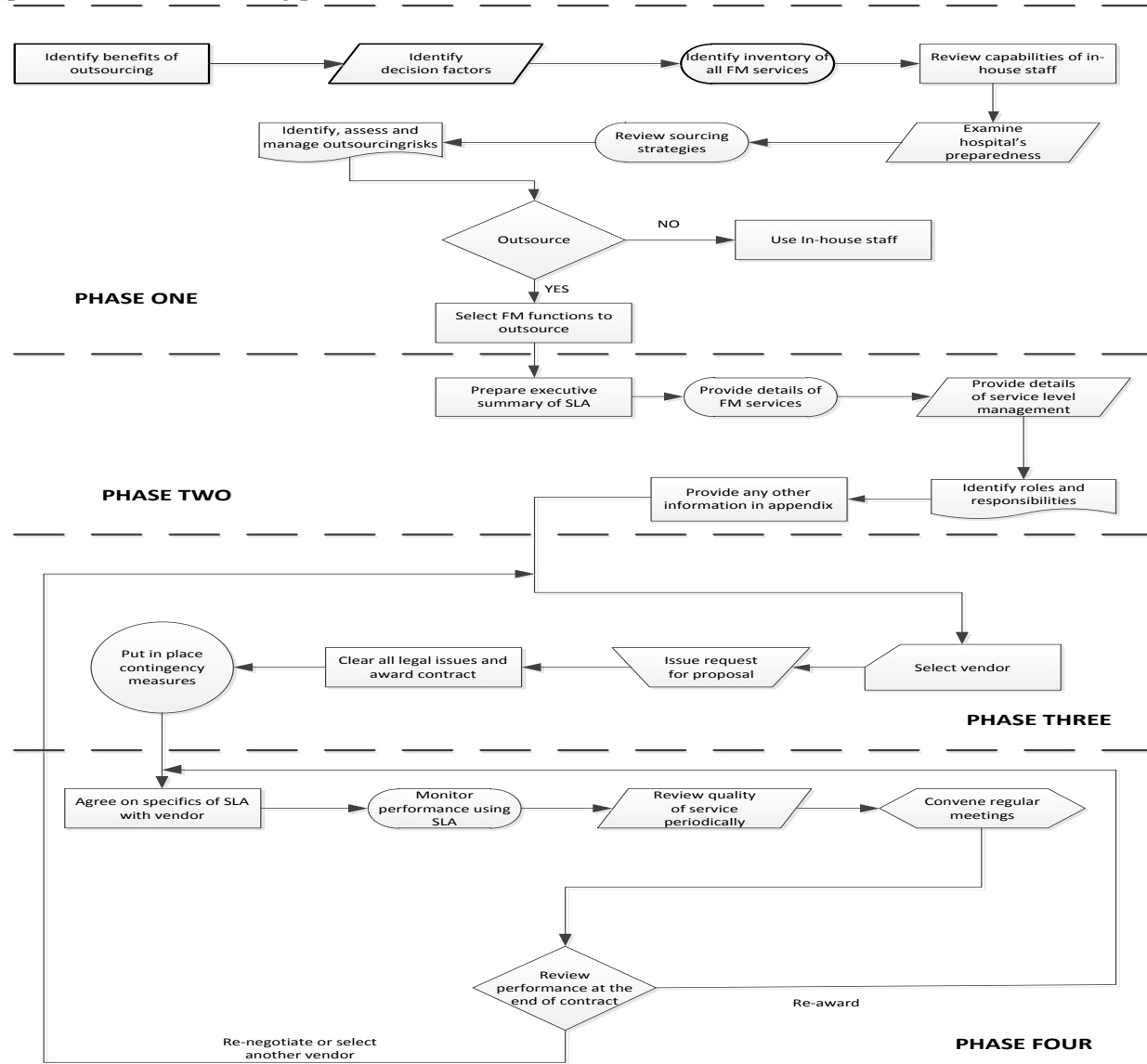


Figure 1: Framework for outsourcing FM services

The general process and structure of the developed framework is illustrated in figure 1 and comprises of four sequential phases. For each of the phases, a number of sub-activities have been identified. The four processes forming the framework are described as follows:

Decision support processes

This phase, made of eight functional activities involves analysing all functions and facilities at the disposal of the hospital, together with possibilities and risks with a view towards assisting in deciding whether to outsource or not. The nine activities, discussed as inputs and outputs are given below:

Benefits of outsourcing: One of the cardinal inputs is the accruable benefits of outsourcing. Many authors have listed such benefits as cost transparency, leverage on skills, expertise, and technologies, increased quality, flexibility and focus on core competencies. This function identifies these benefits as it relates to facilities management services in the context of public hospitals. Although it is difficult to exhaustively identify all conceivable benefits, it has been suggested that many of the desired benefits of outsourcing are general across organisations, even though additional benefits to public agencies such as hospitals may include better accountability and management, ability to re-focus scarce resources onto core functions at a lower cost (Kremic et al., 2006).

Decision factors: This sub-phase analyses the factors influencing the decision to outsource FM services in hospital and identifies the main motives for outsourcing based on the hospital's strategic objectives. In a study on significant factors influencing decision to outsource FM services in public hospitals, Ikediashi and Okwuashi (2015) established that 25 of 31 factors were significant in explaining the decision to outsource FM service in Nigeria's public hospitals; while 15 of them grouped into 5 broad categories were recommended for framework construction based on their factor loadings during analysis. The implication is that these factors are considered as inputs in the decision making process.

Inventory of facilities management services: This function identifies all facilities related services described as non-core functions that support the strategic and operational objectives of the hospital. This inventory enables the hospital to identify the services that need to be outsourced and those to retain in-house.

Review of capabilities of in-house staff: This activity involves assessing the capabilities and capacities of hospital's internal staff in managing and carrying out facilities management services efficiently and effectively. In other words, it examines whether the performance of in-house staff meets recognised standards of cost transparency, timely delivery of services and quality satisfaction of users of the facilities. The anticipated outcome of this function is either the capabilities of in-house staff are able to match that of external providers or the services are candidates for outsourcing.

Hospital's preparedness for outsourcing: This function examines the hospital's structure and its ability to manage the outsourcing relationship using such techniques as strengths, weaknesses, opportunities and threats (SWOTS). It involves looking into the hospital's records to explore its strengths; the likely weakness that may serve as clog on the wheel of outsourcing progress; opportunities as a result of outsourcing and threats from competitors including identifying what are core and non-core functions to protect the integrity of the hospital; all in the context of hospital's preparedness for outsourcing.

Selection of a sourcing strategy for facilities management: This function examines the various sourcing strategies available as possible alternatives to outsourcing. This includes arm's length relationship, operational and strategic partnering, and in-sourcing among others. It also involves examining different forms of outsourcing arrangements such as total facilities management, management contracting, and managing agent.

Risk management processes: This function identifies and evaluates risks of outsourcing each of the FM services. The risk identification and assessment for this framework was done in a study by Ikediashi and Ogunlana (2015). In it, 35 risk factors were identified and assessed in the context of facilities management services in public hospitals. It was established that 24 out of 35 risk factors used for the survey are critical, 4 factors are somehow critical, and 5 factors are not critical. Besides, 9 risk factors (please refer to Ikediashi and Ogunlana, 2015 for details) were selected based on their factor loadings from principal component analysis and are considered as inputs in developing the outsourcing framework. This is however not to suggest that the other 15 factors are not significant. Rather, they should be taken holistically when putting in place mitigation measures before going ahead with outsourcing.

Select activities to outsource: If the decision is "yes" to outsourcing, this function involves selecting the FM services to outsource as indicated in the framework illustrated in figure 1. If the decision is "no", then use the in-house staff as indicated in the framework. It is important to quickly emphasise that selecting the services to outsource is a function of resources at the disposal of the respective hospital.

Preparation of service level agreement

Once the decision is made to proceed with outsourcing of FM services, a service level agreement (SLA) between hospital and its service provider is prepared. This process involves preparation of standard set of guidelines and specifications detailing responsibilities of each party to the outsourcing arrangement including key performance indicators (KPIs) for each FM service, rewards and penalties. The SLA is divided into five main parts as follows:

Executive summary: This gives a full description and overview of the SLA, which is basically to perform the services described and meet or exceed conditions that have been negotiated or agreed upon.

Service(s) description: This part of SLA provides detailed description of all FM services and the negotiated service level agreements associated with each of them. Additionally, there should be clear definition of each service descriptors as follows:

- i. A precise and unambiguous description of the FM service being performed, measured and reported.
- ii. A measurement time frame usually in terms of dates and times over which measurements are to be made such that the hospitals can determine if the service agreement is exceeded, met or violated.
- iii. Specific roles and responsibilities of hospital should be provided. This involves identifying who is responsible for taking each measurement and how each measurement is confirmed.
- iv. Provision should be made for service KPIs (acceptable form of quality) expected from each of the outsourced FM services and their personnel. Where a service performance range is acceptable to all parties, a desired maximum service level requirement (best case) and minimum acceptable (worst case) should be specified, together with rewards and penalties tied to each.
- v. Identify sources of data such as where measurement data is collected, what is collected, where it is collected, how it is collected and who is responsible for gathering the data. It is also vital to identify who to notify and under what conditions in times of emergency or during out of-compliance situations.

Service level management: This part provides details of the process necessary for ensuring continuous monitoring of vendor performance with regards to service levels spelt out in part 2 including events or time frames that triggers process execution. This includes (1) tracking and reporting of service performance (2) problem escalation and dispute resolution (3) service change management including re-negotiating service level requirement terms (4) implementing new FM services and service level requirements (5) periodic review of service level and (6) approval processes.

Roles and responsibilities: This part of SLA specifies general or over-arching roles and responsibilities of both the hospital and its vendors, and roles and responsibilities of any government committee, agency or key stakeholders involved directly or indirectly in the outsourcing contract. Specifically, hospital in its capacity as the client should be able to provide timely, proactive and complete information about necessary changes from the hospital, problems relating to vulnerabilities, hazardous and delicate material storage and any other unusual activity that would require vendor to take extra caution such as health and safety details; complete and thorough details of its infrastructure architecture including maintenance profile especially in areas where vendor services are involved; as well as guarantee for continuous flow of cash payment for work done.

Appendices: This final part of SLA incorporates any other information not captured in the main body of SLA but relevant to the outsourcing relationship such as telephone and contact details of all members of FM in-house team and keys catalogue.

Development of outsourcing contract procedure

This phase of the framework begins once the SLA preparation is complete. It involves all processes which would lead to the eventual selection of a service provider or service providers and award of outsourcing contract. It is divided into five main functions as follows:

Vendor selection: The vendor selection process is anchored on the strategic policy objectives of the hospital on outsourcing which may be based on cost consideration, in which case the vendor with the lowest bidding price is selected. Other considerations could be based on CSR objective, in which case the hospital decides to recruit several local vendors to boost jobs and empower local communities. It could also be strictly based on the need for quality service, in which case the vendor(s) with the highest track record on quality is selected.

Request for proposal: Based on the criteria above, a request for proposal is issued to pre-qualified vendors. The request for proposal defines the scope of work and obligations expected from the successful bidders. This is before the contract is awarded as it is possible for some vendors to be dropped at this stage.

Clearing of legal issues and award of contract: The successful bidders are at this stage invited for final negotiation of contract fee while all legal issues surrounding the contract are examined by both parties to clear all areas of ambiguities. Once this is resolved the contract is awarded and the selected vendor(s) asked to commence work.

Contingency: This function provides for putting contingency measures in place should the selected vendor(s) fail to meet up with agreed conditions for resuming work on site. One way of doing this is to place some pre-qualified vendors on a waiting list, with a provision that they would be called up if the approved vendor(s) fails to meet up to its obligations.

Establishment of procedure for performance monitoring

This phase of the framework involves management of the outsourcing contract using the SLA prepared during the previous phase and other agreed clauses in the signed contract. The hospital's facilities manager or whoever holds that portfolio on behalf of the client hospital has the ultimate responsibility in ensuring that the approved vendor delivers services according to terms of agreed SLA and applies incentive measures (penalty or reward) where necessary. The input to this phase include all measures taken by the vendor to deliver quality service while the expected output is full evaluation of the outsourcing contract including lessons and best practice identified and properly documented for the next round of contract awards. This phase has five main activities as follows:

- i. *The facilities manager in conjunction with the vendor agrees on the specifics of the SLA. This is to give the vendor final opportunity to clear all forms of doubt and ambiguities with the facilities manager.*
- ii. *Performance is monitored using quality indicators in the SLA. It is important to note that performance monitoring using SLA is different from preparation of the SLA. Preparation of the SLA takes place at the second phase of the framework while the prepared document is used to monitor progress of work.*
- iii. *Quality of service is reviewed periodically and documented for presentation to vendor during meetings. It is to serve as quality control. This is anchored on the need to ensure that the level of user satisfaction on quality of outsourced services is regularly passed on to the vendors as a way of building trust and strengthening relationships between vendors and the hospital management on one hand; and between vendors and general users of the facilities on the other.*
- iv. *The facilities manager should convene regular meetings with vendors to discuss areas of urgent improvement and where necessary areas that need change in quality specifications.*
- v. *Review performance by enforcing penalty or disciplinary measures for non-performance and reward high standard of best practice. The outcome of the review is then documented and used as a benchmark for the next line of contract award, re-award or re-negotiations.*

Conclusion

Drawing on theoretical analysis and inputs from two key studies, an outsourcing framework comprising 4 components was developed to assist public hospitals administrators achieve sustainable best practice resource management. The first component, made of nine functional activities involves analysing all functions and facilities at the disposal of the hospital, together with possibilities and risks with a view towards assisting in deciding whether to outsource or not. The second component involves all activities leading to preparation of standard set of guidelines and specifications detailing responsibilities of each party to the outsourcing arrangement including key performance indicators (KPIs) for each FM service, rewards and penalties. The third component of the framework begins once the SLA preparation is complete. It involves all processes which would lead to the eventual selection of a service provider or service providers and award of outsourcing contract. The fourth phase of the framework involves management of the outsourcing contract using the SLA prepared during the previous phase and other agreed clauses in the signed contract.

The study contributes to the facilities management theory by applying theoretical framework developed from extant literature to empirically develop a best practice framework for outsourcing facilities management services. It offers a plausible detailed description of how a careful implementation of the various stages of the framework can lead to sustainable facilities management delivery. The largely exploratory research resulted in important and far reaching conclusions relevant to the academia and practitioners alike. It is hoped that the developed framework will enable stakeholders maintain healthy relationships through the process of negotiations and conflict resolutions and eventual reduction of costs. Besides, where there is a possibility for vendors' opportunistic behaviour, relationship and trust building measures, the dos and the don'ts built into the framework can reduce friction, uncertainty and risk. Through the framework also, vendors can know in more detail the expectations of their clients by understanding their

relationships and the trust built can provide the platform for better negotiations with clients if and when needed.

References

Brown, D. and Wilson, S. 2005. *The Black Book of Outsourcing – How to manage the Changes, Challenges and Opportunities*, Wiley, Hoboken, NJ, 19-43

Deloitte 2016. Deloitte Global Outsourcing Survey. Available at <https://www2.deloitte.com/.../Deloitte/nl/.../deloitte-nl-s&o-global-outsourcing-survey> accessed on 20/7/2017

Ghodeswar, B. and Vaidyanathan, J. 2008. Business process outsourcing: an approach to gain access to world-class opportunities. *Business Process Management Journal*, 14(1):23-38

Goles, T. 2001. The impact of Client-Vendor relationship on Information system Outsourcing success. *PhD thesis*, University of Houston, USA

Gonalgo, M.D., Sackett, P. and Evans, S. 2005. Breaking outsourcing into manageable phases. *IEE Engineering Management*, December/January, 28-30

Hassanain, M.A. and Al-Saadi, S. 2005. A framework model for outsourcing asset management services. *Facilities*, 23(1/2):73-81

Ikediashi, D.I., and Okwuashi, O. 2015. Significant Factors influencing Outsourcing Decision for Facilities Management (FM) Services: A Study on Nigeria's Public Hospitals. *Property Management*, 33(1):59-82

Ikediashi, D.I., and Ogunlana, S.O. 2015. Significant Risk Factors associated with Facilities Management (FM) Outsourcing: a study on Nigeria's Public Hospitals. *Engineering, Construction and Architectural Management*, 22(6):771-796

Kakabade, A. and Kakabade, N. 2001. Outsourcing in the public services: a comparative analysis of practice, capability and impact. *Public Administration and Development*, 21:401 - 413

Kremic, T., Tukel, O.I. and Rom, W.O. 2006. Outsourcing decision support: a survey of benefits, risks and decision factors. *Supply Management: An International Journal*, 11(6):467-482.

Kumar, S., Zampogna, P. and Nansen, J. 2010. A closed loop outsourcing model for developing effective manufacturing strategy. *International Journal of Productive Research*, 48(7), 1873-1900

Liyanage, C. and Egbu, C. 2008. A performance management framework for healthcare facilities management. *Journal of Facilities Management*, 6(1):23-36

Li M, Choi T. 2009. Triads in services outsourcing: bridge, bridge decay and bridge transfer. *Journal of Supply Management*, 45(3):27-39

Mohammed, A.H. and Baba, M. 2005. Developing a contractual framework for outsourcing of facilities management", available at www.fab.utm.my [Accessed on September 18, 2013]

Shohet, I.M. and Lavy, S. 2004. Development of an integrated healthcare facilities management model", *Facilities*, 22(5/6):129-140

ASSESSMENT OF COMPLIANCE WITH ACCESSIBILITY POLICIES FOR WHEEL CHAIRUSERS IN PUBLIC BUILDINGS; THE CASE OF A NIGERIAN UNIVERSITY

Oloruntoyin Paul¹, Akinbogun S.P¹ & Akinbogun O.T²

¹Department of Estate Mgt, School of Environmental Technology, Federal University of Technology Akure

²Department of Project Mgt, School of Management Technology, Federal University of Technology Akure, Nigeria

Abstract

This paper seeks to explore the accessibility of public building to wheelchair users in a University. This is with a view to appraising its compliance with the Principle of Universal Design and impact on sustainable development goal on education. It adopts a qualitative approach. Using the universal design criteria as a model, data were collected by means of physical observation and in-depth interview from one of the Federal Universities in Nigeria. The study found many narrow entrances without ramp for wheelchair access. A majority of the buildings in the university do not leverage on the principle of Universal design to guarantee access for wheelchair users. The implication is a challenge in the achievement of the sustainable development goal concerning the reduction in the level of illiteracy in the country. The study suggests that government should strictly ensure that a public building satisfies accessibility criteria for all disabled upon completion.

Keywords: *accessibility. Disabled, public building, education, wheelchair*

Introduction

The Universal Declaration of Human Rights established a non-discriminatory right to education in (1948). According to the law, everyone has the right to education. Generally, it should be free, compulsory at the elementary level, and accessible at higher level. Other various international laws, covenants and treaties support the course and consider education as a right. According to Article 24-CRPD, (2006), the condition for the enjoyment of this right is regardless of gender, age, race, tribe, religion and physical disabilities. While education is considered a right, its benefits are contingent on the accessibility and usability of the building where the learning activities take place. Despite the breakthrough in information and communication technology which provide leverage for virtual learning opportunities, the conventional mode of classroom learning in a physical building remains most popular and practicable. However, the platform may not be user friendly if it disregards the accessibility of disable people with special needs. Every society has people with one form of disability or the other. According to Cameron (2010), disability is a deprivation or limitation of opportunities to take part in community life on an equal level with others due to physical and social barriers. The importance of accessibility for the disabled in a public space cannot be overemphasized. According to Tomasveki (2001), accessibility is among the four 'A's (availability, accessibility, acceptability and adaptability) developed by the first UN Special Rapporteur on the Right to Education. This was adopted by the Committee on Economic, Social and Cultural Rights in its General Comment 13 on the right to education (1999: Para.6). Arguably, the concept of accessibility cannot be separated from the design of a building in the university so as to avoid deprivation of people living with disabilities. This argument is validated by the urgent need to meet the demand of One billion people living with disability globally (World Bank 2020). According to WHO (2011), disability is more prevalent in the developing countries. For instance, in Nigeria, over 19 million people are living with disabilities (Ahmed Awad and Mastura 2014). Despite the country assent to the International treaty of Convention on the Rights of Person Living with Disability, Akinpelu and Sad (2017) observed that public buildings are often not accessible to people with physical disabilities. Perhaps, this is evident by the large number of out of school children in Nigeria as noted by (UNESCO, 2015). A study conducted by Chiwandire and Vincent (2017) in South Africa, revealed that there have been numerous instances where prospective students with disability were denied admission into public universities in South Africa on the grounds that they do not have appropriate facilities to accommodate them. For example, in January 2015, a wheelchair user was denied admission by Tshwane University of Technology on the grounds that the university was not physically accessible to wheelchair users. Further, Losinsky et al.'s (2003) and Matshedisho (2010) investigated the physical accessibility to wheelchair users of a South African university. Participants expressed concerns over the inaccessibility of some campus buildings, including facilities such as toilets.

More generally, previous studies on accessibility to public facilities are many. However, they cover different scales, from neighborhood units (See Larsen and Gilliland, 2008) to the national level (See Pearce et al., 2008). They include a broad range of public spaces including access to green space (Hillsdon et al., 2006; Coutts, 2008), access to health services (Luo and Wang, 2003; Tanser et al., 2006), access to recreational

services (Diez Roux et al., 2007; Robitaille and Herjean, 2008), and access to open spaces (Witten et al., 2008). Albeit, there are few studies outside the developed world that have expanded the scope to educational building in the developing world where Nigeria is a prime example. At the moment, there is a concern which raises an unanswered question on the accessibility of disabled in Nigerian university. Therefore, the need to evaluate the buildings in terms of their accessibility with particular to wheelchair users is important. This study focuses on a public University using the Federal University of Technology Akure as a context. It looked at the accessibility of the buildings to examine how the sustainable development goal on eradication of illiteracy could be met with particular reference to wheelchair users.

Accessibility in Public Buildings

Access to public building is one of the important factors for assessing usability (Lotfi and Koohsari 2009). The significance of the factor is crucial to socio-cultural, economic and the wellbeing of the people (See Krier, 1984; Glazer, and Lilla, 1987; Moudon, 1992; Sorkin, 1992; Tibbalds, 1992; Worpole, 1992 and Katz, 1994). Generally, accessibility is a term with varying context, however with regard to a building, it explains the ease with which a building, place or facility could be reached by people with and without disability (Cowan, 2005). It measures the relative opportunity for interaction or contact with a building park (Gregory, 1986). According to Tuikolongahau (2019), better accessibility through design will increase the ability of wheelchair users elderly and paraplegic people to live more independently, thus improving their quality of life. A country's physical and social environment may create a barrier to the participation of people with disabilities in education, economic, civic and community life. The barriers include inaccessible buildings, lack of accessible transport, efficient and effective policies. A building not accessible by persons with physical disability exclude the usage of the facility (YarfiAshigbi and Nakau 2017). Generally, most countries have adopted the social model approach to disability. This focuses on "curing" individuals with disability to fit them into society, thereby shifting the emphasis to need for personal changes by people living with disability rather than change in the design of their surrounding environment and society. Rather than being an individual health problem, Oliver (1990) suggests that disability is the society's inability to provide accessible environments for people with disabilities. Drawing from Harris and Enfield (2013), the problem of disability is the "disabling society". It deny of basic human rights of people with disabilities and through discriminatory laws which limit access to adequate education facilities, employment opportunities, participation in decision making, and which result in exclusion from the society. Ahmad, et al (2014) and Yarfi, et al. (2017) corroborate the findings in a study which found the built environment as a disablist. They project the able-bodied values, inaccessibility of public buildings and public spaces due to physical barriers which makes it difficult for people with disabilities to access the buildings and perform their daily obligations (Akinpelu and Sad, 2017). According to Goldsmiths (2007) the idea that environment can be designed with requirements of the disabled in mind was unheard of in the early 60's. The need to provide access for the disabled culminated in Universal design model to accessibility. This approach refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability' (Synopsis of the Disability Act, 2005). Remarkably, several campuses around the world have moved to incorporate and include students with mobile limitation (Hill 1992, Filmer, 2008).

Empirical Studies on Disability Wheelchair Accessibility in Public Facility

Being disabled puts some people in vulnerable situations where "non-disabled people are. They feel very uncomfortable in the presence of the able bodies and tend to be patronized, pitied, and sometimes ignored. Some empirical studies have examined the state of accessibility of public buildings for the disabled. For instance, based on the challenge of integrating wheelchair users into the larger community Hamzat and Dada (2005) examined the accessibility of wheelchair users to a group of public building in Ibadan, Nigeria. Using the American with Disabilities Act Accessibilities Guidelines with specific reference to the doorway's width, height of thresholds and steps, width of routes and grade of ramps, a set of data from were collected from 38 selected buildings. The study found that only 18.4 percent were accessible and limit opportunities for community integration of wheelchair users. Holoway (2001), investigated and described the issues arising from a small-scale investigation into the experience of the disabled students at a university in the United Kingdom. It adopted a semi-structured interviews to reveal individual experience and analysis of relevant documentation from the university. It identify the factors that create a positive experience for disabled students, and those which effect discriminatory practice and marginalisation. The implications of the findings for policy and practice suggest the need for a central policy which supports the philosophy of an

accessible learning environment for all students; evaluation procedures which involve disabled students; staff training and awareness and student advocacy. According to Shelvin et al (2004), as elsewhere, people with disabilities in Ireland have been included in this accessibility in the building process. However, few studies have explored the quality of access and participation for students with disabilities within higher education. It therefore examined the participation of the disabled in third level institutions to facilitate greater access of the marginalized groups who have traditionally been excluded from higher education in Ireland. Using a set of data from a small scale qualitative study, findings show that physical access remains a serious obstacle to full participation of the disabled. Generally, there was a low level of awareness of student needs in relation to assistive provision and assessment. The research highlights the inherent limitations in the current piecemeal institutional response to provision for students with disabilities. It suggested a comprehensive access service that addresses the needs of all marginalized groups in the higher institution. Similarly, in a survey conducted by Ayorkwa and Dansoh (2011) to examine the right of the disabled in the 1992 Constitution on the rights of disabled persons in Ghana. Using a checklist the instrument, the study found that only little had been done to provide access for people with disabilities in selected monumental public buildings. In addition, facilities such as the car parks, main entrances, ramps, staircases and corridors, were not readily accessible to People with Disability. In a related study, Evcil 2009, assessed the level of compliance of public buildings to wheelchair accessibility in Istanbul, Turkey. Using a descriptive method based on observation and physical measurement, data were collected from 26 public buildings. The study found that wheelchair users experienced many architectural restrictions in public buildings although there were intentions to retrofit to the improve accessibility. Welage and Liu (2011), carried out a meta analysis of the studies on wheelchair accessibility in public buildings and discuss the role of professional in this practice area. The study found that a low compliance rate among selected articles related to the accessibility of wheelchair users in public buildings. In addition, none of the study reported 100% compliant with accessibility to wheelchair users despite the enforcement of existing laws and regulations. Parking had the lowest compliance rate among all facilities in terms of accessibility, while entrances had the highest.

Imrie and Kumar (2010) provides a discussion of the diverse experiences of different disabled people with regards to access in the built environment. The study found that, disabled people's needs are poorly articulated and represented in the design and development of the built environment while the regulatory controls which oversee disabled people's access are weak. findings from a focus group discussion shows that many disabled people feel estranged and oppressed by facets of the built environment and generally feel powerless to do anything about it. The study concludes by suggesting a connection between design and implementation of public policy towards the built environment with the daily lived experiences of disabled people. Chinwandire and Vincent (2017), examined the adequacy and measures taken by South African universities to make their built environments more accessible to students with diverse types of disabilities. Data were collected using a semi-structured in-depth face-to-face interviews with Disability Unit Staff Members (DUSMs) from 10 different public universities in South Africa. The study found that the most challenge with promoting higher education accessibility for wheelchair users include the preservation and heritage justification for failing to retrofit older buildings, ad hoc approaches to creating accessible environments and failure to address access to toilets, libraries and transport facilities. While it is obvious that DUSMs know what ought to be done to make campuses more accessible to wheelchair users, students should be empowered to play a leading role in sensitising non-disabled members of universities, to create greater awareness of the multiple ways in which wheelchair user students were excluded from full participation in university activities. The review from the current studies shows that most public building were designed with generic characterization and without cognizance to broader definition of the diverse nature of societal component that includes the disabled. In consonance with Papanek (2000), the review shows that the design of most of the building promote utilitarian and aesthetics standard that are unrelated to the need of people with disability.

Research Method and Data

This study considers buildings within Federal University of Technology Akure (FUTA), Nigeria (See Figure 1)

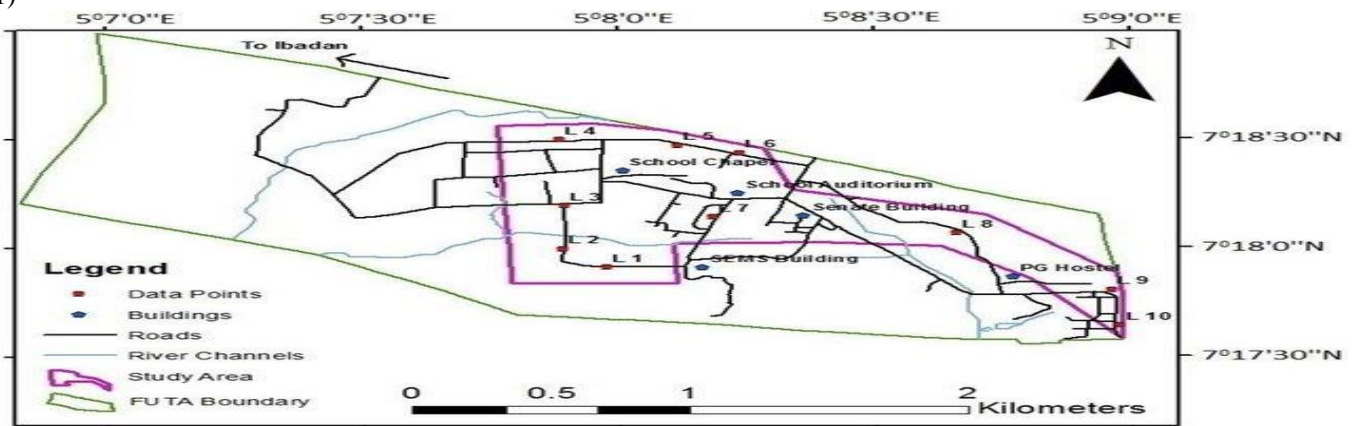


Figure 1: Map of study area (adopted from Akintorinwa and Oluwole 2019)

The building facilities that were considered are twelve (12). They include Central administrative block, Library, Faculty buildings and offices, Departmental buildings and offices, workshop and laboratories, University Health centres, Student affairs, Lecture theatres and room, Sports and recreation facilities, student hostel and banks. The study was a descriptive cross-sectional survey to assess the accessibility of academic buildings in FUTA. A cross-sectional design was used because no hypothesis was stated. A physical access audit checklist is used to examine the selected buildings for compliancy with the criteria designed to measure the usability of the buildings for wheelchair users. The assessment examined how much of the building can be used independently by the disabled students. The accessibility factors available include ramps to buildings, automatic doors, and elevators in multi-storey buildings, curving, washrooms, seating, and designated parking. The descriptive survey approach of the one-time observation of building and infrastructure from the university were analysed. The abridged form of United Nations Accessibility for the disabled, a design manual for a barrier free environment 2003-2004 Accessibility Guidelines instrument was adopted as a tool for the data collection through direct observation. Regarding the oral interview, open ended questions were designed in line with the abridged form of United Nations Accessibility for the disabled, to collect data from a professional builder in the Physical Planning Unit. The interview was conducted face to face. The questions evaluates the level of awareness of structural provisions for the disabled in the design of buildings by built environment professionals at the Physical Planning Unit. Data collected through observation were analysed using descriptive statistics such as frequency tables, percentages and ranking. The buildings that have 100% accessibility provisions were ranked 3, those with 50% and above ranked 2, those with less than 50% ranked 1 while those with no provisions ranked 0. The rankings were summed up for assessment of compliance with the benchmark for accessible building.

Findings

Education is recognized as a right of all globally. Attempt to achieve this is supported by the principle of Universal design to assist wheelchair users and people with special needs. To begin with, the study found that professional builders in the Works department are fully aware of the United Nation standards of structural provisions for the disabled in the design of buildings. However, most of the buildings were designed without recourse to the provision for wheelchair users. Cost cutting and poor ergonomics and other human factors in physical development which often negate the design decision at the design stage are responsible for the lack of accessibility requirement for wheelchair users in most of the buildings in the university. Arguably, findings further show that there is an ill-conceived notion that there are no disabled students on campus and that the courses offered in the university (Engineering, Technology and Science based) cannot be taken successfully by disabled students. This finding is buttressed by the assessment of the available accessibility facilities for disabled in the building within the universities. The assessment of the availability of entrance ramp is presented in Table 1. The availability of ramps was ranked 3 in the university senate and the student affairs complex which indicates that they were fully available, the faculty buildings, offices and, library were ranked 2 showing they were partially available while hostels, departmental offices and auditoria were ranked as 1 which reflects rarity. The banks, laboratories, workshops, lecture halls and rooms sport centre were ranked 0 which indicates unavailable.

Building entrance ramps which are expected to portray an all-inclusive learning environment to the wheelchair users are found missing in all lecture rooms, laboratories, workshops, sport centre and banks within the campus. The hostels were intended to accommodate the students during their learning period in the university. Findings show that 50% of the entrances are not accessible to disabled students. The same was also found about the departmental buildings, offices and auditoria. However, the faculty buildings and offices and the new library had entrance ramps incorporated in most of their designs although not with some few exceptions such as School of Sciences buildings, School of Engineering and Engineering Technology building, School of Health and Health Technology building. All the entrances to the health center, Student Affairs and the University senate which was also expanded recently had ramps which are accessible to disabled students. In one of the cases where ramp was found, it only terminate at the ground floor while the upper floor remains inaccessible to wheelchair users. In the other case, in new developments, the ramps were too steep and are mostly without protective handrails which according to the UN accessibility design consideration should be hard and non-slip surfaced with handrails provided and placed at least 0.40m high along the full length of ramps. It negates the principle of flexibility of use and tolerance of error to minimize the risk of accident from unintended actions. This is because ramps were not initially conceived at the design stage of majority of the building. This means that people with disability are not in consideration in the design and construction of most facilities within the campus. This finding is consistent with Yarfi, Ashigbi & Nakua, (2017) which found a common phenomenon of inaccessible design of public buildings which limit accessibility for people with disabilities in Ghana.

Concerning entrance and automatic doors, the guidelines stated in the abridged form of United Nations Accessibility for the disabled stated that in new accessible constructions, all main public entrances should be accessible to an ambulant disabled person, and the approach to the entrance should be free of stairs and steps. Findings show that the current situation within the campus is far below the standard of accessible design as stairs and steps characterised the design of the buildings in the University. Table 2 shows that all the buildings that were assessed for this research work was ranked 0 for the availability of automatic doors which indicated their non-availability and further reiterates their absence in the buildings within the campus. This is contrary to expectation in the University. New buildings have been developed in the recent past (1-5 years back); still none of this new development has intelligent doors, which implies a disamenity to the disabled. The presence of automatic doors in the buildings, most especially designs that are intended to cater for a large number of students such as lecture halls and auditoria including sport facilities will eliminate barriers to the usage of such buildings by students that are disabled. The availability of elevator in story buildings was ranked 0 showing that it is not available in any of the buildings in the university. Although, most of the buildings are one-storey buildings no elevator was provided in the storey buildings including the school library, faculty buildings and offices and the university senate. None of the other multi-storey buildings, faculties, and departments has a lift. The implication of this is that a wheelchair user needs high physical energy to access the facility. Further, living an independent life without been assisted, stigmatized, and pitied by the non-disabled colleague is inevitable. The university senate, student affairs building, hostels, health centre, banks, laboratories, workshops, lecture halls and rooms, sport centre and auditoria were ranked as 0 for curving indicating their non-availability. Only the faculty buildings and offices, departmental buildings and offices and the library were ranked as 1 showing they were somewhat available.

The presence of modified washrooms in the selected buildings were ranked as 0 in Table 2 showing their non-availability for the use of people with disability in any of the buildings within the Faculty, administrative block and students' hostel. The situation is even critical to the extent that able bodied students have no access to rest room facilities as most of the buildings lack the required number of rest rooms and the available ones are in a very dismal and unhygienic state. In many cases, washrooms are permanently locked and inaccessible to disable and non-disable students. In addition, the provision of seating for the disabled was ranked as 0 indicating that they were not available in the assessed buildings which further allude to the fact that there is no special provision made for the disabled there by creating additional barrier to learning in the lecture halls, rooms and laboratories including workshops within the university. Furthermore, the provision of designated parking for the disabled student was ranked as 0 for all the buildings that were studied which means they are not available in the assessed buildings. This is evident within the campus premise as shown in Table 2 indicating outright neglect of these category of students.

Table 1: Levels of accessibility for the disabled in academic facilities

Buildings	Building Entrance Ramps	Automatic doors	Elevators	Curving	Modified washrooms	Seats for the Disabled	Designated parking	Total %
University Senate	3	0	0	0	0	0	0	14.3
Student Affairs	3	0	0	0	0	0	0	14.3
Hostels	1	0	0	0	0	0	0	4.8
Health centre	3	0	0	0	0	0	0	14.3
Banks	0	0	0	0	0	0	0	0
Faculty buildings/offices	2	0	0	1	0	0	0	14.3
Deptal buildings/offices	1	0	0	1	0	0	0	9.5
Laboratories/workshop	0	0	0	0	0	0	0	0
Library	2	0	0	1	0	0	0	14.3
Lecture halls/rooms	0	0	0	0	0	0	0	0
Sport Centre	0	0	0	0	0	0	0	0
Auditoria	1	0	0	0	0	0	0	4.8
Total %	44.4	0	0	8.3	0	0	0	

Source: Field report, 2018

Table 2: Level of compliance of academic facilities with the accessibility provisions

Buildings	Total %
University Senate	14.3
Student Affairs	14.3
Hostels	4.8
Health centre	14.3
Banks	0
Faculty buildings and offices	14.3
Departmental buildings and offices	9.5
Laboratories/workshop	0
Library	14.3
Lecture halls and rooms	0
Sport Centre	0
Auditoria	4.8

Source: Field report, 2018

From the table 3 while assessing the level of compliance of the selected buildings in line with the accessibility provisions for the disabled, the university senate, student affairs building, health center, faculty buildings and offices and the university library was 14.3% compliant with these accessibility features. Departmental buildings and offices were 9.5% compliant, hostels and auditoria were 4.8% compliant while the banks, laboratories, workshops, lecture halls and rooms and the sport center were not compliant with any of the accessibility features that was studied. The percentage score shows the aggregate level of compliance for each of these features which reflects the level of unacceptance and unpreparedness for the disabled in the Nigerian university system.

Table 3: Availability of accessibility provisions for the disabled in academic facilities

Buildings	Total %
Building Entrance Ramps	44.4
Automatic doors	0
Elevators in story building	0
Curving	8.3
Modified washrooms	0
Seating for the Disabled	0
Designated parking	0

Furthermore, the availability of each of the accessibility features was assessed for all the buildings. Findings show that the 44% of buildings which are either steep or terminate at ground floor. Only 8,3% of the building had curving. None (0%) of the buildings has automatic doors, elevators, modified washrooms, seating for the disabled and designated parking indicating their absence within the campus. This result further emphasized the poor accessibility of the university to prospective students on wheelchairs. The number of wheelchair users in the university is less than five. Despite their number in society, they are debatably deterred by what Goldsmiths (2007) termed “architectural disability” because architects, builders and other stakeholders consider them non existing.

Conclusion

Public buildings are normally unrestricted in their use to the public, hence the need for a design that engages accessibility to the abled and the disabled. This study looks at the compliance of buildings in a university with design considerations for wheelchair users. The aim is to examine whether the accessibility of the buildings promote reduction in illiteracy which is one of goals of sustainable development among the disabled. The study found that the accessibility of a majority of the building is poor for wheelchair users. The current designs of buildings in the portends systematic exclusion of wheelchair users from learning. The the implication is that wheelchair users may be unable to live an independent life in their quest for higher education. This is probably responsible for the low enrolment of the wheelchair users in the institution. Arguably, Wheelchair users are more likely to experience adverse socioeconomic outcome such as education and lower levels of employment and higher poverty rates. With this, it may be difficult for Nigeria to achieve sustainable development goal on the reduction in the level of illiteracy particularly among the people with mobility problem. The need to align with the broader agenda of universal design is inevitable to reduce illiteracy and improve manpower development of wheelchair users.

References

- Ahmed, A., Awad, Z. A.-C., Mastura, A. (2014). Disabling campuses: the development and outcomes of Nigerian disability policies. *OIDA International Journal of Sustainable Development*.
- Akinpelu, D. O., and Sad, S. Z. (2017). Accessibility of Public Spaces: Case Study of Ikeja, Lagos State,. *International Journal of Humanities and Social ScienceInvention*, 12 - 24.
- Akintorinwa, O.J and Oluwole S.T (2018): Empirical relationship between electrical resistivity and geotechnical parameters: A case study of Federal University of Technology campus, Akure SW, Nigeria, *NRIAG Journal of Astronomy and Geophysics*, 7(1):123-133, DOI: 10.1016/j.nrjag.2018.02.004
- Cameron, C. (2010). 'Does anybody like being disabled? A critical exploration of impairment, identity, media and everyday life in a disabling society'. PHD thesis, Queen Magaret univeristy, Edinburgh, UK.
- Chiwandire, D. and Vincent, L., 2017, 'Wheelchair users, access and exclusion in South African higher education', *African Journal of Disability* 6(0):353. <https://doi.org/10.4102/ajod.v6i0.353>
- Danso, A.K, Ayarkwa. J and Dansoh A. (2011) State of Accessibility for the Disabled in Selected Monumental Public Buildings in Accra, Ghana. *The Ghana Surveyor*, 4(1)
- Evciil, A.N(2009)Wheelchair accessibility to public buildings in Istanbul,*Disability and Rehabilitation: Assistive Technology*, 4(2):76-85
- Goldsmith, S. (2007), Universal design: A Manual of Practical Guide for Architect, ed. A. Press, oxford UK: Routledge.
- Hamzat*T.K, and Dada, O.O (2005): wheelchair accessibility of public buildings in ibadan, nigeria *Asia Pacific Disability Rehabilitation Journal*, 16(2)
- Imrie R and Kumar M (1998)Focusing on Disability and Access in the Built Environment,*Disability & Society*,13(3):357-374,DOI: [10.1080/09687599826687](https://doi.org/10.1080/09687599826687)
- Harris, A., & Enfield, S. (2003). Disability, Equality and human right: a training manual for development and humanitarian organisation. Oxford: An Oxfam Publication in association with Action on Disability and Development (ADD), Oxford, UK.
- Hill, J.L. (1992), Accessibility: Students with Disabilities in Universities in Canada. *Canadian Journal of Higher Education*. 22(1):48-83
- Imrie, R. and M. Kumar (1998), Focusing on disability and access in the built environment. *Disability & Society*. 13(3):357-374

- Lotfi,S and Koohsari M.J: (2009) Measuring objective accessibility to neighborhood facilities in the city a case study: Zone 6 in Tehran, Iran, *Cities*, 26:133–140
- Filmer, D., Disability (2008). Poverty, and schooling in developing countries: results from 14 household surveys. *The World Bank Economic Review*, 22(1):141-163
- Oliver, M. (1990, July 23). The individual and social models of disability. Readers in disability studies. Paper presented at the joint workshop of the living options group and the research unit of the royal college of disabilities in hospital, Thames polytechnic, London.
- Shevlin M*, Kenny, M and Mcneela, E.(2004)Participation in higher education for students with disabilities: an Irish perspective,*Disability & Society*,19(1):15-30,
- UNESCO Institute for Statistics (UIS) and Global Education Monitoring Report (GEMR) (2015). “A growing number of children and adolescents are out of school as aid fails to meet the mark” GEMR policy paper 22/UIS fact sheet No. 31. Montreal and Paris: UIS and GEMR.
- Tuikolongahau. M (2019): Inclusive wheelchair house design: a focus on elderly and paraplegic people a DArch project submitted to the graduate division of the university of hawai’i at mānoa in partial fulfillment of the requirements for the degree of doctor of architecture
- Tomasevski, K. (2001). Right to Education - General Information.
- Welage N and Liu, K.P Y,(2011)Wheelchair accessibility of public buildings: a review of the literature,*Disability and Rehabilitation: Assistive Technology*,6(1)1-9
- Wolfensohn, J. (2003). The world bank report. The economic times, Swizerland.
- World Bank (2020): Disability inclusion, <https://www.worldbank.org/en/topic/disability>
- Yarfi, C., Ashigbi, E. Y., & Nakua, E. K. (2017). Wheelchair accessibility to public buildings in the Kumasi metropolis, Ghana. *African Journal of Disability*, 6:341

Appendix 1

Table 4 showing the structural provisions for the disabled in the design of buildings

RAMPS

S/N Design considerations

- 1 Complementary ramped route should be provided next to stairs or steps
- 2 The minimum width of ramps should be 0.90m.
- 3 Landings should be provided every 10.00m, at every change of direction and at the top and bottom of every ramp
- 4 The landing should have a minimum length of 1.20m and a minimum width equal to that of the ramp.
- 5 A protective handrail at least 0.40m high must be placed along the full length of ramps
- 6 The distance between handrails when both sides are used for gripping should be between 0.90 and 1.40m
- 7 The ramp surface should be hard and non-slip
- 8 Carpets should be avoided

ENTRANCES

S/N Design Consideration

- 25 For new accessible constructions, all main public entrances should be accessible to an ambulant disabled person
- 26 The approach to the entrance should be free of stairs and steps

- 27 Accessible entrances should be clearly identified using the international symbol of accessibility including alternate locations of accessible entrances
- 28 The entrance landing dimensions must be sufficient
- 29 The landing should have surface level with a slope of 2% and must be non-slippery
- 30 Entrance doors must operate independently
- 31 The clear door width must be at least 0.90m

DOORS

S/N Design considerations

- 32 Accessible doors should be so designed as to permit operation by one person in a single motion with little effort.
- 33 There must be sufficient space beside the latch side of the door
- 34 Glazed doors should be clearly marked with a coloured band or mark placed for the benefit of all users at a height between 1.40m and 1.60m
- 35 The minimum clear width of straight access interior doors must be at least 0.75m.
- 36 For interior doors, the minimum opening is 0.80m when the door is open
- 37 The minimum width of double leaf doors should be 0.80m for each leaf
- 38 Round knobs are not recommended
- 39 Bathrooms doors and doors fitted with spring closers should be equipped with an extra pull handle
- 40 Operational devices on doors such as handles, pulls, latches and locks should be easy to grasp with one hand.
- 41 Manual door hardware (handles, locks, pulls, e.t.c.) must be located no higher than 1.20m (not exceeding 1.40m).
- 42 Door mats must be flush with the floor surface and secured to the floor at all edges
- 43 The threshold must not be more than 20mm high and bevelled

REST ROOMS

S/N Design considerations

- 48 In any public rest room at least one unisex compartment should be accessible to a wheel chair user
- 49 Accessible rest room should be marked with the international symbol of accessibility
- 50 The height of the toilet seat and bidet should be between 0.45m and 0.50m from the finished floor level
- 51 There should be sufficient space inside the rest room to manoeuvre a wheelchair

Source: United Nations Accessibility for the disabled 2003-2004

CHARACTERISTICS OF MORTARS PRODUCED WITH DIFFERENT PLASTERING SANDS OF YOLA METROPOLIS, NIGERIA

¹Yusuf, U.S., ²Khalil I.M., and ²Garba, M. M.

¹Department of Building, Modibbo Adama University of Technology, Yola, Nigeria

²Department of Building, Ahmadu Bello University, Zaria, Nigeria

Correspondence email: usyusuf100@gmail.com

Abstract

This paper aimed at assessing the suitability of red and black plastering sands as fine aggregates in mortar production in Yola Metropolis. To achieve this, the physical properties of the sands were first determined before the mortar was produced using the fine aggregates. The samples were cured for 7, 14, 28 and 56 days. Tests to determine its density, compressive strength; water absorption and abrasion resistance were conducted. Results showed that the compressive strength of the mortar produced with red sand was higher when compared with the mortar produced with black sand. The mortar produced with red sand had average density of 2323 kg/m³, 2306 kg/m³, 2295 kg/m³ and 2292 kg/m³ while mortar produced with black sand had average density of 2391 kg/m³, 2391 kg/m³, 2394 kg/m³, 2398 kg/m³ for 7, 14, 28 and 56 days. While the compressive strength of mortar produced with red sand for 7, 14, 28 and 56 days were 9.45 N/mm², 11.09 N/mm², 15.82 N/mm² and 16.48 N/mm² and those of black sand were 7.09 N/mm², 9.42 N/mm², 12.03 N/mm² and 14.41 N/mm². The abrasion resistance for red sand at 28 and 56 days were 0.25 % and 0.30 % and those for black sand were 0.17% and 0.29% respectively. Thus, the mortar produced with black sand samples showed more resistance to abrasion when compared with the red sand mortar. It was concluded that black sand would produce mortar with low compressive strengths and high resistance to wearing while red sand mortar has relatively higher tendency to absorb water than black sand. It was recommended that black sand mortar is a better option when it comes to durability as required in plastering and rendering due to its higher durability properties.

Keywords: Fine aggregates, mortar, suitability, engineering properties, water absorption

Introduction

Building materials has been a major concern in the construction industry, in the proposal to deliver adequate housing for the ever growing population of the world particularly those in the developing countries like Nigeria, The cost of building material has always been on a sharp rise and as this increase in price continues, majority of the population continues to fall below the poverty line. This means that the need to search for indigenous materials for the construction of functional but low-cost building has become a necessity. Mortar which is the major building construction material is a combination of cement, fine aggregates and water, which are mixed in a particular proportion to get particular target strength. The cement and water react together chemically to form a paste, which binds the aggregate particles together. The mixture sets into a rock-like solid mass, which has considerable compressive strength (Neville and Brooks, 2010).

The general significance of mortar in essentially all building construction works and civil engineering practice cannot be overemphasized. Mortars are the most broadly used building materials in construction of building structures, normally applied to concrete or masonry surface as rendering and plastering systems to provide protection to the walls of the building (Swan, Rteil & Lovegrove, 2011). Mortar are connecting stones, bricks, block, and plasters are used for rendering on the external and external of wall in the construction of building, the variances between mortar and plasters to take better finish, which depend to a very large extent on the type of sand used in the mix (Varghese & Charvard, 2008). Aggregates are the mass of crushed stone, gravel, sand materials predominantly composed of individual particles, but in some cases clays and silts are used as filler in the production of mortar and concrete. In the past, Aggregates were regarded as chemically inert materials however it has been observed that some of the Aggregates are chemically active while certain aggregates exhibit chemical bond at the interface of aggregate and paste. However, its physical, thermal and sometimes chemical properties influence the performance of mortar (Gupta & Gupta 2008; Neville 2008 & Shetty 2009). Some physical properties of aggregate that must be known before mixing mortar shape and texture, size gradation, specific gravity. According to Mehta and Montero (2007) aggregate component exert considerable influence on the strength, dimensional stability and durability of mortar. The compressive strength of mortar depends on many factors such as the water to cement ratio, degree of compaction, ratio of cement to aggregate, bond between mortar and aggregate, grading, shape, strength, size and texture of the fine aggregate (Beshr *et al* 2003 and Rocco & Elices, 2009). In addition, it plays a major role in determining the cost and workability of mortar mixtures. It assists in reducing the amount of cement paste required in the mix. Aggregates have greater volume stability than cement paste. Therefore, maximizing the amount of aggregate, to certain extent, improves the quality and economy of the mix (Mehta & Montero 2007 and Shetty 2009). Aggregates are used in construction as an

underlying material for foundation and pavements, a major ingredient in mortar, Portland cement and sand. The two sands are different in colours (red and black) and the different sand types; Red (Sample A) and Black (Sample B) exist in Yola, and are used mainly for plastering and rendering works. They are common in the riverine areas of Yola and used among the average residents of these areas especially where normal weight mortar is required for plastering of walls and other structural elements. This research intends to investigate and compare the engineering properties of these sands.

Materials and Methods

The materials used in this study are ordinary Portland cement (OPC), fine aggregate (Plastering sand) and water.

OPC manufactured by Dangote Cement Company in Nigeria was obtained and used throughout the production of specimens. Tests were undertaken to ensure compliance with the British standards BS 12 (1996) and EN 197-1 (2000). Clean and air-dried sands both sourced from Gerei Local Government Area of Adamawa state were used for the research work. It was sieved with a 5mm BS 112 (1971) sieve, so as to remove the impurities and larger aggregates. Before, the fine aggregate was used; it was subjected to sieve analysis in accordance to the BS 933 Part 1 (1997). The water used throughout the research work for mixing the mortars was pumped from borehole. The quality of the water conformed to the specification of BS EN 1008 (2002) which specifies that water to be used must be safe for drinking, free from odour, colour, taste and impurities. The apparatus used in carrying out the various tests in the laboratory includes: head pan, hand scoop, weighing scale, shovel, wheel barrow, trowel, tamping rod, mixing board, standard sieve, vicat apparatus, Le Chateliers apparatus and mould cube.

Various tests were undertaken in order to assess the properties of the individual sand sample. The particle size distributions for the both fine aggregate were determined using sieve analysis in accordance with BS 812-103.1 (1990) and the weight retained on each sieves were recorded. The weights passing and the percentage passing were determined. The weight retained was sum together and compared with the weight of the sample at the beginning of the analysis.

The test of bulk density of the sand samples was carried out in accordance with BS 812-2 [1995]. The bulk density was determined based on saturated surfaced dry. $Bulk\ Density\ (SSD) = (W_1 - W_2)/V$ (1)

The moisture content and absorption capacity of the both fine aggregates were determined in accordance to the provision of BS 812: Part 109: 1990. Thus Moisture content was computed using the relationship thus: $Moisture\ content = (Air\ weight - Oven\ dry\ weight) / Oven\ dry\ weight \times 100$ (2)

The specific gravity (S_g) of the fine aggregates was determined by using the pycnometer method in accordance to BS 812-2 (1995). $S_g = [B - A] / [(D - A) - (C - B)]\ g/m^3$ (3)
Where A = weight of pycnometer; B = weight of pycnometer + sample; C = weight of pycnometer + sample + water; D = weight of pycnometer + water; S_g = Specific gravity

Mortar Production

Mix Design: The final mix entails the use of nominal mix method of mortar proportioning. A nominal mix proportion of 1:4 and a water-cement ratio of 0.7 were used to produce two set of mortar samples, set A and B. The set A is mortar produced with sand sample A. While set B is mortar produced with sand sample B. Quantities of the materials were computed using absolute volume method.

Absolute volume of material (a.v) = $ratio\ of\ material\ in\ mix \times density\ of\ material / specific\ gravity\ of\ material \times 100$ (4)

Quantity of material (kg/m^3) = $ratio\ of\ material\ in\ mix \times density\ of\ material / total\ absolute\ volume$ (5)

Testing of Hardened Mortar

Tests carried out on the hardened Mortar were the determination of the density of the hardened mortar, the compressive strength, and abrasion resistance. The density in kg/m^3 was determined by firstly air-drying the cured cubes, weighing and computing the density using the relationship thus: $Density\ of\ mortar = Mass\ cube\ (kg) / Volume\ of\ cube\ (m^3)$ (6)

Compressive Strength test was conducted according to BS EN 1015 (1999). Mortar cubes of 50mm x50mmx50mm dimension, were crushed at saturated surface dry condition using the hydraulic crushing machine. The failure load was divided by the cross-sectional area of the specimens to obtain the strength. The test was carried out by crushing the cube in a crushing machine at 7, 14, 28 and 56days respectively. This was accomplished by subjecting the cubes to systematic increase in load using a motorized hydraulic compression machine of 1100km (250,000 lb) capacity. The failure load was recorded from which the compressive strength of the cubes were determined using the relationship below. The test was carried out at the concrete laboratory Department of Building, Ahmadu Bello University. The compressive strength (N/mm²) was tested thus: = P/A (7)

Where P = load at failure, and A = Cross-sectional are of specimen (mm)

Abrasion resistance test was aimed at determining the abrasion resistance of the hardened mortar by rubbing action which causes attrition. The rubbing action results in the loss in initial weight per 1cm² of the surface being abraded. Details include mortar cube samples, wire brush, scale, and weights. To achieve this, each specimen was weighed and the value recorded as W₁ before brushing its surface with a wire brush. Wire brush attached with 3.6kg weight was used to stroke the surface of each specimen up to 60 times at constant speed. The specimens were reweighted again and the value recorded as W₂. The loss in weight was calculated by subtracting the final weight from the initial weight (W₁-W₂). Abrasion resistance percentage was calculated using the relationship thus:

$$\% \text{ abraded material} = W_1 - W_2 \times 100 \dots\dots\dots (8)$$

Data Presentation and Discussion of Result

The result of test performed on Fine aggregates (sands) to determine their properties as follows; bulk density, specific gravity, water absorption capacity, moisture content, density, compressive strength, and abrasion test. Tests results were compared and discussed. The physical properties of the individual constituents used in producing mortar for this research work were first and foremost established and the details of the result is presented in Table 1

Table 1: Physical Properties of Red and Black Sand Samples

Properties	Red sand sample (A)	Black sand Sample (B)
Specific gravity	2.61	2.65
Bulk density kg/m ³	1830	1690
Moisture Content(%)	1.12	1.14
Absorption Capacity (%)	5.00	6.00

As it can be observed from Table 1 and Figure 1, the specific gravity of samples A and B aggregates were found to be 2.61and 2.65 respectively. According to Duggal (2012) Specific gravity of aggregates generally is indicative of its quality. A low specific gravity may indicate high porosity and therefore poor durability and low strength. The values of specific gravity of the both samples are relatively within the range when compared with the standard requirement that lies between 2.6 – 2.7. For the sample A and B, they are classified as normal weight aggregate. Specific gravity is the ratio of the mass per cubic meter of the aggregate to the mass of the same volume of water at the stated temperature. It is used in the batching of the mix. Thus when and where the specific gravity is low, for a particular material, it implies that more of such materials will be needed, in the production of mortar. Sesha (2014) classified aggregate with specific gravities ranging from 2.5 - 2.7 as normal weight. From the data and analysis Sample A and Sample B can be classified as normal weight materials as they fall within this classification.

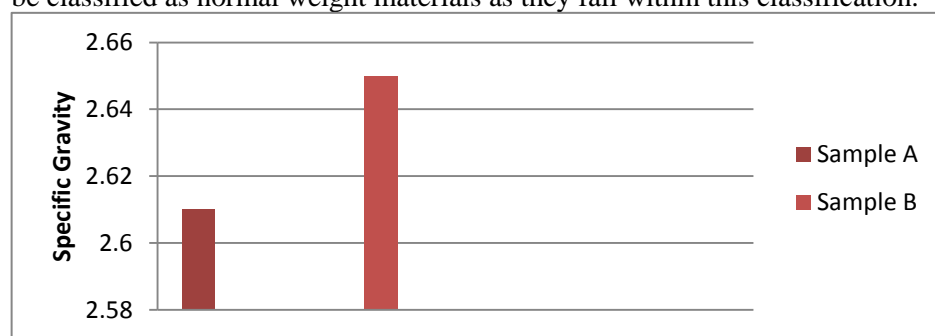


Figure 1: Specific Gravity for Samples A and B Used For Mortar Production

In terms of the Bulk Density of the Fine Aggregates, Table 1 and Figure 2, showed that the bulk density of the aggregate samples A and B were found to be 1830kg/m^3 and 1690kg/m^3 respectively which satisfy the requirements of BS 812 – 108 (1990) that states the range for normal weight aggregates to be between 1280kg/m^3 and 1920kg/m^3 (for bulk density). For the fact that bulk density of aggregates is a function of the particles shape and size, packing, the grading and moisture content.

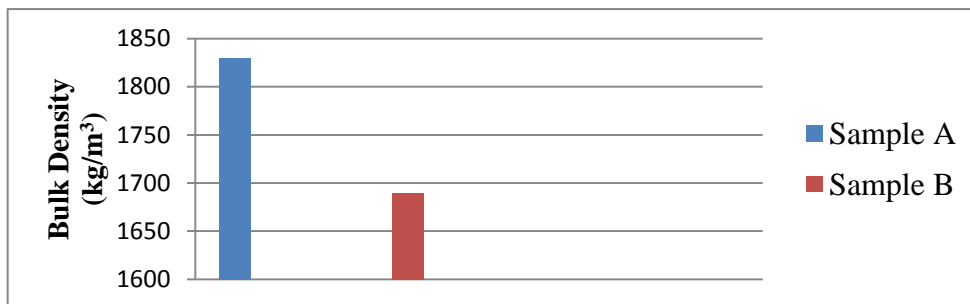


Figure 2: Bulk Density for Aggregate Samples A and B

Thus the bulk density of Sample A greater than that of Sample B. Aggregate of a given specific gravity having low bulk density means that there is loose packing. Therefore, when the two physical properties are considered, it can be said that Sample A is denser than Sample B. Bulk density is the weight of aggregate held by container of unit volume when filled or compacted under different condition (Shetty, 2009 and Duggal, 2012).

Table 2: Results for Sieve Analysis of Red Sand (A) Aggregates

BS Sieve Size	Weight Retained (g)	Total Weight Retained (g)	Cumm % retained	Weight Passing (g)	% passing
10	5	5	0.25	1995	99.75
5	20	25	1.25	1975	98.75
2.5	70	95	4.75	1905	95.25
1.2	365	460	23	1540	77
0.6	438	898	44.9	1102	55.1
0.3	977	1875	93.8	125	6.25
0.15	70	1945	97.25	55	2.75
Pan	55	-	-	0	0
Total		265.2			
Fineness modulus		2.65			

Table 3: Sieve Analysis of Black Sand (B) Aggregates

BS Sieve Size	Weight Retained (g)	Total Weight Retained (g)	Cumulative % retained	Weight Passing (g)	% passing
10	90	90	4.5	1910	95.5
5	205	295	14.75	1705	85.3
2.5	235	530	26.5	1470	73.5
1.2	530	1060	53	940	47
0.6	265	1325	66.25	675	33.8
0.3	580	1905	95.25	95	4.75
0.15	55	1960	98.0	40	2
Pan	40	-	-	0	0
Total		358.25			
Fineness modulus		3.58			

Density of Hardened Mortar

The weight of the mortar cubes were taken in the airy dry condition and the density was obtained using the relationship stated in equation 6 above. The results are presented in Table 4.

Table 4: Density (kg/m^3) of Hardened Mortar Samples

Mortar Samples	7days	14days	28days	56days
Sample (A)	2323	2306	2295	2292
Sample (B)	2391	2391	2394	2398

Table 5: Average Compressive Strength (N/mm²) of Hardened Mortar Samples

Mortar Samples	7days	14days	28days	56days
Sample (A)	9.45	11.09	15.82	16.48
Sample (B)	7.09	9.42	12.03	14.41

Table 1 shows the results obtained for the density measurements. It can be seen that mortar produced with aggregate sample A exhibited lower densities than the mortar made with aggregate sample B for all ages of curing. This was expected, as the specific gravity of aggregate sample A, (2.61) is less than that for aggregate sample B, (2.65). However, the mortar made with aggregate sample B showed a slight increase in density at 28 and 56 days while a decrease in density was observed for the mortar made with aggregate sample A at 28 and 56 days.

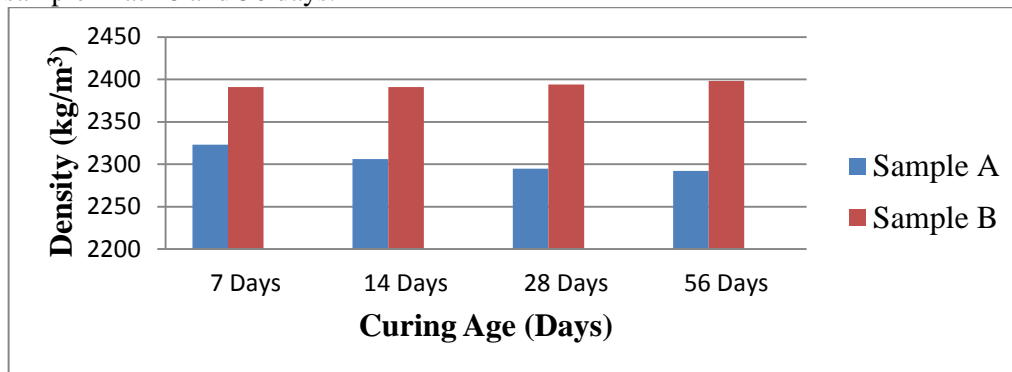


Figure 4: Density of Hardened Mortar Samples A and B

Based on the aforementioned observations, only the control sample meets the generally assumed density for mortar. Glenn Elert (2000) noted that “typical density of mortar is 2300 kg/m³” but “Volume generally assumed for the density of hardened mortar is 2400 kg/m³” it was also stated that densities ranging from 1750–2400 kg/m³ is classified as light weight mortar, while some experts like Neville (2007) and Gupta & Gupta (2008) classified mortar as follows;

- Super heavy weight (density greater than 2500 kg/m³)
- Heavy weight (2500 kg/m³)
- Normal weight concrete (density of 1899 to 2499kg/m³)
- Light weight (density below 500kg/m³)

Looking at this closely, the results obtained from mortar samples A and B have average densities of 2200 kg/m³ and 2030 kg/m³ which can be classified as normal mortars.

Compressive Strength of Mortar

Table 5 and figure 5 presents the average compressive strength of mortar specimens produced with different types of plastering sands of Yola cured in normal water for 7, 14, 28 and 56 days prior to crushing. The compressive strength of mortar produced with aggregate sample A for each of the four curing periods was higher than that of mortar produced with aggregate sample B. The lowest compressive strength for both sands occurred at 7days which are 9.45N/mm² and 7.09N/mm² respectively while the highest strength for both sands occurred at 56days which are 16.48N/mm² and 14.41N/mm². The 28days strength for the sands, 15.82N/mm² and 12.03N/mm² respectively fall below the standard (BS EN 1015-11:1999). This could be due to the higher percentage of silica oxide content in aggregate sample A.

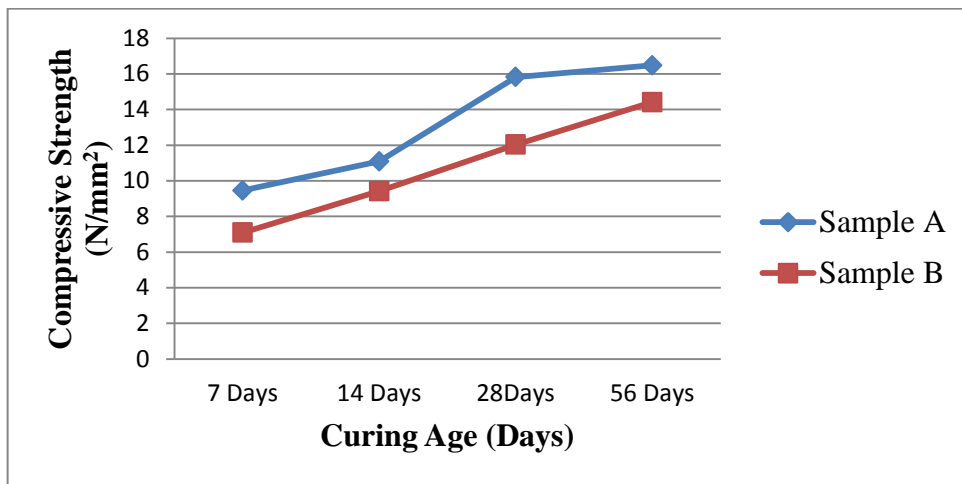


Figure 5: Compressive Strength of Hardened Mortar Samples A and B

The compressive strength of mortar gives an idea of the quality of mortar as such, the compressive strength is used by designers, specifiers and users of mortar as quality index (Mehta & Monteiro 2007).

Water absorption

In terms of moisture content for the samples A and B aggregates, which were found to be 1.12% and 1.14% respectively, the aggregate sample B has a higher moisture content compared to aggregate sample A. According to Neville & Brooks 2010, the important requirement for a dry normal aggregate, is that it must have compacted bulk density of not less than 1200 kg/m³, and thus, it can be inferred that the bulk densities of Sample A and Sample B are within the required bulk density for the production of normal mortar. Accordingly, Sesha (2014) asserted that this type of material (aggregates) falls under normal weight aggregate.

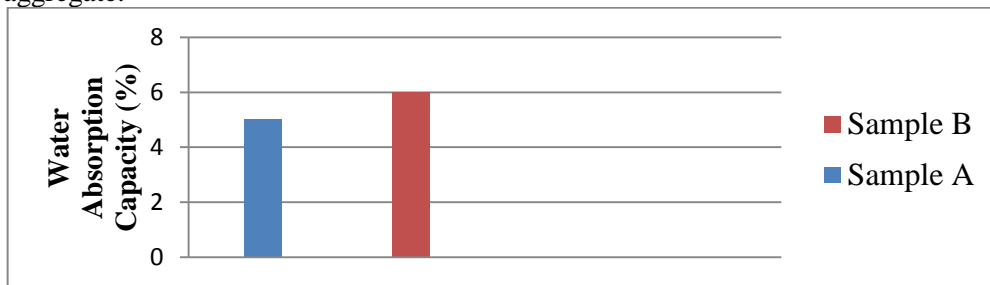


Figure 3: Water Absorption Capacity for Samples A and B

From table 1 and Figure 3, it is seen that aggregate samples A absorbed more water when compared to aggregate sample B, which means mortar produced using this material have more tendency to absorb water at a higher.

Table 6: presents water absorption test results for mortars produced with aggregate samples A and B. Mortar produced with aggregate sample B has lower water absorption rate than that made with sample A having water absorption of 3.53% and 3.14% for 28 and 56 days respectively. The sample A mortar has water absorption of 5.39% at 28 days and 3.92% at 56 days, water absorption reduced with age as a result of improvement of the mortar pore structure with age. From the result it can be clearly seen that, sample B mortar has less water absorption, which implies that it will have less susceptibility to permeability by liquid and of course stronger and durable than sample A mortar. This could be as a result of finer particles of sample B that results in filling the pores in the plastering mortar.

Table 6: Water Absorption (%) of Hardened Mortar Samples

Mortar Samples	28days	56days
Sample (A)	5.39	3.92
Sample (B)	3.53	3.14

Abrasion Resistance

Table 7: Shows the results of abrasion resistance of mortars made with aggregate samples A and B determined at the end of 28 and 56 days curing periods. The loss in weight of sample B mortar was less than that of sample A. This indicated that sample B mortar has higher resistance to abrasion compared to sample A mortar. The percentage loss after abrasion at 28 and 56 days, the sample B mortar loss in weight of 0.17%

and 0.29% while sample A mortar had loss in weight of 0.25% and 0.30%. From the result it can be observed that, the resistance to abrasion of the mortar samples increased with increase in curing days and sample B mortar resist abrasion more than that of A throughout the curing periods. This could be due to the aggregate size, its quantity and improvement in the pore structure of the mortar sample.

Table 7: Abrasion Resistance (%) of Hardened Mortar Samples

Mortar Samples	28days	56days
Sample (A)	0.25	0.30
Sample (B)	0.17	0.29

Summary

In this study various tests were undertaken to evaluate the characteristics of plastering sands, assess the properties of mortar produced with plastering sands of yola and establish their suitability when used for the production of plastering mortar. Highlights of the major findings are as follows: The Specific gravity of Samples A and B are 2.61 and 2.65. Thus The Specific gravity of Sample A is lower than that of Sample B by 0.76%. Also the Bulk density of Samples A and B are 1280kg/m³ and 1920kg/m³ respectively. These values represent that the Bulk density of Sample A is 20% less than the Bulk density Sample B. The mortar produced with Sample A have average density of 2323 kg/m³, 2306 kg/m³, 2295 kg/m³ and 2292 kg/m³ while mortar produced with Sample B have average density of 2391 kg/m³, 2391 kg/m³, 2394 kg/m³, 2398 kg/m³ for 7, 14, 28 and 56 days. While the compressive strength of mortar produced with Sample A for 7, 14, 28 and 56 days are 9.45 N/mm², 11.09N/mm², 15.82N/mm² and 16.48N/mm² and that of sample B are 7.09 N/mm², 9.42N/mm², 12.03N/mm² and 14.41N/mm². The abrasion resistance for Sample A at 28 and 56 days are 0.25 % and 0.30 % and Sample B 0.17% and 0.29% respectively.

Conclusion and Recommendations

Samples A and B can be classified as normal weight aggregates because of their high density and specific gravity. Besides that they are loosely compacted and have higher rate of water absorption capacity. The difference in compressive strength of mortar cube produced with Samples A and B was not much. Thus based on the results of the study, it was concluded that Sample B would produce mortar with low compressive strengths, high resistance to wearing and sample A mortar with relatively, tendency to absorb water compared with the Sample B. Based on the research findings, it is recommended that where strength of mortar is the requirement such as in mortar beds and joints, sample A should be used due to its higher compressive strength value. However, Sample B is a better option when it comes to durability as required in plastering and rendering due to its higher durability properties. There is need to conduct research on the durability properties of mortar produce with Samples A and B aggregates; most especially as relate to exposure to chemically aggressive environment. Above all, research should be undertaken on the possibilities of using Samples A and B in concrete production as well as investigate the effects of admixture on mortar produced using Samples A and B aggregates.

References

- Beshir, H.Almusallam, A.A. Maslehuddin, A. (2003) Effects of coarse aggregate quality on the mechanical properties of high strength concrete. *Construction and Building Materials*, 17(2):97 – 103
- British Standard, BS 112 (1971): “*Determination of Properties of Fine Aggregate*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K.
- British Standard, BS 1881: 116 (1983): “*Methods for the Determination of Compressive Strength of Concrete*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K.
- British Standard, BS 1881: 126 (1986): “*Method for Mixing and Sampling Fresh. Concrete in the Laboratory*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K
- BS 1881 (1986): “*Testing Concrete Part 201: Guide to the use of Non- Destructive Methods of Test for Hardened Concrete.*” British Standard Institution, Linfordwood, Milton Keynes MK14 6LE, U.K.
- British Standard, BS 1881: 124 (1988): “*Methods of Analysis of Hardened Concrete*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K.

- British Standard, BS 812: 109 (1990): “*Method for Determination of Moisture Content of Aggregate*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K.
- British Standard, BS 12: (1991): “*Portland Cement*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K.
- British Standard, BS 882: 109 (1992): “*Aggregates from Natural Sources for Concrete*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K.
- British Standard, BS 933: 1 (1997): “*Determination of Particle Size Distribution-Sieving Method*” BSI, Linfordwood, Milton Keynes MK14 6LE, U.K.
- British Standard European Norms, (1999).Determination of flexure and compressive strength of hardened mortar.BS EN 1015-1, BSI, Linfordwood, Milton Keynes MK146LE, U.K.
- British Standard European Norm, (2002).Mixing Water for Concrete; Specification for sampling, testing and Assessing the Suitability of Water, Including Water Recovered from processes in the Concrete Industry, as Mixing Water for Concrete. BS EN 1008-2, BSI, Linfordwood, Milton Keynes MK146LE, U.K.
- Duggal, S.K. (2012) *Building Materials* New Age International Publishers, New-Delhi, India Pp 181 – 207.
- Gupta, B.I. and Gupta, A. (2008): *Concrete Technology*. Standard Publishers Distributors. New Delhi, India.
- Mehta, K.P. and Monterio, P.J.M. (2007): *Concrete: Microstructure, Properties and Materials*. McGraw Hill Ltd, California .U.S.A.
- Neville, A.M. (2007): *Properties of Concrete Addison*. Wesley Longman Ltd, Edinburgh Gate, Harlow Essex CM 20 2JE, England.
- Neville, A.M. and Brooks (2010): “Concrete Technology.” Second Edition, Addison Wesley Longman Ltd, Edinburgh Gate, Harlow Essex CM 20 2JE, England.
- Shetty, M.S. (2009): *Concrete Technology: Theory and Practice* S. Chand & Company Ltd, Ram Nagar, New - Delhi 110 055, India.
- Swan, A., Rteil, A., Lovegrove, G. (2011). “Sustainable Earthen and Straw Bale 583 Construction in North American Buildings: Codes and Practice.” *Journal of Materials in 584 Civil Engineering*, 23(6):866–872. Doi: 10.1061/(ASCE)MT.1943-5533.0000241 585
- Varghese, P. V and Charvard M, S.(2008) *Building materials* Fourth Edition, Published by India Private Ltd.

LAND ACQUISITION AND HOUSING DEVELOPMENT IN AKWA IBOM STATE

Udeme D. Isa¹, Timothy O. Adewuyi², Michael G. Oladokun² and Jacob Atser³

¹Ministry of Lands and Town Planning, Akwa Ibom State, Nigeria

²Department of Building, Faculty of Environmental Studies, University of Uyo, Uyo, Nigeria

³Department of Urban and Regional Planning, Faculty of Environmental Studies, University of Uyo, Uyo, Nigeria

Abstract

The problem of qualitative housing has been a concern for both the government and individuals in Nigeria. This study objectively determined the stock of land formally acquired based on the number of applications received and approvals issued in Akwa Ibom State between 2007 and 2017. It also assessed the total stock of buildings developed in the study area within the focused time frame. The study adopted a quantitative approach to analysing the data on land acquisition applications and the housing development matters and the relationship between the two parameters using descriptive statistical methods and simple regression analysis. The results of land acquisition applications (LAA) obtained from the three Senatorial Districts in Akwa Ibom State showed that Akwa Ibom North-East Senatorial District accounted for most of the documented LAA received by the Ministry of Lands and Town Planning in Akwa Ibom State. The time-series pattern of LAA in Akwa Ibom State within the time horizon under review showed the most notable trough and peak occurred in 2017 and 2009, respectively. The variance of property development explained by the developed model is 54.7%, which has the number of LAA as a significant independent variable. The p-value for the model is $0.000 < 0.05$; therefore, it was concluded that the property development trend in Akwa Ibom State is predictable. This study provides an insight into the number of applications and approvals issued for land acquisition in Akwa Ibom State over the decade under investigation. The land acquisition and the housing development patterns were vibrantly revealed in this study. It was recommended that developers should endeavour to document their proposed developments with the various appropriate Authorities.

Keywords: land acquisition, housing development, time-series, pattern, Akwa Ibom State

Introduction

According to Oyebanyi (2014), housing is defined as shelter (residential structure) and all social services and utilities such as road, drainage, electricity, health and security services, among others, that make a locality liveable. Shelter in the modern society comprises flat, duplex, bungalow, detached, terrace and tenement structures. Housing is the total unit of a shelter and its environment, which gives man a better quality of life. The importance of housing in human history cannot be overemphasised; it ranked second after food in the hierarchy as the first and most important of all rights (UNCHS, 1993). This position is reinforced by section 16(1) (d) in 1999 Nigerian constitution under the fundamental objectives of state policy which compels the Nigerian state “to provide suitable and adequate shelter for all citizens”. Suffice it to say that all strata of the society, the old and the disadvantaged, should own or have access to decent, safe and sanitary housing accommodation at affordable disposal prices or rental with secure tenure (UNCHS, 1993). Unfortunately, the reverse is the case as despite the policies, institutions and regulations which various Nigerian governments have put in place since independence; there is still a dearth of housing for the low-income segment. Overtime, many authors opined that the need for adequate shelter has continued to attract global attention, especially in developing countries where the urbanisation process has been growing at an alarming rate. Consequently, Chukwujeku (2005) asserted that housing had formed part of the significant discussion in several global summits. Like other developing countries, Nigeria is saddled with the uncontrollable urban population growth caused by the lack of infrastructure provision and poor economic conditions in rural areas. Approximately 50% of Nigerians now lives in urban centres of varying sizes (Oyenuga, 2006). The astronomical increase in population and urban dwellers has created much pressure on social services, and infrastructures such as transportation, electricity, water supply, health services, housing, among others (NREH, 2017). Housing development sector plays a critical role in the provision of the most vital basic needs of man. Any good government must provide affordable accommodation for her citizens.

Oyenuga (2006) lamented the unfortunate scenario of both the Federal and State governments’ fruitless efforts at achieving sustained housing delivery to the ordinary people. Existing realities indicate that the goal is far from being achieved. Cost of building houses is increasing every day, and it is becoming increasingly difficult for an average income earner to own a home. The hapless situation could be attributed to the multiplicity of factors such as lack of secure access to land, high construction costs, limited access to finance, bureaucratic procedures, high cost of land registration and titling. Other factors include uncoordinated policies and implementation at Federal and State levels, ownership rights under the Land Use Act of 1978. Inclusively, the lack of critical infrastructure like roads, affordability gap, electricity, pipe-borne

water, inefficient development control, youth harassment of developers, inelegant revocation and compensation process, among others, are not exonerated (Babade, 2007). Consequentially, there is need for a holistic approach to housing development that will involve the Federal, State and Local governments cum private sector (both formal and informal) in line with the provisions of 2012 National Housing Policy. It is also essential that the relevant government agencies and other stakeholders evolve appropriate housing development strategies in Nigeria's South-South region. The problem of qualitative housing has been a concern for both the government and individuals. Appreciating these problems, both public and private sector developers make efforts through various activities to bridge the gap between housing supply and demand. Be that as it may, the cost of land acquisition, the cost of building materials, deficiency of housing finance arrangement, stringent loan conditions from a mortgage bank, with some necessary government policies which tend to lengthen the regulatory process for obtaining planning approvals for housing development, contribute to the subsistence of housing inadequacy. This study was set towards assessing the collective efforts of solving the housing needs for a decade in Akwa Ibom State. The study objectively determined the stock of land formally acquired based on the number of applications received and approvals issued between 2007 – 2017. It also assessed the total stock of buildings developed in the study area within the range of 2007 to 2017; and establish the relationship between the number of lands formally acquired and the number of buildings designed within the focused period.

The Concept of Housing Development

Housing is referred to as a shelter for human habitation (Abel, 2017). Housing serves as a place where man seeks shelter, comfort, security, and dignity of life, amongst other things. The Oxford Advanced Learners Dictionary (9th Edition) defines housing as houses, flats/apartments that people live in, primarily when referring to their type, price or condition. The World Health Organisation (WHO) as quoted in Onibokun (1990) defines housing as a residential environment which includes, in addition to the physical structure that man uses for shelter, all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and social well-being of the family and individual. Otegbulu (1996) defined housing to encompass the immediate environment, sanitation, drainage, recreational facilities that make life worthwhile. According to UNCHS (1996), a considerable proportion of the world's population see their house as their most valuable asset, and for many, it is also their most significant item of expenditure. Also, Streimikiene (2015) opined that housing reflects any given society's cultural attributes and always being used as one of the best indicators of a person's standard of living and his level of placement in society. In the words of Jinadu (2007), "housing is a bundle of services or a basket of goods which includes the physical structure itself, the ancillary facilities and services within and around it as well as the general environmental qualities and amenities that surround the building". (Abel, 2017). These definitions and conceptions given to housing portray it as an essential and indispensable of human habitation.

Housing Development in Nigeria

By its nature, housing represents a significant investment requiring a substantial capital outlay. In most housing projects, the developers either as a corporate organisation or individuals have to save or borrow. Keivan and Werna (2001) posited that most developing countries' houses would continue to be provided through individual effort. It can be assumed that the most common form of housing provision through the formal private sector is that initiated by an individual owner-occupier, designed and built by commissioned Architects and Builders. In the urban areas of Iran for example, the share of house building for personal consumption ranged between 76% and 92% of total annual production in the ten years of 2005 to 2015 (Dimuna, 2016). According to Oyenuga (2006), housing produced through private initiatives constitutes at least 90% of Nigeria's housing stock. The author argued that there is no affordable housing without land; with the opinion that access to land is beyond location and availability but to the degree of ease to which an ordinary citizen can acquire land for private development. Land Use Act of 1978 which was promulgated to make land available equitable for all Nigerians has succeeded in making it easier for land to be acquired for public use while access to land for private use has become difficult.

Windapo and Iyagba (2007) identified land as the main component of the housing problem because it is in the place where housing construction starts, emphasising the cost of acquiring land, other factors identified were the cost of building materials, cost of finance, foreign exchange rates, cost of infrastructure and labour cost. On the other hand, Nubi (2000) opined that availability and accessibility to land; the cost of processing and perfecting land titles; the cost of construction and income; acute shortage of skilled personnel of various

trades in the construction industry; the cost of building materials; saving; and low contribution to the National Housing Fund are the problems confronting affordable housing. Babade (2007) argued that corruption in government allocation, land speculation by private landowners, and exorbitant land prices do not favour the urban worker in having access to land for housing development. The study identified impediments to affordable housing as a rise in housing construction cost, land tenure, the process of land acquisition, cost of registering land title, town planning regulations and building bye-laws guiding urban land development, high cost of land survey and building approval processing, the ever-increasing cost of building materials, lack of infrastructure, securing loans at a higher cost and slower pace of building houses by the Federal and State governments.

Housing Problem in Nigeria

Since the dawn of urban civilisation, Nigeria's housing problem has been a concern of individual, families, groups, and governments (Gilbert, 2007). According to Aliyu (2011), this problem has often been associated with land acquisition problems, low income of the individual, high cost of building material, statutory regulation, and non-use of local building materials. It is usually a situation of either the government has failed in meeting up with its obligations or that the individuals had remained for some times incapacitated to be able to breakthrough various bureaucracies in the land acquisition procedure. A shelter must not be only adequate for the population but also habitable. The problem is more pronounced in the urban areas where population pressure is increasing than rural areas. The problem of looking for shelter leads to invasion of land to build in Nigeria. Despite the past efforts towards solving the nation's housing problem, it was evident that the public and private sectors' combined efforts over the past successive governments had continued to fall far short of housing need. Past governments had almost entirely left this critical sector to private efforts, concentrating on providing limited residential quarters for its deserving officers. Bowyer (2008) noted that the significant symptoms of urban housing problems include: -An absolute shortage of housing units; the emergence and proliferation of slums and squatters' settlement, especially in large cities; rising house rents; and a growing inability of citizens to buy or build their own houses. Individual efforts to own a residence becomes quite tricky due to several constraints. The personal satisfaction in some random climate is significantly impacted by the nature and standard of built-up structures, mainly residential properties. A quick gander at past housing approaches and projects in Nigeria divulges that effective resolutions to housing problems in general, low-income housing in particular, is yet to be found.

It is commonly agreed that most Nigeria segments face a housing "crisis" of significant proportion and a munificent number of statistics and studies are available supporting this view (Aliyu *et al.*, 2011). In most cases, it is evident in Nigeria that the designed objectives for a particular project are hardly ever realised. A critical examination of the various government housing policies makes it evident. For instance, Egunjobi (2007) assessed the effectiveness of public low-income housing programme in metropolitan Kano, which showed that the overall contribution of the programme in terms of increasing the supply of new housing required in metropolitan Kano was 50% of the planned target of 77,852 housing units for the period between 1975 and 1980. Besides, the low-income group for whom the programme was meant did not constitute a substantial proportion of the eventual beneficiaries. Abraham (2007), Adebayo and Rowling (2007), and Agbola and Alabi (2007) made similar observations with the submissions that housing situation in urban centres has deteriorated continually due to rapid natural population growth and increasing rural-urban migration. Undoubtedly, it is supposed to serve as warning waves to the government to evolve a workable policy concerning urban residential land use. If this is meaningfully carried out, urban residential land use would have been free from the catalogue of land administration problems.

Abdul (2008), Adeniyi (2007), Bourne (2007), and Chatterjee (2008) acknowledged that housing problem manifests itself in many ways which include: conspicuous and residential house rent situation, absolute scarcity of housing, the involvement in the proliferation of slums and squatter settlements, lack of finance on the part of the citizen to construct their own house, especially in large cities. Adamu (2007) submitted that housing problem, especially in our metropolis, is virtually a function of urban land administration's irregularities. The ugly situation had unavoidably matured to a poor tenancy situation. The average urban dweller seems to be exhausted of all the possible options. Egunjobi (2007) noted that most low-income earners find it difficult to secure loans or other forms of assistance for building their own homes. Likewise, building standard is one of the central problems of providing shelter for many low-income earners. Maigwa (2014) interdicted a strategy that cannot guarantee easy access to residential land by the poor, but rather

hearten speculation and turn back to question the validity of individual tenure certainly erodes the basis of its acceptability. It is a chaining situation as far as urban land acquisition is a concern. The attendant problem here is that land seems to be abundant, is shared among affordable individuals. Bowyer (2008), Dwyer (2005), and Gilbert (2007) reasoned that the slow development of residential plots in our urban and emerging urban centres could also be attributed to non-imposition of taxes to discourage land hoarding as well as the fraudulent practice of multiple sales of a single plot to many prospective buyers which is common some parts of Nigeria. Similarly, lack of readily available investment opportunities in the developing countries made it safe for individuals to invest in land, due to its unique qualities, relatively to other resources. Clois and Joan (2009) concluded that there is no doubt that many developing countries blindly imitate foreign laws imported from abroad of inherited as part of the colonial legacy. The developing countries should understand that the colonists introduced these laws to maintain their home countries status in the new era of territories they found themselves.

Sustainable Urban Housing Development

The sustainable development concept was initially defined as “development that meets the present’s needs without compromising future generations’ ability to meet their own needs (Farah and Nur, 2012). In other words, this means any development should meet people’s desires with no harm to other people’s desires in the future. However, this concept was gradually amended to focus on the quality of life, enhancing three(3) dimensions including economic, social and environmental aspects. These three (3) main elements are essential to promote sustainable development for any project, especially housing development. Housing could promote social equity among people, generate economic growth and promote environmental conservation. Winston and Eastway (2008) indicated that housing should be further developed to act as an indicator based on its importance in sustainable development. Several aspects are considered in housing, including location, construction and design, dwelling use, and regeneration (Winston and Eastway, 2008). In the case of locations, land use planning in terms of easy access to public transport and employment and mixed-use development is crucial as it is the first stage of every housing development. Also, higher densities, access to open spaces, housing quality, affordability and safe living environment are among characteristics that should be given concern in designing a residential development for a community. Meanwhile, dwelling use and regeneration involve characteristics such as maintenance and management and energy efficiency. The concept of sustainable housing and its practice is still new, especially in developing countries like Nigeria. The European Union indicated sustainable housing in three perspectives which are: - construction, social and economic factors and eco-efficiency (Abubakar *et al.*, 2010) while Karrupannan and Sivam (2009) described sustainable housing as away of contributing to community building, to social justice and economic viability at a local level. In addition to this, Farah and Nur (2012) argued that the general factor of sustainable housing practice, applied under various circumstances, depend on the State in which it is implemented. Based on these perspectives, it is clear that housing practice itself plays crucial roles in providing a vital quality of life for people, including socio, economic, and environmental aspects of sustainability.

Nowadays, sustainable housing concerns aspects of the building’s physical design and high technology, which are much related to green building. In planning perspective, several housing aspects need to be emphasised in achieving sustainable urban housing development. It should include site location and design of the house, which are considered the most significant factors involving areas that can be determined through the development plan as it is one of consideration aspect in preparing the plan. Similarly, the house design in planning perspective can be determined through planning standard and guidelines — for instance, the provision of open space. Urban housing problems usually arise when the developer in urban areas is less interested in building medium and low-cost housing due to small gains from the development, which affect affordability (Yakob *et al.*, 2012). Besides, the shortage of land supply and increased land value in urban areas may also affect open space provision. The reasons adduced being the compliance of development plan and standard guidelines provided for planning approval where at some point, developers refuse to comply with the provision as there is lack of enforcement carried out by the Authority (Chua and Deuchi, 2008; Nazirul, 2009). If such a situation happened, it may affect people’s quality of the living environment in urban areas and achieve sustainability seemed impeded.

violation of the rules of normality, linearity, and homoscedasticity and outliers. It was done by inspecting the Histogram of Regression Standardised Residual to ensure no skewness in the data set, the Normal Probability plot (P-P) of Regression Standardised Residual and the Scatterplot. If the data lie reasonably in a straight diagonal line from left to top right, it would suggest no significant deviations from normality. Wherever skewness was discovered (either positive or negative) while exploring the data set with SPSS, data transformation was conducted. The multicollinearity problem was resolved by inspecting the “Collinearity Diagnostic” table in the preliminary analysis. If the condition index and the tolerance value in the “coefficient” table for that variable are less than 0.10 or VIF value is above 10, it suggests a multicollinearity problem. The “scatterplot” diagram is inspected to check for outliers. Tabachnick and Fidell (2007) define outliers as cases with a standardised residual (as displaced in the scatterplot) of more than 3.3 or less than -3.3. Additionally, Cook’s Distance in the residual statistics table is inspected to ensure that any outlier presence causes no significant problem. Tabachnick and Fidell (2007) suggested that cases with Cook’s Distance of more than 1 are potential threats to the model. The goodness-of-fit for the model is the coefficient of determination, or R^2 , representing the dependent variable variance accounted for by its linear relationships with the independent variables. To determine whether or not the model, with its independent variables, is a significant predictor of the dependent variable (that is, significant test for R^2), a statistical significance test is performed using the F-statistic. The R^2 value is statistically significant or different from zero if the computed F-statistic is greater than the F-critical value for the defined probability level. For this study, the p-value used is at a 0.05 level. Therefore, for the output interpretation, if the obtained significance level (p-value) associated with the F-statistic is less than 0.05 (at 95% confidence), then R^2 is statistically significant.

Variable Selection

The first step to multiple regression analysis is selecting the variables to be used in the analysis. Multiple regression analysis is a dependence technique; therefore, the variables used as the dependent variable and the independent variables must be specified. For this study, selecting the parameters to explore the relationship between the number of properties developed and the number of landed properties formally acquired is based on the significant relationship between the independent variables and the dependent variable. In this study, the data were derived from the Area Planning Authority registers of the Local Government Areas in Akwa Ibom State. The records covered a decade and a year, from 2007-2017. The number of applications received, the number of applications approved, and the number of properties developed as captured by respective Authority was obtained. The authorities’ records kept when enforcement of the property/building regulations and control were carried out were employed to build up the data for this study. Hence, the possibility of capturing the three measurable variables employed as dependent and independent variables for this study which are: The number of applications received (Independent variable); the number of applications approved (Independent variable); and the number of properties developed (Dependent variable). These building construction process parameters selected are quantitative measures of the legal building development characteristics established with precise definition. These parameters are also usually the first few parameters identified for the building development control process.

Findings and Discussion of Results

This section of the study presents the analyses of the stock of land acquired between 2007 and 2017. The analysis was conducted based on the number of applications received and approvals issued vis-à-vis the land acquisition, and the relationship between the land formally acquired and the number of properties developed for the time horizon under consideration.

The Stock of Land Acquired Based on the Number of Applications Received between 2007– 2017

The study collected and collated the number of land acquisition applications (LAA) received by the Ministry of Lands and Town Planning for all the local government areas in Akwa Ibom State. The unit of analysis for this research work was based on the Senatorial Districts in Akwa Ibom State. There are three Senatorial Districts in Akwa Ibom State which are Akwa Ibom South (Eket), Akwa Ibom North-West (Ikot Ekpene) and Akwa Ibom North-East (Uyo) Senatorial Districts.

Akwa Ibom South Senatorial District

Akwa Ibom South Senatorial District has twelve (12) local government areas: Eastern Obolo, Eket, EsitEket, Ibeno, Ikot Abasi, Mbo, MkpattEnin, Okobo, Onna, Oron, UdungUko, and UrueoffongOruko. The most

prominent local government area in terms of development in this Senatorial District is Eket. Table 1 shows the number of applications received for the Akwa Ibom South (Eket) Senatorial District. Table 1 shows that apart from the Eket local government area, all other local government areas witnessed a low number of land acquisition applications. For example, for the years under review, Eastern Obolo, EsitEket and UdungUko local government areas recorded zero applications. The implication is that for those three local government areas, there was no documentation of residents applying to the Ministry of Lands and Town Planning in Akwa Ibom State for land acquisition. It may be because Lands were acquired in those local government areas unofficially.

The reasons alluded for the three local government areas of Eastern Obolo, EsitEket and UdungUko may be right for all other local government areas with low and scattered land acquisition applications except for Eket and Oron local government areas as indicated in Table 1. For example, throughout the eleven-year time horizon surveyed by this study, only five land acquisition applications were received from Ibeno local government area with one application in 2008, three in 2009 and one in 2011 (Table 1). There were no applications for the rest of the years in that local government area. The same phenomenon occurred in UrueoffongOruko local government area with only three applications in eleven years (one each in 2015, 2016 and 2017, as shown in Table 1). However, there is a change in trend for Eket and Oron local government areas as those two local government areas witnessed a surge in the number of applications received by the Ministry of Lands and Town Planning in Akwa Ibom State for land acquisition (see Table 1). The number of applications received in those two local government areas could be attributed to the fact that the population and development in those local government areas are far more than other local government areas in the Senatorial District. As shown in Table 1, the Eket local government area received 13, 17, and 15 applications in 2007, 2008 and 2009.

Table 1: Number of LAA for Akwa Ibom South Senatorial District

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Eastern Obolo	0	0	0	0	0	0	0	0	0	0	0
Eket	13	17	15	8	11	9	9	11	12	10	4
EsitEket	0	0	0	0	0	0	0	0	0	0	0
Ibeno	0	1	3	0	1	0	0	0	0	0	0
Ikot Abasi	2	2	2	1	0	1	2	0	2	0	0
Mbo	0	1	0	1	1	0	2	0	2	0	0
MkpatEnin	4	1	0	1	2	0	0	0	0	1	1
Okobo	0	0	1	0	0	2	0	0	1	4	0
Onna	0	0	1	0	0	0	1	0	1	0	2
Oron	2	1	6	2	2	3	5	2	0	5	0
UdungUko	0	0	0	0	0	0	0	0	0	0	0
UrueoffongOruko	0	0	0	0	0	0	0	0	1	1	1
Total	21	23	28	13	17	15	19	13	19	21	8

The Authorities received lower applications in other years than those three years, with 2017 recording the local government area's lowest land acquisition applications. Descriptively, the pattern based on the figures shows troughs and peaks. Applications received by the Ministry of Lands and Town Planning in Akwa Ibom State for land acquisition in Oron local government area are relatively lower than those of the Eket local government area. It could be in terms of the development in Eket due to oil and gas workers' activities in Eket local government area. However, these two local government areas accounted for over seventy-five percent of the total land acquisition applications for Eket Senatorial District.

Akwa Ibom North-West Senatorial District

Akwa Ibom North-West Senatorial District has ten (10) local government areas: Abak, Essien Udim, EtimEkpo, Ika, Ikono, Ikot Ekpene, Ini, ObotAkara, OrukAnam, and Ukanafun. The most developed settlements in this Senatorial District are Ikot Ekpene and Abak in Ikot Ekpene and Abak local government areas. Table 2 indicated the number of applications received for the Akwa Ibom North-West Senatorial District. It is revealed from Table 2 that most local government areas in this Senatorial District witnessed a low number of applications received for land acquisition except for Ikot Ekpene and Abak local government areas. Ikot Ekpene and Abak local government areas, being the most developed local government areas in the

Senatorial District, explain the higher number of applications received in those local government areas than the other ones.

Table 2: Number of LAA for Akwa Ibom North-West Senatorial District

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Abak	7	9	5	4	4	4	3	5	6	6	4
Essien Udim	0	0	1	3	0	0	0	0	2	3	0
EtimEkpo	0	0	0	0	0	1	0	0	0	0	0
Ika	0	0	0	0	1	0	0	0	0	0	0
Ikono	2	0	0	2	1	3	2	1	1	0	0
Ikot Ekpene	8	15	12	13	16	11	10	11	14	10	4
Ini	0	0	0	0	0	0	0	0	0	0	0
ObotAkara	0	0	0	0	0	0	0	0	0	0	0
OrukAnam	0	0	2	1	0	1	1	1	1	1	1
Ukanafun	0	2	0	0	2	0	0	0	1	1	1
Total	17	26	20	23	24	20	16	18	25	21	10

The breakdown in Table 2 evidenced that Ini and ObotAkara local government areas recorded zero number of applications for the years under review, implying no documentation of land acquisition. It may be concluded that the lands acquired in those local government areas were unofficial, not known to government documentation. In EtimEkpo and Ika local government areas, for eleven years, only one application each was documented in the year 2012 and 2011 respectively. There were only nine land acquisition applications throughout the eleven-year time horizon of this analysis for Essien Udim local government. The number of applications received in Ikono, OrukAnam and Ukanafun local government areas is low. However, Ikot Ekpene and Abak local government areas recorded a more significant number of applications received by the Ministry of Lands and Town Planning in Akwa Ibom State for a land acquisition than other local government areas earlier mentioned. The maximum number of applications received in any one year for Abak local government area is nine, 2009 while the minimum is three in 2013. The significant number of applications received in this local government area could be attributed to the population and development in the local government area and Ikot Ekpene local government area in the same Senatorial District. Regarding the applications received by the Ministry of Lands and Town Planning in Akwa Ibom State for land acquisition in Ikot Ekpene local government area, the number is quite more than that of Abak local government area. Ikot Ekpene is seen as the headquarters of Ikot Ekpene Senatorial District. As such, the local government's development level is by far more than that of other local government areas in the Senatorial District. The explanation could be responsible for more documented applications for land acquisition in the local government area. Therefore, it can be inferred that both Abak and Ikot Ekpene local government areas account for over eighty percent of the total applications for land acquisition received in the North-West Senatorial District.

Akwa Ibom North-East Senatorial District

Akwa Ibom North-East Senatorial District has nine (9) local government areas. The local government councils are Etinan, IbesikpoAsutan, Ibiono Ibom, Itu, NsitAtai, Nsit Ibom, NsitUbium, Uruan, and Uyo. Uyo is the headquarters of Akwa Ibom North-East Senatorial District and the capital of Akwa Ibom State. The other local government areas which are very close to the city of Uyo include IbesikpoAsutan, Itu and Nsit Ibom local government areas. In the whole of Akwa Ibom State, Uyo local government area is the most developed. Table 3 shows the number of applications received for land acquisition in Akwa Ibom North-East Senatorial District. It is evident from Table 3 that majority of the local government areas in Akwa Ibom North-East Senatorial District recorded a more significant number of applications received for land acquisition as compared to the two Senatorial Districts previously discussed. Uyo, together with other local government areas very close to it, are the most developed local government areas in the Senatorial District. The developmental status advances the more significant number of applications received in those local government areas. The breakdown in Table 3 shows that no local government area recorded zero number of applications for all the years under review (2007 – 2017). However, the number of applications received in NsitAtai and NsitUbium local government areas are low. For example, in the space of eleven years (2007 – 2017), only three applications were documented for NsitAtai local government area with one in 2009 and two in 2016. For NsitUbium local government area, only four applications for land acquisition were documented. The implication drawn from the record in the two local government areas evidenced little

documentation of residents applying to the Ministry of Lands and Town Planning in Akwa Ibom State for land acquisition. The pattern of applications received in Etinan, Ibiono Ibom, Nsit Ibom, and Uruan local government areas are identical as can be seen in Table 3. In Nsit Ibom local government area, for example, for eleven years, the maximum number of applications documented was 12 in 2015, while the minimum numbers were three in 2008, 2009 and 2017. Uruan local government area witnessed a maximum number of applications documented in 2017, 11 and the minimum in 2011, which is two. Ten was the maximum number of applications recorded for the Ibiono Ibom local government area in 2015 with a minimum number of three applications in 2008, 2009 and 2011. The number of applications received in Etinan local government area is low with five applications in 2007 as maximum, while there are no recorded applications in the year 2013.

Table 3: Number of LAA for Akwa Ibom North-East Senatorial District

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Etinan	5	3	3	5	3	1	0	2	1	1	1
IbesikpoAsutan	55	38	67	52	46	41	40	54	46	52	38
Ibiono Ibom	5	3	3	4	3	5	7	8	10	5	6
Itu	56	56	58	57	50	45	51	49	43	66	45
NsitAtai	0	0	1	0	0	0	0	0	0	2	0
Nsit Ibom	4	3	3	5	11	10	7	6	12	7	3
NsitUbium	0	0	1	0	0	0	0	1	1	1	0
Uruan	4	4	6	5	2	7	10	6	7	6	11
Uyo	410	351	419	337	327	302	320	351	281	388	263
Total	539	458	561	465	442	411	435	477	401	528	367

Complementing the records obtained from North-East Senatorial District, Uyo, IbesikpoAsutan, and Itu local government areas recorded many applications received by the Ministry of Lands and Town Planning in Akwa Ibom State for land acquisition. The record may have been influenced by the State Ministry of Lands and Town Planning's regulatory obligation, being very effective in the local government areas surrounding the Capital city of Uyo. In terms of the number of applications received, the maximum number of applications recorded for IbesikpoAsutan local government area is 67 in 2009, while the least applications of 38 were recorded in the years 2008 and 2017. Itu local government area had 66 has the maximum applications received in 2016, while the minimum is 43 recorded in 2015. Based on the number of applications received by the Ministry of Lands and Town Planning in Akwa Ibom State for land acquisition in Uyo local government area, the number is by far greater than that of IbesikpoAsutan and Itu local government areas. A discerning glance of Table 3 indicates that the number of applications recorded for Uyo local government area is approximately four times more of IbesikpoAsutan and Itu local government areas combined. Consequent upon Uyo being the State capital, the level of development in the local government is by far greater than that of any other local government areas in Akwa Ibom State. The implication explains the surge in the number of documented land acquisition applications in the local government area. Summarily, the total number of applications for IbesikpoAsutan, Itu and Uyo local government areas accounted for over ninety percent of the total land acquisition applications received in Akwa Ibom North-East Senatorial District.

Total Number of Applications for Land Acquisition Applications in Akwa Ibom State

The results of land acquisition applications obtained from the three Senatorial Districts in Akwa Ibom State were concisely summarised, as presented in Figure 2.

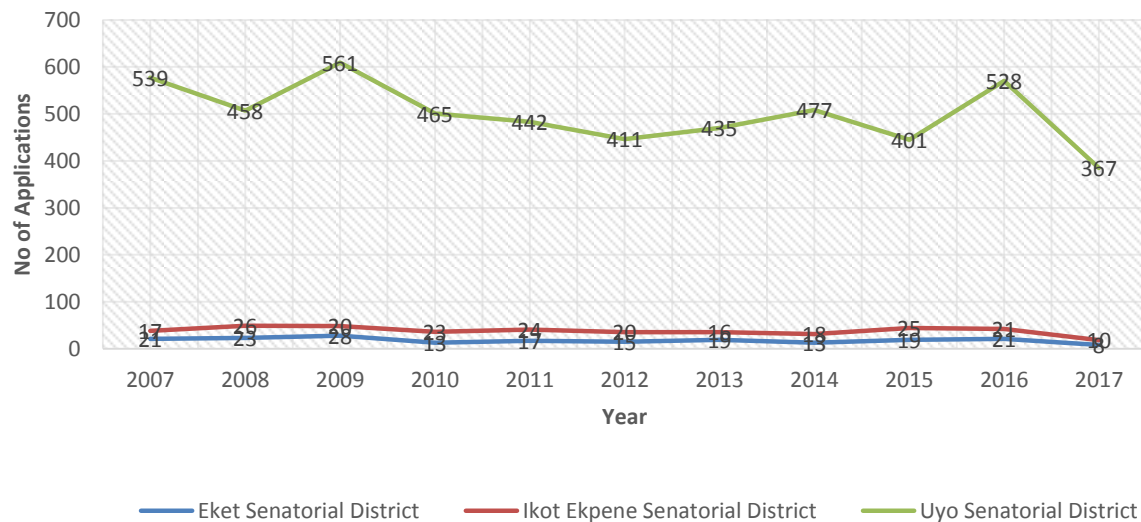


Figure 2: Number of LAA Based on Senatorial Districts in Akwa Ibom State

Figure 2 shows that Akwa Ibom North-East Senatorial District accounts for most of the documented LAA received by the Ministry of Lands and Town Planning in Akwa Ibom State. The time-series pattern of LAA in Akwa Ibom State within the time horizon under review is plotted in Figure 3. For example, 577 applications were received the year 2007 out of which the applications from the North East Senatorial District accounted for 93.41%. In 2008, a total of 507 applications from the North East Senatorial District contributed 90.34%. Therefore, the contribution of the North-East Senatorial District is profound for all the years under consideration. The troughs and peaks of the LAA may not be adequately captured descriptively without the plotting depicted in Figure3. The growth and decline in the number of applications documented for land acquisition in Akwa Ibom State are better appreciated with a cursory glance of Figure 3. The time-series pattern of LAA in Akwa Ibom State within the time horizon under review showed the most notable trough and peak in 2017 and 2009. Ujene and Atser (2017) obtained a similar result noting that the number of building plans submitted after the introduction and implementation of development control instruments [site plan analysis report (SPAR) and environmental impact assessment report (EIAR)] in Uyo, the capital city of Akwa Ibom State, reduced drastically. Therefore, this study has documented the number of applications submitted to the Ministry of Lands and Town Planning in Akwa Ibom has evolved over the years.



Figure 3: Time Series Analysis of LAA in Akwa Ibom State between 2007 and 2017

The Stock of Land Acquired Based on the Number of Approvals Issued between 2007– 2017

This section discusses the number of land acquisition approvals (LAAP) issued by the Ministry of Lands and Town Planning for all the local government areas in Akwa Ibom State as part of objective three of this study.

Akwa Ibom South Senatorial District

The most prominent local government area in terms of development in Akwa Ibom South Senatorial District is Eket. Table 4 shows the number of approvals issued for land acquisition for Akwa Ibom South Senatorial District. It can be deduced that apart from Eket local government area, all other local government areas within the South Senatorial District witnessed a low number of approvals in consonance with the number of applications received. For example, for the years under review, Eastern Obolo, EsitEket and UdungUko local government areas recorded zero number of approvals mainly because there were zero applications in those local governments. It may mean that there was no documentation of residents applying for land acquisition for those three local government areas. Hence there is no basis for issuing any approval. Similarly, the results recorded for other local government areas are a true reflection of the number of applications. The number of approvals issued for all other local government areas with low and scattered applications for land acquisition is indicated in Table 4. For example, throughout the eleven-year time horizon for this analysis, only three approvals were issued for land acquisition from Ibeno local government area with one approval each in 2007, 2009 and 2011. A similar scenario played out in UrueoffongOruko local government area with just two approvals issued in eleven years (one each in 2015 and 2017).

Table 4: Number of LAAP for Akwa Ibom South Senatorial District

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Eastern Obolo	0	0	0	0	0	0	0	0	0	0	0
Eket	10	15	14	2	6	7	8	7	12	4	3
EsitEket	0	0	0	0	0	0	0	0	0	0	0
Ibeno	1	0	1	0	1	0	0	0	0	0	0
Ikot Abasi	0	1	4	1	0	0	2	0	1	0	1
Mbo	0	1	0	0	1	0	1	0	0	2	0
MkpatEnin	2	1	0	0	1	0	0	0	0	0	0
Okobo	0	1	1	0	0	0	2	0	1	2	0
Onna	0	0	0	0	0	0	1	0	1	0	2
Oron	2	3	6	0	1	2	1	2	0	1	1
UdungUko	0	0	0	0	0	0	0	0	0	0	0
UrueoffongOruko	0	0	0	0	0	0	0	0	1	0	1
Total	15	22	26	3	10	9	15	9	16	9	8

Akwa Ibom North-West Senatorial District

The number of approvals issued for land acquisition for Akwa Ibom North-West Senatorial District is shown in Table 5. Table 5 shows that most local government areas in the Senatorial District witnessed a low number of approvals issued for land acquisition except for Ikot Ekpene and Abak local government areas where there were marginal improvements. Ikot Ekpene and Abak local government areas, being the most developed local government areas in the Senatorial District, had the highest number of land acquisition applications, hence the higher number of approvals issued in those local government areas.

Table 5: Number of LAAP for Akwa Ibom North-West Senatorial District

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Abak	3	6	4	1	2	2	2	4	1	6	3
Essien Udim	0	0	0	2	0	0	0	0	0	1	0
EtimEkpo	0	0	0	0	0	0	0	0	0	1	0
Ika	0	0	0	0	0	1	0	0	0	0	0
Ikono	1	0	0	1	0	3	1	1	0	1	0
Ikot Ekpene	4	13	10	6	10	3	7	6	9	5	2
Ini	0	0	0	0	0	0	0	0	0	0	0
ObotAkara	0	0	0	0	0	0	0	0	0	0	0
OrukAnam	0	0	2	0	0	0	1	1	0	0	1
Ukanafun	0	0	0	0	0	0	0	0	1	0	0
Total	8	19	16	10	12	9	11	12	11	14	6

It has been shown earlier that Ini and ObotAkara local government areas recorded zero number of applications for all the years under review. Together with all other local government areas with similar records, the two local government areas scored zero number of approvals accordingly. The total approvals

issued for land acquisition in Abak and Ikot Ekpene local government areas accounted for over seventy percent of in Ikot Ekpene Senatorial District, being more populated and developed in the Senatorial District.

Akwa Ibom North-East Senatorial District

The number of approvals issued for land acquisition in Akwa Ibom North-East Senatorial District is discussed in this section. It is important to note that Uyo is the Akwa Ibom North-East Senatorial District's headquarters and Akwa Ibom State's capital. The other local government areas that are proximate to the city of Uyo are IbesikpoAsutan, Itu and Nsit Ibom local government areas. Table 6 indicates the number of approvals issued for land acquisition in Uyo Senatorial District. Table 6 shows that most of the local government areas in Uyo Senatorial District recorded a more significant number of approvals issued for land acquisition except a few of them like NsitAtai and NsitUbium local government areas. Uyo, being the capital city, explains the reason for the high number of approvals issued. It is also important to also bring to the fore that Uyo local government areas and other adjoining local government areas are meticulously controlled by the Uyo Capital City Development Authority (UCCDA).

Table 6: Number of LAAP for Akwa Ibom North-East Senatorial District

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Etinan	2	3	2	5	4	2	1	0	1	1	1
IbesikpoAsutan	24	50	56	51	36	22	52	34	53	37	21
Ibiono Ibom	1	3	2	2	2	2	3	4	8	4	5
Itu	44	48	45	50	36	21	49	39	38	57	32
NsitAtai	0	0	0	1	0	0	0	0	0	1	0
Nsit Ibom	2	2	2	4	5	2	5	5	6	4	1
NsitUbium	0	0	0	0	0	0	0	1	0	0	0
Uruan	1	2	5	1	1	2	8	4	3	3	4
Uyo	318	417	369	360	316	139	336	249	318	254	155
Total	392	525	481	474	400	190	454	336	427	361	219

The records indicate that NsitAtai and NsitUbium local government areas received the lowest number of approvals for land acquisition in the entire Senatorial District. For example, in the space of eleven years (2007 – 2017), only two approvals were issued for NsitAtai local government area with one each in 2010 and 2016. Only one application was successfully approved for NsitUbium local government area in 2014. Similarly, the pattern of approvals issued for Etinan, Ibiono Ibom, Nsit Ibom, and Uruan local government areas is identical, as shown in Table 6. In Nsit Ibom local government area for example, for a period of eleven years, the maximum number of approvals issued was 6 in 2015, while the minimum number was two each year between 2007-2009 and 2012. Uruan local government area witnessed a maximum number of approvals in 2013 with the approval of eight applications. For Ibiono Ibom local government area, a maximum of eight applications was approved in 2015 being the highest for the entire duration examined by this study. The number of approvals issued in the Etinan local government area was low with five applications approved in 2010 as maximum, with no recorded approvals in 2014. Uyo, IbesikpoAsutan, and Itu local government areas contrast with other local government areas in the Senatorial District previously discussed. Factually, the three local government areas recorded a more significant number of application approvals in the Senatorial District. The State Ministry of Lands and Town Planning's regulatory obligation is beneficial in these three local government areas surrounding the State Capital, Uyo, together with the Uyo Capital City Development Authority (UCCDA), captured the scene.

Total Number of Land Acquisition Approvals Issued in Akwa Ibom State

The results from the three Senatorial Districts in Akwa Ibom State about the total number of land acquisition approvals issued are summarised and presented in Figure 4. The number of approvals issued is a trajectory to the number of applications documented in the State. From Figure 4, it was evident that Akwa Ibom North-East Senatorial District accounted for the majority of land acquisition approvals issued, with both Akwa Ibom South and Akwa Ibom North-West Senatorial Districts trailing behind at a far distance.

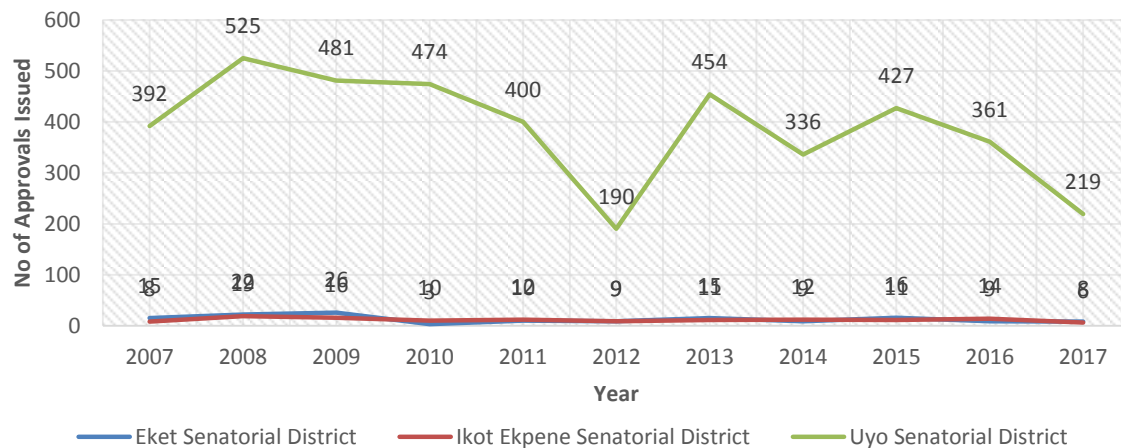


Figure 4: Number of LAAP Based on Senatorial Districts in Akwa Ibom State

Figure 5 shows the pattern of the total number of approvals issued for land acquisition in Akwa Ibom State. It is crystal clear that Akwa Ibom North-East Senatorial District's data moderates all other Senatorial Districts based on the time series result in Figure 5. For instance, the troughs and peaks pictured in Akwa Ibom North-East Senatorial District curve in Figure 4 are repeated in the pattern shown in Figure 5. The growth or decline in the number of approvals issued for land acquisition in Akwa Ibom State is vividly captured in Figure 5. The time-series pattern of LAAP in Akwa Ibom State within the time horizon under review showed the most notable trough and peak in 2012 and 2008. The notable peak coincided with the sharp increase in the revenue accruing to the State from the Federation account resulting from the implementation of 13% derivative fund to oil-producing State in the country. Hence, the scenario could be explained by the increase in the income available to the State's residents, thereby acquiring landed properties. On the other hand, the period of the trough manifested the reactions of the State's residents to the introduction and implementation of development control instruments [site plan analysis report (SPAR) and environmental impact assessment report (EIAR)] in Uyo, the capital city of Akwa Ibom State. According to Ujene and Atser (2017), the rate of building plans approval was higher before implementing the control instruments (SPAR and EIAR) because LAAP is also one of the requirements for building plan approval. This study provides an insight into the number of approvals issued for land acquisition in Akwa Ibom State over the decade under investigation.

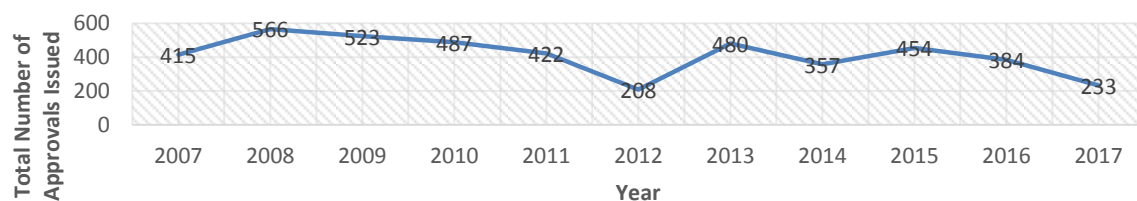


Figure 5: Total Number of LAAP in Akwa Ibom State

Total Stock of Buildings Developed in Akwa Ibom State between 2007- 2017

This section of the study discussed the number of buildings developed in the study area for about a decade. Specifically, the section gives the stock of buildings developed concerning the land acquisition between 2007 and 2017. The analysis was performed based on the Senatorial Districts in Akwa Ibom State.

Akwa Ibom South Senatorial District

Table 7 presents the stock of buildings developed in Akwa Ibom South Senatorial District. It is important to note that the number of buildings developed captured by this study, on the one hand, was based on the number of land acquisition approvals issued which was consequent upon the number of applications received for land acquisition. This study, on the other hand, added supplementarily, the data for the non-formal properties developed. The properties were either not approved for development or applications were not submitted.

Table 7: Number of buildings developed in Akwa Ibom South Senatorial District between 2007 and 2017

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Eastern Obolo	11	12	9	9	8	24	19	16	18	20	22
Eket	225	134	134	207	191	182	273	263	347	311	358
EsitEket	20	18	25	46	32	22	25	28	39	39	35
Ibeno	17	19	28	21	32	27	36	39	40	43	63
Ikot Abasi	19	23	34	26	31	28	40	29	31	33	37
Mbo	19	27	12	20	19	24	27	38	41	58	54
MkpatEnin	22	20	22	17	33	20	18	15	29	33	37
Okobo	9	9	11	12	13	16	17	11	27	20	22
Onna	26	18	21	19	17	20	29	40	40	49	59
Oron	47	51	71	74	75	89	86	107	114	125	127
UdungUko	7	6	7	9	8	6	10	11	14	16	17
UrueoffongOruko	5	6	4	5	6	7	8	17	19	21	23

For the years under review, Eastern Obolo, EsitEket and UdungUko local government areas recorded low developments while Eket local government area made the highest development record. It has been shown in the preceding stanzas that apart from Eket local government area, all other local government areas witnessed a low number of approvals issued based on the number of applications received for land acquisition. The low number of approvals might be responsible for the subsequent low development pattern observed for most local government areas within the Senatorial Districts. The submission implies that there was insufficient documentation of residents for building development in most local government areas. The possible reason may be the unofficial lands acquisition pattern in those local government areas. The high documentation maintained by the Eket local government area for building development could be since land developers in this local government area are more enlightened, and the area planning authority was proactive in checkmating illegal developments.

Akwa Ibom North-West Senatorial District

Table 8 indicates the number of buildings developed in Akwa Ibom North-West Senatorial District within the period covered by this study. Majority of the local government areas in this Senatorial District witnessed low documentation of building development except for Ikot Ekpene and Abak local government areas. To this end, Ikot Ekpene and Abak local government areas are the most developed local government areas in the Senatorial District. It explains the higher number of building development documentation received in those local government areas than the other ones.

Table 8: Number of buildings developed in Akwa Ibom North-West (Ikot Ekpene) Senatorial District between 2007 and 2017

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Abak	39	46	59	25	22	21	59	50	66	69	78
Essien Udim	21	19	22	27	28	39	45	48	43	46	47
EtimEkpo	18	23	19	20	24	17	23	19	22	28	36
Ika	15	29	28	22	30	32	36	38	85	76	56
Ikono	25	28	32	36	38	39	39	43	45	92	118
Ikot Ekpene	102	96	133	102	212	177	170	186	223	215	205
Ini	25	35	28	18	27	31	42	64	57	63	79
ObotAkara	15	25	42	19	26	18	24	16	55	76	85
OrukAnam	6	10	16	18	21	28	30	34	28	39	45
Ukanafun	8	12	14	13	19	15	27	36	28	30	35

Akwa North-East Senatorial District

Table 9 shows the building development record in Akwa Ibom North-East Senatorial District within the year under review. It is evident from Table 9 that majority of the local government areas in Akwa Ibom North-East Senatorial District recorded a more significant number of building development as compared to the two previously discussed Senatorial Districts of Akwa Ibom South and Akwa Ibom North West, except a few of the local government areas like NsitAtai and NsitUbium local government areas. The surge of building development in Uyo local government area and the very close ones can be explained by the State capital status relative to other distant local government areas.

Table 9: Number of buildings developed in Akwa Ibom North-East (Uyo) Senatorial District between 2007 and 2017

L.G.A.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Etinan	34	37	41	46	40	44	55	56	79	88	122
IbesikpoAsutan	53	79	87	97	86	72	90	77	82	121	150
Ibiono Ibom	20	23	33	16	18	14	28	69	81	87	100
Itu	132	137	164	154	142	113	163	147	306	238	272
NsitAtai	36	26	15	14	19	27	33	64	55	96	102
Nsit Ibom	48	44	51	60	22	27	89	99	105	116	207
NsitUbiom	18	17	26	16	13	12	15	18	47	59	56
Uruan	98	66	82	83	80	89	102	122	227	222	217
Uyo	400	496	392	501	667	307	465	300	260	368	3717

Total Number of Buildings Developed in Akwa Ibom State

To summarise the three Senatorial Districts' development pattern in Akwa Ibom State, each Senatorial District's results are pictorially presented in Figure 6. These results help arrive at the total numbers of buildings developed in Akwa Ibom State, as shown in Figure 7. The analysis depicts that the number of buildings developed increases yearly with an upsurge in 2016 to 2017, though the number of LAA and LAAP is contrariwise. Therefore, the number of land acquisition approvals showing the opposite direction to the number of building developed indicated a high level of illegal structures sprouting up within the reviewed period. The phenomenon was forecasted in Ujene and Atser (2017) studies and Ofem and Atser (2005).

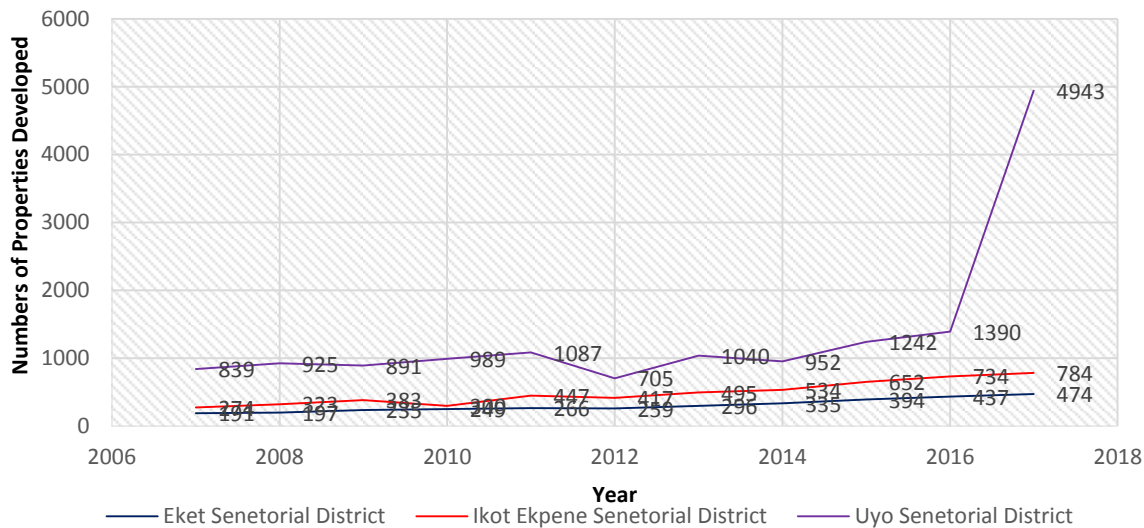


Fig 6: Numbers of Buildings Developed Based on Senatorial Districts in Akwa Ibom State

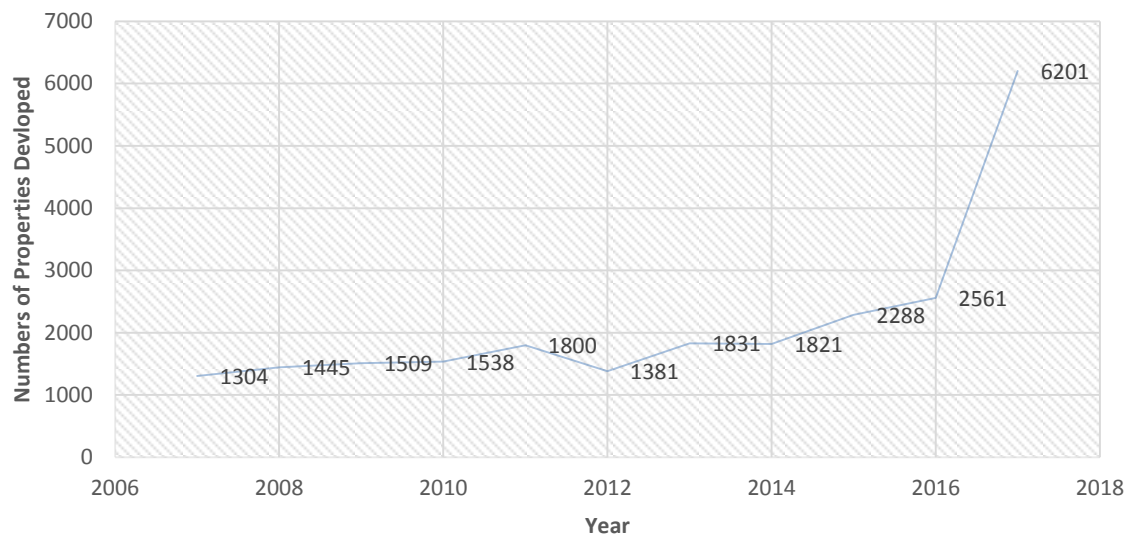


Figure 7: Total Numbers of Buildings Developed in Akwa Ibom State

Relationship between Properties Developed and Land Acquisition

The establishment of the relationship between the land formally acquired, and the number of properties developed to predict the properties development forecast in the study area was analysed. The objective was achieved by developing a multiple linear regression model using data collected from the records of the respective Authorities concerned with property development control in each of the thirty-one (31) Local Governments in Akwa Ibom State. The data used for the model's development are from three hundred and forty-one development control measurement cases. The data set collected for the assessment of development control and the parameters associated with the formal control process was used to develop multiple linear regression models in the form:

$P = a + b_1X_1 + b_2X_2$ Where: P = Predicted number of Properties Developed as a dependent variable;
 a = Regression constant; b_1 and b_2 = Partial regression coefficients; X_1 and X_2 = Parametric independent variables of formal development control processes.

Standard multiple linear regressions were used to assess the parametric independent variables of the formal development control process. Preliminary analyses were performed to ensure that assumptions of normality, linearity, homoscedasticity and outliers not violated. The preliminary regression model for the selected building development model was developed. After that, the variables that did not significantly contribute to the model were dropped one after the other according to their insignificance level. The variable's p-value in the regression model was the criterion used to determine the variable's significance in the model. The result of the multiple linear regression analyses for development control is presented as follows:

Simple Linear Regressions for Predicting Properties Development in Akwa Ibom State

The analysis was initialised with standard multiple regression analysis to assess two (2) parametric variables: The number of applications received, and the number of applications approved to predict the number of properties developed. Preliminary analysis was carried out to ensure no violation of the assumption of normality, linearity, homoscedasticity, independence of residuals and to mitigate the effect of outliers. The initial result did not indicate unacceptable multicollinearity problems with maximum condition index of $10.164 < 30$. Nevertheless, the number of applications approved was excluded from the preliminary model due to insignificance problem of the p-value of $0.200 > 0.05$. Additionally, the preliminary model's tolerance value was $0.070 < 0.1$ and their corresponding VIF of and $14.383 > 10$. It suggests a multicollinearity problem. Despite this initial problem, the number of applications received was retained because of its condition index of 2.12 and its significance p-value of $0.000 < 0.05$. This action resolved the multicollinearity problem as indicated by the condition index of $1.999 < 30$, tolerance values of $1.0 > 0.1$ and VIF of $1.0 < 10$ for the final regression model. However, the assumptions of normality, linearity, homoscedasticity were not violated as indicated in the normal probability plots, histogram, and scatter plot. Maximum Cook's Distance = $0.179 < 1$, indicating that the few outliers existing are within acceptable limits that will not influence the regression analysis. The sample size is 341 cases $> (50+8m)$ as suggested by Tabachnick and Fidell (2007) for a standard multiple regression is satisfied. Regression statistics of the

regression model for predicting properties development in Akwa Ibom State is presented in Table 10 with the two steps model MRS-1 to MRS.

Table 10: Predicting Properties Development in Akwa Ibom State

Closeness of fit					
Step	Model	MSE	Operation	Term	P-value
1	MRS-1	7.478	drop	App Iss	0.200
2	MRS-2	14.78			

The multiple linear regression models could no longer hold for the model. As such, the simple standard regression model for property development in Akwa Ibom State is: $P = 1.361 + b_1X_1$ where: P = Predicted number of Properties Developed as a dependent variable; b_1 = Partial regression coefficient; and X_1 = number of applications received. The variance of property development explained by the model is 54.7%, which has the number of applications received as an independent variable, as shown in Table 11. The p-value for the model is $0.000 < 0.05$; therefore, it can be concluded that the property development trend in Akwa Ibom State is predictable. The variable in the model listed with its beta and part correlation values of its unique contributions to the dependent variable variance is beta = 0.740, part = 0.740). The properties of the model are presented in Table 11.

Table 11: Model summary of regression for Properties Development in Akwa Ibom State

	R	R ²	Adj. R ²	Std error	R Square Change	F Change	df1	df2	Sig. F Change
1	0.740 ^a	0.547	0.546	0.29434	0.547	409.300	1	339	0.000

a. Predictors: (Constant), AppFor_Log; b. Dependent Variable: PropDev_Log

Conclusions and Recommendations

The issue of subjective housing has been a worry for both the public Authority and people. Valuing these issues, both public and private developers put forth attempts through different policies to overcome the problem of housing. Nevertheless, the cost of land acquisition, the cost of building materials, insufficient funds for housing deficit, severe advance conditions from a home loan bank, with some vital government strategies add to the means of housing deficiency. This study documented the number of applications submitted to the Ministry of Lands and Town Planning in Akwa Ibom has evolved over the years. The growth and decline in the number of applications documented for land acquisition in Akwa Ibom State are better appreciated as presented in this study. An insight into the number of approvals issued for land acquisition in Akwa Ibom State over the decade under investigation was provided. The relationship between the land formally acquired, and the number of properties developed to predict the study area's properties development forecast was analysed. The variance of property development explained by the model is 54.7%, with the number of applications received as an independent variable. The p-value for the model is $0.000 < 0.05$; therefore, it can be concluded that the property development trend in Akwa Ibom State is predictable. Therefore, this study recommends that developers should endeavour to document their proposed developments with the various appropriate Authorities in the State to ease the control of such and ensure improved city image.

References

- Abel, U. S. (2017). Assessment of Housing Management and Maintenance Practices in Akwa Ibom Property and Investment Company (APICO) Estates in Uyo, Akwa Ibom State, Nigeria. An Unpublished B.Sc. Thesis, Department of Estate Management, University of Uyo, Uyo.
- Abdul, A. A. (2008). Time Lag in the Development of Urban Residential Plots in Kano Metropolis. An Unpublished M.sc Thesis, Department of Geography, Bayero University Kano.
- Abraham, C. (2006). Man's Struggle for Shelter in an Urbanising World, Massachusetts Institute of Technology Press. U. S. A. pp. 12.
- Abubakar, A.H, Abd Razak, A., Abdullah, S., Awang, A., Parumal, V. (2010). Critical Success Factor or Sustainable Housing: A Framework from the Project Management View. *Asian Journal of Management Research*, pp. 66-80.

- Adamu, E. O. (2007). The Private Development of Residential Land Subject to Statutory Title in Makurdi, Benue State, Nigeria. Unpublished M.Sc. Thesis, Bayero University, Kano.
- Adebayo, A and Rowling, L. (2007). Management Problems of Rapid Urbanisation in Nigeria. University of Ife Press, Ile-Ife, Nigeria.
- Adeniyi, E. O. (2007). Housing and the Construction Industry in Nigeria. Nigerian Institute of Social and Economic Research (NISER), Intec Printers, Ibadan. p. 3.
- Agbola, T. and Alabi, O. (2007). Major problems of Housing in Nigeria. A Paper Presented at the Workshop on Housing Organised by Bobabin Nig. Ltd. Held at Green Spring Hotel, Ibadan.
- Aliyu, A. A., Kasim, R. and Martin, D. (2011). Factors Affecting Housing Development in Makama Jahun Area of Bauchi Metropolis, Nigeria. *International Journal of Trade, Economics and Finance*, 2(4):263-268.
- Babade, T. (2007). Affordable Housing Programme an Agenda for the Federal Ministry of Housing and Urban Development: Issues, Constraints, Challenges and Prospects, in Nubi, T. O., Omirin, M. M. & Afolayan, A. S. (Eds.) Private Sector Driven Housing Deliver. Issues, Challenges and Prospects: Lagos, Department of Estate Management, University of Lagos.
- Bourne, L. S. (2007). Geography of Housing. Edward Arnold, London.
- Bowyer, J. (2008). Building Technology. The Butter Wort Group, United Kingdom.
- Chatterjee, E. (2008). Urbanisation Trends and Problems of Urban Housing in Nigeria. Ibadan University Press, Ibadan.
- Chua, R.S. and Deguchi, A. (2008). Implementation Issues on Planning Control According to the Provision of Tom and Country Planning Act 1976 in Malaysia. *Journal of Architecture and Urban Design*. 1(4):47-58.
- Chukwujeku, I. E. (2005). The Roles of Housing Corporation in Housing Delivery: A Case Study of Kogi Investment and Properties Ltd. *Housing Today*, 1(9):6.
- Clois, E. K and Joan, C. K. (2009), Residential Housing. The Goodheart Willcox Company, Inc. South Holland Illinois.
- Dimuna, K. O. (2016). Enhancing Land Acquisition for Individual Housing Development in Nigeria: A case study of Benin Metropolis, Edo State, Nigeria. *International Journal of Research and Innovation in Applied Science (IJRIAS)*, 1(VII):1-9.
- Dwyer, D. J. (2005). People and Housing in Third World Cities. Longman Group Limited, London,
- Egunjobi, L. (2007). Housing Affordability and the Nigeria Poor. A Paper Presented at the Staff/Postgraduate Students' Seminar 1997/1998 Session, Geography Department, University of Ibadan, Ibadan.
- Farah, I. and Nur, E. M. (2012). Sustainable Housing Development: The Way Forward for Hillside Areas. *Proceedings of 3rd international conference on Business and Economic Research (ICBER 2012)*, 12-13 March, Bandung, Indonesia 272-298.
- Gilbert, A. (2007). The Housing of the Poor: in Gilbert A. and Gugher J. (ed) Cities, Poverty and Development: Urbanisation in the Third World. Oxford University Press. Minna. p. 13.
- Jinadu, A. M. (2007). Understanding the Basis of Housing. Revised Edition, Jos: University Press. Nigeria.
- Karrupannan, S and Sivam, A. (2009). Sustainable Development and Housing Affordability. 1-7.

- Keivan, R. and Werna, E. (2001). Modes of Housing Provision in Developing Countries. *Progress in Planning*, 55(2):65-118.
- Maigua, R. K. (2014). Factors Influencing Provision of Low-Cost Housing in Nairobi County, Kenya. An Unpublished Master of Arts Thesis, Department of Project Planning and Management, University of Nairobi, Kenya.
- Nazirul, Z. A (2009). Sustainable Construction in Malaysia: Developer's Awareness. *World Academy of Science, Engineering and Technology*, 53:807-814.
- Ofem I.B. and Atser J. (2005) The socio-economic implications of illegal developments in Uyo metropolis. *Environment and Social Harmony*, 1(1):1-10
- Onibokun, P. (1990). Urban Housing in Nigeria: Nigeria Institute of Social and Economic Research (NISER), pp. 115-116.
- Otegbulu, A. (1996). Housing the urban poor in new towns: An Integrated Appraisal. A Paper Presented at the 25th Annual Conference of the Nigerian Institution of Estate Surveyors and Valuers Held on 26th – 31st March, Abuja, Nigeria.
- Oyebanji, A. O. (2014). Development of a Framework for Sustainable Social Housing Provision (SSHP) in England. An Unpublished PhD Thesis, University of Central Lancashire, England, United Kingdom.
- Oyenuga, S. O. (2006). Affordable Housing for the Masses in a Democratic Nigeria. *Journal of Estate Surveying Research*, 1(2): 9-12.
- Pallant, J. (2007). *SPSS Survival Manual – A Step by Step Guide to Data Analysis using SPSS for Windows*. 3rd ed., England: McGraw Hill, Open University Press.
- Streimikiene, D. (2015). Quality of Life and Housing. *International Journal of Information and Education Technology*, 5(2):140-145.
- Tabachnick, B. G. and Fidell, L. S. (2007). *Using Multivariate Statistics*. 5th ed., United States of America, New York: Pearson Education, Incorporated.
- Ujene, A. O. and Atser, J. (2017). Influence of Development Control Instruments on Building Development in Uyo Metropolis. *Journal of Contemporary Research in the Built Environment*, 1(1):20-34.
- United Nations Commission on Sustainable Development (UNCHS, 1996). An Urbanizing World: Global Report on Human settlement 1996, United Nation's Centre for Human Settlement, Oxford University Press. 195-234.
- United Nations Centre for Human Settlement (UNCHS, 1993). National Trends in Housing Production Practices. Vol.4: Nairobi, Kenya.
- Windapo, A. O, and Iyagba, R.O. (2007). Modelling the Determinants of housing Construction costs in Nigeria. *Proceedings of the Annual Research Conference of the Royal Institution of Chartered Surveyors*, 6th and 7th September, Georgia Tech., Atlanta, USA, 1-6.
- Winston, N. and Eastaway, M. (2008). Sustainable Housing in the Urban Context: International Sustainable Development Indicator Sets and Housing. *Social Indicators Research*, 87(2):211-221.
- Yakob, H., Yusof, F., and Hamdanb, H. (2012). Land Use Regulations Towards a Sustainable Urban Housing: Klang Valley Conurbation. *Procedia - Social and Behavioural Sciences*, 68:578 – 589.

BENEFITS OF DIGITAL TRANSFORMATION OF THE CONSTRUCTION INDUSTRY UNDER THE FOURTH INDUSTRIAL REVOLUTION

Michael Gbolagade Oladokun¹, Henry Okpo Asuquo¹ and Adegbenjo David Adelakun²

¹Department of Building, Faculty of Environmental Studies, University of Uyo, Uyo, Nigeria

²Department of Building Technology, School of Environmental Studies, The Oke Ogun Polytechnic, Saki, Nigeria

Abstract

This study presents the result of an investigation of the fourth industrial revolution and digitalisation within the Nigeria construction industry from the construction firm's perspective. The study adopted a qualitative research approach through the interview, carried out among eight case companies in Abuja, Nigeria. Thematic analysis was used in analysing the data generated. The specific method of thematic analysis adopted was conversational analysis. The study revealed the most significant benefit of digital transformation is increased efficiency, improves productivity, makes work easier, and among many others was revealed. The study concluded that the benefits of digital transformation under the fourth industrial revolution are so many that it cannot be ignored. It offers benefits such as increased operational efficiency improve accuracy, makes working easier, mass customisation of products, improve productivity and performance, among many others. The study recommends an increase in awareness of the fourth industrial revolution through seminars, workshop and training on the fourth industrial revolution.

Keywords: Construction industry, digitalisation, industry 4.0, Nigeria, qualitative research

Introduction

The Construction industry in Nigeria has been contributing to the national economy and reduction of the rate of unemployment, provision of shelter and provision of amenities like buildings, railways, airport, roads, and bridges for ease of movement and circulation. The construction industries in the world are witnessing a total technological shift from the traditional way of doing work to a more sophisticated and digitalised ways of doing work that will further change lives and improve client behaviour as the construction industry has never witnessed before. This technological shift is made possible through the digitalisation of the construction industries. Ernest and Young (2015) revealed that digitalisation is a process involving the conversion of analogue or traditional way of passing information into a digital process or information, which entails the intersection of new technologies and modern abilities in changing and improving client behaviour. The digitalisation of the construction industry was referred to as construction 4.0 by Osunsanmi, Aigbavboa and Oke, (2018). The construction 4.0 was coined from the fourth industrial revolution. However, the industrial revolution has evolved in four stages over the years. These revolutions are regarded as industrial revolutions 1.0, 2.0, 3.0 and 4.0.

The first industrial revolution started at the end of the 18th century, this revolution was characterized by water and steam power to mechanize way of doing things (Kagermann, Wahister and Helbig, 2013). The second industrial revolution started at the beginning of the 20th century, this revolution focused on electric power for the mass production process and also the second industrial revolution was characterised by the introduction of electrically powered mass production based on the division of labour (Kagermann *et al.*, 2013). Similarly, Li and Yang (2017) corroborated that the second industrial revolution saw how mass production was powered by electrical means, thereby coining the term 'electrical revolution' for it. The third industrial revolution used electronics and information communication technology to automate production, and the revolution was characterised by digitalization through the introduction of microelectronics and automation (Rojko, 2017). It ushered in an era of ICT to automate production (Li and Yang, 2017). According to Osunsanmi *et al.* (2018), this revolution was not just characterized by ICT, but also by the use of the software. However, this revolution was more flexible than the first and second revolution as it digitalised and facilitated flexible production. The fourth industrial revolution can be traced to Germany in early 2012 (Rojko, 2017). The manufacturing industries in Germany sought ways to overcome its challenges and the solution arrived at, ushered the industries to the fourth industrial revolution. The outcome of this revolution has helped the manufacturing industry stay competitive, and today Germany's manufacturing industry is one of the most competitive industries in the world. Since the introduction of the fourth industrial revolution, it has swept around Europe and also in Asia, and this revolution has enabled a total connection of people and the work environment (Rojko, 2017; Osunsanmi *et al.*, 2018). The fourth industrial revolution ushered in systems processes such as cyber-physical systems, augmented reality, BIM, RFID, cloud computing, 3D printing, drones, automation, big data, internet of all things, robotics, and these systems offer smooth and fast connectivity. The fourth revolution is characterised by the internet and also the speed at

which work is done and an important part is that it is customer friendly. Having gone through the variables that constitute the background of the study, it can be understood that there is a need to carry out a study on the fourth industrial revolution and digitalisation of the construction industry in Nigeria with a view to focus on the benefits of adopting digital transformation under the fourth industrial revolution by the construction industry.

An Overview of the Construction Industry in Nigeria

The Construction industry in Nigeria has been contributing to the national economy and reduction of the rate of unemployment, provision of shelter and provision of amenities like buildings, railways, airport, roads, and bridges for ease of movement and circulation. The National Bureau of Statistics (2016) affirmed that the construction industry in Nigeria contributed about 4.13% of the total Gross Domestic Product (GDP) within the first quarter of the year in 2016. It is, therefore, safe to say that the construction industry in Nigeria is the bedrock of infrastructural development and a key player to the growth of the nation's economy. According to Itheme and Chiagorom (2018), the Nigerian construction industry is closely linked with politics of the nation and very much often, the industry has been used to describe the level of performances at both federal and state levels of governments. Idoro (2004) observed that the construction industry as a key player in the growth of the economy. Idoro (2012) stated the construction industry holds the key and crucial input to the economy of Nigeria. Oladinrin, Ogunsemi, and Aje (2012) posited that the construction industry as a large sector of the economy, which is saddled with responsibilities of creating a million jobs and also add significantly to GDP of most countries.

According to Gaith, Khalim and Ismail (2012), the construction industry is important as the construction activities of the industry involve the erection, installation, maintenance or construction of a portion or construction of the entire project. These activities are controlled, monitored, inspect, and supervise by the contractor, subcontractor and also the contribution of materials and equipment suppliers. Winch (2006) stated the construction industry is characterized by fragmentation, each actor has their own goals in the value chain. The complexity of products delivered by the construction industry is regarded to be high (Gosling & Naim, 2009). The construction industry in Nigeria has been faced with many challenges, challenges such as; lack or poor productivity, low performance, low profitable, project delay, poor communication, and challenges in regards to quality, sourcing and managing finance (Ezeokoli *et al.*, 2016; Oladapo, 2016; Ishaq *et al.* 2018; Osunsanmi *et al.*, 2018). Dale (2007) further revealed that clients of the construction industry are not satisfied by the performance of the industry, which the results are felt on the project delivery. The future of the Nigerian construction industry lies on the digitalisation of the industry if it seeks for solutions surrounding its challenges. The digitalisation of the industry will improve the performances of construction firms. Berger (2016); Ezeokoli *et al.* (2016) opined the benefits of the fourth industrial revolution and digitalisation of the construction industry are no doubts numerous as it will improve productivity, reduce cost by eliminating waste and time spent on activity that won't improve performance and productivity, improve quality and timely delivery, customer-friendly and with digitalisation means effective communication. The fourth industrial revolution will afford construction firms in Nigeria the ability to monitor, check and track products and aid connectivity of activities within and outside the firms and while 3D products models would give construction firms' added advantage. Furthermore, it is safe to say digitalisation will improve productivity, improve supply chain, thereby leading to an increase in the performance of the construction firms (Osunsanmi *et al.*, 2018). The digitalisation of the construction industry will make the industry undisputed player of the Nigeria economy.

Benefits of Adopting Digital Transformation by Construction Firms in Nigeria

The digitalisation of construction firms in Nigeria will lead to an improved construction project performance thus, reduce cost and time overruns (Osunsanmi *et al.*, 2018). Making customer life easier has been a core aspect of the fourth industrial revolution, as customers are at the Centre of the fourth industrial revolution to improve and reflect on customer behaviour. According to Ezeokoli *et al.* (2016); Solis *et al.* (2014) opined the benefits of these digital trends will offer new technological business models to enable firms to be more effective in engaging customers at every point, which at the end better customer satisfaction. Osunsanmi *et al.* (2018); BUSSINESSEUROPE (2015) also supported by saying the fourth industrial revolution will enhance and create greater customer satisfaction. The finding of Aghimien *et al.* (2018) observed most significant benefits that will be derived from digitalisation of the construction industry includes time-saving in construction projects delivery, increase productivity, increase the speed of work, increase document

quality, speeding up of response time, and simpler working methods. Rojko (2017) stated that the benefits of the digital transformation are the fact that, it improved customer responsiveness, however, this is possible because customer are getting informed every day and therefore, digitalisation create an interface by engaging customers responses at the production process. Lavanya, *et al.* (2017), opined the digitalisation of the construction industry offer benefits such as customized and quick solutions will lead to the realisation of customized products at the same cost of mass production, thus lead to customer satisfaction because customers are at the centre of digitalisation.

Deloitte (2015) posited that customisation of a product has been made possible with the fourth industrial revolution and it will spread very well in the future. Clients or customers increasingly want to specified and determine how the products are manufactured and also giving inputs into development processes of production at the early stage (Deloitte, 2015). Therefore, the construction firms need to use these opportunities of customisation to make more efficient, more extensive, more intelligent and more flexible use of this trend. Digitization offer speed of reaction to changes in the global market place, which will increase operational efficiency and in return ensure a higher quality of standard (Ezeokoli *et al.*, 2016; Solis *et al.*, 2014). Lavanya *et al.* (2017) posited, increased efficiency and competitiveness' of the construction firms is made possible through targeted planning for the processes. To improve or increased operational efficiency and also achieved lower costs through the introduction of technology such as cloud technology, the fourth industrial revolution has offered this benefits of increased operation efficiency (Crnjac, *et al.*, 2017). According to Ezeokoli *et al.* (2016); Solis *et al.* (2014) problems of data storage will be a thing of the past, since the introduction of smart technology such as; Big Data, IoT and Cloud computing, these technologies have provided deeper data analysis and also reduce burden of data storage and management of a company. Equipping the construction firms with the digitalisation will offer the firms the ability to innovate quickly and become competitive in the current global market, (Ezeokoli *et al.*, 2016). Solis *et al.* (2014); Gartner, (2015) both authors revealed the construction firms will gain a competitive advantage when firms undergo digital transformation. Lavanya *et al.* (2017) also suggested, Construction firms will gain competitiveness when its products reached the market through the expansion of features arising from the internet of things (IoT).

The fourth industrial revolution provides greater profitability and productivity that will lead to improved operation (Ezeokoli *et al.*, 2016). Digitalisation will offer construction firms higher productivity through a reduced setup period, reducing errors (Lavanya *et al.*, 2017). Additionally, Balfour Beatty (2017) the digitalization of the construction industry will improve the firm's productivity and also addresses the issues of low profitability and also the construction firms will offer higher profitability when it offers customised products and customer solutions. Therefore, the digital transmission will offer constructions firms more profit and generate new revenue growth. According to a survey, CGI (2017) manufacturing industry insights pointed that business priorities of the fourth industrial revolution will optimize Today Company's operation, cost pressure, business agility and therefore offers company speed to the market. Furthermore, digitalisation will provide products and service innovations with increased speed to market and also improve customer's experience. According to Osunsanmi *et al.* (2018) adopting a fully digital approach to a business environment done by banking, automobile and manufacturing sectors, has significantly improved productivity, accuracy, efficiency and also improve customer satisfaction of the respective sectors.

According to Lavanya *et al.* (2017) reveals the benefits of the fourth industrial revolution and digitalisation will offer the construction firms an opportunity of exhibiting, transparency and efficiency by providing real-time information. Since the introduction of internet of things, devices can now be enriched with embedded sensors, computing and connected using standard technologies, which will lead to improving efficiency and better planning workforce when the devices connected to communicate with each other. The involvement of automation of the construction operations will improve accuracy, which will lead reduction of human errors and also to improve health and safety and time delay, equipment with sensors are embedded to able updates to be sent indicating if the equipment needs maintenance, repairs or reducing the need for find and fix in a dangerous situation, this will cut off issues of health and safety (Balfour Beatty, 2017). According to Rojko (2017) attributed the advantage of the fourth industrial revolution, where firms will capitalise more efficient use of natural resources and energy, more flexible working environment, short time to market for a new product (ability to optimise today's operation). Additionally, Osunsami *et al.* (2018) suggested, the fourth industrial revolution and digitalisation of the construction will improve the overall performance of the

construction industry. Lavanya *et al.* (2017) asserted with digital transformation, the construction industry will witness continuous improvement.

According to Balfour Beatty (2017) technologies such as virtual and augmented reality creates customer-focused products, thereby giving customer simulated environment in 3 or 4D model, which enable the client to experience the structure as it has been built. These allow customers to feel and drive maximum satisfaction. Additionally, in a bid to increase the performance of the construction professionals which depends on the information available, BIM has been introduced to eliminate the traditional way of passing construction design on paper format, thereby leading to reduction of errors, which the construction professionals are predisposed to when passing design on paper format (Osunsanmi *et al.*, 2018). According to Schwab (2016) better collaboration between construction firms, this involves when construction firms share resources through collaborative innovation, better value can be created for both parties. This was supported by (Balfour Beatty, 2017) that cloud-based or real-time sharing of information will ensure everyone involved to access current information, this will facilitate collaboration. Benefits to be derived from digital transformation by construction firms includes time-saving in construction projects delivery, increase/improved productivity, increase the speed of work, increase document quality, and simpler working methods (Aghimien *et al.*, 2018). Finally, through digital transformation elimination of project delays in the form of cost and time overrun are made possible through minimisation of waste, improved productivity and also by the effective exchange of information which lead to better communication (Osunsanmi *et al.*, 2018).

Research Methodology

This study adopted a case study research approach and qualitative data were gathered from construction firms operating in Abuja, Nigeria, towards meeting the objectives of the study, which entails assessing the benefit of adopting digital transformation by construction firms under the fourth industrial revolution. Since the study deployed a case study approach, hence it is right to adopt a purposive sampling technique. Purposive sampling is extremely useful when a researcher wants to construct a historical reality, describe a phenomenon or develop something about which only a little is known and also purposive sampling strategy is more commonly used in qualitative research. The instrument for data collection for the study was the interview. The interview was employed to have an in-depth understanding of the fourth industrial revolution and digitalisation and also to gain an understanding of underlying reasons, opinions and motivation to uncover trends in thought, thereby diving deeper view into the fourth industrial revolution. Eight construction firms were interviewed in a category of four foreign and four indigenous construction firms. The study has an attribute of multiple case studies. Eisenhardt (1989) posited some cases between four and ten in multiple case studies, reasons that with less than four cases it might be difficult to generalize as you cannot get much complexity and with more than ten cases the complexity and volume might become too heavy. To analyse the qualitative data generated, the study adopted a thematic analysis. Guest (2012) posited the most common forms of qualitative analysis are thematic analysis. Thematic analysis is deployed in pinpointing, examining, and recording patterns of meaning or themes within data and the specific method adopted was conversational analysis. The conversation analysis focus on a detailed exploration of the conversation between two or more people. The purpose of data analysis in qualitative research is to recognize or identify similarities, differences and patterns and description of the matter studied.

Data Presentation, Analysis and Discussion of findings

Table 1 indicates the information of the case companies' representative from the position held in the company, to the profession of the representative and also their respective working experience in the company and the construction industry at large.

Table 1: Details of case companies' representatives

s/n	Company Type	Categorisation of the company	Position Held	Profession	Working experience
1.	Company A	Foreign	Asst. IT manager	IT Eng.	12years in IT business and 3years in the company
2.	Company B	Foreign	Project Manager	Quantity Surveying	21years in the construction business and 20years in the company
3.	Company C	Foreign	Asst. IT manager	IT Eng.	12years in IT business and 3years in the company
4.	Company D	Foreign	Project Manager	Quantity	20years in the construction business

				Surveying	and 15years in the company
5.	Company E	Indigenous	Project Manager	Architecture	10years in construction business and years in 3years
6.	Company F	Indigenous	Cost Accountant	Quantity Surveying	20years in the construction business and 17years in the company
7.	Company G	Indigenous	CEO/Project Manager	Architecture	20years in the construction business and 12years in the company
8.	Company H	Indigenous	HOD Technical Unit	Quantity Surveying	11years in the construction business and 11years in the company

Table 1 indicates the categorisation of the case companies are into foreign and indigenous construction firms (four foreign and four indigenous, in a total of eight), were interviewed to have an in-depth understanding of the fourth industrial revolution. Table 1 also indicates the position held by the case companies' representatives. Four representatives are project managers (company B, D, E and G). While representative of company 'A' and 'C' are assistant I.T managers. Company 'F' representative position held as the cost accountant of the company and company 'H' held the position of the head of the technical unit. Table 1 further indicates the profession of the case companies' representatives. Company B, D, F and H, representatives are registered quantity surveyors and company E and G representative are registered architects and also company A and C are information technology engineers.

Table 1 shows the working experience in the respective case companies and the construction industry at large. Company A and C worked in the I.T business for 12 years and both worked for the company for 3yrs. Company 'B' representative worked in the construction business for 21 years and 20 years with the company. Company 'D' worked in the company for 15 years and have been in the construction business for 20 years and company 'E' had 10 years working experience and have worked with the company for 3 years. Furthermore, company 'F' worked in the construction business for 20 years and worked with the company for 17 years and company 'G' representative worked in the construction business for 20 years and worked with the company for 12 years. Company 'H' representative has been in the construction business for 11 years and has been with the company for 11 years.

Benefits of Adopting Digital Transformation under the Fourth Industrial Revolution

There are many benefits when deploying digital transformation under the fourth industrial revolution. The digital transformation transforms operations and processes within the construction firms as it improves productivity and enhances the efficiency of the construction companies.

Table 2: Major Findings on the Benefits of Adopting Digital Transformation under the Fourth Industrial Revolution

Key info. Provider	Major Interview Findings	Issues Address
Company A	"Well, the company have enjoyed a lot of benefits since adopting digital transformation".	Digital transformation gives the real-time scenario of what is happening on-site, saves time, makes work easier, competitive advantage, improve productivity, improve project performance
Company B	"The company is just at the beginning stage of this digital transformation but the company is already reaping some benefits"	Digital transformation makes work easier, achieve more in less time (reduce cost and time overrun), improve project performance, reduce errors, and improve productivity.
Company C	"Honestly, the company has improved a lot since the integration of digital transformation"	Digital transformation makes work easier, gain competitive advantage, improve performance, and increase operational efficiency
Company D	"The company has enjoyed the adoption of digital transformation, as its impacts are felt on the company operations"	Digital transformation improves productivity, minimize waste, high level of accuracy, and improve performance.
Company E	"Yes, at the moment the company is already reaping the benefit of digital transformation on the production of smart homes"	Digital transformation improves performance, increase efficiency, improve accuracy, and customization.
Company F	"Since the introduction of digital transformation, the company have been enjoying some benefits"	Digital transformation makes work easier, client satisfaction, improve performance, and increase operational efficiency
Company G	"Digital transformation has improved this company in all ramification and this improvement has been greatly welcomed"	Digital transformation makes work easier, improve accuracy, and improve project performance

Company H	"From the little systems and processes of the fourth industrial revolution the company have adopted, the company is reaping some benefits"	Digital transformation improve productivity, increase efficiency and improve performance
-----------	--	--

Table 2 shows the various benefits of adopting digital transformation under the fourth industrial revolution revealed by the case companies interviewed. Improve productivity, increase efficiency, improve performance, improve speed among many others were revealed (Table 2). According to company 'D' claimed

"When you adopt digital tools or undertake digital operations, surely it will improve productivity, minimise waste, these too when properly used gives you high level of accuracy and lastly it increases or improves the speed of work".

Company C' added "I think for us with the adoption of the fourth industrial revolution and all that comes along with it, it makes working easier, it makes us very efficient", a matter of fact if you adopt this digital tools, you will gain competitive advantage and it will increase operational efficiency. Company G' agreed by saying "it makes our work easier, much easier", Company E' also claimed,

"This digital transformation has improved our company performance, increased our efficiency, we achieved improve accuracy and provides our company with simplifying working method, we are building smart homes and I will tell you customization of these smart homes is made possible with the fourth industrial revolution".

Company F' revealed that digital transformation makes work easier, we complete the task on time, the client is satisfied by the company performance and the company achieved an increase in operational efficiency. According to company 'A' "One of the benefits is that it will give you a real-time scenario of what is happening in the site, that means you can monitor the operation at the site, it saves time". Company B' added, this digital transformation "we are talking about is making the work easy and you achieve more in less time, deliver work on time (reduce cost and time overrun)". Company H' "digital transformation usually can improve productivity by 100%, efficiency and effectiveness, everything you can get it there". Table 3 shows the similarities and differences in issues addressed between the foreign and indigenous construction firms.

Table 3: Cross Case Analysis of Interview Findings on Benefits of Adopting Digital Transformation

s/n	Similarities of Issues Address	Differences of Issues Address
1.	Competitive advantage was revealed by both foreign and indigenous construction firms interviewed (Company A – H)	There is no difference as both the foreign and indigenous construction firms believe digital transformation will make construction company gain competitive advantage
2.	Improve performance were common to both foreign and indigenous construction firms interviewed (Company A – H)	There is no difference as both the foreign and indigenous construction firms revealed digital transformation will improve the performance and the construction industry at large
3.	Makes work easier were common to both foreign and indigenous construction firms (company A, B, C, F, and G)	makes working easier were revealed more by foreign construction firms when compared to indigenous construction firms
4.	Improve productivity were revealed by both foreign and indigenous construction firms (company A, B, D, and H)	Improves productivity were revealed more by foreign construction firms when compared to indigenous construction firms
5.	Increase efficiency was common to both foreign and indigenous construction firms (company C, E, F, and H)	Increase efficiency was revealed more by indigenous construction firms when compared to foreign construction firms
6.	Improve accuracy were revealed by both foreign and indigenous construction firms	Improve accuracy were revealed more by indigenous construction firms when compared to foreign construction firms

Table 3 revealed the similarities and difference issues addressed between the foreign and indigenous construction firms. Benefits of digital transformation such as competitive advantage improve productivity, improve performance, increase efficiency and making work easier are common between both foreign and indigenous construction firms (Table 3). There is no significant difference between both the foreign and indigenous construction firms on competitive advantage and improve the performance benefits of adopting digital transformation under the fourth industrial revolution. While improving productivity, increase

efficiency, and making work easier were revealed more by indigenous construction firms when compared to foreign construction firms.

How will these Benefits of Digital Transformation under the Fourth Industrial Revolution Improve the Construction Industry?

A follow-up question was asked to see if the digital transformation under the fourth industrial revolution will improve the construction industry. All the case companies agreed that the digital transformation will improve the construction industry. According to company E,' digital transformation will improve the construction industry tremendously because construction work or product will accurate, errors will be minimised, the operation will be efficient and generally improve productivity. Company G' supported by saying "It will improve remarkably; errors reduce if fact precision will come in". Company F' also agreed the benefits of digital transformation will improve the construction industry, it will reduce errors, things will be precise, "I think the digital transformation is what the construction industry needs to improve its performance". Company C believed digital transformation will increase the construction industry efficiency, improve productivity and meet client's satisfaction. It will improve the construction industry optimally, said company A. company D' indicated that these benefits will improve the performance of the industry, which will, in the end, improve productivity and the quality of product or project will be satisfactory. Company B' advocates the adoption of BIM,

"most of these abandon projects in Nigeria is as a result of lack of planning from the inception, and digital transformation such as building information modelling (BIM) finishes the entire project at the inception and you just go to the site to put implementation without any little errors but before it was try and error, you connect on-site and that gives a lot of wastages in time, in resources and manpower".

Why do you think the Benefits of Digital Transformation are what your Construction Firm need to Stay Competitive?

The follow-up question was designed to know how critical the role of digital transformation is in the construction business. Company A' opined how important it is to stay competitive in the construction market, "You know the world itself is moving and you need to catch up with it, if you are a businessman and you don't want to catch up with the technology, now you will discover you are edge aside", so is one of the criteria for the company to stay competitive in the market. Company D' added construction firms need more digital tools so it can compete with other firms, "We need to change the mode of operation so it can evolve around innovation, by so doing, we can stay competitive or risk been pushed out of construction market. While company G' claimed, "If you are not in tune with the trend of events, you are out of business completely". Company B' said digital transformation is what you need,

"I want to stay in business, so if I can engage a system that will deliver to me my project on time, I don't think I will even mind the cost because I will get value for what am saving, this digital transformation will deliver work on time and it will help construction firms stay competitive".

However, company H' suggests "You cannot sit behind while other industries (firms) are going ahead of you, while they are improving all day long, you can't just sit back and relax like doing it the usual way and expect new results".

Company E' gave an insight into the importance of digital transformation,

"This company has become a force to reckon within a short period and our clients are satisfied by our performance because of this digital transformation, we gain reputation or should I say won the heart of many because, this digital tools gave us an added advantage in the stiff competition we are in the construction industry, building smart home has kept this company at the top".

In summary, benefits of adopting digital transformation under the fourth industrial revolution such as improve productivity, profitability, accuracy, and increased efficiency, makes working easier, competitive advantage, mass customisation, among many others were revealed and this will improve the overall performance of the construction industry.

Discussion of findings

The result of the findings revealed the most significant benefits to be derived from digital transformation under the fourth industrial revolution of the construction industry includes; competitive advantage, improve productivity, makes work easier, increase accuracy, increase/improve speed of work, improve performance,

customisation, client satisfaction, and lastly, improve the construction industry in Nigeria. This finding is similar to the finding of Aghimien *et al.* (2018) suggest benefits to be derived from digitalisation includes; increase productivity, increase the speed of work, speeding up of response time, competitive advantage, time-saving in construction projects delivery, simpler working methods. The finding also confirms with Osunsanmi *et al.* (2018) submission that digital transformation will eliminate project delays in form of cost and time overrun, minimise waste, improve productivity, better communication and digitalisation will improve the overall performance of the construction.

Furthermore, the findings further confirm Lavanya *et al.* (2017) observed benefits of the fourth industrial revolution such as competitive advantage, customised and quick solutions will lead to the realisation of customised products at the same cost of mass production and this will lead to client satisfaction. Also, less rework and scarcely change orders are noted when digital transformations under the fourth industrial revolution are adopted. The most significant finding of the study revealed an increase in operational efficiency as the benefits of adopting digital transformation. This finding confirms Crnjac, *et al.* (2017). Suggest improved or increased operational efficiency and also achieved lower through the introduction of technology such as cloud technology, the fourth industrial revolution has offered these benefits of increased operational efficiency. The benefits of adopting digital transformation under the fourth industrial revolution are the fact that it improved customer responsiveness. However, this is possible because clients are getting informed every day through the internet and therefore, digitalisation of the construction industry could create an interface by engaging clients/customer responses at the production process. From the findings of this study, the benefits of adopting digital transformation under the fourth industrial revolution will increase the productivity of the construction; these benefits will improve the overall performance of construction firms and construction industry at large. Construction firms will gain a competitive advantage when their products reached the market through the expansion of features arising from the internet of things. Each of the systems and processes that constituted the fourth industrial revolution has various benefits that will go a long way of solving problems associated with the construction industry.

Conclusion

The fourth industrial revolution has been slow to penetrate the construction industry in Nigeria; this is due to the low level of awareness on the fourth industrial revolution. The concept of the fourth industrial revolution has been understood, with it been limited to the advancement of ICT, automation, artificial intelligence and BIM. Most construction firms are uninformed about the concept of the fourth industrial revolution. The benefits of digital transformation under the fourth industrial revolution are so many that it cannot be ignored. It offers benefits such as increased operational efficiency improve accuracy, makes working easier, mass customisation of products, improve productivity and performance, among many others. Therefore, the study recommends an increase in awareness of the fourth industrial revolution through seminars, workshop and training on the fourth industrial revolution.

References

- Aghimien, D., Aigbavboa, C., Oke, A and Koloko, N. (2018). Digitalisation in construction industry: construction professionals perspective. retrieved from https://www.researchgate.net/publication/329141252_digitalisation_in_construction_industry_construction_professionals_perspective on february 2018.
- Andrade, M. (2016) Prototipagem rápida. In: BRAIDA, F. et al. 101 Conceitos de Arquitetura e Urbanismo na Era Digital. São Paulo: ProBooks, 164-165 p.
- Aniekwu, A. N. and Audu, H. O. (2010). The Effects of management on productivity. A comparative study of indigenous and foreign firms in the Nigeria construction industry.
- Azhar, S. (2011). Building Information Modeling (BIM): Trends, benefits, risks, and challenges for the AEC industry. *Leadership and management in engineering*, 11(3), 241-252.
- Balfour Beatty (2017). Innovation 2050: A Digital Future for the Infrastructure Industry.

- Berger, R. (2016). Digitalization in the construction industry: A comprehensive guide to reinventing companies. www.rolandberger.com (Retrieved 3rd September 2018).
- Business Europe (2015). BUSINESS EUROPE Recommendations for a Successful Digital Transformation in Europe, 2015. Online available from www.buiness europe.eu.
- Cajzek, R., Gradnje, G., and Klanšek, U. (2016). An Unmanned Aerial Vehicle for Multi-Purpose Tasks in the construction Industry. *Journal of Applied Engineering Science*. Paper number: 14(2016)2, 385, 314 – 327. Doi 10:5937/jaes14-10918.
- CGI (2017). Industry 4.0 making your business more competitive. Visit cgi.com or contact us at info@cgi.com for more information. © 2017 CGI GROUP INC.
- Crnjac, M., Veža, I., and Banduka, N. (2017). From concept to the introduction of industry 4.0. *International Journal of Industrial Engineering and Management*, 8(1): 21-30.
- Dale, J. (2007). Innovation in Construction: Ideas are the future, CIOB Survey, 2007. www.Ciob.org.uk.
- Deloitte, (2017). The Fourth Revolution is now: are you ready? Future of Operations. www.deloitte.com/futureofoperations © 2017 Deloitte LLP. All rights reserved.
- Eisenhardt, K. M. (1989) "Building Theories from Case Study Research". *The Academy of Management Review*, Vol.14, No.4, pp.532–550.
- Ernest and Young (2015). Risk and Opportunity in an increasingly digital world, insurance Governance Leadership Network, Tapestry Networks Inc, 2015. www.tapestrynetworks.com (Retrieved 13th September 2018).
- Ezeokoli, F. O., Okolie, K. C., and Okoye, P. U. (2016). Digital transformation in the Nigeria construction industry: The professionals' view. *World Journal of Computer Application and Technology*, 4(3): 23-30.
- Gaith, F. H., Khalim, A. R., and Ismail, A. (2012). Application and Efficacy of Information Technology in Construction Industry. *Scientific Research and Essays*. Vol. 7(38), pp. 3223-3242, 27 September 2012.
- Gartner. (2015). Building the Digital Platform: Insights from 2016, Gartner CIO Agenda Report, 2015. Online available from <http://gartner.com/cioagenda>.
- Gosling, J. and Naim, M. M. (2009). Engineer-to-Order Supply Chain Management: A Literature Review and Research Agenda. *International Journal of Production Economics* 122, 741-754.
- Guest, G. (2012). *Applied Thematic and Analysis*. Thousand Oaks, California: Sage. P. 11.
- Idoro, G. I. (2004). The effect of globalisation on safety in the construction industry in Nigeria. Proceedings: The International Symposium on Globalisation and Construction. School of Civil Engineering, Asian Institute of Technology, Bangkok, Thailand, November.
- Idoro, G. I. (2012). Influence of the Monitoring and Control Strategies of Indigenous and Expatriate Nigerian Contractors on Project Outcome. *Journal of Construction in Developing Countries*, 17(1) 2012, 49–67, 2012.
- Iheme, C. C. and Chiagorom, C. F. (2018). Construction Industry and its Constraints in Nigeria. *International Journal of Advanced Research in Social Engineering and Development Strategies*. IJARSEDS. Hard Print: 2315-8379 | Online: 2354-161X | Vol. 5, No. 1 January 2018.

- Ishaq, I. M., Omar, R., and Mohammed, M. (2018). Challenges of communication between client and contractor during construction projects: The Nigerian Perspective. *International Journal of Engineering and Modern Technology*, ISSN 2504-8856. Vol. 4.No. 2. 2018. www.llordpud.org.
- Ismail, S. A., Bandi, S. and Maaz, Z. N. (2018). An Appraisal of the Potential Application of Big Data in the Construction Industry. *International Journal of Built Environment and Sustainability*. Published by Faculty of Built Environment, Universiti Teknologi Malaysia. Website: <http://www.ijbes.utm.my>. IJBES 5(2)/2018, 145-154.
- Kagermann, H., Walister W., and Helbig, J. (2013). Recommendations for implementing the strategic initiative Industrie 4.0: final report of the Industrie 4.0 working group.
- Lavanya, B., Shylaja B. S., and Santhosh M. S. (2017). Industry 4.0 – The Fourth Industrial Revolution. *International Journal of Science, Engineering and Technology Research (IJSETR)* Volume 6, Issue 6, ISSN: 2278 -7798.
- Li J. and Yang, H. (2017). A Research on Development of Construction Industrialization Based on BIM Technology under the Background of Industry 4.0. *MATEC Web of Conferences* 100, 020 (2017). DOI: 10.1051/ mateconf/2017 710002046.
- Maaz, Z. N., Bandi, S., and Amirudin, R. (2018). Big Data in the Construction Industry: Potential Opportunities and Way Forward. *The Turkish Online Journal of Design, Art and Communication - TOJDAC* ISSN: 2146-5193, September 2018 Special Edition, p.1470-1480.
- Madakam, S., Holmukhe, R. M., and Jaiswa, D. K. (2019). The Future Digital Work Force: Robotic Process Automation (RPA). *Journal of Information Systems and Technology Management – Jistem USP*. Vol. 16, 2019, e201916001. ISSN online: 1807-1775 DOI: 10.4301/S1807-1775201916001.
- Mahmud, S. H., Assan, L., and Islam, R. (2018). Potentials of Internet of Things (IoT) in Malaysian Construction Industry. *Annals of Emerging Technologies in Computing (AETiC)*, Print ISSN: 2516-0281, Online ISSN: 2516-029X, pp. 44-52, Vol. 2, No. 1, 1st March 2019, Published by International Association of Educators and Researchers (IAER), Available: <http://aetic.theiaer.org/archive/v2n4/p4.pdf>.
- McAfee, A., and Brynjolfsson, E. (2012). Big Data: The Management Revolution. *Harvard Business Review*, 90(10), 61–68. <https://doi.org/10.1007/s12599-013-0249-5>.
- National Bureau of Statistics (NBS). Nigerian Gross Domestic Product Report, First Quarter 2016, Issue 9, 2016. www.nigerianstat.gov.ng (Retrieved 11th September 2018).
- Oladapo, I. O. (2016). Problems of the construction industry in Nigeria. Pp140-144. Article Zeitschrift: IABSE reports of the working commissions de travail AIPC = IVBH Berichte der Arbeitskommissionen. <http://dx.doi.org/10.5169/seals-21509>
- Oladinrin, T. O., Ogunsemi, D. R. and Aje, I. O. (2012). Role of Construction Sector in Economic Growth: Empirical Evidence from Nigeria. *FUTY Journal of the Environment*, Vol. 7, No. 1, July 2012. © School of Environmental Sciences, Modibbo Adama University of Technology, Yola – Nigeria. ISSN: 1597-8826. <http://dx.doi.org/10.4314/fje.v7i1.4>
- Osunsanmi, T. O., Aigavboa, C. and Oke, A. (2018). Construction 4.0: The future of the construction industry in South Africa. *World Academy of Science, Engineering and Technology International Journal of Civil and Environmental Engineering*, 12(3): 206-212.
- Rojko, A. (2017). Industry 4.0 concept: Background and overview. <https://doi.org/10.3991/ijim.v11i5.7072> (Retrieved 10th September 2018).

Schwab, K. (2016). The Fourth Industrial Revolution. World Economic Forum 91–93 route de l a CapiteCH-1223 Cologny/Geneva Switzerland. ISBN-13:978-1-944835-01-9. ISBN-10: 1944835016. REF: 231215. www.weforum.org.

Singh, R., Gehlot, A., Singh, V. P., Garg, V., Kumar, S., Choudhury, S., Pachauri, R. (2017).Role of automation in construction industries: a review. *Journal of Engineering Technology* (ISSN: 0747-9964) Volume 6, Issue 2, July 2017, PP.799-831.

Solis, B., Li, C., Szymanski, J. (2014). Digital Transformation: Why and How Companies are investing in New Business Model to Lead Digital Customer Experience, Altimeter Group, 2014. Online available from <http://www.altimetergroup.com/disclosure>.

Tatum, M. C. and Liu, J. (2017).Unmanned Aircraft System Applications in Construction. *Procedia Engineering*. 2017 Jan 1; 196:167-75.

Teicholz, P. (2004), “Labor Productivity Declines in the Construction Industry”, Causes and Remedies, AECbytes Viewpoint #4, available from http://www.aecbytes.com/viewpoint/issue_4.html.

Winch, G. M. (2006).Towards a Theory of Construction as Production by Projects. *Building Research & Information* 34(2), 154-163.

ACCESS TO HOUSING FACILITIES AS TOOLS FOR SHAPING THE IDEA OF HOUSING QUALITY IN BENIN CITY, NIGERIA

Uyi EZEANAH

Department of Urban and Regional Planning, University of Jos, Nigeria
ezeanahu@gmail.com, ezeanahu@unijos.edu.ng; 07035912080

Abstract

In Benin city as in other urban areas in Nigeria, it is vital that housing which is one of the basic requirements of man is greatly enhanced to meet the satisfaction of the people. However, over time due to poor policy measures and low level of implementation of housing delivery programmes, the quality of housing delivered vis-à-vis provision of adequate housing facilities have been compromised. This article explores access to housing facilities as a tool for shaping the idea of housing quality in Benin city. A qualitative method was adopted, and interviews and observations were employed. One of the significant findings from this study is that access to housing facilities within the diverse neighbourhoods varied and were greatly influenced by the type of housing, socioeconomic status of the respondents and this, in turn, affected the lives of the people. On the basis of the findings, it is recommended that the government should provide an enabling environment for housing delivery as well as an efficient mechanism for monitoring housing performance while effective compliance with stipulated government standards on housing facilities should be enforced.

Keywords: *Housing, Facilities, Quality housing, lived experiences, Benin city.*

Introduction

Most Nigerian cities are plagued by a growing deficit of city services and infrastructure as well as a decay of housing facilities due to increased urbanisation; this is more prevalent in low-income settlements. As argued by Basorun(2003) and Fadairo and Taiwo(2009) this deficit is arguably tied to the government's ineptitude in providing basic housing facilities for the public due to ineffective policy implementation. The effect of this inadequate provision of internal housing facilities on the lived experiences of the residents is extensive and problematic and such experiences shape the centrality of 'independent facilities' to ideas of 'quality'.

Residential housing satisfaction has been evidenced by several scholars such as Ibem and Amole (2012) as a means to determine the quality of life experienced by people in their houses. Residential housing satisfaction is defined as a reflection of the degree to which the occupants of a dwelling unit feel that their housing helps them to achieve their goals(Inah *et al.*, 2014) and explained further that it is a measure of the degree to which housing quality performance is meeting the occupant's expectation in terms of benefit and needs. Housing functions more as part of the social environment instead of as an individual environment. That is why the status of a region and the individuals domiciled in any given region are stronger predictors of occupants' psychosocial benefits, such as self-sufficiency, comfort, and status (Kearns, Hiscock, Ellaway, & Macintyre, 2000; Dupuis & Thorns, 1998). Furthermore, the provision of housing facilities may either enhance or constrain the mental and physical health of individuals within a given house (Wilkinson, 1999; Shaw, 2004).

In some cases, the presence of such housing facilities is dependent on the provision of broader infrastructure in an area or neighbourhood and the relevance of this scale of provision is important. Therefore various authors (Nubi, 2002; Morakinyo, Okunola & Odewanle, 2014) defined infrastructural facilities as those facilities that enable an urban area to function well. Yet neighbourhood scale provision does not mean that facilities will necessarily be internal to houses and this distinction is key for ideas of "quality". For this study, the concept of "housing facilities" is used and refers to those facilities that are internally located within the house, which include toilet, bathroom, and kitchen. Moreover, some other studies examined residents' perception of quality (Ibem 2012a) of some newly constructed public housing in Ogun state, residential satisfaction in public core housing (Ibem& Amole, 2012; Inah *et al.*, 2014), and urban residential satisfaction and the planning implications in a developing world context: the example of Benin City, Nigeria (Ogu, 2002). However, till date no study has precisely investigated access to facilities as a tool for shaping peoples idea of housing quality and its impact on their lived experiences in Benin City, Nigeria. It is against this background that this paper examines access to housing facilities as a tool for shaping the idea of housing quality in Benin City. The paper identifies ways in which the adequacy or inadequacy of these facilities affects the people and considered why the different house types account for the adequacy or inadequacy of the facilities provided. It further established that there are different answers and considerations amidst

tenants and homeowners. Furthermore, it considered why sharing of facilities occur amongst the residents either as tenants or as home-owners and explored these differences and their influences on the day to day living. The next section explores the concept of housing quality, this is key to understand what constitutes quality housing within a given context.

Literature review

Quality of housing is often used as norms or measures that are applicable in legal cases pertaining to questions of the acceptability of construction relative to prevailing laws or standards that function within the housing construction industry (Etemini and Yakubu 2017). The idea of housing quality has a multidimensional view with wider social and economic implications. Housing considered to be of moderately decent quality in some locations could be assessed as being demonstrative of substandard quality in a diverse setting and *vice versa*. Consequently, getting a universal definition of housing quality is problematic because of local and indigenous discrepancies in the qualitative and quantitative scopes of housing quality. Meng and Hall (2006) explored the qualitative and quantitative characteristics of housing units, their immediate environments, and the requirements of the people. The quantitative scope of housing quality depends on housing features which are measurable such as; the size of rooms, number of windows, and number of rooms. The qualitative scope of housing is problematic to quantify or measure due to its subjective nature as it involves ideas about lifestyle, the choices and aspirations of the residents (Meng and Hall, 2006). Nevertheless, housing quality parameters are subjective as they relate to what people consider as the local norms and conditions and that what is considered to be of relative quality differ from place to place or from region to region, therefore to overcome the diverse issues posed by the multifaceted way in which housing quality is defined, the people or planners who define housing quality must do so based on their subjective values which captures the norms that are indigenous to the people.

Globally, numerous parameters have been used to assess different characteristics of housing quality. In the United States, what is used to assess housing quality is the Worst Case Housing Need Index and Critical Housing Need Index which appraises; very low incomes, a severe cost burden, people living in severely inadequate housing which includes issues such as plumbing, heating, hallways amongst others as parameters for defining or assessing housing quality (HUD, 2003). Nevertheless, in some countries in Africa such as Nigeria, Kenya, Ghana, and Ethiopia; there are no universal parameters used to measure housing quality yet, some indicators are used. For example; Ebong, (1983), Hammer *et al.* (2000), Okewole and Aribigbola (2006), Olayiwole *et al.* (2006) and Amao (2012) defined housing quality as comprising those parameters such as the structural state of the house and other amenities within the house as well as services that enable living in such areas to be beneficial so that the health, comfort and safety of the people are enhanced. Consequently, any house deemed to be 'quality' must meet the following requirements: aesthetics, age of the building, absence of sludge and disposal of waste within the residence, and free movement of people, sanitation, drainage, as well as the provision of infrastructural services that could improve the well-being of the people. Ezeanah (2020) defined housing quality as "one which is spacious, clean, accessible and habitable in terms of the finesse of the interior of the building. It should have good water supply and electricity supply; the environment should be quiet and conducive and the structure/building or house should be accessible by roads. It should be secured and comfortable. Besides, it should have adequate space, be constructed with good quality materials, comfortable, beautiful, secured and should ensure privacy. It is observed that peoples' perception of quality is closely linked to whether or not they built a house themselves". Thus, several definitions of housing quality have been explored both in the developed world and developing countries using diverse characteristics or attributes to define what housing quality is in general. For this study the definition of quality housing by Ezeanah, (2020) is adopted. This section has explored the concept of housing quality within different contexts globally and nationally. The ensuing section now highlights the approach and procedures employed for this study, whilst justifying the use of the research design, data collection methods, and analysis of data and the choice of the case study areas used for this study.

Method of Study

A qualitative method was adopted for this study making use of a semi-structured interview consisting of a series of open-ended questions and observations. The use of interviews in this study was vital because it allowed interviewees to freely assign interpretations to occurrences (Bryman, 2008). This study focussed on four geographical areas of Benin City with an emphasis on housing delivery within the city and its

periphery. The interviews were conducted with four main groups of people. The first group involves tenants and those who inherited houses; the second group involves the house owners in addition to private developers, the government officials made up the third group while members of Community Development Association (CDA) were the fourth group. The spoken words were transcribed and used as stated without changing the semantics and grammar but the local English (Pidgin English) was transcribed to proper English in the texts. This was essential to "systematically organise and analyse textual data regardless of the analytical techniques and tools used whilst identifying and taking into considerations vernacular expressions, emotions or specific speech patterns used as recommended by McLellan, *et al.*, (2003). Pseudonyms were used in the presentation of data to maintain anonymity.

In Benin City, the four case study areas used were (1) Ibiwe and its environs- the slum areas; located around the core of the city. This area is characterised by low-income earners, high densities, poorly developed, unplanned residential area and are referred to as the traditional core of the city; (2) Uselu and Ugbowo axis of Benin City is an area made up of diverse income groups, several types of housing are found in the area, subject to mixed-use and possesses a medium population density. Uselu and Ugbowo are within a planned residential area which is located in the intermediate core of the city; (3) Government Reservation Area (GRA) is an area for the elite; characterized by high income, highly developed and planned medium/low-density residential area; and (4) lastly, Amufi community is located at the periphery of the city, it is a new and developing area with medium densities and a mix of both medium/low-income earners and it is regarded as the new developments/urban fringe area. Figure 1 shows the map of Benin City showing the selected neighbourhoods. The reason for the choice of these neighbourhoods reflects the significance of these areas to the type of housing located in these areas and the income differentials of the interviewees within the specific neighbourhoods. These include mixed-income levels (low, middle- and high-income earners), mixed uses (residential houses and houses used as centres for worship and commercial activities), the types of buildings constructed, and newly developing regions or areas.

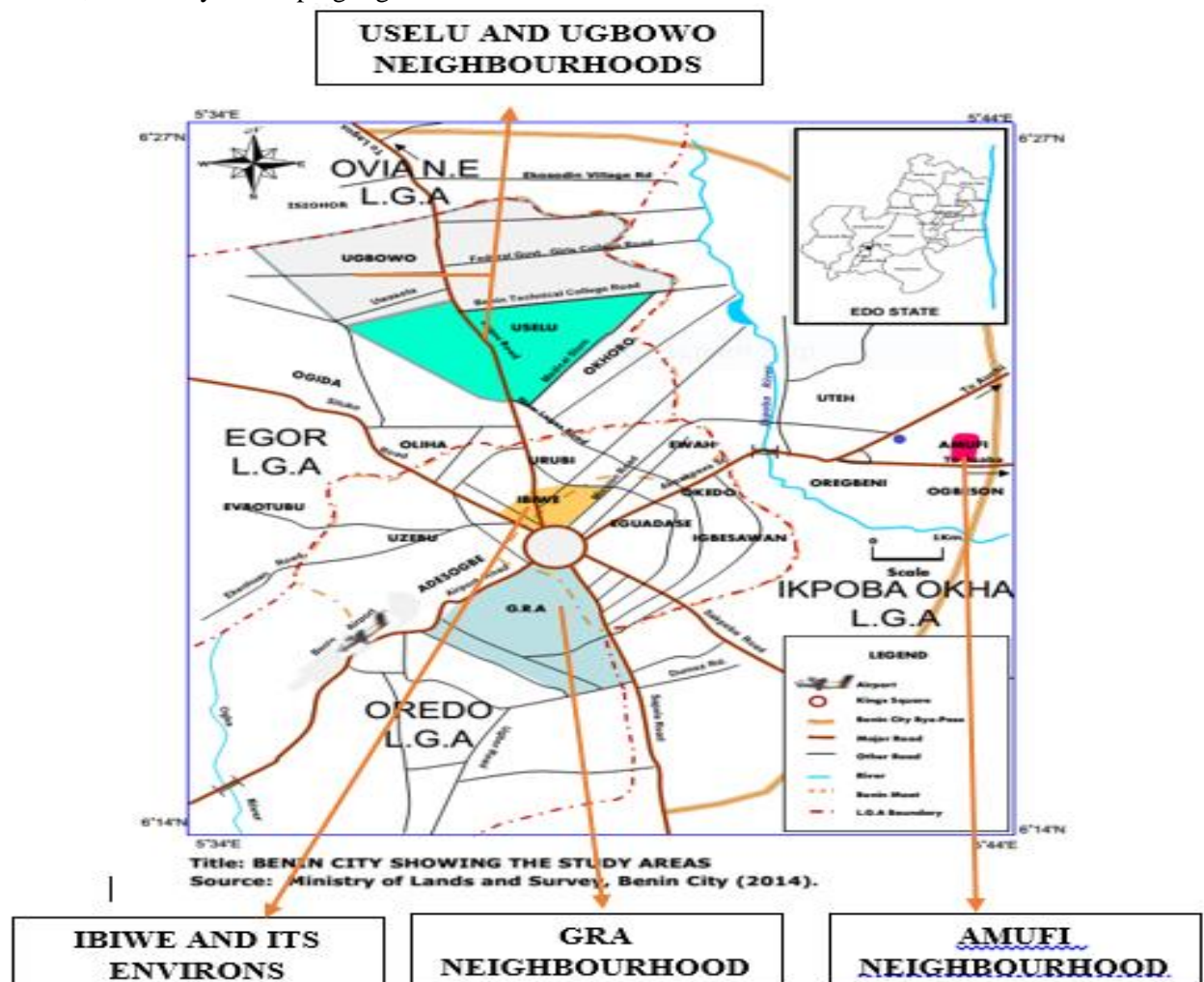


Fig.1. Map of Benin City showing the selected neighbourhoods

NVivo software was used for the qualitative analysis of this study. The software was used to assist with coding data, storing, and retrieving interview transcripts, and notes in addition to journal articles. Detailed interpretation and discussion of the findings were facilitated from codes generated from data which were coded into themes and sub-themes (Ezeanah 2020). In analysing the data, thematic analysis was employed. Being a type of narrative enquiry, it was used in classifying, evaluating and reporting repeated forms within data as recommended by Boyatzis (1998) and Bryman (2008). The themes generated assisted the analysis process (Cope 2005).

Presentation of Data and Discussions

To comprehend how access to housing facilities shapes the idea of housing quality and impacts on the people lived experiences in the diverse neighbourhoods, the following housing facilities were investigated: toilet and bathroom facilities and kitchen facilities. The section begins by highlighting the facilities available in the interviewees' houses, explores how the respondents perceive the adequacy of the facilities provided in their houses and how it impacts their lived experiences within the houses.

Toilet and Bathroom Facilities

An overview of the descriptive characteristics of residents' facilities is now presented to reveal the variety of quality and services that individual respondents lived with. The types of toilet facilities available in the houses of most of the interviewees were the water system. However, most houses domiciled within the city centre (Ibiwe and its environs and some part of Uselu and Ugbowo) had pit toilets (referred to as the aqua priva). Omuta (1986) defined the aqua priva "as a device whereby excreta are stored in a watertight tank with a constant water level. The device is a combination of the removal and infiltration processes of human waste disposal."

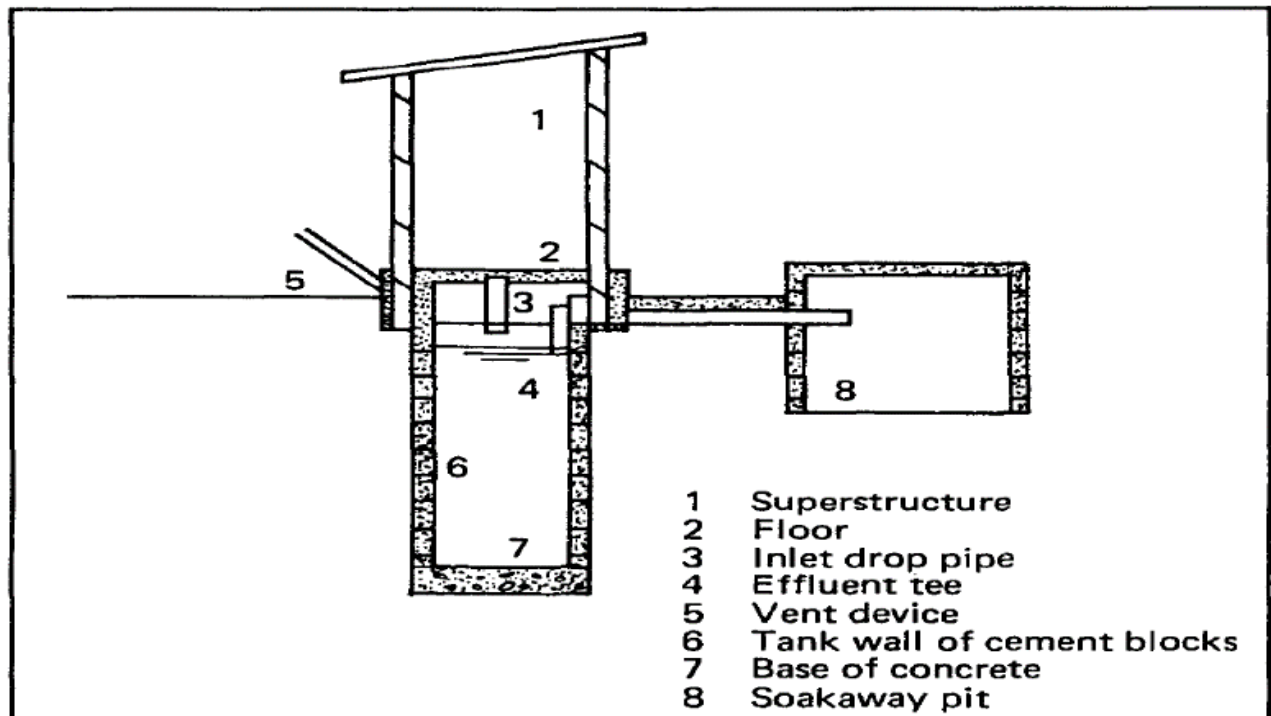


Fig.2 a type of toilet known as the aqua privy; **Source:** Adapted from Omuta (1986)

The pit type of toilet and makeshift bathroom are dominant features within the Face-me-I-Face-You (FMIFY) house type (Mrs Osasere, Mr Gift and Mr Osaretin were residents interviewed) and in these cases, toilets were not 'independent' or private to house-occupiers. The toilets in this form of housing are commonly pit latrines and the bathrooms usually have no door. They are, insecure and visible to people outside and are typically constructed with roofing sheets or wood. These bathrooms were usually located outside the building. Figure 3 is a photo of a courtyard house in Uselu and Ugbowo with toilet and bathroom

facilities situated externally. Such conditions made residents' experiences of such facilities problematic. There are several reasons for this. Security issues were a key concern, and this is worsened when using the facilities at night. Residents described this as 'scary'. Furthermore, due to the poor state of sanitation in the pit toilets, residents preferred defecating on sheets of papers which were then thrown into the pit toilet since they could not make use of the available pit toilet. In studies carried out by Tipple (1987) and Afram and Korboe (2009) in Ghana, it was observed that the occupants of the FMIFY house frequently had to defecate in forest land due to the inadequacy of toilet facilities.



Fig. 3: A courtyard house showing the location of the pit toilet, and bathroom in Uselu neighbourhood in Benin City.
Source: Photograph by Author

Nonetheless, out of the whole sample of interviews conducted for the entire study, the FMIFY housing is no longer that typical and is decreasing in number in the city more generally due to the influx of the flats and bungalows or self-contained (one-bed) houses. In Ibiwe and its environs and Uselu and Ugbowo neighbourhoods water closet type of toilets are becoming more common due to the increase in the number of flats constructed. As evidenced most interviewees in the GRA had all of these internal housing facilities provided. The availability and the type of toilets provided are the water system, shower and bath. The economic status of this area shaped both the existence of facilities within houses as well as within the neighbourhood more generally. Subsequently, residents in this area experienced an absence of pressure on the general provision of services in the area more evidenced by the fact that there was an adequate level of maintenance in addition to the provision of the aforementioned facilities. Hence because the housing facilities were available at both the scale of the neighbourhood as well as internally, interviewees lived experiences within such houses were enhanced as issues of poor health and unsanitary living conditions were minimised amongst the residents. For all interviewees living in GRA, and some in parts of Uselu and Ugbowo the toilet and bathroom facilities were an internal water system type of toilet. In Amufi, facilities were provided within some houses. This is because Amufi is a new development area and occupied primarily by middle-class civil servants who mainly built flats to live in. As most of the houses in Amufi are new, most of these key housing facilities are provided within the house with very few exceptions (Mr Ndidi, Mr Paul and Mr Matthew were residents interviewed). Similarly, Ibem (2012) shows that flats and bungalows in Nigeria usually contained the water closet type of toilet.

The problem of inadequacy of facilities was encountered by residents (tenants and home-owners) living in Ibiwe and its environs within the FMIFY housing type where facilities provided were highly inadequate and in a poor state. These included, as noted, pit toilets, makeshift bathrooms, and makeshift kitchens. These findings confirm the view of Okeyinka (2015) that such facilities are highly inadequate and have been caused due to issues of unavailability, lack of maintenance and poor systems of health and sanitation. Inadequacy concerning toilets was a result of poor quality but also the lack of privacy: *No, they are not*

adequate because the toilet is not that good. After all, the place is bad. It's not healthy for someone to go to that kind of place, say you want to pass out faeces or something... (Jordan tenant). Then the toilet, the same thing: open with no door, if you want to go to the toilet, you look for wrapper and cover yourself (Mrs Ighodalo).

Some other problems associated with the pit toilet and the makeshift bathrooms range from environmental pollution, health risk, unhygienic conditions and hazards to children living within that environment. Also, the water closet toilet is not without its challenges in Benin City. This is mainly due to the problem of water supply. For a house which does not have an adequate supply of water, then flushing after use is a problem. This will constitute health hazards if not tackled. Therefore, for the general well-being of all living in any type of house, the type and condition of the toilet and bathroom should be adequate. Furthermore, in Ibiwe and its environs and some locations within Uselu and Ugbowo, evidence of high levels of dissatisfaction was tied to the inaccessibility of facilities which resulted in long queues and waiting times for access to these facilities (toilets and bathrooms): *They are not adequate at all, the situation where you live in this passage house you have 10 rooms in one line to use one toilet is outrageous, then for the bathroom, you have to wait for the person using it to finish before you can take your bath it is not good at all, (Mrs Osasere, tenant in FMIFY house in Ibiwe).*

The level of satisfaction derived by the interviewees was also constrained by high occupancy rates. The reason for this high occupancy rate in the house type discussed above is because the typical traditional Bini house type (which is either the courtyard house or the FMIFY house) is normally occupied by more than one household. This is especially true in the core of the city, where the indigenous people are concentrated, and because of their relatively low level of income, they are precluded from occupying better quality housing types. Findings from the interviewees indicated that an average of 5 or more households live in this type of house and in some cases, the figure was higher. Here, the number of persons living per room in this house type is beyond the recommended rate of 2 or 2.5 as indicated by The Association of Housing Corporations of Nigeria, which stipulates 2.5 persons per room as a standard for the measurement of overcrowding. This standard has been adopted by all the states in the nation (Association of Housing Corporations of Nigeria, 1986).

The high amount of multi-occupation of house units is also compounded by cultural factors. Among the Binis, married children continue to live with their parents for some years before moving out to establish their own homes. As observed young married children (males) currently stay with their parents indefinitely or until they can build or acquire their dwelling units which do not happen easily these days because of the economic recession. This relates to informal practices, rules and norms observable within the Bini culture where young married males live with their wives and children in their parents' houses and this does not apply to female children (personal observation).

Renters in the FMIFY type of house may occupy one or two rooms in cramped crowded conditions. Moreover, a high proportion of the renters are migrants who cannot accommodate other households for a prolonged period due to issues of the small size of rooms and cost. Moreover, several renters, who are low-income earners found it difficult to afford the costs of renting quality houses. Instead, they tended to rent a room or two in FMIFY or acquire rooms - rent-free – in the houses of their relations (Okeyinka, 2015). However, this cultural practice is dissimilar to that identified in Kumasi, Ghana (Tipple and Wilhis, 1989) where lineage members have a strong claim to live in family houses rent-free. In the Bini culture, the inheritance of a property, such as a dwelling unit, is by the most senior son of the family; therefore, automatic rights to occupation do not cover other relatives. The individual who inherits the property is, nevertheless, conscious of extended family ties and cultural obligations. This is especially important for the Bini where polygamy is common and, as a result, rooms are given to siblings rent-free. In contrast, residents living in Amufi, as well as Uselu and Ugbowo communities derived satisfaction from living in their houses because they possessed independent facilities such as bathrooms and toilets. The satisfaction stemmed from the fact that the facilities were functional and well maintained (Mrs Oyinbo, Mrs Onajatamiri, Mrs Patricia and Mr Asoro were residents interviewed). For residents in GRA with access to facilities such as toilets and bathrooms, there was satisfaction with the internal facilities because they were properly maintained and of good quality (Mrs Edoba-Osas, Mr Patagana and Mrs Bello were residents interviewed). The GRA is an elite area that has the economic might to produce flats, bungalows and duplexes; by design, these houses are constructed with such internal facilities. It follows; all else being equal that the access, availability, adequacy, quality and satisfaction derived from housing facilities is not limited.

Kitchen Facilities

The availability and type of the kitchen facilities provided are used by many residents to evidence both the quality of their housing and their lived experiences in their houses. Many of the residents living in FMIFY houses in Ibiwe and its environs lacked internal kitchens. This is because most of the kitchens were built externally and were constructed using make-shift materials like mud or clay walls, wood or planks, covered with zinc roofing sheets and this type of kitchen affected their lived experiences, in the sense that cooking under such severe weather conditions impacted on their lived experiences adversely. Some of the more recently constructed kitchens were built with blocks to prevent rain or the damaging effects of too much sunshine and heat. As evidenced by various interviewees, these external kitchens are marked features of this housing type (FMIFY). In Ugbowo and Uselu communities, access to kitchen types was more diverse. Some houses had make-shift external kitchens while others had more modern internal kitchens. The lack of access to an internal kitchen meant that quality housing was undermined as evidenced by this interviewee: *it's not adequate because it's not modern based kitchen and it's a clay sand kitchen and the place are, untidy which makes the house not to be quality (Ms Jordan, Uselu and Ugbowo were interviewed)*. This corroborates the findings by Okorie (2015) that a lack of such housing facilities impacted on the general wellbeing of individuals as the residents' find cooking in such kitchens difficult due to over congestion, lack of privacy and issues of rains (Mrs Osasere, Mrs Ighodalo, and Mrs Bamidele were interviewed).

In GRA and Amufi communities, access to kitchen facilities was not problematic because of the type of house dominant in this area. The houses had fitted kitchens with modern equipment. These kinds of kitchens provided safer cooking environments for the residents (Mrs Edoba-Osas, Mrs Patricia, and Mr Patagana, were residents interviewed). The limited sizing of some of these kitchens did, however, prove problematic. However, this concern is relative and as long as such a facility aids them in the realisation of their needs as argued by Olatubara and Fatoye (2006) and Inah *et al.* (2014) then their lived experiences are enhanced compared with those living with external make-shift facilities.

Adequacy has, thus far, been discussed in relation to toilet and bathroom facilities. The provision of inadequate kitchens or the total absence of a kitchen was evidenced in Uselu and Ugbowo communities as impacting on the lived experiences of the residents: *To start with, there is no kitchen in my house. The kitchen he [the landlord] intended building, he started it but left it incomplete. Because there is no kitchen, I decided to cook beside my door (room). And if it's raining, I'll now cook in the room which would now make the room to be hot and pretty dangerous; you must be very careful (Mrs Ighodalo was the resident interviewed)*. When houses lack kitchens, residents find cooking problematic and they resort to cooking in their rooms. This exposes them to health hazards (Mrs Ighodalo and Mrs Osasere) which in turn affect their lived experiences within such houses. The absence of a kitchen can be attributed to a range of factors including limited financial power (be it in the form of home-owning or rent). The problem of inadequate kitchens is prevalent in Ibiwe and its environs and Uselu and Ugbowo because of the dominance of the 'FMIFY' house type and the associated socio-economic realities of those who reside therein.

Similarly, many of the residents living in FMIFY houses in Ibiwe and parts of Uselu and Ugbowo had their kitchens located outside. External location undermines the adequacy of the kitchen because of reduced privacy, convenience and access. This type of structure and its external location had a significant effect on their idea of quality, level of satisfaction derived from these types of houses as well as a significant impact on residents' lived experiences as they had to go outside to cook their meals regardless of adverse weather conditions, which could impact on their health status negatively. Residents also disliked the feeling of being cramped in a small kitchen. This reduced their satisfaction levels as cooking within such cramped spaces meant time was wasted and privacy was substantially compromised (Ms Jordan, Mr Osazee and Mrs Ighodalo were residents interviewed). In contrast, those living in flats, bungalows and duplexes had kitchens in their homes and thus expressed some level of satisfaction. That said, internal kitchens were not without their problems. Limited space in the kitchen resulted in an overall feeling of a lack of quality of life experienced by an individual and this is linked to the amount of satisfaction derived by a person (Ibem and Amole, 2012). Morakinyo, *et al.* (2014) concludes that for peoples' lived experiences within their houses to be enhanced in health and length of life terms, their housing facilities should be adequate and satisfying irrespective of the neighbourhood or socio-economic status. That is why Hanmer *et al.* (2000) noted that housing quality is contingent on the delivery of housing facilities. Likewise, Aduda (2002) argued that the socio-economic life of individuals is enhanced when satisfactory housing facilities are provided. Several

residents in GRA and parts of Amufi were satisfied with the facilities provided in their houses including their toilets, bathrooms, kitchens and the sizes of their rooms (Mrs Orjikafor, Mrs Edoba-Osas and Mr Asekhome.) Most of the residents in these two communities were living in flats, bungalows, or duplexes which contained internal facilities. This again is an indication of the financial standing of most residents in these neighbourhoods. These findings support the views of Olatuba and Fatoye (2006) that the level of satisfaction derived by individuals in their houses reflects how much the houses help in actualising their lifestyle aims.

Conclusions and Recommendations

Access to facilities as a tool for shaping the idea of housing quality and its impact on peoples lived experiences in Benin City, Nigeria was investigated. It revealed that in Ibiwe and its environs the inadequate access to such housing facilities (toilet and bathroom, kitchen) impacted extensively on their lived experiences. It was found that most houses in Ibiwe and its environs, Ugbowo/Uselu and a few parts of Amufi did not have toilets, bathrooms and kitchens located within the houses and the type of toilet available was the pit toilet or aqua- privy which was sited outside the building. Similarly, the type of bathroom and kitchen available was the makeshift kitchen and bathroom and in some houses, the people had to rely on defecating in surrounding bushes close to their houses. Findings also reveal that the presence of these types of facilities was dependent on the type of house dominant in these neighbourhoods namely the Face-me-i-face-you (FMIFY) and the courtyard house. While in GRA and Amufi, facilities like the toilets, kitchens and bathrooms were provided thereby enhancing residents' daily lives significantly. These findings echo similar observations and evidence in the wider literature (Tipple 1987 and Afram and Korboe 2009).

In terms of satisfaction derived from the provision of facilities in the house and its impact on their lived experiences, this study shows that the lack of functional toilet/bathroom and kitchen within the house in each case study or the type of toilet available in the different neighbourhoods produced a mixed level of satisfaction and impact on their lived experiences. For those in Ibiwe and its environs, parts of Uselu and Ugbowo and in a few places in Amufi the level of satisfaction produced very problematic outcomes for the residents in these neighbourhoods and impacted greatly on their lived experiences. This was because the non-provision, inadequacy of the facilities provided in addition to the type of facility (pit toilet, makeshift bathroom or kitchen) impacted their lived experiences. The diverse problematic outcomes on the residents in these neighbourhoods include impacts on health, privacy, security, gender relations, well-being, hygiene, and nutrition – this makeup the lived experience.

This study further revealed that the adequacy and availability of these facilities are dependent on the type of housing. For those in GRA and most parts of Amufi, the findings demonstrate a high level of satisfaction from these facilities because the facilities were up to date and functional, which again is a function of the type of housing found in this neighbourhood (flats, bungalows and duplexes as explored earlier in this paper). This further corroborates Inah *et al.* (2014) that the level of satisfaction derived by individuals in their houses reflects how the houses help in actualising their aims within the house, and consequently, the type of house, location of house and type of tenancy are reasons advanced by the residents for either their satisfaction or non-satisfaction with the facilities provided. Furthermore, the barriers to housing choice stem from politics of such provision which is embedded in how housing is delivered concerning the socio-economic status of the residents which determines what quality of housing is delivered in these neighbourhoods.

The focus of this study on access to facilities as a tool for shaping the idea of housing quality and its impact on peoples lived experiences in Benin City, Nigeria has provided a nuanced understanding on how access to housing facilities within the house is a major pre-requisite for positive levels of satisfaction derived by the residents from their houses and on its impact on their lived experiences within the diverse case study areas. This paper suggests that the government must ensure an enabling environment for housing delivery in Nigeria. Second, the government should ensure that house developers comply with housing standards to ensure the provision of housing facilities such as toilet, bathroom and kitchen within the house to enhance residents lived experiences within such houses in Benin City and the county at large. Third, an efficient mechanism of monitoring and implementation should be enforced for effective compliance with stipulated government standards on housing facilities.

References

- Aduda, G. T. (2002). The Cost of Corruption in the Development and Management of the City in Nigeria, in Amole, D. *et al.*, (eds) *The City in Nigeria: Perspectives, Issues, Challenges and Strategies*, Proceedings of the National Conference organised by the Faculty of Environmental Design and Management, Obafemi Awolowo University, Ile-Ife, November 9 – 11, 2002.
- Afram, S.O. and Kothoe, D. (2009). Continuity, Utility and Change: The Urban Compound House in Ghana. *Open House International*, 34(4):36-46.
- Amao, F. L. (2012). Housing Quality in Informal Settlements and Urban Upgrading in Ibadan, Nigeria (A case study of Apete in Ibadan). *Developing Country Studies*, 2(10):68-80.
- Association of Housing Corporations of Nigeria, (1986) Review of Building Codes and Bye-Laws.
- Basorun, J. O. (2003). Basic Elements of Urban and Regional Planning. Akure: *Shalom Publishers*.
- Boyatzis, R. E. (1998). Transforming qualitative information: Thematic analysis and code development. Sage.
- Bryman, A. (2008). *Social research methods*, 3rd edn, Oxford: Oxford University Press.
- Cope, M. (2005). Coding qualitative data. *Qualitative research methods in human geography*, 2:223-233.
- Dupuis, A., & Thorns, D. C. (1998). Home, home ownership and the search for ontological security. Oxford, UK: Wiley-Blackwell.
- Ebong, M.O. (1983). The Perception of Residential Quality: A case study of Calabar, Nigeria. *Third World Planning Review*, 5(3):273-284.
- Etemini, E.S. and Yakubu, U.Y.(2017). Analysis of housing quality in the peripheral area of Lafia town. *International Journal of Geography and Regional Planning Research*, 2(1):36-44.
- Ezeanah U. (2020). Basic Infrastructure Provision and its Impact on People's Experiences of Housing Quality in Benin City, Nigeria, *Journal of Environmental Science*. 20(1):77-93
- Ezeanah, U. (2020). Quality Housing: Perception and Insights of People in Benin City, Nigeria. *Urban Forum*. <https://doi.org/10.1007/s12132-020-09409-1>
- Fadairo, G. and Taiwo, A. (2009) Urbanization, Housing and Infrastructural Facilities in Lagos, Nigeria. *Journal of Architecture and built environment*. 37(1):9-14.
- Gandy, M. (2006). Planning, anti-planning, and the infrastructure crisis facing metropolitan Lagos. In *Cities in contemporary Africa*. 247-264. Palgrave Macmillan, New York.
- Hanmer L, Booth D, Lovell.E. (2000). Poverty and Transport: A Report prepared for the World Bank in collaboration with DFID, Overseas Development Institute.
- HUD User website. (2003). Worst Case Housing Need 2003 Report.
- Ibem E.O. (2012.) Accessibility of Services and Facilities for Residents in Public Housing in Urban Areas of Ogun State, Nigeria, *Urban Forum* 24:407–423.
- Ibem, E. O., and Amole, O. O. (2011). Assessment of the qualitative adequacy of newly constructed public housing in Ogun State, Nigeria. *Journal of Property Management*, 29(3):285–304.

- Inah Sylvester A. *et al.*, (2014) Residential Housing Satisfaction of the Urban Poor in Calabar Metropolis, Nigeria.
- Kearns, A., Hiscock, R., Ellaway, A., & Macintyre, S. (2000). 'Beyond four walls'. The psycho-social benefits of home: evidence from West Central Scotland. *Housing Studies*, 15(3):387-410
- McLellan, E., MacQueen, K. M., and Neidig, J. L. (2003). Beyond the Qualitative Interview: Data Preparation and Transcription. *Field Methods*, 15(1):63-84.
- Meng, G. and Hall, G. B. (2006). Assessing Housing Quality in Metropolitan Lima, Peru. *Journal of Housing and the Built Environment*, 21(4):413-439.
- Morakinyo, K. O, Okunola, A. S. and Odewande, A. (2014). An Assessment of Housing Infrastructural Provision in Public Housing: A Case Study of Bashorun Housing Estate Akobo, Ibadan Oyo State, Nigeria. *Civil and Environmental Research*. 6(12):
- Nubi, T.O (2002). 'Procuring, Managing and Financing Urban Infrastructure: Towards an Integrated Approach Land Management and Property Tax Reform in Nigeria, in `Omirin *et al.*,(ed.) Department of Estate Management, University of Lagos, Akoka.
- Okewole, I. A and Aribigbola, A. (2006) Innovations and sustainability in Housing Policy Conception and Implementation in Nigeria, 414-420
- Okeyinka, Y. (2014). Housing in the Third World Cities and Sustainable Urban Developments. Developing Country. *Development Country Studies*. 4(8):112-120
- Olatubara, C.O. and Fatoye, E.O. (2006) "Residential satisfaction in public Estates in Lagos State, Nigeria". *Journal of Nigerian Institute of Town Planners*, 1(19):103-124.
- Olayiwola LM, Adeleye A, Jiboye AD (2006). "Effect of Socio-cultural factors on Housing quality in Osogbo, Nigeria". International Symposium on Construction in Developing Economies: New issues and challenges. Santiago, Chile. 18-29.
- Omuta, G. E. D. (1986). Minimum versus affordable environmental standards in third world cities. *Cities*, 3(1):58-71.
- Shaw, M. (2004). Housing and public health. *Annual Reviews of Public Health*, 25(2):40-59
- Tipple, A.G. & Willis, K. G. (1989). The Effects on Households and Housing of Strict Public Intervention in a Private Rental Market: A Case Study of Kumasi, Ghana. *Geoforum*, 20(1):15-26.
- Tipple, A.G. (1987). The Development of Housing Policy in Kumasi, Ghana, 1901 to 1981: with an analysis of the current housing stock, CARDO Centre for architectural research and development overseas, University of Newcastle upon Tyne.
- Wilkinson, D. (1999). Poor housing and ill health: A summary of the research evidence. Edinburgh, Scotland: Scottish Office Central Research Unit.

MODELLING THE EFFECT OF CORPORATE GOVERNANCE ON THE SUSTAINABILITY OF CONSTRUCTION FIRMS USING STRUCTURAL EQUATION APPROACH

Monday Otali¹ and Usen Udoh²

¹Department of Building, University of Uyo, Nigeria

²Department of Architecture, University of Uyo, Nigeria

Corresponding author: otalimonday@yahoo.com

Abstract

The need to ensure accountability, transparency, responsibility and power distribution within a firm cannot be overemphasised. The aim of the study is to establish the effect of corporate governance on construction firm performance using structural equation modelling approach. The study adopted survey approach and 1179 copies of structured questionnaire were administered to construction firm representatives while 980 valid responses were received giving a response rate of 83.2%. Data collected were analysed using descriptive statistics and structural equation modelling. The result of the model fit indices showed a good model fit. The correlation coefficient ($\beta = 0.53$) shows that effective implementation of corporate governance principles positively influences the sustainability of construction firms. The study reveals that corporate governance accounts for 28% of the variability in the sustainability of construction firms. Specifically, this study shows that that effective implementation of corporate governance accounts for 26.1%, 17.3%, 19.9% and 65.4% of the variability in the remuneration and benefits of employees, employees relationship, general employees satisfaction, and social performance of the construction firms. Based on the findings, this study concludes that effective implementation of corporate governance principles has positive and direct effect on the sustainability of construction firms in the Niger Delta region of Nigeria.

Keywords: Construction firms; sustainability; corporate governance; Structural Equation Modelling; Niger Delta

Introduction

The need to direct and control the affairs of any organisation by specifying the rights and responsibilities of the stakeholders in order to achieve sustainability cannot be overemphasised. Effective and efficient corporate governance ensures robust and reliable structure and processes for directing, coordinating and controlling the corporate affairs of the organizations for improved and sustainable performance. Furthermore, poor corporate governance leads to poor firm performance, manipulation of financial reports of the organization, and dissatisfaction among the organisation's stakeholders (Bhasin, 2013). Organisations that implement effective corporate governance achieve higher sustainability than those organisations that do not have or fail to implement good and effective corporate governance. Empirically, firms with good corporate governance have forty-one percent (41%) higher sustainability rate than their counterpart that do not have efficient corporate governance (Eccles, Ioannou, & Serafeim, 2014). The general problem is that inefficient corporate governance negatively influences firm performance. The absence of a well structured governance system has resulted in a mismanagement of organisations coupled with corporate fraud, dishonesty and a host of numerous corporate scandals (Zuva & Zuva, 2018).

Organization for Economic Cooperation and Development (2000) stated that corporate governance is concerned with the accountability, transparency, responsibility and power distribution within a corporate entity. The responsibilities of the board of directors and the incentives provided to top management of the firm are two fundamental attributes of the corporate governance system. Boards of directors perform a monitoring and evaluation roles, and also give relevant advice to aid effective decision making that are in consonance with the firm goals and objectives. It is worth to note that firms which incorporate environmental and social sustainability principles into top management decisions are likely to perform better in respect to these two pillars of sustainability as well as economic sustainability (Eccles, Ioannun and Serafeim, 2012). In addition, Duc and Thuy (2013) noted that corporate governance is considered to consist of the following elements: (i) the size of the board; (ii) the presence of female board members; (iii) the duality of the CEO; (iv) the education level of board members; (v) the working experience of the board; (vi) the presence of independent (outside) directors; (vii) the compensation of the board; and (viii) the ownership of the board.

The need to achieve greater productivity and deliver their products in a sustainable manner, have compelled the construction firms to continuously seek for innovations and new strategies that will culminate in greater organisational performance. According to Luu, Kim, Cao and Park (2008) performance measurement is the heart of ceaseless improvement. The main objective of performance evaluation is to assist the top

management team of the organisation to develop new models that will facilitate the achievement of organisational goals (Cokins, 2006). Due to difficulties in defining the concept of corporate sustainability as well as the multidisciplinary nature of sustainability, there are different approaches in conceptualising and operationalising sustainability constructs. Santos and Brito (2012) stated that firm performance is a subset of firm effectiveness that covers operational and financial outcomes. Corporate sustainability extends the principles of sustainable development to the level of organisations. The concept of firm performance in literature refers normally to financial aspects such as profit, return on assets (ROA), return on equity (ROE) and economic value added (EVA). Neely and Adams (2000) posited that different corporate entities are seeking for broader performance strategies and performance indicators that will incorporate non financial indicators while measuring organisational performance. The firm performance indicators used in this study include social performance, general employees' satisfaction, employees' relationship and remuneration and benefits received by the employees for the jobs done in the organisations (Ali, Al-Sulaihi and Al- Gahtani, 2012). The theoretical background used to visualize company performance in the study is stakeholder theory (Agle *et al*, 1999; Kaplan & Norton, 1992; Waddock & Graves, 1997).

Some studies have been carried out on corporate governance and firm sustainability as separate entities. For example: Zuva and Zuva (2018) developed a corporate governance framework to enhance the performance of organizations, Delima and Ragel (2017) assessed the impact of corporate governance on organisational performance in financial institutions in Batticaloa district and concluded that there is a strong positive relationship between corporate governance and organisational Performance, Honghui (2017) evaluated the effect of corporate governance on firms listed on the Nairobi securities exchange. The study concluded that there is a positive relationship between corporate governance and firm performance. The study also posited that corporate governance accounts for 52.3% of firm performance. Adebayo, Ibrahim, Yusuf and Omah (2014) assessed the influence of corporate governance on the performance of food producing companies operating in Nigeria, and revealed that corporate governance is positively associated with the performance of organisations. Furthermore, Changezi and Saeed (2013) established the relationships between corporate governance and performance of banks in Pakistan. The study revealed that effective corporate governance system result in high performance of organisations which also prohibits the fraudulent practices in the organisation. In addition, Walker (2018) assessed the corporate governance strategies that improve organisational performance in the accounting industry, and the findings showed that there is a strong association between corporate governance and organisational success. In the same manner, Grace, Vincent and Evans (2018) studied the effect of corporate governance on performance of financial institutions in Kenya. The results showed that corporate governance explains 30.2 percent of the variation in organizational performance.

Evidence in literature showed that several studies were carried out on corporate governance and organisational performance as separate entities. Furthermore, there are studies on the influence of corporate governance on firm performance. Literature search revealed that some of the studies focused only on the financial performance of the organisations. Limited studies incorporated other dimensions of firm sustainability in their research. Also there are studies on the influence of corporate governance on firm sustainability in other countries and sectors outside construction industry. However, there is limited empirical study on the effects of corporate governance on the sustainability of firms in the construction sector. Specifically, limited research has been carried out on the effect of corporate governance on the sustainability of construction firms in Nigeria. Hence, the aim of this study is to develop a model for predicting the effect of corporate governance on the sustainability of construction firms using structural equation approach.

Research Methodology

This study used structured questionnaire for data collection. The questionnaire comprises of three parts. The first part comprises information about the firm representatives. The second part comprises the constructs and dimensions used to assess the level of implementation of corporate governance in the construction firms while the third part contains the construction and dimensions used to assess the firm sustainability. This study used stratified sampling technique because of the heterogeneous nature of the population. It became necessary to stratify before taking the samples. The study area comprises nine (9) states and each state has construction firms operating in it. After stratification, this study took the samples from each state randomly. The sample frame comprised of 1781 construction firms operating in Niger Delta region of Nigeria. Figure 1

shows that the number of construction firms in Abia, Akwa Ibom, Bayelsa, Cross River and Delta States were 165, 214, 128, 223 and 200 respectively. In addition, the number of firms operating in Edo, Imo, Ondo and Rivers States were 237, 143, 221 and 250 respectively. In order to establish the sample size, this study used Yamane (1967) equation. Figure 1 also shows that the sample size for Abia, Akwa Ibom, Bayelsa, Cross River, Delta and Edo were 117, 139, 97, 143, 133, and 149 respectively. Furthermore, the sample size for Imo, Ondo and Rivers state were 105, 142 and 154. Figure 2 reveals that Rivers state had the highest number of construction firms operating in it. This can be attributed to economic activities in River state and the number of developmental projects going on in the state. The aggregated sample size for this study was 1179. A total of 1179 copies of questionnaire were administered to the construction representatives comprising of project managers, Architects, Builders and Civil engineers working in the construction firms operating in Niger Delta region of Nigeria.

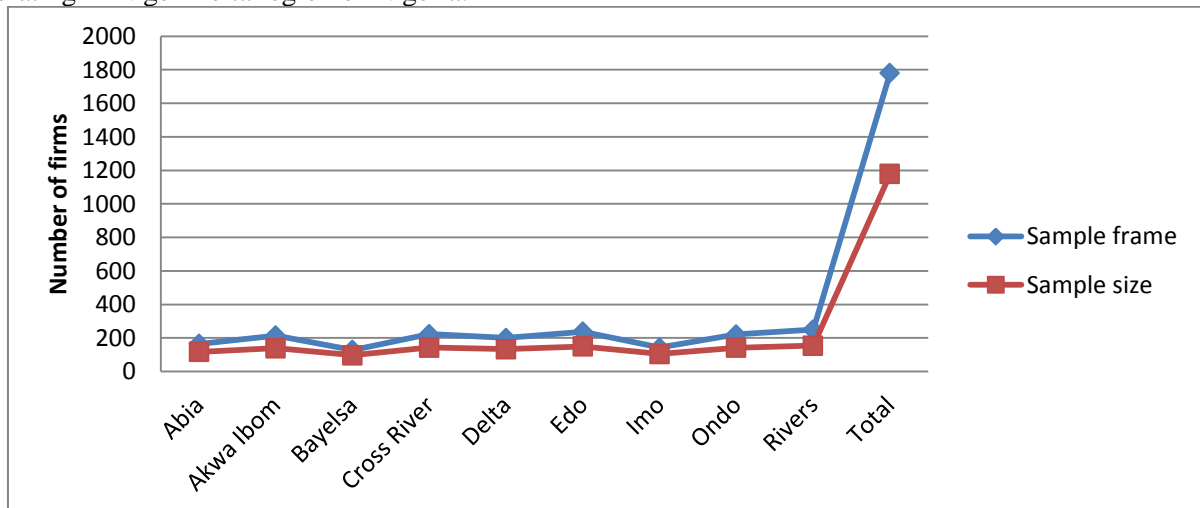


Figure 1: Sample Frame and Sample Size

The result of descriptive statistics showed that the construction professionals (Project managers, Architects, Builders, Civil Engineers) that were sampled in this study possessed minimum qualification of Higher National Diploma (HND). Figure 2 shows that 20% possessed HND, 30% possessed B.Sc and 50% possessed M.Sc. Fifty percent (50%) of the respondents were project managers, twenty percent (20%) of the respondents were Architects, ten percent (10%) were Builders and twenty percent (20%) were civil engineers. The work experience of the respondents ranged between the intervals of 5- 10, 11- 15, 16-20 and above 20 years. Also, 50 % of the respondents had work experience above ten (10) years. It therefore implies that the educational qualification and work experience of the respondents were adequate and their responses can be relied on. A Five point (1-5) likert scale was used for data collection. This approach is in line with Kazaz *et al*, (2008) and Santos and Brito (2012). Scale 1 implies very low level of implementation of corporate governance/very low level of performance while scale 5 implies very high level of implementation of corporate governance /very high level of performance (Kazaz *et al*, 2008; Santos & Brito, 2012). Data were analysed using descriptive statistics and structural equation modelling. Structural equation modelling (SEM) was used to establish the effect of corporate governance on the sustainability of construction firms.

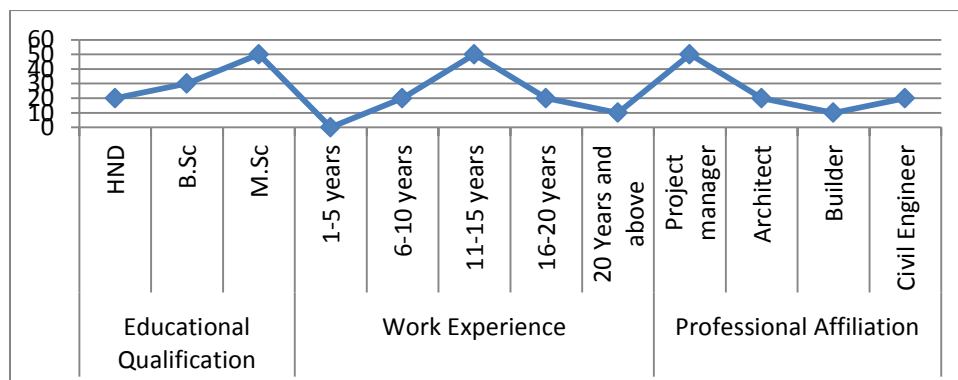


Figure 2: Respondents' characteristics

Results and Discussion

This section contains the descriptive results of the questionnaire distributed to the firms and the response rate. This section also contains the results of the structural equation model predicting the effect of corporate governance on the sustainability of construction firms. Structured questionnaire was used as a research tool for data collection in the study. Figure 3 shows the number of questionnaire administered to construction companies through their representatives, the number of questionnaire returned, percentage of the questionnaire returned and the response rate. Figure 3 indicates that the response rate ranged between 76.10% and 94.7%. The analysis in figure 3 connotes that a good number of the administered questionnaire was returned. Figure 3 also reveals that construction firms operating in Delta state recorded the highest response rate (94.7%) while the construction firms operating in Abia state had the least response rate (76.10%). The study shows that the overall response rate is 83.2%. In agreement with Groves (2006), the response rate in the study is considered very good and adequate.

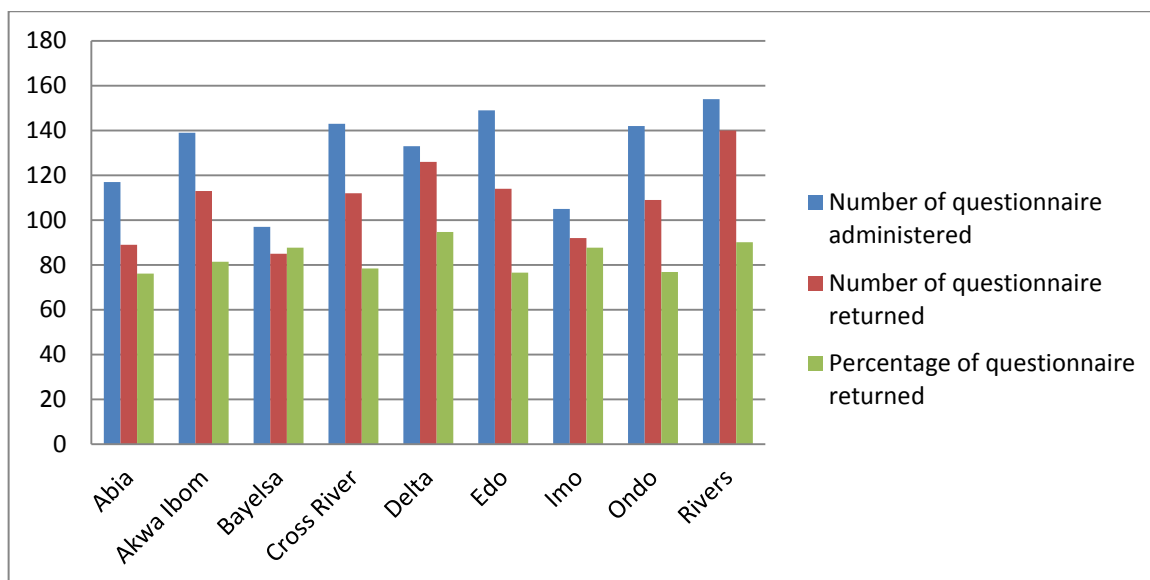


Figure 3: Questionnaire Administration and Response Rate

Structural Equation Modelling (SEM) for Establishing the Effect of Corporate Governance on the Sustainability of Construction Firms

Structural equation modelling was used to establish the effect of corporate governance on the performance of construction firms. These processes include model estimation, verification and validation of the final model.

Model Estimation: Maximum likelihood estimate (MLE) was applied in the study to determine the unique contrast between the elements. The Promax rotation method was used to show the principal dimensions that formed contrast patterns between the variables. Furthermore, the promax rotation method was used because of the large data involved and it also accounted for the correlation between variables. The result showed that KMO is 0.827, and p -value = 0.001 at 0.05 level of significance which confirmed the appropriateness and adequacy for conducting factor analysis for the data set. This value is greater than the cut-off of 0.5 for KMO and Bartlett's test < 0.05. This confirmed the appropriateness and adequacy for conducting factor analysis for the data set.

The study was not about grouping data because the breakdown of corporate governance and firm performance into constructs and dimensions from the literature was done at a preliminary stage. In Principal component analysis (PCA) was used in this study to reduce the variables and find the smallest components that explained most of the variations in the data set. The result of the rotated matrix of components indicates that no component had less than three variables. The result indicates that the correlation coefficient (R) is greater than 0.5 for each variable. This shows a strong relationship between the variables. This also satisfied the condition stated in the literature by Tabachnick and Fidell (2007), who posited that the correlation coefficient (R) must be 0.30 or greater, because anything below suggests a very weak relationship between the variables.

Verification and Validation of the Final Model: The final model was validated using the model fit indices. The results in table 1 shows that the model fit indices of the final model satisfied the bench marks set in literature. The results showed that the estimates are within the expected limits. The values of chi-square / degree of freedom, goodness of fit, root mean square, error of approximation, comparative fit index, tucker lewis index, normed fit index, incremental fit index and relative index are 1.9582, 0.9603, 0.0675, 0.9638, 0.9727, 0.9647, 0.9662 and 0.9563 respectively. The values of these model fit indices showed a satisfactory model fit. This study is in tandem with Schumacher and Lomax (2004), Zulu (2007), Hair *et al.* (2010) and Byrne (2010) that used many model fit indices to the determine the overall fitness of the model.

Table 1. Model Fit Indices

Model Fit Indices	Recommended	Source(s)	Final Model	Remark
X ² /Degree of freedom	< 2	Byrne, 2001	1.9582	satisfactory
Goodness of fit (GFI)	0 – 1	Bagozzi and Yi, 2012	0.9603	satisfactory
Root Mean Square Error of Approximation (RMSEA)	≤ 0.10	Tabachnick and Fidell (2007)	0.0675	satisfactory
Comparative Fit Index(CFI)	> 0.9	Kline, 2005	0.9638	satisfactory
Tucker Lewis Index(TLI)	≥ 0.90	Bagozzi and Yi, 2012	0.9727	satisfactory
Normed Fit Index (NFI)	0 – 1	Doloi <i>et al.</i> , 2011	0.9647	satisfactory
Incremental Fit Index (IFI)	0 – 1	Molenaar <i>et al.</i> , 2000	0.9662	satisfactory
Relative Fit Index (RFI)	0 – 1	Doloi <i>et al.</i> , 2011	0.9563	satisfactory

Table 2 shows the estimates of the standardised regression weight, the standard errors (S.E), and the *p*-values. Furthermore, another set of criteria that assess the adequacy of the model are the feasibility of parameter estimates, the appropriateness of standard errors, and the statistical significance of parameter estimates. To check the feasibility, the parameters were checked to ensure that the estimates are correct. The correctness of the estimates implies that each of estimates have the correct values and sign. This is to avoid estimates having correlation coefficient greater than one (1). The appropriateness of the standard error is also a key parameter for evaluating the adequacy of the model. Table 2 indicates that the values of standard errors are small, which implies a good model fit. The results in table 2 also shows that all the *p*-values are less than 0.05 level of significant set for the test. This indicates the estimates are significant at 95 % confidence level. These criteria and checks showed that the model fit is good.

Table 2: Standardised Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	P-values
SCF	<---	CG	0.529	0.021	***
CGSR	<---	CG	0.905		
CGTD	<---	CG	0.891		
CGBD	<---	CG	0.780		
SP	<---	SCF	0.809	0.229	***
GES	<---	SCF	0.446		
ER	<---	SCF	0.415		
RBOC	<---	SCF	0.511		
CGSG	<---	CG	1.00		
CGSR16AD	<---	CGSR	0.377		
CGSR14AD	<---	CGSR	0.741	0.045	***
CGSR12AD	<---	CGSR	0.850	0.045	***
CGSR11AD	<---	CGSR	0.856	0.047	***
CGSR8AD	<---	CGSR	0.893	0.054	***
CGSR7AD	<---	CGSR	0.878	0.053	***
CGSR6AD	<---	CGSR	0.901	0.057	***
CGSR5AD	<---	CGSR	0.897	0.057	***
CGSR3AD	<---	CGSR	0.823	0.063	***
CGTD5AD	<---	CGTD	0.872		
CGTD4AD	<---	CGTD	0.828	0.036	***
CGTD3AD	<---	CGTD	0.859	0.040	***
CGTD1AD	<---	CGTD	0.822	0.040	***
CGBD8AD	<---	CGBD	0.888		
CGBD7AD	<---	CGBD	0.891	0.034	***

			Estimate	S.E.	P-values
CGBD5AD	<---	CGBD	0.921	0.033	***
CGBD4AD	<---	CGBD	0.905	0.035	***
CGBD2AD	<---	CGBD	0.857	0.034	***
CGBD1AD	<---	CGBD	0.916	0.030	***
SP2	<---	SP	0.568		
SP3	<---	SP	0.695	0.110	***
SP4	<---	SP	0.791	0.118	***
SP5	<---	SP	0.873	0.130	***
SP6	<---	SP	0.845	0.130	***
SP7	<---	SP	0.865	0.123	***
SP8	<---	SP	0.843	0.135	***
SP9	<---	SP	0.869	0.147	***
GES11	<---	GES	0.661		
GES13	<---	GES	0.588	0.084	***
GES15	<---	GES	0.858	0.119	***
ER2	<---	ER	0.683		
ER3	<---	ER	0.738	0.103	***
ER4	<---	ER	0.711	0.093	***
RBOC2	<---	RBOC	0.522		
RBOC4	<---	RBOC	0.426	0.095	***
RBOC5	<---	RBOC	0.688	0.129	***
RBOC6	<---	RBOC	0.782	0.130	***
RBOC7	<---	RBOC	0.697	0.119	***
CGSG4AD	<---	CGSG	0.788		
CGSG3AD	<---	CGSG	0.848	0.052	***
CGSG2AD	<---	CGSG	0.843	0.049	***

Table 3 shows the total effect of corporate governance on the sustainability of construction firm. The correlation coefficient of 0.529 indicates that corporate governance has positive effect on the sustainability of construction firm. Table 3 also shows the squared multiple correlations of each of the variables in the model. The squared multiple correlations reveal the proportion of variability in firm performance as explained by the level of implementation of corporate governance. Table 3 reveals that 28% of the variability in the overall sustainability construction firms in Niger Delta, Nigeria is explained by the level of implementation of corporate governance by the management of the firms.

Table 3: Standardized Total Effects and Squared Multiple Correlation

	CG	SCF	CGSG	RBOC	ER	GES	SP	CGBD	CGTD	CGSR	Squared Multiple Correlation
SCF	.529	.000	.000	.000	.000	.000	.000	.000	.000	.000	.280
CGSG	1.00	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.00
RBOC	.270	.511	.000	.000	.000	.000	.000	.000	.000	.000	.261
ER	.220	.415	.000	.000	.000	.000	.000	.000	.000	.000	.173
GES	.236	.446	.000	.000	.000	.000	.000	.000	.000	.000	.199
SP	.428	.809	.000	.000	.000	.000	.000	.000	.000	.000	.654
CGBD	.780	.000	.000	.000	.000	.000	.000	.000	.000	.000	.608
CGTD	.891	.000	.000	.000	.000	.000	.000	.000	.000	.000	.794
CGSR	.905	.000	.000	.000	.000	.000	.000	.000	.000	.000	.818
CGSG2AD	.886	.000	.843	.000	.000	.000	.000	.000	.000	.000	.710
CGSG3AD	.891	.000	.848	.000	.000	.000	.000	.000	.000	.000	.719
CGSG4AD	.829	.000	.788	.000	.000	.000	.000	.000	.000	.000	.622
RBOC7	.188	.356	.000	.697	.000	.000	.000	.000	.000	.000	.486
RBOC6	.211	.399	.000	.782	.000	.000	.000	.000	.000	.000	.611
RBOC5	.186	.351	.000	.688	.000	.000	.000	.000	.000	.000	.473
RBOC4	.115	.217	.000	.426	.000	.000	.000	.000	.000	.000	.181

RBOC2	.141	.267	.000	.522	.000	.000	.000	.000	.000	.000	.273
ER4	.156	.295	.000	.000	.711	.000	.000	.000	.000	.000	.506
ER3	.162	.307	.000	.000	.738	.000	.000	.000	.000	.000	.545
ER2	.150	.284	.000	.000	.683	.000	.000	.000	.000	.000	.466
GES15	.202	.383	.000	.000	.000	.858	.000	.000	.000	.000	.735
GES13	.139	.262	.000	.000	.000	.588	.000	.000	.000	.000	.345
GES11	.156	.295	.000	.000	.000	.661	.000	.000	.000	.000	.437
SP9	.372	.703	.000	.000	.000	.000	.869	.000	.000	.000	.755
SP8	.361	.682	.000	.000	.000	.000	.843	.000	.000	.000	.711
SP7	.370	.700	.000	.000	.000	.000	.865	.000	.000	.000	.748
SP6	.362	.683	.000	.000	.000	.000	.845	.000	.000	.000	.713
SP5	.374	.706	.000	.000	.000	.000	.873	.000	.000	.000	.762
SP4	.338	.639	.000	.000	.000	.000	.791	.000	.000	.000	.625
SP3	.298	.562	.000	.000	.000	.000	.695	.000	.000	.000	.483
SP2	.243	.459	.000	.000	.000	.000	.568	.000	.000	.000	.323
CGBD1AD	.714	.000	.000	.000	.000	.000	.000	.916	.000	.000	.838
CGBD2AD	.668	.000	.000	.000	.000	.000	.000	.857	.000	.000	.734
CGBD4AD	.706	.000	.000	.000	.000	.000	.000	.905	.000	.000	.819
CGBD5AD	.718	.000	.000	.000	.000	.000	.000	.921	.000	.000	.847
CGBD7AD	.695	.000	.000	.000	.000	.000	.000	.891	.000	.000	.793
CGBD8AD	.693	.000	.000	.000	.000	.000	.000	.888	.000	.000	.789
CGTD1AD	.732	.000	.000	.000	.000	.000	.000	.000	.822	.000	.676
CGTD3AD	.765	.000	.000	.000	.000	.000	.000	.000	.859	.000	.738
CGTD4AD	.737	.000	.000	.000	.000	.000	.000	.000	.828	.000	.685
CGTD5AD	.777	.000	.000	.000	.000	.000	.000	.000	.872	.000	.761
CGSR3AD	.744	.000	.000	.000	.000	.000	.000	.000	.000	.823	.677
CGSR5AD	.811	.000	.000	.000	.000	.000	.000	.000	.000	.897	.804
CGSR6AD	.815	.000	.000	.000	.000	.000	.000	.000	.000	.901	.811
CGSR7AD	.794	.000	.000	.000	.000	.000	.000	.000	.000	.878	.770
CGSR8AD	.808	.000	.000	.000	.000	.000	.000	.000	.000	.893	.797
CGSR11AD	.774	.000	.000	.000	.000	.000	.000	.000	.000	.856	.732
CGSR12AD	.769	.000	.000	.000	.000	.000	.000	.000	.000	.850	.723
CGSR14AD	.670	.000	.000	.000	.000	.000	.000	.000	.000	.741	.549
CGSR16AD	.341	.000	.000	.000	.000	.000	.000	.000	.000	.377	.142

Effect of Corporate Governance on the Sustainability of Construction Firms

Tables 1–3 indicate a satisfactory model fit as all output values are within acceptable limits. Statistical significance of parameter estimates was assessed and the result indicates all the p -values are less than 0.05. This implies that all the estimates are significant at ninety five percent (95%) confidence level. The model fit indices showed a satisfactory model fit. This study is in consonance with Schumacher and Lomax (2004), Zulu (2007), Hair *et al.* (2010) and Byrne (2010) that used many model fit indices to determine the overall fitness of the model. Figure 4 reveals that corporate governance has direct and positive influence on the performance of construction firms in Niger Delta region of Nigeria ($\beta = 0.53$). The study shows proper dissemination of information among the shareholders and giving them the opportunity to contribute to management decisions improve the performance of the organization. These include obtaining relevant information on a timely basis right to elect the board members, sharing in corporate profits, participating in amendments to governing documents, and giving the shareholders the opportunity to question the board on fundamental issues. Furthermore, transparency in the structure and control of the firms also influence positively the sustainability of the firm. These include bringing positive changes to the structure and control based on the needs of the shareholders, and the ability of shareholders to consult with each other on issues concerning their interest.

This study shows that the extent organisational top management implements performance-enhancing mechanisms for employee has direct positive effect on the sustainability of the firm. In addition, the right of stakeholders and employees in particular to whistle blow to the board without risk of retribution influences

the performance of the organisation. Figure 4 shows that disclosure of financial and operating results, disclosure of company objectives, disclosure of major share ownership and voting rights and disclosure of remuneration policy for board members and executives have direct positive effect on the sustainability of the firm. Figure 4 also reveals that effective and efficient carrying out of duties by the board members influence the sustainability of the firm. These include board members acting on a fully informed basis, board members exercising duties of loyalty and care, and the board members treating all shareholders fairly. Other duties of the board members that have positive effect on the sustainability of the construction firms include application of high ethical standards in the organization, overseeing the process of disclosure and communications, and the capacity of the board members to have objective and independent judgment. This study is in tandem with Bhasin (2013) who posited that corporate governance leads to greater firm performance. This study is also in agreement with Changezi and Saeed (2013) who established the relationships between corporate governance and performance, and revealed that effective corporate governance system result in high performance of organizations.

Empirically, table 3 shows that 28% of the variability in the overall sustainability of construction firms operating in the Niger Delta region of Nigeria is accounted for by the level of implementation of corporate governance principle by the top management of the firms. It also shows that 26.1% of the variability in the remuneration and benefits of employees is explained by the implementation of corporate governance principles. This implies that corporate governance influences the basic values of the organization which include learning as key to improvement, the extent that supervisors in this company are willing to share all relevant information with subordinates, the ability of the firm to be flexible and continually adapting to change, the policy of the firm to always moving toward improved ways of doing things and organization principle to give opportunity for personal growth and development to the employees. The result also shows that 17.3% of the variability in employees relationship is explained by the level of implementation of corporate governance principles. This indicates that corporate governance influences the extent the employees get along well with their coworkers, the level of their happiness with their relationship with their fellow workers, and how employees stimulating each other. Table 3 also indicates that 19.9% of the variability in general employees satisfaction is accounted for by effective implementation of corporate governance principles. In addition, 65.4% of the social performance of the construction firms is explained by the level of implementation of corporate governance. This connotes that efficient corporate governance influences the level of infrastructural development, standard of living of the organisational stakeholders, public and private sector investment, peace and security, bio-diversity and eco-system stability, poverty reduction, human health standard and Pollution control by the construction firms operating in the Niger Delta region of Nigeria. This study is in agreement with Eccles, Ioannou, and Serafeim (2014) who stated that firms with good corporate governance have (41%) higher sustainability. This study is also in tandem with Honghui (2017) who posited that corporate governance accounts for 52.3% of firm performance of the companies. Furthermore, this study is in consonance with Grace, Vincent and Evans (2018) who revealed that corporate governance explains 30.2% of the variation in organisational performance.

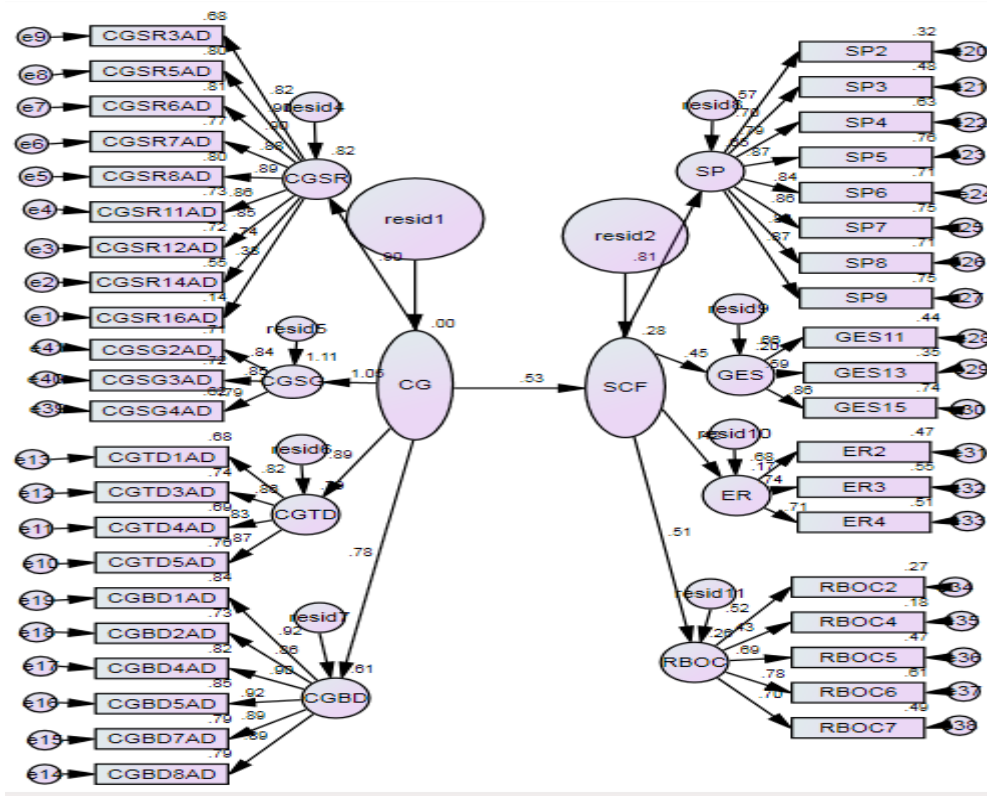


Figure 4: Structural Equation Model (SEM) of Effect of Corporate Governance on the Sustainability of Construction Firms

Conclusion and Recommendation

This study assessed the effect of corporate governance on the performance of construction firm in Niger Delta region of Nigeria using structural equation modeling approach. The study developed a structural equation model for predicting the effect of corporate governance on construction firm sustainability. The model estimation and modification, verification and validation were carried out. The result of the model fit indices showed a good model fit. The correlation coefficient ($\beta = 0.53$) shows that effective implementation of corporate governance principles positively influences the sustainability of construction firms. The study reveals that corporate governance accounts 28% of the variability in the sustainability of construction firms. Specifically, this study shows that implementation of corporate governance accounts for 26.1%, 17.3%, 19.9% and 65.4% of the variability in the remuneration and benefits of employees, employees' relationship, general employees satisfaction, and social performance of the construction firms. Based on the findings, this study concludes that effective implementation of corporate governance principles has positive and direct effect on the sustainability of construction firms in the Niger Delta region of Nigeria. This study recommends that construction firms should always strive to implement effective corporate governance principles in order to achieve better and improved corporate performance.

References

- Adebayo, M., Ibrahim, A.O. B., Yusuf, B., and Omah, I., (2014). Good Corporate Governance and Organisational Performance: An Empirical Analysis, *International Journal of Humanities and Social Science*, 4, 7(1), 170-178
- Agle, B. R., Mitchell, R. K., and Sonnenfeld, J. A. (1999). Who Matter to CEOs? An Investigation of Stakeholder Attributes and Salience Corporate Performance, and CEO values. *Academy of Management Journal*, 42(5):507-525.
- Ali, H.A.E.M, Al-Sulaihi, I.A. and Al-Gahtani, K.S. (2012). Indicators for Measuring Performance of Building Construction Companies in Kingdom of Saudi Arabia, *Journal of King Saud University – Engineering Sciences*, 25:125–134.

- Bhasin, M. L. (2013). Corporate governance and forensic accountant: An exploratory Study, *Journal of Accounting, Business & Management*, 20(2):55-83.
- Byrne, B.M. (2010). Structural Equation Modeling with AMOS: *Basic Concepts, Applications and Programming*, 3rd edition, Rutledge, Taylor and Francis, New York, NY
- Changezi, N.I. and Saeed, A. (2013). Impact of Corporate Governance Framework on the Organizational Performance, *Journal of Management Policies and Practices*, 1(2):1-8
- Cokins, G. (2006). Performance management. In: Adkins, T. (Ed.), *Case studies in Performance Management: A Guide from the Experts*. New Jersey: John Wiley and Sons.
- Delima, V.J. and Ragel, V.R. (2017). Impact of Corporate Governance on Organizational Performance, *International Journal of Engineering Research and General Science*, 5(5):6-16
- Duc, V., and Thuy, P. (2013). *Corporate Governance and Firms Performance: Empirical Evidence from Vietnam*. Paper presented at the 42th Australian Conference of Economists Conference held by Murdoch University, Perth, Western Australia.
- Eccles, R. G., Ioannou, I., and Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance, *Management Science*, 60:2835–2857.
- Grace K, Vincent M, Evans A.(2018). Corporate Governance and Performance of Financial Institutions in Kenya, *AcadStrat Manage J*, 17:1–7.
- Groves, R. M. (2006). Non Response Rates and Non Response Bias in Household Surveys. *Public Opinion Quarterly*, 70(5): 646-675.
- Hair, J.F., Black, W.C., Babin, B.J., and Anderson, R.E. (2010), *Multivariate Data Analysis: A Global Perspective*, Prentice-Hall, Inc., Englewood Cliffs, NJ, USA
- Honghui, L. (2017). The Effect of Corporate Governance on performance of firms listed on the Nairobi securities and Exchange, School of Business, University of Nairobi. *International Journal of Business and Management Studies*, 10(1):16-29
- Kazaz A, Manisali E, Ulubeyli S. (2008). Effect of Basic Motivational Factors on Construction Workforce Productivity in Turkey. *J Civil Eng Manage*. 14: 95–106.
- Kaplan, R. S., & Norton, D. P. (1992). The Balanced Scorecard: Measures that Drive Performance. *Harvard Business Review*, 70(1):71-79.
- Luu, T., Kim, S., Cao, H. and Park, Y. (2008). Performance Measurement of Construction Firms in Developing Countries. *Construction Management and Economics*, 26, 373–386.
- Neely, A. and Adams, C., (2000). Perspectives on Performance: the Performance Prism, Proceedings of the 5th International Conference on ISO 9000 and TQM, School of Business, HKBU, Hong Kong, 390-394
- Organization for Economic Cooperation and Development (2000). Principles of Corporate Governance. Oslo Manual, OECD, Paris.
- Santos, J. B. and Brito, L. A. L. (2012). Toward a Subjective Measurement Model for Firm Performance. *Bar, Rio de Janeiro*, 9(6):95-117.
- Shumacker, R. and Lomax, R. (2004). *A Beginner's Guide to Structural Equation Modelling*, 2nd edition, Lawrence Erlbaum associates

- Tabachnick, B.G and Fidell, L.S. (2007), *Using Multivariate Statistics, 5th edition*, Pearson Education, Upper Saddle River, NJ
- Waddock, S. A., and Graves, S. B. (1997b). The Corporate Social Performance-Financial Performance Link. *Strategic Management Journal*, 18(4): 303-319.
- Walker, A.D.(2018). Corporate Governance Strategies to Improve Organizational Performance in the Accounting Industry, Business Administration, Walden University
- Yamane, T. (1967). *Statistics: An Introductory Analysis*, 2nd Ed., New York: Harper and Row.
- Zulu, S.L. (2007). *The Impact of Project Management Process Quality on Construction Project Performance: A Structural Equation Model*”, Unpublished PhD Thesis, Heriot Watt University, Edinburgh
- Zuva,J. and Zuva, T.(2018). Corporate Governance and Organisational Performance, *International Journal of Business and Management Studies*, 10, 1, 16-29

ASSESSMENT OF FACTORS RESPONSIBLE FOR LOW LEVEL OF PROFESSIONAL REGISTRATION BY BUILDING GRADUATES IN NIGERIA

S. Muhammad, Z. H. Ishaq, and F. E. Afolabi

Department of Building, Ahmadu Bello University Zaria, Nigeria

ziyadishaq2@gmail.com; 08037872101

Abstract

The large number of building construction projects undertaken in the country implies the need for substantial number of professional builders who are tasked with managing the production of buildings. Despite the huge number of building graduates produced by various higher educational institutions in the country, the number of registered builders remains relatively low. The number of registered builders does not reflect the number of building graduates produced by various accredited institutions. This indicates that a large proportion of the building graduates do not pursue the track of professional registration. The study assessed the factors responsible for low level of professional registration by building graduates. A quantitative research method using questionnaire survey was adopted. Close ended structured questionnaire was used to solicit responses from building graduates who have no professional registration. 355 questionnaires were distributed to purposive sampled respondents and 91.27% valid response rate was obtained. Descriptive statistics was used to analyse the data. The study found that 65% of the respondents indicated their intention to obtain their professional registration within a period of one to three years. The study also identified 11 reasons that respondents indicated as significant for low level of professional registration by building graduates, the topmost being 'lack of financial strength' (MS = 3.36), 'lack of awareness about registration process' (MS = 3.06), 'CORBON License and Seal is of little use' (MS = 3.04) and 'high cost of membership' (MS = 3.01). These reasons were consolidated into four factors, which are financial, registration benefit, and awareness and regulations implementation. The study concludes that building graduates are willing to obtain professional registration but are constrained by a combination of factors. The study recommends that CORBON and NIOB should take appropriate steps that would minimise professional registration challenges faced by building graduates.

Keywords: Building, Graduates, Professional, Registration.

Introduction

Building construction sub-sector of the construction industry is responsible for the creation of buildings for various uses. It requires adequate and well trained professionals for effective and efficient delivery of projects. The built environment professionals are saddled with the responsibilities across all the phases of a project. In Nigeria, the roles of each category of professionals are clearly spelt out in the National Building Code. Olatunji, Oke and Owoeye (2014) defined building professional as an academically trained specialist, statutorily registered and professionally responsible for building production management, construction and maintenance of buildings for the use and protection of mankind and his assets. Bamisile (2004) added that the builder is the professional at the centre of the physical buildings construction from the inception to the completion of the building. The relevance of the Builder is crucial, especially at the construction stage. According to Fellows (2003), professionalism in the building industry involves exercising the body of unique knowledge into construction projects. Professionalism includes internalizing the core values and beliefs of the profession as well as understanding the real meaning of the practice. Professional registration is an important milestone for any specialist. It establishes one's proven knowledge, understanding and competence and usually awarded by licensed bodies. According to Meintjes and Struweg (2009), one of the greatest problems faced by professional bodies is that most of the graduate practitioners do not become members of their professional bodies. Furthermore, the role of employers in the process is also brought into question, which could be a contributing factor that leads to low professional membership. Many employers are not demanding employee membership of professional bodies (Fedoryshyn & Hintz, 2000).

The Nigerian Institute of Building (NIOB) and Council of Registered Builders of Nigerian (CORBON) are the main bodies that play a role with regard to registration of professional builders. The bodies also regulate the scope of practice of building profession, advocates for the profession in the political arena, and promote awareness and understanding of building profession through the use of various media and fora (NIOB, 2017; Micah, 2009). However, only CORBON has the mandate and statutory obligation to register and appoint a person or persons as Builders under the Builders Act. Warren and Wilkinson (2008) stated that it appears that despite increasing number of graduates in Australia, new entrants to the profession are failing to become full members of professional bodies. According to Biodun (2016), building profession in Nigeria is constantly being challenged with issues such as professional registration by graduates and battle of relevance in the society. Usman, Ishaq and Muhammad (2018) conducted a qualitative study which identified barriers responsible for low level of professional registration by building graduates. These include financial

constraint, High cost of registration, NIOB policy of payment of backlog of annual dues, Perceived lack of advantage, Poor government policy and non-implementation of national building code. However, the sample size for the study is too small to make a generalization of the findings. Moreover, it was observed that some reasons which could contribute to low level of registration were not considered. Thus there is the need to conduct a study with an improved sample size and a more comprehensive set of barriers. Therefore this study assessed the factors responsible for low level of professional registration by building graduates in Nigeria.

Profession, Professionalism and Professional ethics

A profession can be referred to as an organised occupational group, which is recognised and regulated by law, and is guided by standards and ethics of practice (Hemuka, 2010). Vee and Skitmore (2003) describes it as an occupation that requires both mastery and advanced study of a specialized body of knowledge undertaken to enhance and safeguard some matter that reasonably affects others well-being. A profession is guided by continuous training and code of ethics. The core characteristics of a profession according to Biodun (2016) are prolong specialised training in a body of learning and service orientation collectively. Three common characteristics of a profession according to Gardner and Shulman (2005):

- i. To serve in the interests of clients in particular and the good of society in general.
- ii. An organized attempt to learning from experience both individually and collectively and thus, enhancing new knowledge from the real meaning of practice.
- iii. The growth of a professional community responsible for the oversight and monitoring of quality practice and effective professional education.

A professional provides service for the good of the people, exercise a skill based on knowledge acquired by training and education. The provision of service entails demonstration of appreciable competence with utmost integrity maintained by a code of conduct of the relevant professional body (Ebekozen, 2014). Developing and sustaining sound and competent professional practice is the objective of all the professional institutions in the built environment. Gardner and Shulman (2005) described a compact between society and the professional to act selflessly, responsibly, and wisely. According to Fellows (2003), professionalism in the building industry involves exercising the body of unique knowledge into construction projects. Professionalism includes internalizing the core values and beliefs of the profession as well as understanding the real meaning of the practice Professional ethics are cardinal guiding principles, moral codes, rules, behaviour, character conduct and etiquette, which are recognised as the standard of work ethics expected of member of a profession, trade or business. Without a code of ethics, and ethical behaviour, there is no profession. The fundamental purpose of professional code of ethics is to maintain high ethical standard, integrity, and credibility for the professional members, client and public at large. Other purposes of professional ethics according to Biodun (2016) are:

- i. Ensure order and uniformity of practice in business dealings.
- ii. Bridge the gap between public policy, professional practice, and business morality.
- iii. Create framework for practitioner to be efficient, effective and efficient in the discharge of their duties while also providing a check on their conducts.
- iv. It gives credibility to the professional body because of sanction it can impose on erring member.

Professional Builder in the Built Environment

A Builder is a professional at the centre of the physical construction of buildings. Builders' role in building development process in general, is to construct the building. A builder is an expert in building production management in the building industry. Builders carry out buildability and maintainability analysis, preparation of production management documents and general management of the production process on site (Biodun, 2016). According to Ogunbiyi (2015), building practitioners have been misunderstood to an extent even by the built environment professionals and people in the society. The builder's area of practice as highlighted by Ogunbiyi (2015) include building production management, building Maintenance, feasibility and viability study, arbitration and litigation Services, report on and reactivation of abandoned projects, resident supervision, management of direct labour project and building Survey. Additional services ratified by the professional and statutory bodies of the professional builder include estimating and pricing for tenders in building projects, risk management, facilities management, Value Management, settlement of Building Contractors' claims.

Roles of NIOB and CORBON in Registration of Professional Builders

There are two bodies that play major roles for registration of professional builders in Nigeria; the Nigerian Institute of Building (NIOB), and Council of Registered Builders of Nigeria (CORBON). Both organisations work closely in the training and re-training of professional builders, creating public awareness, carrying out research, curricular development, accreditations, Continuous Professional Development, regulating and controlling the practice of building profession in Nigeria (Micah, 2009). The NIOB is a professional association for builders while CORBON is a government regulatory body that controls and regulates the practice of the Building profession in all its aspects and ramifications (Obiegbo, 2009). The registration process consists of two broad stages. A candidate must first attain the corporate membership of NIOB after passing the necessary examinations and interview. The prospective candidate then need to obtain practice licence from CORBON after satisfying the stipulated requirements. A professional builder need to remain registered with CORBON throughout his professional career (Biodun, 2016; CORBON, 2017). A foreigner whose qualifications and experience are assessed and accepted to be of equal standard to that of corporate member of MNIOB can be registered as a “Temporarily Registered Builder”. Graduate members of NIOB can register as “Provisionally Registered Builder” and progress to Fully Registered Builder status through the Corporate Examination of NIOB and the Professional interview of CORBON.

Methodology

The study adopted quantitative research method to assess the factors responsible for low level of professional registration. The target population for this study comprised of building graduates with minimum of 3 years’ post-graduation experience, who are yet to obtain professional registration with CORBON. There is no existing directory or database for the target population, the total number of members of the population is difficult to determine. Thus, the population is considered to be infinite and the sample size for the study was obtained using the Cochran (1977) formula. Using 95% Confidence level, 5% margin of error and 30% degree of variability, a minimum sample size of 323 was determined. A total of 355 questionnaires were distributed by adding 10% over the minimum sample size to account for invalid or non-responses. Closed ended questionnaires were used to solicit information from the respondents. The main section of the questionnaire that is useful for achieving the main objective of the study consists of a set of potential reasons responsible for low level of professional registration. Respondents were expected to rate how significant the reason is in hampering profession registration on a 5-point rating scale. The respondents were selected using purposive sampling technique after satisfying certain criteria. The questionnaires were administered in 12 states across the six geopolitical zones of Nigeria in order to obtain a broader perspective. Out of the total number of questionnaires distributed, 331 were filled and returned but only 324 were found fit for analysis. Descriptive statistics was used to analyse the data. Respondents’ demographics were analysed using percentages. The data assessed using rating scale was analysed using mean and standard deviation.

Results and Discussion

Demography of Respondents

Respondents were asked to provide some background information regarding their highest education qualification, years of post-qualification and current work organisation or engagement. This is in order to have proper background about the respondents so as to relate it to the issue of professional registration. The results are presented in Table 1.

Table 1 presents the respondents demography comprising highest educational qualification, years of post-graduation experience and type of respondents’ organisation. The breakdown of respondents’ highest educational qualification indicates that 108 (33.2%) are HND holders, 166 (51.2%) hold B.Sc., 24 (7.4%) hold PGD, 26 (8.0%) hold M.Sc. and 0 (0%) of the respondents holds PhD. Based on the requirements for Corporate membership of NIOB, candidates with BSc, or higher qualification have a shorter route in terms of professional examinations to be completed. Those with HND have longer route because they have to write and pass more professional examinations. From the results presented, majority of respondents (66.7%) are supposed to have shorter route for professional registration. As stated earlier, the study population consists of graduates with at least 3 years post qualification. This is because a period of 3 years is considered as the reasonable minimum to accomplish full registration with CORBON. From the results presented, less than 50% of the respondents have between 3 -5 years’ post-graduation. This implies that majority have longer years of post-qualification, over which they could have registered as professional builders. In fact, over 20% have over 10 years of post-qualification, which is ‘more than enough’ time to complete professional registration.

Table 1: Respondents Demography

Characteristics	Classification	Frequency	%
Highest Educational Qualification	HND	108	33.3
	B.Sc.	166	51.2
	PGD	24	7.4
	M.Sc.	26	8.0
	PhD	0	0
	Total	324	100.0
Years of Post-Qualification	3 – 5 years	149	46.0
	6 – 10 years	103	31.8
	11 – 15 years	47	14.5
	16 – 20 years	15	4.6
	More than 20 years	10	3.1
	Total	324	100.0
Type of Respondent Organisation	Construction Firm	171	52.8
	Consultancy Firm	24	7.4
	Government Ministry/Agency	99	30.6
	Higher Educational Institution	21	6.5
	Others	2	0.6
	No Response	7	2.2
	Total	324	100.0

Source: Field Survey (2019)

The results in Table 1 also indicated that over 90% of the respondents are engaged construction firms (52.8%), government ministries/agencies (30.46%) and consultancy firms 24 (7.4%). These imply that they are employed and therefore engaged in one or more aspects of practice of the building profession, despite not being professionally registered. The fact that the majority are engaged in the selected type of organisations also implies that they are earning some income, even though the income level has not been established.

Membership of NIOB

As described earlier, a building graduate needs to attain corporate membership of NIOB in order to be qualified for full registration with CORBON. There are other membership status of NIOB that can be attained by graduates preparatory to becoming corporate member. These are Associate and Graduate membership cadres for HND and BSc graduates respectively. Corporate member status can then be attained through examinations, interview and mandatory continuous professional development workshops, seminars and conferences. Respondents were asked to indicate whether they currently possess any membership status or otherwise and the result is presented in Table 2.

Table 2: Membership of NIOB

Status	Frequency	Percentage
Yes	213	65.7
No	109	33.6
No Response	2	0.6
Total	324	100.0

Source: Field Survey (2019)

As presented in Table 2, about 65.7% of the respondents had a membership status of the NIOB. This indicates that respondents are on the track of becoming corporate members of NIOB. About 33.6% of the respondents did not obtain any membership status of the NIOB, implying that the journey to become a registered builder is still far.

Intension to register as Professional Builder

As indicated in the previous sub-section, many of the respondents are already on the track of professional registration, having obtained a form of NIOB membership. This implies an intention of becoming a registered builder in the distant or near future. The respondents were also asked to

indicate the period over which they plan to obtain full professional registration with CORBON. The result is presented in Table 3.

Table 3: Plan to Register with CORBON

Period	Frequency	Percentage
Next 6 months	39	12.0
Next one years	105	32.4
Next two years	56	17.3
Next three years	51	15.7
Not at all	27	8.3
No Response	46	14.2
Total	324	100.0

Source: Field Survey (2019)

It can be seen from Table 3 that 77.4% of the respondents intend to become fully registered builders within the next three years. The figure is higher than that of those who currently have a membership status with NIOB (65.7%). This implies that some of the respondents who do not currently have any membership status of NIOB have the intention of becoming fully registered with CORBON over the next three years, in addition to those already 'on track'. On the other hand 22.5% either indicated no intention to register with CORBON at all or within the next three years. It is quite impressive that there are more building graduates who intend to become registered professionals than those who have not. However, it should be of concern that a reasonable number of building graduates (over 20%) do not signify any intention of registering at all or in the near future.

Job or practice challenges due to lack of professional registration.

Respondents were also asked to indicate how often they face challenges on their current engagements despite not being professionally registered. The result is presented in Table 4.

Table 4: Challenges Faced due to lack of professional registration

Categories	Frequency	Percentage
Most Often	23	7.1
Often	120	37.0
Not Often	88	27.2
Rarely	68	21.0
Not at all	21	6.5
No Response	4	1.2
Total	324	100.0

Source: Field Survey (2019)

Results from Table 4 indicates that majority of the respondents do not frequently encounter job challenges as a result of not being professionally registered. This situation would not encourage building graduates to give serious attention to the issue of professional registration since it may not so much affect their job prospect or opportunities. It is common occurrence to find untrained or unregistered practitioners performing the role of registered professionals within the Nigerian construction industry. Some building graduates can be found among these categories of practitioners.

Reasons for Low level of Professional Registration by Building Graduates.

Respondents were asked to rate the different reasons responsible for the low level of professional registration on a 5-point scale. Where 1= Least significant, 2 = fairly significant, 3 = Significant, 4 = Very significant, 5 = extremely significant. The objective is to determine which of the reasons are more prominent so that they could be targeted or addressed in order to enhance professional registration among building graduates. The result is presented in Table 5.

Table 5: Reasons for the low Level of Professional Registration by Building Graduates

Reasons	Mean	SD	Rank
Lack of financial strength	3.36	.623	1
Lack of awareness about registration process	3.06	.830	2
CORBON license & seal is of little use	3.04	.942	3
High cost of membership	3.01	.820	4
Lack of benefits from registration	2.94	.604	5
Intrusion of allied professions on builder's roles	2.94	.713	6
Backlog of money to be paid to NIOB	2.93	.721	7
Non-implementation of National Building Code	2.85	.794	8
Payment of annual dues and annual license renewal	2.81	.901	9
Lack of consequence for non – registration	2.75	.637	10
Negative perceptions of building as a profession	2.75	.651	11
To be free from professional ethics & penalties	2.46	.713	12
Ethical misconduct by NIOB	2.37	.739	13
Lack of future prospect for the profession	2.28	1.103	14
Corruption in the NIOB	2.06	.991	15
No intention to practice as a professional builder	1.83	.613	16

Source: Field Survey (2019)

From the results in Table 5, eleven reasons (mean score approximately 3.0 or more) could be considered to play “significant” role in the low level of professional registration by building graduates. The topmost reason is ‘lack of financial strength’ which implies the respondents’ financial incapability to afford the necessary registration fees. This could be as a result of the respondents earning low income or having many financial burdens. A closely related reason is ‘high cost of membership’. Perhaps, the respondents consider the professional registration fees to be high in relation to their income.

‘Lack of awareness about registration process’ rank second on the list of reasons for low level of professional registration. This is possible but surprising for graduates not to be aware of the professional registration processes. This could result from inadequate sensitisation or low level of activities related to the professional bodies during the period of study. It is also possible for graduates not to be aware of the registration processes if the curriculum of the course ‘professional practice’ is deficient or if the students do not pay proper attention to what is being taught in it.

Furthermore, the respondents perceive that ‘CORBON license and seal is of little use’. The respondents might have felt that obtaining practice licence and seal from CORBON, which are the instruments of recognition of registered builders, does not offer any advantage. This is closely related to another reason ‘lack of benefit from professional registration’. Thus, there exists a feeling of little or no benefits obtainable from professional registration among the respondents. Hence, many building graduates may decide not to be registered. The results also indicate that the respondents are concerned about ‘intrusion of allied professionals on builder’s roles’. Under normal circumstances, each group of professionals should not encroach into the roles of others. This however is not the case and is very prevalent in the Nigerian building construction sub-sector. Along the same line, the respondents consider ‘non-implementation of National Building Code’ to be detrimental to registered builders opportunities. The prevailing situation seems to result from lack of implementation, compliance and enforcement of standard practice or existing laws. This has contributed to the continued used of quacks. This demotivates building graduates from professional registration.

Factors Responsible for Low level of Professional Registration

It has described in the preceding sub-section, only eleven out of sixteen reasons were considered to significantly contribute to the low level of professional registration by building graduates. A close examination of the reasons reveals that some are related to one another. Thus, it is possible to consolidate the reasons into number of factors responsible for low level of professional registration. After careful consideration, a set of four factors as presented in Table 6 are proposed. The reasons consolidated are indicated alongside each of the factors.

Table 6: Factors Responsible for the low Level of Professional Registration

Factor	Reasons	Group Mean
Financial	Lack of financial strength High Cost of Membership Backlog of Money to be paid to NIOB Payment of annual dues and Annual License renewal	3.05
Registration Benefit	CORBON License & Seal is of Little Use Lack of Benefits from registration Lack of consequence for non – registration	2.91
Awareness	Lack of Awareness about Registration Process Negative perceptions of building as a profession	2.91
Regulations implementation	Intrusion of Allied Professions on Builder's Roles Non-implementation of National Building Code	2.90

Source: Field Survey (2019)

Conclusion and Recommendation

The study assessed the factors responsible for low number of registered builders relative to the number of building graduates. The study concludes that there is the willingness on the part of building graduates towards professional registration despite several professional registration hurdles faced. This is evidenced by the fact that majority of the respondents indicated their intention to get registered with CORBON within a time frame of 1 to 3 years. Significant number of the respondents has already obtained graduate membership of NIOB. The factors hindering professional registration by building graduates have been categorised into four: financial, registration benefit, awareness and regulations implementation. However, the extent to which each of the identified factors contributes to the low level of professional registration has not been evaluated in this study. It is worth noting that all the professional registration challenges are not insurmountable if necessary measures are taken by the appropriate stakeholders. Enhancing the level of professional registration among building graduates needs to be approached from different dimensions. One of such measures is reviewing the registration fees payable to NIOB and CORBON with a view to making it financially more affordable. The mechanisms for creating awareness about registration processes and benefits among building students and graduates should be enhanced. In the same vein, NIOB and CORBON need to continue its current efforts of promoting and protecting the practice mandate of professional builders.

References

- Bamisile, A. (2004) Building Production Management. Lagos, Nigeria: Foresight Publishers.
- Biodun, O. (2016). "Interactions of the Built Environment Professionals in Real Estate Service Delivery- An Estate Surveyor and Valuer View Point" by Biodun Olapade & Co. (Estate Surveyors &Valuers).
- Cochran, W. G. (1977). *Sampling techniques*. New York: John Wiley.
- CORBON (2017). List of Registered Builders Entitled to Practice in the Federal Republic of Nigeria.
- Ebekozien, A. (2014). Professional practice for Quantity Surveyors. Auchi, Edo State, Nigeria: A and B Computer Ventures.
- Fedoryshyn, A. and Hintz, I. (2000). Where are all the accounting students? *New Accountant*, 16(1):27-32.
- Fellows, R. (2003). Professionalism in construction: Culture and Ethics. CIB TG 23 International Conference, Hong Kong, 1 – 11.
- Gardner, H., and Shulman, L. S. (2005). The professions in America today: Crucial but fragile. *Daedalus*, 134(3):13-18.
- Hemuka, N. (2010). Professional Practice (Theory, Principles and Practice). Benin City: Real Estate Publication.
- Meintjes, C. & Niemann-Struweg, I. (2009). The Role of a Professional Body in Professionalization: The South African Public Relations case. *Prism*, 6 (2). Assessed online on April 30, 2019 from http://praxis.massey.ac.nz/prism_online_journ.html.
- Micah, E. O. (2009). Unique Roles of Professional Builders in the Society. The Nigerian Institute of Building Holding at Port-Harcourt Wed. 18th November.

NIOB(2017).Builder's Conference/Annual General Meeting.
<http://niobnat.org.ng/portal/frontend/MembershipGrades.aspx>.

Ogunbiyi, M. A. (2015).Elements of Professional Practice and Procedures for Builders. Lagos, Nigeria: Tony Terry Prints.

Olatunji, S. O., Oke, A. E. &Owoeye, L. C. (2014). Factors Affecting Performance of Construction Professionals in Nigeria. International Journal of Engineering and Advanced Technology (IJEAT).

Usman, O. J., Ishaq, Z. H. and Muhammad, S. (2018). Exploring Factors Responsible for Low Level of Professional Registration by Building Graduates in Nigeria. *Construction Focus*

Vee, C. and Skitmore R. M. (2003). Professional Ethics in the Construction Industry. Journal of Engineering Construction and Architectural Management 10: 117-127.

Warren, C.M.J. and Wilkinson, S.J. (2008). 'The relevance of professional institutions to students and early career practitioners in the property and construction industries within Australia', paper presented to CIB International Conference on Building Education

ASSESSMENT OF BUILDERS' RISK INSURANCE IMPLEMENTATION IN THE NIGERIAN CONSTRUCTION INDUSTRY

Fawziyya M. Oyeleke, Shehu Muhammad and Dikko Kado

Department of Building, Ahmadu Bello University, Zaria

Corresponding email: fawzifanim@gmail.com; +234 8067959960

shehudal@yahoo.com; +234 704411464; dikkobb@yahoo.com; +234 8068109087

Abstract

The construction phase of building projects is associated with some risks. The Builders' Risk Insurance (BRI) policy provides coverage for risks that occur during construction of buildings. The Regulation on BRI is relatively new in Nigeria and the level of its implementation in the construction industry has not been ascertained. The aim of this study is to assess the implementation of BRI in the Nigerian construction industry. Mixed method research design which consists of questionnaire survey and interview was adopted. A total of 118 and 26 questionnaires were administered to construction insurance companies respectively. Interviews were conducted with relevant personnel of National Insurance Commission and Federal Capital Development Authority. The questionnaire data was analysed using percentage, mean and Kendall's Coefficient of Concordance. The interview data was analysed using content analysis. The study found that the level of awareness on BRI is moderate (51.05%). The level of enforcement of BRI by NAICOM was found to be low. The level of compliance by both construction and insurance companies is moderate (0.56 agreement level). 'Inconsistent Government policy' with Mean Score (MS = 4.27), 'ineffective implementation and enforcement strategy' (MS = 4.18), 'unstable economic condition' (MS = 4.12) and 'poor attitude towards insurance services' (MS = 3.81) were the top ranked barriers to implementation of BRI. The study concludes that the level of awareness, enforcement and compliance are inadequate. Overall, the implementation of BRI in the Nigerian construction industry is unsatisfactory, thus serious action is needed in order to improve on the current situation.

Keywords: Builders' Risk Insurance, Compliance, Construction Risks, Enforcement, Implementation.

Introduction

The construction industry is prone to different types of risk as a result of the complex nature of construction work. Most of the risks with highly detrimental consequence occur during the construction phase and can negatively influence the outcome of building projects. Effective management of risks is an essential ingredient for the success of projects as well as the industry as a whole. Insurance is one of the effective risk management strategies that can be adopted to mitigate the consequences of unwarranted events that occur during construction (Ogunbayo 2014; Renuka *et al* 2014). Insurance can provide some form of security and stability to a policy holder as well as the construction industry at large (Nwite 2014). Although different types of insurance are available to the construction industry, the Builders' Risk Insurance (BRI) which is also referred to as Construction All Risk (CAR) is a specialized type of insurance that covers losses that results to buildings while under construction or renovation (Adeleke, Tai, Esan and Buari 2013). BRI provides coverage to losses due to fire, lightning, explosions, riot, vandalism and malicious act, vehicle and aircraft impact, burglary and theft, windstorm and hail, collapse, workers' liability, third party liability and body injury (Glen and Clark 2005). Cases of building collapse, accidents, theft and vandalism have been recurring and have been a major concern in the Nigerian construction industry. Their occurrence involves loss of lives and property (Oseghale, Ikpo and Ajayi 2015). It was established that in the last 10 years, the casualties of building collapse have been very high, with the casualty figure of 3,210 persons (SON) 2019. Other construction work related risks such as theft, accidents are also common occurrence. In most instances, the buildings under construction were not insured according to the Insurance Act 2003. Legislation governing the BRI in Nigeria, which are aimed at addressing the negative consequence of construction risks, are recent. The desired benefit of BRI to the stakeholders is dependent upon awareness and successfully implemented of its provisions. There is inadequate information about implementation of BRI policy in the Nigerian construction industry. No studies have so far assessed the implementation of BRI policy in the country. Hence, this study assessed the implementation of BRI policy in the Nigerian construction industry with regards to awareness, compliance, enforcement and challenges of the policy. This paper proposes an implementation framework to enhance implementation of the policy.

Literature Review

Relevance of Insurance to the Nigerian Construction Industry /Legislation on Builders Risk Insurance in Nigeria

Construction industry in Nigeria accounts for 3.05% of the country's Gross Domestic Profit (GDP) and it is the 8th largest contributing sector of the economy (Adeagbo 2014). The insurance sector plays an important

role for a sustained economic growth and the development of a nation by transferring risks from business and individuals. As a result of the insurance sector being plagued with numerous challenges, its contribution to the Nation's Gross Domestic Profit (GDP) is as low as 1% in the last decade (Pan African Capital 2013). Government legislation supports the prospect of growth for the industry as the compulsory insurance for public building as well as those under construction, health and worker's liability is being propagated. The Nigerian Insurance Act 2003 applies to all insurance businesses. Part XI section 64 (1) of the Act made provision for Builders' Risk Insurance policy by stating that any building constructed of 2 floors and above should be insured with the appropriate insurer to protect lives and properties. In section 64 (2), it states that the law shall cover for building under construction and builders' risk insurance is an insurance coverage for buildings under construction to provide adequate indemnity against damages done to the building while under construction. While section 65, emphasised on the insurance of public building against hazards of collapse, fire, earthquake, storm and flood. The section defined public buildings as tenement house, hostels and buildings for educational or medical services, recreation purposes or transaction of business.

Awareness to the Implementation of BRI policy

Insurance is important in modern day economies as it is vital to individuals' and public security. The need for awareness to insurance cannot be overemphasized as it helps secured individuals, families and organizations to make informed financial decisions, improving community development by contributing to the communities. Awareness on insurance also stem from both social and economic evolutions as the need to cover severe risk by individuals is increasing and insurance market is becoming more complex, therefore, increasing awareness can have positive impact on both market and global economy and society at large (OECD 2017). Awareness to BRI and other insurance policy is still at infancy stage in Nigeria with little or no interest in insurance as a result of lack of knowledge of the benefits of the insurance Popoola (2018). A study by Adeleke *et al* (2013) highlighted the adequacy of BRI in the Nigerian construction industry and the study also pointed out that professionals in the building industry are very much aware of BRI policy but more effort is needed by the relevant stakeholders to ensure and create proper awareness to the policy so as to improve the level of enforcement and compliance of the BRI policy thereby creating an enabling and sustainable working environment for the stakeholders involved in construction.

Enforcement of Insurance Policy in Nigeria

Enforcement of policy is important in ensuring effective regulation in which the strategies are challenging for government to develop and apply without compromising cost and reducing the effect of risks when they occur (Ayantoye 2015). Nigerian insurance industry has grown over the past decade which is a positive sign of development in the industry, although, it is still faced with challenges of low implementation and enforcement of compulsory insurance PWC (2015). However, Lead way assurance (2017) states that NAICOM in collaboration with Federal Fire Service and Nigeria Insurers Association (NIA) plans to enforce the compulsory public building insurance which protects an owner and contractor against collapse, fire, earthquake, storm and flood. The policy also covers legal liabilities of occupier's liability insurance which is a cover for loss of properties, bodily injury or death suffered by users and third parties.

Barriers Militating Against Implementation of BRI Policy in Nigeria

The barriers that have been described apply to insurance generally. Since the interest of this study is on Builders' Risk Insurance, it is important to identify the ones that are peculiar to the implementation of BRI. This has so far not been articulated in literature. A number of factors have been identified by various authors as hindering the implementation of insurance generally. These factors have been described in various literatures as summarized in Table 1.

Table 1: Summary of Barriers Militating against Implementation of Insurance

S/N	Factors	Authors				
		Odeniyi (2006)	Bologi (2008)	Osinuga (2016)	Elendu (2013)	Ayantoye (2015)
1.	Excessive protocol and bureaucracy				✓	
2.	Low level of confidence on insurance companies				✓	
3.	High premium rate			✓		
4.	Low level of understanding of the policy					✓
5.	Inadequate access to information			✓		

	technology					
6.	Lack of skilled personnel			✓		
7.	Improper documentation	✓				
8.	Ineffective implementation and enforcement strategy		✓	✓		✓
9.	Low indemnity rate after loss or damage				✓	
10.	Ineffective contractual arrangement					✓
11.	Delay in claim settlement by insurance companies	✓				
12.	Unstable economic condition					✓
13.	Inconsistent Government policy				✓	
14.	Religious beliefs					✓

Source: Author's compilation (2018)

Methodology

The study adopted concurrent mixed research approach which consists of questionnaire survey and interview. The questionnaire survey was targeted at respondents from construction and insurance companies. The survey sought to establish facts on the level of awareness, compliance and perception on barriers militating against implementation of BRI. The purpose of the interview was to determine the level of enforcement of BRI policy. This was done through interaction with relevant personnel of the National Insurance Commission (NAICOM) and Federal Capital Development Authority (FCDA) in Abuja. NAICOM is the insurance regulator while FCDA are responsible for granting all permits for construction as well as control of developments. Using Glenn (1992) formula, a sample size of 91 was determined from a population of 965 tax paying construction companies at a confidence level of 90% and 10% precision level. A total of 118 questionnaires were administered (30% added for non-response) to construction companies. Random sampling was initially planned in selecting the respondents. However, it could not be implemented due two challenges faced; non-availability at the indicated addresses and unwillingness of some selected companies to participate in the study. After several attempts, the study resorted to using construction companies that were willing to participate in the survey. Out of the 102 filled and returned questionnaires, only 97 were fit for analysis. A census was adopted for insurance companies because the population is very small (26). Of the 22 questionnaires returned, only 16 were fit for analysis. Interview was conducted with one staff each from the Department of General Insurance of NAICOM and Department of Public Building of FCDA. The interview was structured in such a way that pre-set questions were prepared and asked. The conversations during the interview sessions were recorded and later transcribed for the purpose of analysis.

The quantitative data collected from both construction and insurance companies was analysed using descriptive statistics on SPSS package. Percentage as used to determine the level of awareness. Kendall's W was used to test the level of agreement on compliance. Mean scores were determined and used to rank the barriers militating against implementation of BRI. The qualitative data (interview data) was analysed using content analysis in order to determine the level of enforcement of BRI. Since only one individual was interviewed in each organisation, highlights of the interview were extracted because a detailed content analysis cannot be carried out on a single data information.

Results and Discussion

A total of 102 filled questionnaires, representing 86.4% response rate, were received from construction companies, but only 97 were used for analysis because 5 were not properly filled. According to Fincham (2008) a desirable and accepted survey response rate conducted in person or face to face should be at least 60%. The response rate obtained is within the acceptable range. Also, the minimum sample size calculated for construction companies (90) has been satisfied, thus adequate for analysis. 22 questionnaires were returned by insurance companies, representing 84.6% response rate. Only 16 were used for analysis as 6 of the companies indicated that they do not engage in BRI policy but other specific types of insurance business only. Results obtained from analysis of the data are presented below.

Awareness of BRI Policy

Part of what this study sort to ascertain was the level of awareness among construction firms, who are the key stakeholders that are mandated to subscribe to BRI policy. Four relevant questions were posed to be able to assess their knowledge on the subject. Table 2 below shows the results on level of awareness of BRI. From Table 4.1, it has been established that the level of awareness on BRI is 51.05%. This implies a

moderate level of awareness. A previous study by Adeleke *et al* (2013) found that professionals in the construction industry have 50% level of awareness on BRI policy. In this regard, it can be stated that there is very small change in the level of awareness from the time of the previous to the current study. This implies that more effort is needed in order to improve awareness on BRI among the relevant stakeholders.

Table 2: Construction Firms' Level of Awareness on BRI

S/N		Aware	Not Aware
1.	Nature of construction covered by BRI	58.8%	41.2%
2.	Type of buildings covered by BRI	48.5%	51.5%
3.	Nature of risks covered by BRI	66.0%	34.0%
4.	The ACT that covers BRI	30.9%	69.1%
	Average	51.05%	48.95%

Source: Field Survey (2018)

Enforcement of BRI

Facts revealed from analysis of interview data indicate low level of BRI enforcement by NAICOM. One of the enforcement challenges is related to inadequate manpower that can monitor and enforce BRI regulations across large number of building construction projects. An existing collaboration between NAICOM and Council for Registration of Engineers (COREN) has not yielded much result. NAICOM plans to collaborate with state government so as to improve implementation. It was established that insurance certificate for BRI policy subscription is not part of documents required for approval of building construction projects by FCDA. This makes it difficult for FCDA to enforce BRI during any stage of project, as the legal jurisdiction does not exist. This legal gap may apply not only to planning and development regulations of the Federal Capital Territory, Abuja but to other states as well. Thus, there is the need for review of the existing legal framework for more effective enforcement of BRI.

Compliance with BRI Policy

Compliance with provisions of BRI regulations was assessed based on the perspective of both construction and insurance companies. Table 3 shows the result on BRI subscription frequency. The contractors indicated that BRI is taken frequently (most often and always) at about 44.4%, while the insurance companies feel that it is only taken frequently at about 25%. The results were further used to determine agreement level of both respondents using Kendall's coefficient of concordance or Kendall's W, which is presented in Figure 1.

Table 3: Level of Agreement on Frequency of BRI Subscription

Scale	Construction Company Rank	Percentage (%)	Insurance Company Rank	Percentage (%)
Never	3	19.6	5	0.0
Rarely	5	13.4	2	25.0
Sometimes	2	21.6	1	50.0
Most often	1	28.9	3	18.8
Always	4	15.5	4	6.2

Source, Field Survey (2018)

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distributions of How often does the firm take up BRI and How often do construction companies take up this cover are the same.	Related-Samples Kendall's Coefficient of Concordance	.564	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 1: Results of Kendall's W Test

Figure 1 show the result of Kendall's W obtained from SPSS. A value of 0.56 was obtained and base on kappa interpretation, values within the range of 0.41 – 0.60 signify moderate agreement. Thus, level of agreement on frequency of taking BRI policy is moderate. This result implies that construction and insurance companies have not agreed much on the level of compliance with the BRI policy. This corresponds to the result from tables 3 on construction companies frequently of taking up BRI policy.

Barriers to implementation of BRI

The results in the Table 4 show the means and ranks for each of the barriers as rated separately by the construction and insurance companies, as well as the combined rating of all respondents. A 5-point Likert scale, with a rating of '1' representing strongly disagree on one extreme and '5' representing strongly agree on the other extreme, was used to obtain the ratings.

Table 4: Barriers to the implementation of BRI

S/N	Barriers	Construction Companies		Insurance Companies		Combined	
		Mean	Rank	Mean	Rank	Mean	Rank
1.	Inconsistent Government policy	4.09	2	4.44	2	4.27	1
2.	Ineffective implementation and enforcement strategy	3.85	3	4.50	1	4.18	2
3.	Unstable economic condition	4.11	1	4.13	3	4.12	3
4.	Poor attitude towards insurance services	3.61	5	4.00	4	3.81	4
5.	Low level of understanding	3.23	9	3.63	5	3.43	5
6.	Low level of confidence on insurance companies	3.48	8	3.19	7	3.34	6
7.	High premium rate	3.63	4	2.75	10	3.19	7
8.	Excessive protocol and bureaucracy	3.06	10	3.31	6	3.19	8
9.	Ineffective contractual arrangement	3.04	11	3.00	8	3.02	9
10.	Low indemnity rate after loss or damage	3.56	6	2.19	13	2.88	10
11.	Delay in claim settlement by insurance companies	3.55	7	2.06	14	2.80	11
12.	Inadequate access to information technology	2.31	13	2.94	9	2.63	12
13.	Lack of skilled personnel	2.51	12	2.31	12	2.41	13
14.	Religious beliefs	2.15	14	2.50	11	2.33	14

Source: Field Survey 2018

The respondents are considered to agree with a barrier as an impediment to BRI implementation if it has a mean score of at least 3.50. It can be observed from table 4 that construction companies agreed with seven barriers, while the insurance companies agreed with only five barriers. There is high similarity in the ranks of the barriers rated by both construction and insurance companies. All the top five barriers rated by the insurance companies are among the top five barriers rated by the combined respondents. Similarly, four of the top five barriers rated by the construction companies are among the top five barriers rated by the combined respondents. 'High premium' is the only barrier among the top five rated by construction companies that is not among the overall top 5. This is not surprising because of cost implication it poses on the insurer while the insurance companies do not believe high premium is a barrier because they have to pay compensation where there is loss or damage and they would lose money in the process. Similarly, 'low indemnity rate after loss or damage' is considered to be a barrier by the construction companies but not by the insurance companies. This is because once a claim is made, the insurance company would try to minimise the amount to be paid. It tries to establish whether the loss is genuine or the loss was avoidable. Conversely, the construction companies would like to be compensated as high as possible. Often, the final settlement may not be as they desire. A similar situation can also be observed in relation to the barriers that are ranked low by both the construction and insurance companies. Out of the bottom five overall ranked barriers, three and four were ranked among the bottom five by construction and insurance companies respectively. The only few exceptions are 'low indemnity rate after loss or damage' and 'delay in claim settlement by insurance companies'. These are considered as barriers by the construction companies. It is obvious that construction companies would like to be compensated within the shortest possible time. On the part of insurance companies, all the necessary investigative processes need to be followed before genuine claims are settled. The difference in perception should therefore be understood in this context.

Level of Agreement on Barriers to Implementation of BRI

Results from Table 4 were used to further test the level of agreement between construction and insurance companies on the barriers to implementation of BRI. The results are shown in Table 5.

Table 5: Level of agreement on Barriers to the implementation of BRI

S/N	Barriers	Rank		
		Construction Companies	Insurance Companies	s
1.	Inconsistent Government policy	2	2	121
2.	Ineffective implementation and enforcement strategy	3	1	121
3.	Unstable economic condition	1	3	121
4.	Poor attitude towards insurance services	5	4	36
5.	Low level of understanding	9	5	1
6.	Low level of confidence on insurance companies	8	7	0
7.	High premium rate	4	10	1
8.	Excessive protocol and bureaucracy	10	6	1
9.	Ineffective contractual arrangement	11	8	16
10.	Low indemnity rate after loss or damage	6	13	16
11.	Delay in claim settlement by insurance companies	7	14	36
12.	Inadequate access to information technology	13	9	49
13.	Lack of skilled personnel	12	12	81
14.	Religious beliefs	14	11	100
Total				700

Source: Field Survey (2018)

From SPSS, Kendall's $W = 0.77$. Based on kappa interpretation, values within the range 0.61 – 0.80 signify good agreement. This further buttress the results in Table 4 which indicates high degree of similarity in barriers that are highly and lowly ranked by both respondents.

Proposed framework for Enhancing Implementation of BRI

The aim of the study is to assess BRI implementation policy in Nigeria construction industry with objectives to assess awareness, compliance, and enforcement of the policy as well as barriers militating against implementation. Based on the findings of the study, it can be stated that there is inadequate awareness on BRI from construction companies. The level of compliance from both construction and insurance companies is moderate. There is low level of enforcement by NAICOM as a result of manpower inadequacies. The key barriers militating against implementation were also identified. All these point to poor implementation of BRI policy. A framework for enhancing implementation has been proposed. The framework consists of four components representing the key areas of inadequacies of BRI implementation as identified from the findings of the study. Each component has a set of strategies, which indicates actions that should be taken to overcome the shortcomings and improve implementation of BRI policy. Detail of the framework is presented in Figure 2.

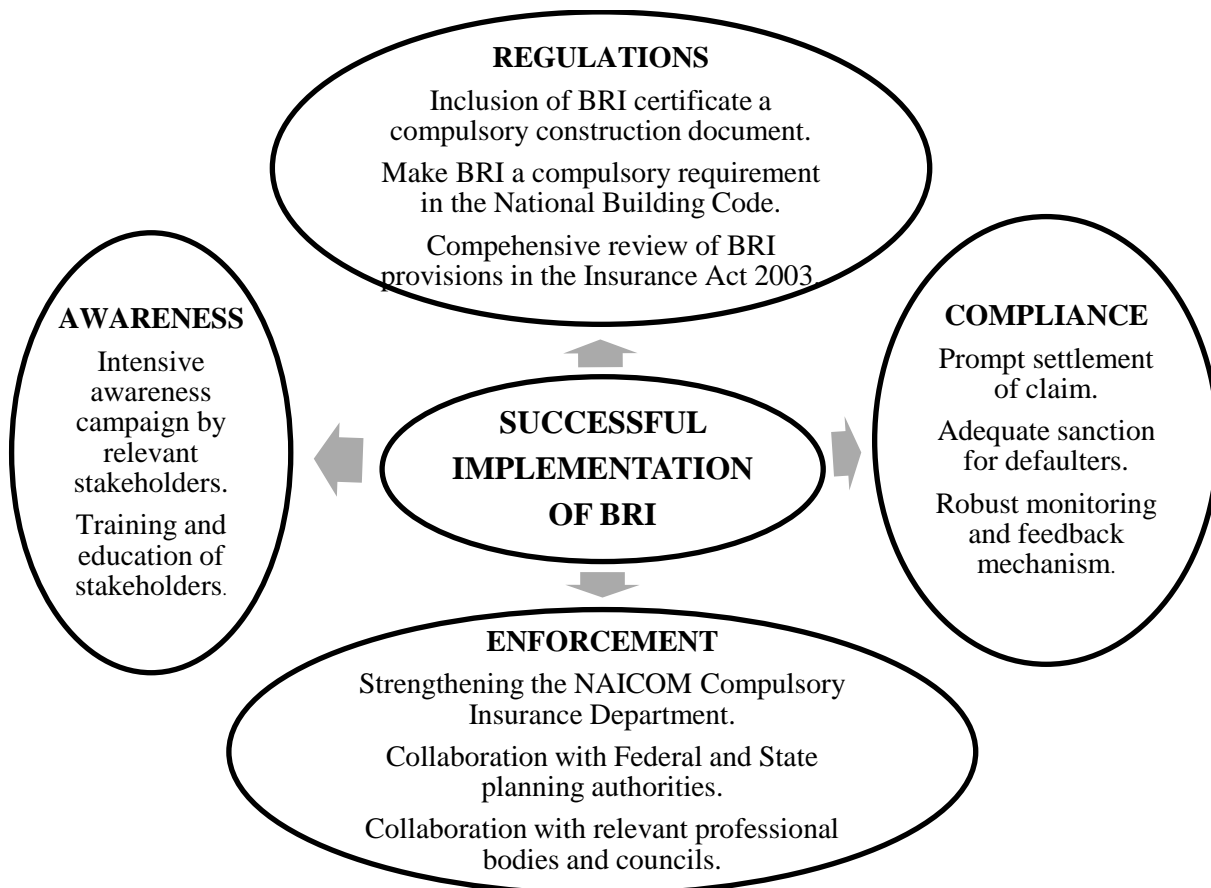


Fig 2: Proposed Framework for Enhancing Implementation of BRI

Conclusion

The shortcomings hindering effective implementation of builders' risk insurance can be attributed to all the respective stakeholders, that is, government, construction and insurance companies. Overall, the implementation of BRI in the Nigerian construction industry is unsatisfactory, thus serious action is needed in order to improve on the current situation. The strategies suggested in the proposed framework, if adopted, would enhance the implementation of BRI in the Nigerian construction industry.

References

- Adeagbo, A (2014) Overview of the building and construction sector in the Nigerian economy. *Journal of International development. JORIND*.12 (2):349-366.
- Adeleke, JS, Tai, AA, Esan, MT & Buari, TA (2013) Adequacy of Builders Risk Insurance policy in Nigerian Building Industry. *PM World Journal*2 (11):1-12.
- Ayantoye, MA (2015) Stakeholder's compliance level on insurance of building under construction in Abuja. Unpublished B. Sc project submitted to the Department of Building. Federal University of Technology, Minna.
- Bologi, C (2008) The reform of insurance companies and its transformation of Nigeria's financial sector. Available from: www.thelawyerschronicle.com (Accessed 3 October, 2016).
- Elendu, NC (2013) The contribution of insurance industry to gross domestic product (GDP) in Nigeria (1985-2010). Published thesis submitted to the Department of Economics, Faculty of management and social sciences. University of Caritas Amori-mk. Emere. Enugu State, Nigeria.
- Fincham, JE (2008) Response Rates and Responsiveness for Survey Standard and the Journal. *American Journal of Pharmaceutical Education*. 72 (2):43.

- Glen, BR & Clark, W (2005) Builders Risk Insurance. Available from: www.cwilson.com (Accessed 8 December, 2015).
- Glenn, DI (1992) Determining sample size. *Program evaluation and organizational Development*, IFAS Extension University of Florida.
- Hansen, JK (1990) Insurance requirements and cost in the construction industry. Published M.Sc. research submitted to Department of Civil Engineering. University of Washington.
- Insurance Requirement in Contracts IRIC, (2016), Integrated Insurance and Financial services. A procedure manual. Available from: www.alliant.com (Accessed 6 September, 2017).
- Leadway Assurance, (2017) Naicom Begins Enforcement of Compulsory Public Insurance: Is your Building Compliant? Available from: www.leadway.com (Accessed 25 April, 2019).
- Nigerian Insurance Act, (2003) Insurance of property. Section 64—72 Federal Government Publishers, Lagos State, Nigeria. 32 – 37.
- Nwite, SC (2014) The role of Nigerian Insurance industry in Environmental risk management in the Nigerian quarry industry. *Global Advanced Research journal of management and business studies*. 3 (1):001 – 006.
- OECD, (2017) Awareness and Education on Risk and Insurance. Revised analytical and comparative report. Available from: www.oecd.org (Accessed 25 April, 2019).
- Odeniyi, VA (2006) An appraisal of insurance claims settlement to construction firms in Kaduna State, Nigeria. Unpublished M.Sc. Thesis submitted to Department of Building, Ahmadu Bello University, Zaria
- Ogunbayo, OM (2014) Assessment of risk analysis processes in the Nigerian construction industry: contractors and project managers' views. *International journal of advancements in research and technology*. 3 (11):36 – 42.
- Oseghale, GE, Ikpo, IJ & Ajayi, OD (2015) Causes and effect of building collapse in Lagos State. Nigeria. *Civil and Environmental Research* 7 (4):34 – 43.
- Osinuga, D (2016) The challenges of the Nigerian Insurance industry. Available from: www.linkedin.com (Accessed 12 September, 2017).
- Pan African Capital, (2013) Insurance industry: a review. Available from: www.panafricancapital.com (Accessed 1 April, 2017).
- Popoola, N (2018) Failed policies, declining confidence slow insurance industry's growth. Available from: www.punchng.com (Accessed 25 April, 2019).
- PWC, (2015) Nigeria Insurance survey. African insurance trends. Available from: www.pwc.com (Accessed 25 April, 2019).
- Renuka, SM, Umarani, C& Kamal, S (2014) A Review on critical risk factors in the life cycle of construction project. *Journal of Civil Engineering Research*. 49 (2A):31-36.

AN ASSESSMENT OF THE IMPACT OF PROJECT RISK FACTORS ON PROJECT COMPLETION TIME IN NIGERIA

Z. H. Ishaq, S. Muhammad, M. Abubakar and Y. S. Lawal

Department of Building, Ahmadu Bello University Zaria, Nigeria

ziyadishaq2@gmail.com; 08037872101

Abstract

Completion time is an important criterion for determining construction project success. Many construction projects are completed behind schedule as a result of various risks involved in construction projects. Performance of project completion time can be improved if the risk factors that could cause delay are evaluated and managed. This study assessed the impact of project risk factors on completion time of construction projects. Data was collected using structured questionnaires administered to 192 construction practitioners. 138 questionnaires were duly completed and returned but only 114 (59.38%) were found fit for analysis. Descriptive statistics was used to analyse the data. The study identified 'financial difficulties of owner' (MS = 4.35), 'inadequate time estimate' (4.33), 'delay in progress payment by owner/client' (4.23), 'poor labour productivity' (4.22), 'shortage of skilled labour' (4.18) and 'frequent design changes' (4.05) to be the topmost risk factors that impact on project completion time. The study concludes that 'financial', 'design' and 'contract administration and project management' related factors group are those with high impact on project completion time.

Keywords: *Completion time, Construction projects, Impact, Risk factors*

Introduction

Construction industry has a poor reputation in risk analysis when compared with others such as finance or insurance (Laryea, 2008). The Construction industry and its stakeholders are afflicted with a high degree of risk because of the nature of construction environment, organizations, business activities and processes (Ibironke, Famakin & Akingunola, 2011). In the industry, risk is a combination of activities that affect the project objectives (POs) of time, cost, and quality and scope (Ehsan, Alam, Mirza, & Ishaque, 2010). Chieng, Wu and Huang (2014) argued that, the size and complexity of construction projects (CPs) are increasing, thereby increasing risk. ISO 31000 (ISO, 2009) defines risk as any event that has the potential of hindering the achievement of objectives. In construction projects context, risk management (RM) is a systematic way of identifying, analysing, and dealing with risks associated with a project so that the project objectives are achieved. According to Ehsan *et al.* (2010), RM is an important part of project management and has become an increasingly challenging activity because of the complexity of the processes involved (Azevedo, Ensslin, & Jungles, 2014). Although RM can be sophisticated and complicated, the starting point should be an assessment of the problem and possible solutions (Nnadi & Ugwu, 2013). RM in Nigerian construction projects has been carried out in a very limited and ineffective way (Adeleke, Bahaudin & Kamaruddeen, 2015). Each project has many associated risks that affects its success. These risks differ between projects, depending upon technology, finance, construction site, size of project and so on (Adeleke, *et al.*, 2015). Dada and Jagboro (2007) posited that one of the major reasons that lead to poor or ineffective project delivery in Nigerian construction industry is improper assessment of risk factors. This results to persistent poor performance, with so many projects failing to meet completion time target. Since risk factors may have a varying impact on different project objectives, it becomes necessary to assess the impact of project risk factors (PRFs) on project completion time. The purpose of this study is to assess the impact of PRFs on project completion time in order to assist in minimising time overruns in construction projects.

Construction Project

Construction project deals with the process of creating physical infrastructure such as buildings, highways, airports and utilities. Construction projects consist of various stages or phases as described by different authors with all leading to the similar project life cycles. Liu and Zhu (2007) divide construction stages into conceptual, design, tender, preconstruction, and construction. Zou, Zhang and Wang, (2006) also divided the stages of a construction project into feasibility, design, construction, and operation. PMI (2004) defined phases of construction project as Concept, Planning, Detailed Design, Construction, and post Construction. The number of phases may also increase depending on the managers' viewpoint. Each phase may be subdivided in order to focus on the details of each phase separately and more cautiously

Risk in Construction Projects

According to PMI (2004) project risk is an uncertain event or set of circumstances that its occurrence will have an effect on achievement of one or more project objectives. Risk in relation to construction is an event in the process of a construction project in which its occurrence will lead to uncertainty in the final cost,

duration or quality of the project (Akintoye & Macleod, 1997). Such events are numerous with regard to construction projects.

Classification of Construction risk

Various institutes and authors have classified construction risks into different types and hierarchies. Smith and Bohn (1999) have classified construction risk as either internal or external. Risk has also been broadly categorized as either subjective or objective. Risks can be further subcategorized into smaller groups according to their type and impact. Wiguna and Scott (2006) classified risks into four categories: economic and financial risks, external and site condition risks, technical and contractual risks, and managerial risks. PMI (2004) also categorise risk into another four categories: Technical risks, organizational risks, project risks and external risks (TOPE risks).

Construction Project Risk Management

Uher (2003) defined risk management (RM) as the logical way of identifying areas of risk and consciously determining how each should be treated. It is a management tool that aims at identifying sources of risk and uncertainty, determining their impact, and developing appropriate management responses. Many authors have examined the issue of RM in CPs. PMI(2004) provided four (4) phases of the RM process: Identification, quantification, responses development and control. RM covers the process of identification, assessment, allocation, and management of all project risks (Abrahamsson, 2002).

Risk Factors affecting Construction Projects

In line with the context of this research, generating robust risk factors that affect construction projects is necessary. Previous studies which conducted robust review of construction risk factors were explored. Laryea *et al* (2012) identified a total of 42 major risk factors that affect construction business in West African countries. Enshassi and Mosa (2008) also identified 44 construction project risk factors and categorized them into nine groups. Aliyu (2013) identified 15 risk factors that affect construction projects in Nigeria. Baba (2014) also identified 60 risk factors affect construction projects in Nigeria. Furthermore, Hedaya and Saad (2017) identified 45 risk factors affecting construction projects. The reviewed risk factors were harmonised, yielding a total of 65 risk factors, which are classified under 10 groups. These are: Contract Administration and Project Management related, consists of 7 factors; Design related, consists of 6 factors; Construction and Contractors Site Management related, consists of 20 factors; Financial related, consists of 7 factors; Information and Communication related, consists of 3 factors Legal related, consists of 4 factors; Human Resource (workforce) related, consists of 7 factors; Economic related, consists of 5 factors; Political related, consists of 3 factors; and Environmental related, consists of 3 factors. The harmonised risk factors are used to develop the data collection instrument for the study.

Methodology

Quantitative research approach was adopted. Data was collected using structured questionnaire. The population of the study is infinite, thus, sampling frame cannot be established. Sample size was determined in accordance with Cochran (1977), using 95% confidence level, 10% confidence interval and 50% degree of variability. A minimum sample size of 96 was obtained. Glenn (1992) suggested increasing the sample size to account for non-responses and incomplete responses. However, considering the large number of variables contained in the data collection instrument and the response rate obtained from similar studies containing large number of variables in the survey instrument, this study assumed a valid response rate of at least 50% of the total number of questionnaires distributed. Therefore 100% of the estimated sample size was added. 192 questionnaires were distributed to Architects, Builders, Engineers, Quantity Surveyors and Project Managers using convenience sampling technique. 138 were duly completed and returned while only 114 were found fit for analysis representing 59.38% valid responses. In order to enable assessment, respondents were asked to rate the impact of the risk factors on project completion time, using a 5-point scale. A risk impact assessment guide by PMI (2004) as shown in Table 1 was adopted to guide the respondents. Descriptive statistics was used to analyse the data. Mean scores and standard deviation were computed and used to rank the impact of the risk factors on PCT. Risk factor having mean value ranging from 0 to 1.49 is considered as having very low impact, while risk factor with mean score 1.5 to 2.49 is considered as having low impact, risk factor with mean score 2.5 to 3.49 is considered as having moderate impact, risk factor with mean score 3.5 to 4.49 is considered as having high impact and risk factor with mean

score ≥ 4.5 is considered as having very high impact. The standard deviation was used to rank the factors where there is a tie in the mean scores.

Table 1: Risk impact assessment guide

Risk factor	Project objectives	Negligible 1	Low 2	Moderate 3	High 4	Very high 5
N	TIME	<5% time increase (Insignificant)	5-10% time increase	10-15% time increase	15-20% time increase	>20% time increase

Source: PMI (2004)

Results and Discussion

Assessment of Impact of the Risk Factors on Project Completion Time (PCT) was carried out. Respondents were presented with 65 risk factors affecting construction projects and were asked to rate the impact of the risk factors on project completion time on a 5 point scale as described in the methodology. The risk factors are categorised into 10 groups and the results are presented in Tables 2, 3 and 4.

Table 2: Impact of the Risk Factors on Project Completion Time (Group wise)

S/N	Risk Factors	Mean	SD	Group Rank
A	Contract Administration and Project Management Related			
1	Poor project management	3.98	.872	1
2	Change in the scope of the work	3.81	.797	2
3	Bribery and Corruption	3.54	.854	3
4	High Competition in Bids	3.39	.928	4
5	Delay in decision making	3.37	.953	5
6	Undefined scope of work	3.33	1.062	6
7	Inaccurate quantity take-off	3.24	.539	7
	Group Mean/SD	3.52	.858	
B	Design Related Factors			
1	Frequent design changes	4.05	.891	1
2	Mistakes/ errors in design	3.99	.785	2
3	Poor design	3.78	1.079	3
4	Incomplete design at the time of tender	3.69	.783	4
5	Delay in design	3.25	.782	5
6	Delay in approval of design	3.01	.991	6
	Group Mean/SD	3.63	.885	
C	Construction and Contractor's Site management Related			
1	Inadequate time estimate	4.33	.772	1
2	Inadequate experience by project team	3.90	.852	2
3	Mistakes during construction	3.79	.860	3
4	Schedule delay	3.75	.807	4
5	Deviating from specifications due to misunderstanding of drawings	3.71	.952	5
6	Shortage of materials	3.70	.531	6
7	Late delivery of materials	3.59	.752	7
8	Inadequate cost estimate	3.58	.842	8
9	Late delivery of equipment	3.54	.807	9
10	Inadequate project monitoring	3.46	1.006	10
11	Poor site management	3.46	.720	11
12	Poor site supervision	3.45	.705	12
13	Equipment unavailability	3.44	.729	13
14	Inadequate project control	3.44	.733	14
15	Equipment failure	3.20	.731	15
16	Undocumented change orders	3.18	.878	16
17	Incompetent subcontractors	3.18	.644	17
18	Materials theft	2.84	.983	18
19	Labour accident	2.56	.810	19
20	Materials wastage	2.42	.703	20
	Group Mean/SD	3.43	.791	
D	Financial Related Factors			
1	Financial difficulties of owner	4.35	.741	1
2	Delay in progress payment by owner/client	4.23	.679	2
3	Poor cash flow management	3.96	.813	3
4	Financial failure of contractor	3.94	.998	4
5	Delay in payment to supplier/subcontractor	3.94	.672	5

6	Poor financial control on site	3.66	.739	6
7	Contractual claims	3.25	.885	7
	Group Mean/SD	3.90	.663	
E	Information and Communication Related Factors	Mean	SD	Group Rank
1	Slow information flow between stakeholders	3.39	.747	1
2	Poor communication between stakeholders	3.27	.801	2
3	Lack of coordination between stakeholders	3.22	.606	3
	Group Mean/SD	3.29	.718	
F	Legal Related Factors			
1	Difficulty of obtaining permits from regulatory authorities	3.18	1.264	1
2	Lack of specialised arbitrators to help settle dispute fast	3.07	.884	2
3	Legal disputes during construction phase among contract parties	3.06	.998	3
4	Ambiguity of work legislations	2.50	1.329	4
	Group Mean/SD	2.95	1.119	
G	Human Resource (Workforce) Related Factors			
1	Poor labour productivity	4.22	.890	1
2	Shortage of skilled labour	4.18	.878	2
3	Shortage of unskilled labour	3.67	.816	3
4	Shortage of technical personnel	3.38	.745	4
5	Labour absenteeism	3.03	.867	5
6	Difficulty in training new labour	2.90	1.212	6
7	High cost of labour	2.85	.975	7
	Group Mean/SD	3.46	.912	
H	Economic Related Factors			
1	Increase in exchange rates	3.25	.917	1
2	Increase in interest rates	3.19	1.021	2
3	Increase in prices of materials	3.16	.892	3
4	Increase in cost of labour	3.04	.976	4
5	Increase in fuel/oil Prices	2.72	.955	5
	Group Mean/SD	3.07	.952	
J	Political Related Factors			
1	Political crises/Civil unrest	3.96	1.052	1
2	Unfavourable Governmental policies	3.06	1.011	2
3	Changes in governmental Laws	2.74	1.007	3
	Group Mean/SD	3.26	1.023	
K	Environmental Related Factors			
1	Unfavourable project location	3.54	.879	1
2	Force majeure (earthquake, flood etc.)	3.48	1.322	2
3	Effects of weather	3.33	1.196	3
	Group Mean/SD	3.45	1.132	

Source: Field Survey (2019)

Table 2 present the impact of the risk factors on project completion time. As seen in the Table, a total of 65 risk factors were presented and grouped into 10. For contract administration and project management related factors, poor project management has the highest mean value (3.98) and is therefore considered as the risk factor with the highest impact on project completion time within this group thus ranked 1st. Change in the scope of the work (3.81) and risk incurred due to bribery and corruption (3.54) are the 2nd and 3rd risk factors with highest mean value. On the other hand, inaccurate quantity take-off having a mean value of (3.24) is ranked 7th and therefore considered as the risk factor having the lowest impact on project time. Also as it can be seen that the first three risk factors in terms of their rank have high impact on project completion time having a mean value within the range of (3.50 to 4.49) while the remaining risk factors all have mean value ranging from (2.51 to 3.49) and are considered as having moderate impact on project completion time. Furthermore, this group has an overall mean value of (3.52) which is considered to be high. The second group is the design related risk factors. Under this category, it can be seen that, the risk factor with highest impact is frequent design changes, having a mean score of (4.05) and is therefore ranked first. This is followed by mistakes/ errors in design (3.99) and Poor design (3.78) ranked 2nd and 3rd respectively. On the other hand, the risk factor with the least impact is delay in approval of design, having a mean value of (3.01) and therefore ranked 6th. Risk factors ranked 1st to 4th under this group have a mean value ranging from 3.50 to 4.49 and are therefore considered as having high impact on project completion time, while those ranked

5th and 6th have a mean value ranging from (3.50 to 3.49) hence considered as having moderate impact. This group also has an overall mean value of (3.63), which is also considered to be high

Construction and contractors site management related group consist of 20 factors. Under this group, the three with the highest mean score are inadequate time estimate (4.33), inadequate experience by project team (3.90) and mistakes during construction (3.75). On the other hand, Materials theft (2.84), labour accident (2.56) and materials wastage (2.42) are the risk factors with the lowest mean value thus ranked 18th 19th and 20th respectively. Furthermore, out of the 20 risk factors under this category, nine (ranked 1st to 9th) have a mean score ranging from (3.5 to 4.49) and are therefore considered as having high impact, while factors ranked 10th to 19th have mean score ranging from (2.5 to 3.49) and are therefore considered as having moderate impact. The factor ranked 20th have a mean score < 2.5 hence considered as having low impact.. This group has an overall group mean of (3.43), thus considered as moderate impact on project completion time. Under financial related factors, the three with highest mean score are financial difficulties of owner/client with mean score of (4.35), delay in progress payment by owner/client (4.23) and poor cash flow management (3.96). These are ranked 1st, 2nd and 3rd respectively. It can be seen that all the risk factors under this category with the exception of contractual claims (3.25) have mean score ranging from (3.5 to 4.49) and therefore can be considered as having high impact on project completion time. This group also has an overall group mean of 3.90. Information and communication related group has all the 3 factors having a mean score ranging from 2.50 to 3.49, and are considered as having moderate impact on project completion time. The risk factor with highest mean score under this category is slow information flow between stakeholders (3.39) followed by poor communication between stakeholders (3.27) and lack of coordination between stakeholders (3.22). The group also has an overall mean score of 3.29. Under legal related Group, the risk factor with highest impact is difficulty of obtaining permits from regulatory authorities (3.18). This is followed by lack of specialised arbitrators to help settle dispute fast (3.07), legal disputes during construction phase among contract parties (3.06) and ambiguity of work legislations (2.50). All the risk factors under this category have a mean score ranging from 2.50 to 3.49. The group also has an overall mean score of 2.95, thus considered as having moderate impact on project completion time.

Under the human resource related group, the three risk factors with the highest mean values are poor labour productivity with mean score of (4.22), shortage of skilled labour (4.18) and Shortage of unskilled labour (3.67). On the other hand, the risk factors with lowest mean values are labour absenteeism (3.03), difficulty in training new labour (2.90), and high cost of labour (2.85) and are ranked 5th, 6th and 7th respectively. Furthermore, the risk factors ranked (1st to 3rd) have mean score ranging from 3.5 to 4.49 therefore are considered as having high impact on project completion time while risk factors ranked 4th to 7th have a mean score ranging from 2.50 to 3.49 and are considered as having moderate impact. In the economic related category, the risk factor with highest mean score is increase in exchange rate with a mean score of (3.25), followed by increase in interest rate (3.19). The risk factor with the lowest mean score is increase in fuel/oil prices with a mean score of (2.72). Furthermore all the risk factors under this category have mean score ranging from 2.5 to 3.49 and are considered as having moderate impact on project completion time. Political related group has political crises/civil unrest having mean score of 3.96, thus considered as having high impact on project completion time, while unfavourable governmental policies (3.06) and Changes in governmental Laws (2.74) have a mean value ranging from (2.5 to 3.49) and are considered as having moderate impact on project completion time. The group has an overall mean score of 3.26. The last group of the risk factors is the environmental related. The risk factor with the highest mean score under this category is unfavourable project location (3.54) and therefore ranked 1st followed by force majeure (earthquake, flood etc.) (3.48) ranked second and effects of weather (3.33) ranked 3rd. The risk factor ranked 1st is considered as having high impact on project completion time while the risk factors ranked 2nd and 3rd have mean values ranging from (2.50 to 3.49) thus considered as having moderate impact on project completion time. This group has an overall mean score of 3.45.

Comparing the group mean scores of the risk factors, financial related factors has the highest group mean (3.90) and therefore ranked 1st followed by design related factors having a mean score of (3.63) thus ranked 2nd while the groups with the lowest mean score are human resource (workforce) related factors and information and communication related factors having a mean score of (3.07) and 2.95) respectively thus ranked 9th and 10th. The results are presented in Table 3.

Table 3: Impact of the risk factors (group) on project completion time

Risk factors group	Group Mean	S D	Group Rank
Financial related	3.90	0.663	1
Design related	3.63	0.885	2
Contract administration and project management related	3.52	0.858	3
Human resources (workforce) related	3.46	0.912	4
Environmental related	3.45	1.132	5
Construction and contractors' site management related	3.43	0.791	6
Information and communication related	3.29	0.718	7
Political related	3.26	1.023	8
Economic related	3.07	0.952	9
Legal related	2.95	1.119	10

Source: Field Survey (2019)

As seen in Table 3, three out of ten groups of factors have a mean scores ranging from 3.5 to 4.49 thus considered as having high impact on project completion time. The remaining seven groups have a mean value ranging from 2.5 to 3.49, therefore considered as having moderate impact on project completion time. Financial related factors (3.90) are found to have highest impact on PCT followed by Design related factors (3.63) and Contract administration and project management related factors (3.52). These group of factors all have a mean value ranging from (3.5 to 4.49) which indicates that, the average overall impact of the risk factors under these groups are high. The finding is consistent with the work of Aftab, Ismail and Ade (2012) who also identified, design and documentation issues, financial management and contract administration related issues and contract administration related issues as the major factors affecting project completion time in Malaysia. Therefore more attention should be given to the risk factors under these categories identified as having high impact on PCT. Furthermore, Table 4 presents the overall impact of the risk factors on project completion time in descending order of their mean values.

Table 4: Impact of the risk factors on project completion time

S/N	Risk Factors	Mean	SD	Rank
1	Financial difficulties of owner	4.35	.741	1
2	Inadequate time estimate	4.33	.772	2
3	Delay in progress payment by owner/client	4.23	.679	3
4	Poor labour productivity	4.22	.890	4
5	Shortage of skilled labour	4.18	.878	5
6	Frequent design changes	4.05	.891	6
7	Mistakes/ errors in design	3.99	.785	7
8	Poor project management	3.98	.872	8
9	Poor cash flow management	3.96	.813	9
10	Political crises/Civil unrest	3.96	1.052	10
11	Delay in payment to supplier/subcontractor	3.94	.672	11
12	Financial failure of contractor	3.94	.998	12
13	Inadequate experience by project team	3.90	.852	13
14	Change in the scope of the work	3.81	.797	14
15	Mistakes during construction	3.79	.860	15
16	Poor design	3.78	1.079	16
17	Schedule delay	3.75	.807	17
18	Deviating from specifications due to misunderstanding of drawings	3.71	.952	18
19	Shortage of materials	3.70	.531	19
20	Incomplete design at the time of tender	3.69	.783	20
21	Shortage of unskilled labour	3.67	.816	21
22	Poor financial control on site	3.66	.739	22
23	Late delivery of materials	3.59	.752	23
24	Inadequate cost estimate	3.58	.842	24
25	Late delivery of equipment	3.54	.807	25
26	Bribery and Corruption	3.54	.854	26
27	Unfavourable project location	3.54	.879	27
28	Force majeure (earthquake, flood etc.)	3.48	1.322	28
29	Inadequate project monitoring	3.46	1.006	29
30	Poor site management	3.46	.720	30
31	Poor site supervision	3.45	.705	31
32	Equipment unavailability	3.44	.729	32
33	Inadequate project control	3.44	.733	33
34	Slow information flow between stakeholders	3.39	.747	34

35	High Competition in Bids	3.39	.928	35
36	Shortage of technical personnel	3.38	.745	36
37	Delay in decision making	3.37	.953	37
38	Undefined scope of work	3.33	1.062	38
39	Effects of weather	3.33	1.196	39
40	Poor communication between stakeholders	3.27	.801	40
41	Delay in design	3.25	.782	41
42	Contractual claims	3.25	.885	42
43	Increase in exchange rates	3.25	.917	43
44	Inaccurate quantity take-off	3.24	.539	44
45	Lack of coordination between stakeholders	3.22	.606	45
46	Equipment failure	3.20	.731	46
47	Increase in interest rates	3.19	1.021	47
48	Incompetent subcontractors	3.18	.644	48
49	Undocumented change orders	3.18	.878	49
50	Difficulty of obtaining permits from regulatory authorities	3.18	1.264	50
51	Increase in prices of materials	3.16	.892	51
52	Lack of specialised arbitrators to help settle dispute fast	3.07	.884	52
53	Legal disputes during construction phase among contract parties	3.06	.998	53
54	Unfavourable Governmental policies	3.06	1.011	54
55	Increase in cost of labour	3.04	.976	55
56	Labour absenteeism	3.03	.867	56
57	Delay in approval of design	3.01	.991	57
58	Difficulty in training new labour	2.90	1.212	58
59	High cost of labour	2.85	.975	59
60	Materials theft	2.84	.983	60
61	Changes in governmental Laws	2.74	1.007	61
62	Increase in fuel/oil Prices	2.72	.955	62
63	Labour accident	2.56	.810	63
64	Ambiguity of work legislations	2.50	1.329	64
65	Materials wastage	2.42	.703	65

Source: Field Survey (2019)

Table 4 present the overall impact of the 65 risk factors on project completion time irrespective of their groupings. As seen in the Table, the first five risk factors with the highest mean scores are financial difficulties of owner (4.35), inadequate time estimate (4.33), Delay in progress payment by owner/client (4.23), Poor labour productivity (4.22) and Shortage of skilled labour (4.18). These risk factors are ranked 1st, 2nd, 3rd, 4th, and 5th, respectively. On the other hand the last five risk factors having the lowest mean score are changes in governmental Laws having a mean value of (2.74), increase in fuel/oil Prices (2.72), labour accident (2.56), Ambiguity of work legislations (2.50) and materials wastage (2.42) and are therefore ranked 61st, 62nd, 63rd, 64th and 65th respectively. Furthermore, out of the 65 risk factors considered in the study, twenty seven risk factor (those ranked 1st to 27th) have a mean value ranging from (3.5 to 4.49) and are therefore considered to have high impact on projects completion time. This implies that, these risk factors may likely lead to 15-20% time increase if not properly managed. Furthermore, thirty seven risk factors (those ranked 28th to 64th) have a mean score ranging from (2.5 to 3.49) hence, can be considered as having moderate impact on project completion time. This means that, these risk factors could result to 10-15% project time increase. Meanwhile, only one risk factor (material wastage) has a mean score ranging from (1.5 to 2.49) hence considered as having low impact and implies that, the risk factor may likely lead to <5% time increase.

Conclusion and Recommendations

This study assessed the impact of project risk factors on completion time of construction projects. General perception of construction practitioners was sought regarding the impact of the risk factors on project completion time. The paper concludes that the risk factors have a varying degree of impact on construction projects completion time. Furthermore, the paper identified financial difficulty of clients, inadequate time estimate, and delay in progress payment by clients, poor labour productivity, shortage of skilled labour, frequent design changes among others to be the risk factors with highest impact on project completion time. The study recommends that, clients should always ensure that, funds are available and released when due so that the projects are completed at the required time. Furthermore, contractors should also ensure that, their

construction programs are carefully prepared to determine the minimum completion period to be stated in their form of tender. In doing that, considerations should be given to some factors such as lead times for orders of materials and equipment, and their deliveries to the site as well as their installations, Risks associated with on-site and off-site activities that are generally outside the contractor's control. Also, workers should be motivated to achieve optimal productivity and design changes should as much as possible be avoided by preparing a comprehensive design prior to selecting the contractor. The limitation of this research is that, the frequency of occurrence of the risk factors in construction projects is not considered, in the next phase of this research, the frequency of occurrence of the risk factors will be assessed in order to determine the significance of the effect of the risk factors on project completion time. This is because a risk factor may have high impact but low frequency of occurrence, as such the effect of the risk factor may likely not be significant.

References

- Abrahamsson, M. (2002). Uncertainty in Quantitative Risk Analysis – Characterization and Methods of Treatment. *Department of Fire and Safety Engineering*, Lund University.
- Adeleke, A., Bahaudin, A., & Kamaruddeen, A. (2015). Level of Risk Management Practice in Nigeria Construction Industry - From a Knowledge Based Approach. *Journal of Management Marketing and Logistics*, 2(1) :12-23.
- Aftab H. M., Ismail A.R. and Ade A. A (2012) “Time and Cost Performance in Construction Projects in Southern and Central Regions of Peninsular Malaysia. *International Journal of Advances in Applied Sciences (IJAAS)* 1(1):45~52
- Akintoye, A.S. and Macleod, M.J. (1997) „Risk analysis and management in construction“ . *International Journal of Project Management*. 12(1):31-38
- Aliyu, B. A. (2013) Risk Management in Nigerian Construction Industry *Unpublished M.Sc. Thesis. Eastern Mediterranean University, Gazimagusa, North Cyprus*
- Azevedo, R. C., Ensslin, L., & Jungles, A. E. (2014). A Review of Risk Management in Construction: Opportunities for Improvement. *Modern Economy*, 5:367-383.
- Baba, Y. (2014). An investigation of the perceptions of contractors and consultants on risk management practices in Nigerian building projects. *Unpublished M.Sc. Dissertation. Ahmadu Bello University, Zaria.*
- Cochran, W. G. (1977). *Sampling techniques*. New York: John Wiley.
- Dada, J.O., & Jagboro, G.O. (2007). An Evaluation of the Impact of Risk on Project Cost overrun in the Nigerian Construction Industry. *Journal of Financial Management of Property and Construction*, 12(1):37 – 44.
- Ehsan, D. N., Alam, M., Mirza, E., & Ishaque, A. (2010). Risk Management in Construction Industry. *Institute of Electrical and Electronics Engineers*, 16-21.
- Enshassi, A., & Mosa, J. A. (2008). Risk Management in Building Projects: Owners' Perspective. *The Islamic University Journal (Series of Natural Studies and Engineering)*, 16(1):95-123.
- Hedaya, A. M. A. & Saad, M. A. S. (2017). “Cost Overrun Factors in construction projects in Bahrain” *Modern Applied Science*; 11 (7) <https://doi.org/10.5539/mas.v11n7p20>
- Ibironke, O.T., Famakin, I.O., & Akingunola, T.O. (2011). Evaluating Risk factors for Build, operate & Transfer Procurement in the Nigeria Construction Industry. *Built Environment journal*, 8(1):37-44.
- ISO. (2009). “Risk management—Principles and guidelines.” ISO 31000, Lausanne, Switzerland, 10–11.

- Laryea, S., Agyepong, S., Leiringer, R., & Hughes, W. (2012). Construction in West Africa. *WABER Conference 1st Ed.* Pp. 187-191.
- Leryea S. (2008). "Risk Management Practices in insurance, Insurance, and Construction." *Construction & Building Research conference (COBRA)*. The Royal institution of chartered Surveyors, Dublin.
- Liu, L. and Zhu, K. (2007) „Improving cost estimates of construction projects using phased cost factors“ , *Journal of Construction, Engineering and Management*, 133(1):91-95.
- NBS (2011). 2010 and Q1, Q2 2011 GDP for Nigeria, NBS, Central Business District, Abuja www.nigerianstat.ng, accessed on september 18, 2018.
- NBS (2012) Revised 2010 and Estimates for Q1- Q4, Gross Domestic Product for Nigeria, NBS, Abuja, www.nigrerianstat.ng, accessed on september 18, 2018.
- NBS (2014) 2012 and Estimates for Q1-Q3, 2013 Gross Domestic Product for Nigeria, NBS, Abuja, www.nigrerianstat.ng, accessed on september 19, 2018
- Nnadi E. O. E., & Ugwu O. O. (2013). An Appraisal of Risk Management in Nigeria Construction Industry. *International Journal of Research and Advancement inEngineering Science*, 3(2):41-50.
- Project Management Institute (PMI), (2004) *Project Management Body of Knowledge (PMBOK)*, 3rd ed. USA: Project Management Institute, Inc.
- Smith, G. and Bohn, C. (1999) "Small to Medium Contractor Contingency and assumption of risk". *Construction Engineering and Management*. 125(2):101-108.
- Uher, T. (2003) *Programming and scheduling techniques*. Sydney: UNSW Press.
- Wiguna, I.P.A. and Scott, S. (2006) „Relating risk to project performance in Indonesian building contracts“ , *Construction Management and Economics*, 24(11):1125-1135.
- Zou, P., Zhang, G., and Wang, J.Y. (2006) "Identifying key risks in construction projects: Life cycle and stakeholder perspectives", *Proc. 12th Pacific real estate society conference*. Auckland, New Zealand, 22-25 January.

FACTORS AFFECTING VALUATION ACCURACY FOR SECURED LENDING IN ABUJA, NIGERIA

¹CHARLES-AFOLABI, Christianah Yetunde, ²WAHAB Muktar Babatunde, ⁴USMAN Jemila & OLANIYI Kafilat J.

¹Estate Management Department: Redeemer's College of Technology and Management, Ogun State

²Estate Management Department: Kaduna State University, Kaduna state.

³Estate Management Department Zungeru Polytechnics, Niger State.

⁴Estate Management Department Federal Polytechnics, Offa Kwara.

(corresponding author: sikemicharles@gmail.com)

Abstract

The study examined the factors affecting the accuracy of valuation for secured lending in Abuja Nigeria. Secured lending provides that the value of real property used as collateral should at least be at par with the loan. the need to establish inaccuracy in property valuation with view to identifying the factors causing variance is to provide a guide for Valuers to exercise caution, this forms major premise of this study. the study analysed responses from 20 estate surveying and valuation firms who are majorly into valuation for secured lending and 12 banks who have carried sale of foreclosed properties after default. The study examined Twelve the valuation reports of properties used for secured lending and actual sale values using F-test two-sample to identify the extent of inaccuracy between opinion value and actual sale value. The result revealed that f-test at 5.3388 at p-value of 0.0049 is statistically significant, indicating that the gap between opinion value and actual sale significantly wider to cause inaccuracy. The result regression analysis revealed that 73.9% variation in actual sale amount is influenced by valuation opinion. The study therefore analyse the factors responsible for inaccuracy using descriptive mean and relative important index. The result revealed that client influence (borrower), professional negligence and unethical practices among the firms were major factors affecting the valuation accuracy. The study therefore concludes that opinion values provided by valuers could not be relied upon 100% by the banks. The study recommends that the regulatory institutions should appraise the quality of her professional ethics, rules and regulation, the code of conduct, valuation standards and all measures guiding the professional practice

Keywords: Secured lending, Valuation accuracy, Actual sale, Valuation opinion

Introduction

Valuation is an expression of opinion of value for property interest which may be needed for different important purposes ranging from property sale or acquisition, financing, taxation, investment appraisal (Millington, 1998). Valuation for secured lending is one the purpose of valuing real properties. Secured lending which involves the provision of real property as collateral requires such property to be valued as well. The estimation of the worth is thus an art that requires expertise skills and judgment; therefore there is a possibility of bias or a degree of error in valuation of opinion. Studies in UK, US and Nigeria (Adair *et al*, 1996; Crosby *et al*, 1998; Ogunba, 1997; Ogunba & Ajayi, 1998) have established that inaccuracy exist in valuation. Therefore valuation of the collateral property is one of the key processes in secured lending; however there exists valuation inaccuracy because the eventual sale price of the collateral does not equate or close to the opinion of value in the event of foreclosure (Aluko, 2007). This thus cumulates into bad loan for the lending institution, a situation in which the financial institution is unable to recover part or the total principal and the interest of the given loan within the stipulated time of the lending (Thakor & Udell, 1991; Pozzolo, 2002). However, the lending institution additionally seek security for the loan repayment by a tangible asset called collateral. Such loan potentially becomes a "secured lending" if the credit advance is underpinned by collateral of the borrower's real property interests (Golin & Delhaise, 2013). On the other hand, an unsecured lending is that in which no collateral security is provided (Gonas *et al*, 2004). This means that the lender only has the promise of the borrower to repay which may not be followed through. A typical example is a credit card transaction. Secured lending is usually preferred because the process involves assessing the loan risk against bank's loan screening criteria such as the 7Cs of lending (Ofonyelu & Alimi, 2013) which includes collateral; thereby the risk of the lender is reduced and the borrower can enjoy lower rates as well. The studies conducted by Flesig(1996), Boots (1996), De Soto(2000) and Gan (2007) on the determinants for secured lending revealed that the financial institutions are of different categories but commercial banks are the major ones in the business of lending. Nwuba, Egwuatu and Salawu(2013) affirmed that as much as lending is essential for business and economic growth, the use of collateralized lending is very important in the lending process. Boot *et al* (1996) it was stated that collateral is widely used in loan contracts to serve as a powerful instrument in dealing with financial hazards. Gan (2007) also affirmed that collateral support plays a huge role in lending by banks all over the world and real estate is regarded as important collateral. Flesig (1996) further remarked that banks in developing countries

only give loans secured with real estate and only in rare cases do they give loans with movable assets. Usually the loan amount is a function of the value of the pledged property, therefore it is expected that the collateral value should have parity with an amount that will cover the repayment of the loan in the event that the borrower is unable to pay from his cash flows. Thus determining the value of the pledged assets professionally is vital to the loan process best practices. The aim of this study is to examine firstly if the valuation for secured lending across financial institution in Nigeria is mostly accurate or inaccurate and then to examine the factors affecting the accuracy of valuation for secured lending in Nigeria in order to combat the menace that can jeopardize the credibility and future of real estate profession in Nigeria.

Literature Review

Aluko (2004) carried out an accuracy study on a larger scale with a focus on mortgage valuations and subsequent sale prices of such mortgaged properties used as collateral securities. In his study, Bank records of mortgage valuations conducted by fifty nine (59) estate firms in Lagos metropolis were examined. The sale prices of the properties were compared with their earlier valuation estimates and analyzed by means of regression and ANOVA. He came to a conclusion that valuations in Nigeria are a good proxy for price and that despite the anecdotal evidence to the contrary the mortgage valuers are doing a very good job of price prediction. Bretten and Wyatt (2002) investigated the extent and possible causes of variance in property investment valuation for commercial lending purposes within UK using questionnaire survey circulated to 220 lenders, finance brokers, valuers, property companies and institutional investors involved in commercial property valuation process in order to gauge professional opinion. They observed that the main cause of variance was the individual valuer's "behavioral influences" and that parties to a valuation instruction widely accept "the margin of error" principle. Their study concluded that variance can enter the valuation process at any stage, from the issuing of instruction letters and negotiation of fees through to external pressure being exerted on the valuer when finalizing the valuation figure. Boyd and Irons (2002) conducted a study on the variance that existed between five valuers in mortgage valuation on the popular Meyer Centre case in Australia. The study investigated the causes of the variance by evaluating the decision of the Queensland Supreme Court on this matter. Arising from the pronouncement of the Court, wrong valuation methodology, incorrect valuation data, and value analysis were the causes of variation in the Meyer Centre case.

Ogunba (2004) expanded the coverage area of accuracy studies to a consideration of property valuation estimates and sale prices in the six States of Southwestern Nigeria. The approach adopted in the study was similar to the one adopted in his earlier work. Statistical tests such as range, inter-quartile range, mean deviation, regression analysis, and analysis of variance employed by the author confirmed his earlier work that valuation estimates were not good proxy for sale prices and also that valuation estimates of one firm were not good proxy of other firms. Nasir (2006) carried out a study on valuation variation in commercial properties in Malaysia. It was revealed from the study that the variance that existed was below the $\pm 10\%$ stipulated by the Board of Valuers, Appraisers and Estate Agent, Malaysia (BOVAEA). The study submitted that the imposition of sanctions by BOVAEA for valuation variation of more than $\pm 10\%$ might have resulted in the low level of variation that was obtained in the study area.

According to Babawale, 2007, there are few negligence cases against valuers in Nigeria but they are usually resolved within the regulatory professional body. Literally one can say that the practitioners of estate surveying and valuation in Nigeria are still enjoying a level of security in practice. Gan (2007) also affirmed that collateral support plays a huge role in lending by banks all over the world and real estate is regarded as important collateral. The study further remarked that banks in developing countries only give loans secured with real estate and only in rare cases do they give loans with movable assets. Notwithstanding, the borrower must also be known to own real estate which the lender can claim in addition to already pledged movable asset in the case of default. Adegoke (2008) investigated valuers' behavior in Nigeria when valuing properties in localities that they lack substantial prior experience in Nigeria. He sampled 122 estate surveying and valuation firms in Lagos metropolis. He used quasi-experimental and survey methods for the study. The researcher employed simulated valuation method in carrying out valuation of a single commercial office property located in a city that the participants/respondents were not familiar with. The study revealed a wide variance of valuation outcomes from the mean which showed that the valuation outcomes were not reliable. Ajibola (2010) examined the causes of valuation inaccuracy in Lagos Metropolis by a survey of 300 estate surveyors and valuers through questionnaires and interviews and 150 questionnaires were returned

representing a response rate of 50%. The data analysis was done using descriptive statistics. He also interviewed selected executive members of the valuation profession in Nigeria and 10 valuation lecturers. His result shows that 78.8% of the respondents relied on in-house database for valuation assignments and reliance on in-house data source indicates that the valuers use information that may not be properly processed and this could in turn result in valuation inaccuracy.

Babawale and Omirin (2011) remarked that inaccuracy can emerge in valuation exercise at any of the stages. Valuation process as earlier stated involves a lot of activities ranging from information gathering, analysis and computation to reporting. So it is expected that the valuer is careful and observes due diligence in order not to undermine the process and jeopardize the result. Ayedun *et al*, 2012 established that the imperfect nature of property market makes it difficult to validate market data which in turn may cause valuation inaccuracy. The market is such that information is not readily available; therefore it is the information that the valuer can get that he will work with. Babawale (2012) sought to examine the adaptation of valuation standards in the practice of real estate valuation in Nigeria. He expressed that absence of standard means there is no professionalism and there is every tendency for abuse, conflicts, mediocrity and complacency. Therefore in the work, he assessed the level of compliance with standards obtainable in Nigeria. According to Nwuba *et al* (2012), the valuation process starts with the giving of instruction, gathering of information, analysis and calculations, report drafting, preparation of final report and submission. This means that the lending institution initiates the valuation processes which starts when the instruction or requests for valuation is given to the valuer.

Nwuba *et al*, (2013) in their study found that just as in previous studies, real estate is not only an important collateral instrument, but also the most widely accepted in the Nigerian banking sector. Their result goes further to acknowledge that possession of valid and verifiable title is a key requirement in the loan process. More importantly, the study also affirmed that the key requirement in secured lending decision is professional valuation of the collateral which is usually a real estate asset; that is a mortgage valuation. This then means that given the general acceptance of real estate as collateral in loan granting, real estate valuers too have an important role to fulfill in secured lending in that mortgage valuation will be required in making the lending decision.

Akinjare *et al*. (2013) on the causes of valuation variance in Lagos is one of the recent studies in Nigeria that tried to trace the root cause of variation in valuation. One hundred and thirty questionnaires were administered on valuation firms and was analysed using RII. The finding revealed categorized the causes into endogenous and exogenous factors to includes use of different input variables, use of a different method of valuation for the endogenous variable, while lack of adequate market information and client influence was identified as the exogenous variables. Adegoke *et al* (2013) evaluated the perception of clients on reliability of mortgage valuation in Nigeria. A sample size of 50 lending institutions was randomly chosen representing 57.5% of the target population in Lagos State, the study area. The study used descriptive statistic to analyse the data. The study reveals that clients are of the opinion that valuations produced by valuers were not reliable. The study therefore concludes that the estate surveyors and valuers in the country owe their clients a duty of care by presenting accurate and reliable valuation reports since other stakeholders of the real property investors depend on these reports for their investment decisions. Effiong (2015) revealed that lack of standard, lack of market comparable data, lack of regulatory framework, methods adopted, client influence, inadequate training, imperfect knowledge of property market, assumption on cost per square meter, lack of experience and failure to discipline valuers on negligence matters were the causes.

Adegoke (2016) investigated the causes of valuation variance and valuation inaccuracy in non-statutory valuation in Nigeria. One hundred and sixty three questionnaires were used for collecting the data from estate surveying and valuation firms and RII was used for the analysis. The RII results show that the causes of variance and inaccuracy in valuation are valuer skill, valuer judgment, valuer experience and problems of relevant data with an RII of 0.922, 0.921, 0.908 and 0.890 respectively. Atilola *et al* (2019) evaluated the factors causing variance in property assessment in Kwara state. The study utilized the purposive sampling to select registered estate surveyors and valuers in and study employed. Relative Importance Index (RII) was used to analyse the data collected. Findings showed that factors that fell within the range index of significant factors (0.841 to 0.979) are: experience in rating valuation, comprehensiveness of the law, unrealistic valuation assumption and availability of market indices for the input variables.

Table 2.1: Summary of Previous Studies Reviewed

Authors/Year	Scope	Methodology	Findings	Comment
Ogunba 1997, Ayedun <i>et al</i> 2011, Olafa S.A 2015	Accuracy of Valuation	Actual Valuation, Survey and Interviews	Established the existence of valuation inaccuracy	Lagos; No causing factor established
Aluko 2004	Reliability of Mortgage Valuation for lending	Regressed open market value against transaction price of mortgaged properties	Relatively reliable because results were quite accurate but falls short of what applies in UK, USA and Australia	Lagos; Mentioned Estimated Realisation Price (ERP) and Estimated Restricted Realisation Price (ERRP) as alternative methods used abroad
Babawale G.K and Alabi AA 2013	Effect of Valuation Accuracy on Mortgage Finance	Survey of lender's opinion	Inaccuracy exists in form of overvaluation and this has a limiting effect on mortgage financing	Lagos; Valuation inaccuracy can lead to a negative impact in the real estate industry
Amidu 2006, Amidu and Aluko 2007, Babawale and Omirin 2011 & 2012, Ayedun C.A <i>et al</i> 2012	Causes of Valuation Variance and Inaccuracy	Survey and Interview	Availability of data, Knowledge and expertise of the valuer, Influence of clients on valuation and Valuation standards and its enforcement by the regulatory authorities.	Lagos used as representative study area. However Abuja property market is peculiar in itself and it must also be noted that value is localised.

Source: Author's extract from the literature reviewed, 2019.

All these previous studies starting with Ogunba, (1997); Ogunba & Ajayi (1998) have examined accuracy of valuation with respect to investment and in a broad perspective (Ayedun *et al*, 2010); the perception and reliability of valuation for mortgage (Adegoke *et al*, 2013; Aluko, 2004; Olafa, 2015); causes of inaccuracy (Ayedun, *et al*, 2012; Babawale & Omirin, 2011); influence of clients on valuation (Amidu & Aluko, 2007; Iroham *et al*, 2012 to Babawale & Omirin, (2011) on the impact of factors influencing inaccuracies in valuation. These studies which are mostly carried out using Lagos as the study area have been able to establish the existence of inaccuracy in Nigerian valuation practice and have also identified some factors responsible. Therefore this study takes it further to examine the factors affecting the accuracy of valuation as it relates to secured lending specifically mortgage lending in Abuja; Abuja being the capital city of Nigeria and the second most important city after Lagos which has been the only major area of study over the years. More so, the study will examine how the factors responsible for valuation inaccuracy play out in valuation done for secured lending in Abuja; to identify the dominant ones and the less important. Then the role of the regulatory authorities in mitigating the influence of the identified factors will also be examined.

Methodology

As a result of the Central Bank consolidation exercise in 2004, the total number of commercial banks in Nigeria is twenty-four (24) and their head offices are mostly in Lagos, however they all have branches within Abuja and they have genuine concerns about the problems of secured lending. This number thus formed the second sample frame for this study. The second category of information providers consist of firms of estate surveying and valuation under Nigerian Institution of Estate Surveyors and Valuers, (NIESV) and registered by Estate Surveyors and Valuers Registration Board of Nigeria (ESVARBON). Although the sample frame of the various study population categories are small, a sample size of 25 experienced estate surveying practicing firms in Abuja based on the age and experience of the firms, 16 banks engaged in active lending operations were sampled for the study.

Table 1 Sampling Frame and Size

Population	Frame	Sample size	%
Estate firms	107	25	25
Banks	24	16	66.67
Regulatory Authorities	2	2	100

Frequency distribution was able to help define the characteristics of the data and the percentage distribution, whereas the Relative Importance Index (RII) help to assess the significance of each factor affecting valuation accuracy and their rankings. This Relative Importance Index was calculated as:

$$\text{Relative Importance Index} = \frac{\sum wF}{N} \dots\dots\dots \text{Equation 1}$$

Where: w = weighting given to each factor on a scale of 1 to 4 (where '1' corresponds to "not important" and '4' corresponds to "very important") F = frequency of responses N = total number of respondents. Therefore the actual level of accuracy cannot be measured because sale price is not dependent on valuation or vice versa. Nevertheless, this study used regression analysis to measure the impact or effect of the valuation on the actual sale price.

Usually a regression model is expressed as:

$$Y = a + bX + e \dots\dots\dots \text{Equation 2}$$

Where X = independent variable

Y = dependent variable.

b = The slope of the equation

a = The intercept

e = Error term

Results and Discussion

Cumulatively, about 83% of the respondents with over 10 years' experience as credit officers responded to the research on the accuracy and factors affecting the accuracy of valuation for secured lending in the study area. The respondents are all also second degree holders.

Table 2 Years of Experience of Bankers

Years of Experience	Frequency	%
1 - 5	0	0
6 - 10	2	16.7
11 - 15	6	50
16 - 20	4	33.3
21 - 25	0	0
Above 25	0	0
Total	12	100

These responses indicate that majority of the respondent are people knowledgeable and qualified with respect to the area of focus of this study. The tables show that 85% of the respondents are trained valuers and 80% of them are registered professional members by the regulatory authorities. This study also considered the area of firms' specialization in order to determine how much energy or effort is invested in the respondents' areas of focus. The study also sought to find out how much valuation the firms do for the purpose of secured lending in the study area.

Table 3: Qualification of Estate Firms' Respondent

Qualification	Frequency	%
HND	0	0
B Sc	3	15
HND/B Sc + ANIVS	15	75
HND/ B Sc + FNIVS	1	5
Others	1	5
Total	20	100

The data presented in Table 4 are collected from four different banks. One of the banks gave four cases of asset foreclosure, another one provided information for six cases and the last two presented one each. The data as shown is the valuation and the actual sale price of the collateral both in millions of naira, and the last column is the margin of differences between the figures as calculated by the author. This data is used to assess the level of accuracy in the study area and the average level of the disparity between the valuation amount and actual sale price of the foreclosed properties is calculated as 35%. The data is further subjected

to F-test sample to test significance of differences in the two samples. The result revealed that the mean variance is statistically significant indicating the there are wide variance between opinion value and actual sale.

Table 4: Test of Valuation Inaccuracy in the Study Area

Bank	No of Reports	Valuation Figure (N' Million)	Actual sale (N' Million)	Difference (%)
Bank 1	A	89	51	-43
	B	96	125	30
	C	485	175	-64
	D	55	63	15
Bank 2	A	125	56	-55
	B	58	75	29
	C	191	103	-46
	D	72	90	25
	E	178	132	-26
	F	116	102	-12
Bank 3	A	97	62	-36
Bank 4	A	456	275	-40
Summary	Mean	168.166		
Valuation figure	Variance	21742.33		
	Observations	12		
	Df	11		
	Mean	109.083		
Actual sale	Variance	4072.446		
	Observations	12		
	Df	11		
F	5.338887			
P(F<=f) one-tail	0.004927			
F Critical one-tail	2.81793			

Source: Author's Field Survey (2016).

The implication of this result is that the sale price of foreclosed property is affected by the amount of the opinion of value to the extent of 73.9%; that is the valuation amount impacted the sale price to the degree of 73.9%. The value of R^2 further reveals the amount of variation in actual sale price influenced by valuation opinion.

Table 5: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.860a	.739	.713	78.97466	3.008

a. Predictors: Foreclosed amount; b. Dependent Variable: Valuation amount

The slope of the equation is not close to 1, in fact it is far from 1 in a negative direction, the level of significance, .000 is also much less than 0.05, implying that there is a statistical relationship between the valuation amount and the actual sale price. Also the intercept is significantly distinguishable from zero thus indicating that valuations of the foreclosed properties are often more than the sale price; therefore an explanation can be called for factors responsible for the difference.

Table 5: Regression Result

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	.48.539	46.652		-1.040	.323
Foreclosed amount	1.987	.373	.860	5.324	.000

The analysis of response from the banks as shown above reveals that the foremost issue they have with secured lending valuation is their clients, the borrowers; they influence the valuation all to ensure they get the loan approved by the bank (the RII is 0.8958). This fact is absolutely true because the author in one of the chats with credit officers witnessed a phone conversation held on speaker; the bank official spoke with a staff of one of the most notable firms in Abuja and the individual responded that out of 10 requests for valuation, 8 of the bank clients will come to negotiate for a bias opinion. The person continued that there are instances that the clients offer as much as millions of naira just to have their way. This first ranked factor

must have culminated into the second where the banks expressed that another factor affecting the accuracy of secured lending valuation is the ethical culture of the firm (RII is 0.8542). Of course one may not doubt this in that a firm which has a staff that allows for influence in one way or the other will mean that there is something wrong with professional ethic in the firm. The author also in another private chat learnt that banks have started delisting some firms for their valuation jobs; in fact the name he mentioned is one of the foremost notable firms in the industry. After considering influence of client, professional ethic of firms, the next factor the banks ranked is knowledge, skill, experience and judgment of the valuer with RII value of 0.8125. Truly, valuation is a job of high intellect; as such anyone to carry out valuation should be well trained and experienced in order to avoid bias of opinion. While the bank considered other factors such as time lag of sale, valuation method and professional negligence as part of the challenges (RII= 0.7708, 4th), they think that valuation standard, state of the property market and economy of the country has little impact as they were ranked lower (RII= 0.6458, 8th and 0.5833, 9th respectively). This could be that they expect that a qualified professional valuer would comply with the regulatory standard and exercise due diligence in the discharge of his duty. More so, the state of the property and the economy would have been factored into the consideration for arriving at the opinion of value. Finally the report showed the type of property is not a problem with the accuracy of valuation done for secured lending as this was ranked last. This could possibly be that if all other things are in place and right with the valuation, the type of property should not affect the accuracy.

Table 6: Factors Affecting Accuracy of Valuation for Secured Lending by Banks

Factors	N	Sum	Mean	RII	Rank
Time lag before sale	12	37.00	3.0833	0.7708	4th
Property type	12	22.00	1.8333	0.4583	10th
Valuation Process/heuristics	12	37.00	3.0833	0.7708	4th
Knowledge/skill/experience of valuer	12	39.00	3.2500	0.8125	3rd
Ethical culture of firm	12	41.00	3.4167	0.8542	2nd
Professional negligence of valuer	12	37.00	3.0833	0.7708	4th
Client's influence (borrower)	12	43.00	3.5833	0.8958	1st
Adherence/effectiveness of valuation	12	31.00	2.5833	0.6458	8th
State of the property market	12	28.00	2.3333	0.5833	9th
Changes in political/economic conditions	12	32.00	2.6667	0.6667	7th

This second table that shows the response of the valuers to factors affecting accuracy of valuation for secured lending however revealed a slightly different opinion. The valuers ranked professional negligence as first contributory factor (RII= 0.9750); actually this singular response is loaded in that it could definitely be interpreted to contain the banks' opinion as well. This is because a professional that ensures due diligence on its duty will not allow room for influence or bias. The second ranked factor is time lag of sale (RII= 0.9625); while valuation is defined as future worth or benefit of a property, it is also worthy of note that opinion of value in valuation report is stated with reference to the particular date of valuation or better put as the date of inspection. This is definitely different from the future where in circumstances surrounding the property could have changed or anything could have happened; however property is known to appreciate and not depreciate in value. Therefore this is what should caution the valuers and not to be used as defense. However the time lag time of sale can also be seen in the terms of marketing period; truly asset foreclosure by bank is usually done within the shortest time possible and does not follow normal open market sale conditions. Therefore this can affect the value and contribute to valuation inaccuracy. Knowledge, skill, experience and judgment of valuer and Valuation Process- Techniques/Heuristics were ranked next by the valuers (RII= 0.9375 and 0.9250 respectively); this is quite right because for anyone to come out with best result in valuation, they must be skilled, well experienced and must ensure to apply appropriate method and approach while exercising due diligence. However the valuers do not think that Client's influence (RII= 0.9167, 5th) and Ethical culture of firm (RII= 0.8125, 6th), are the main issues as against the position of the bank because they were ranked much lower. This may be because nobody would deliberately want to expose him or herself, nevertheless, the response shows that they know it could be a problem to valuation job integrity, hence the need to eliminate these as factors that could contribute to accuracy of valuation especially for secured lending and in the study area. The valuers too like the banks expressed that valuation standard, state of the property market and economy of the country are of lesser impact as they would have factored all these in the valuation; more so the comparable prices they use would have reflected the state of the market or the economy. Also like the banks, property type was ranked last factor affecting valuation for secured lending in the study area.

Table 7: Factors Affecting Accuracy of Valuation for Secured Lending by Estate Firms

Factors	N	Sum	Mean	RII	Rank
Time lag before sale	20	77.00	3.8500	0.9625	2nd
Property type	19	31.00	1.6316	0.4079	10th
Valuation Process/Heuristics	20	74.00	3.7000	0.9250	4th
Knowledge/skill/experience of valuer	20	75.00	3.7500	0.9375	3rd
Ethical culture of firm	20	65.00	3.2500	0.8125	6th
Professional negligence of valuer	20	78.00	3.9000	0.9750	1st
Client's influence (borrower)	15	55.00	3.6667	0.9167	5th
Adherence/effectiveness of valuation	20	60.00	3.0000	0.7500	7th
State of the property market	20	44.00	2.2000	0.5500	9th
Changes in political/economic conditions	20	45.00	2.2500	0.5625	8th

Source: Author's Field Survey (2016).

Implication of Findings and Conclusion

Real estate practitioners in Nigeria too have taken a dive into this aspect of the profession. This study as part of the research sought to look at factors affecting accuracy of valuation specially with regards to secured lending in a prime location like Abuja which is a second place of interest after Lagos state in Nigeria. The study found out accuracy of valuation for secured lending in the study area is questionable and the problem as stipulated by users of valuation for secured lending (the banks), is the influence of client and ethical culture of valuation firm. Although the estate valuation firms think it is professional negligence and the knowledge, skills and experience of the valuer that cause inaccuracy in valuation for secured lending in the study area. This study thus conclude that whichever way this outcome is being assessed at; to say it is clients influence, ethical culture of firms or professional negligence and the knowledge, skills and experience of the valuer that are responsible for inaccuracy of valuation for secured lending in the study area, then the problem is not far-fetched as these factors are issues emanating from within the profession. They are matters that are directly related with the conduct and practice of the profession; hence the solution can only come from within. Also, as part of conclusion for this study is the fact that the banks do not capitalize on the accuracy or inaccuracy of our valuation for secured lending; what they require of the valuation exercise is integrity and reliability of the report. If the credit officers have to carry out further independent investigation of the collateral asset again as a result of bias of opinion, then the effort is not worthwhile as the banks could have as well jettison the commissioning of a valuation professional in the first instance. This means possibly, a time could come when valuers would no longer be relevant for valuation in secured lending. The study therefore recommends that the regulatory institutions should appraise the quality of her professional ethics, rules and regulation, the code of conduct, valuation standards and all measures guiding the professional practice. The ethics should be re-polished if need be, offences and sanctions should be clearly stated, then the valuation standards should be upgraded to measure up to acceptability and competitiveness globally. There should be re-orientation of members of the profession to the effect that it would not be business as usual; the regulators are ready to take on any act of indiscipline for optimum sanction without prejudice or compromise.

Reference

- Adair, A., Hutchison, N., MacGregor, B., McGreal, S., & Nanthakumaran, N. (1996). An Analysis of Valuation Variation in the UK Commercial Property Market: Hager and Lord revisited. *Journal of Property Valuation and Investment*. 14(5), 34-47. <http://dx.doi.org/10.1108/14635789610154271>
- Adegoke O.J., Olaleye, A. & Oloyede, S.A.(2013). A study of Valuation Clients'Perception on Mortgage Valuation Reliability. *African Journal of Environmental Science and Technology*. 7(7), 585-590
- Ajibola, M. O., & Oletubo, A. A. (2011). Assessment of Accuracy of Valuation in the Property Market in Lagos Metropolis. *Global Journal of Engineering and Technology*, 4(1), 45-51.
- Aluko B. T. (2004). Reliability of Mortgage Valuation for Institutional Lending in Nigeria, *International Journal of Strategic Property Management*, 8(4), 193-203. DOI : 10.1080/1648715X.2004.9637517
- Aluko, B. T. (2007). Implications of the Current Trend in Mortgage Valuation Practice in Nigeria. *International Journal of Strategic Property Management*, 11(1), 17-31.

- Amidu, A., & Aluko, B. T. (2007a). Client Influence on Valuation: Perceptual Analysis of the Driving Factors. *International Journal of Strategic Property Management*, (2007). 11 (1), 77– 89.
- Atilola M.I, Ismail A, Achu, K & Bujang, A.A (2019) An Evaluation Of Factors Causing Variance In Property Assessment *Journal of the Malaysian Institute of Planners* Volume 17 Issue 1 (2019), Page 82 – 93
- Ayedun, C.A., Oloyede, S.A. & Durodola, O.D. (2012). Empirical Study of the Causes of Valuation Variance and Inaccuracy in Nigeria. *International Business Research*. 5(3), 34-49. doi:10.5539/ibr.v5n3p71
- Babawale, G. K. (2012). An Assessment of the Current Standard of Real Estate Valuation Practice in Nigeria. *Elixir International Journal*. Elixir Soc. Sci. 47 (2012) 9094-9102.
- Babawale, G. K., & Omirin, M. (2012). An Assessment of the Relative Impact of Factors Influencing Inaccuracies in Valuation. *International Journal of Housing Markets and Analysis*, 5 (2), 1 - 1.
- Babawale, G.K. (2007). Valuers' Liability for Negligence. The Estate Surveyor and Valuer. *Journal of the Nigerian Institution of Estate Surveyors and Valuers*, 30(1), 49-55.
- Boot, A. W. A., Thakor, A. V. & Udell, G. F. (1991), Secured Lending and Default Risk: Equilibrium Analysis, Policy Implications and Empirical Results. *The Economic Journal*, 101 (406), pp. 458 – 472
- Boyd, T., and Irons, J. (2002). Valuation variance and negligence: The importance of reasonable care. *Pacific Rim property Research Journal*, 8 (2), 107-126.
- Crosby, N., Lavers, A., & Murdoch, J. (1998). Property Valuation Variation and the 'Margin of Error' in the UK. *Journal of Property Research*, 15(4), 305-330.
- De Soto, H. (2000). *The Mystery of Capital*. London: Transworld Publishers (Black Swan Books).
- Effiong, J. B. (2015). A comparative study of valuation variance and accuracy between Nigeria and UK. *International Letters of Social and Humanistic Sciences*, 57, 94-105.
- Fleisig, H. (1996), Secured Transactions: The Power of Collaterals. *Finance and Development*, 33 (2), pp. 44 - 46.
- Gan, J. (2007), Collateral, Debt Capacity and Corporate Investment: Evidence from a Natural Experiment. *Journal of Financial Economics*, 85 (2007), pp. 709 - 734. <https://doi.org/10.1016/j.jfineco.2006.06.007>
- Golin, J., & Delhaise, P. (2013). *The Bank Credit Analysis Handbook: A Guide for Analysts, Bankers and Investors*. Asia: John Wiley & Sons.
- Gonas, J. S., Highfield, M. J., & Mullineaux, D. J. (2004). When are Commercial Loans Secured? *Financial Review*, 39(1), 79-99. doi:10.1111/j.0732-8516.2004.00068.x.
- Millington, A. (1988). *Introduction to Property Valuation (3rd Edition)*. London: The Estate Gazette LTD
- Nwuba, C., Egwuatu, U.S. & Salawu, B. M (2012). Client Influence on Valuation Process: Means, Motive and Impact. In Laryea, S., Agyepong, S.A., Leiringer, R. & Hughes, W. (Eds) *Procs 4th West Africa Built Environment Research (WABER) Conference*, 24-26 July 2012, Abuja, Nigeria
- Nwuba, C., Egwuatu, U.S. & Salawu, B. M (2013). The Application of Real Estate as Loan Collateral in Nigeria's Banking Sector. *Research Journal of Finance and Accounting* Vol.4, No.11,

- Ofonyelu, C. C., & Alimi, R. S. (2013). Perceived Loan Risk and Ex Post Default Outcome: Are The Banks' Loan Screening Criteria Efficient?. *Asian Economic and Financial Review*, 3(8), 991.
- Ogunba, O. A., & Ajayi, C. A. (1998). An Assessment of the Accuracy of Valuations in Residential Property Market in Lagos. *The Estate Surveyor and Valuer, Journal of the Nigerian Institution of Estate Surveyors and Valuers*, 21(2), 19-23.
- Ogunba, O.A (1997) A Study of Valuation and Pricing Practices in the Residential Property Market in Lagos Metropolis, *an Unpublished M.Sc. Thesis*, Obafemi Awolowo University, Ile-Ife.
- Ogunba, O.A. (2004). *The demand for accuracy in valuations: the case of Nigeria*. Paper presented at the International Symposium on Globalization and Construction, Thailand. Assessed April 2, 2013 from <http://www.irbnet.de/daten/iconda/CIB6046.pdf>
- Olafa S. A. (2015). Clients Perception on the Accuracy of Valuation Reports in Ibadan Metropolis. *Journal of Educational Policy and Entrepreneurial Research (JEPER)* Vol.2, N0.4. April 2015. Pp 9-20
- Pozzolo, A. F. (2002). Secured Lending and Borrowers' Riskiness. *Available at SSRN 302124*. Retrieved on December 24th, 2016 from <https://www.bis.org/publ/cgfs19bdi1.pdf>
- Thakor, A. V., & Udell, G. F. (1991). Secured Lending and Default Risk: Equilibrium Analysis, Policy Implications and Empirical Results. *The Economic Journal*, 101(406), 458-472. DOI: 10.2307/2233552

MAINTENANCE CULTURE OF PUBLIC PROPERTIES IN NIGERIA: CASE STUDY OF ADO-ODO/OTA LOCAL GOVERNMENT AREA, OGUN STATE

Osuorji G.C., Esuabanga W.E., Igbokwe I.E., & Sodangi A.A

Nigerian Building and Road Research Institute, KM 10 Idioroko, Ota, Ogun State

Correspondence E-mail: osuorjig@yahoo.com; Tel: +2347038337731

Abstract

Following the recent frequency of building collapse in Nigeria, it is expedient to look into the maintenance culture of most public properties in Nigeria. This paper is aimed at examining issues related to lack of maintenance, effects of maintenance culture and ways of improving maintenance culture and quality of public properties in Nigeria through review of archival materials, questionnaires and participative observation. It was discovered that the major factors/issues affecting maintenance culture include overcrowding (3.36), corruption (3.34), lack of maintenance culture policy (3.34), major effects of lack of maintenance culture include degradation/dilapidation (4.16), building collapse (4.11), wall and floor cracks (3.65) and ways of improving maintenance culture include , proper supervision (3.68), implementation of maintenance culture policy (3.36), proper training of personnel (3.52), proper use of building (3.51). The following recommendations were made that Public facilities should not be overcrowded as it weakens the strength of the building/facility easily, Proper supervision/accountability should be put in place whenever maintenance work is to be done and Implementation of maintenance culture policy should be everyone's business not just those in authority.

Keywords: Public building, Maintenance, Culture, Maintenance culture, Structures.

Introduction

The maintenance of any facility (building or equipment) should first be considered or put in place before such facilities are acquired. Maintenance is an integral part of property development and management. Unfortunately, poor maintenance culture in Nigeria has become a widely recognized problem (Mbamali, 2003), and this attitude has been treated with levity be it in our homes, offices, schools or use of public facility. Maintenance culture in this study suggests the habit of regularly and constantly keeping a building, machine, facility, equipment etc. in good working condition. Maintenance culture is an attitude, which is sadly lacking in Nigeria, be it in our homes, offices, schools, or factory. It is important to stress that, it's not enough for facilities of development to be put in place, it is more important that these facilities be properly and adequately maintained so that the purpose for which they were set up for would be achieved. However, the attitude of people towards public facilities is that "government property does not belong to anyone" (Adeleye, 2009). This study aimed at examining factors/issues affecting lack of maintenance, effects of lack of maintenance, ways of improving maintenance culture and quality of public properties and benefits of maintenance. To this extent, public facilities meant to serve the masses are rotting away, in a dilapidated state and as such under-utilized and as a result do not last long due to lack of maintenance. However, the purpose of this research was to identify reasons why public buildings are not maintained properly, problems that causes lack of maintenance of public buildings and ways of improving maintenance of public building

Literature Review

The Advanced Learners Dictionary (2009) defined maintenance as the action or process of preserving an object, or activity. It is an action performed to keep some machines or system functioning or in service. Kumar and Suresh (2008) postulated that maintenance is an action taken to prevent a device or component from failing or to repair normal equipment degradation experienced with the operation of the device to keep it in proper working order. This paper therefore considers maintenance as a process of preserving an asset or facility in its state of continuous use and function, above a minimum acceptable level of performance over its design life span.

Maintenance culture according to Mark et al, (2006) the concept of maintenance culture is the internal environment between management and staff in ensuring effective maintenance through the sharing of ideas, beliefs, and values of each member in an organization. According to Suwaibatul-Islamiah, Syazwina, and Eizzatual (2012) posted that maintenance culture is the values, ways of thinking, behavior, perception, and the underlying assumption of any person or group or society that considers maintenance as a matter that is important and practices it in their life. If a nation must develop, it is important that installations as well as maintenance of its existing facilities be given priority (Dabara, Ankeli, Guyimu, Oladimeji and Oyediran, 2015). Neglect of maintenance has accumulated consequences in rapid increase in the deterioration of the fabric and finishes of a building accompanied by a harmful effect on the occupants. The declining

maintenance culture in Nigeria and its effects on building has become a major challenge to both the public and private sector.

According to Sidney (1991), permanent structure requires less attention than temporary ones, any house owner will confirm that even the best constructed building needs constant attention. According to Seelay (1997), maintenance work on a building should commence from the day the contractor leaves the site. British Standard Institute (1974), considered maintenance as the combination of technical and administrative actions taken to preserve a structure, system or equipment to function properly. The necessity of maintenance work on buildings is noted in the fact that all buildings, as well as the materials and components there in, deteriorate or suffer loss in aesthetic, strength, and or functional value, following the exposure to the elements of weather over time. The life span of building, appearance and quality of materials used would be affected depending on the manner to which maintenance is adhered to in the building.

Causes of Poor Maintenance Culture

Some of the major factors identified for the poor maintenance culture within our society are examined:

Corruption: Obayelu (2007) defined corruption as an effort to wealth or power through illegal means for private gain at public expense, or a misuse of power for private benefit. Ogundiya (2009) saw corruption as the exploitation of public position, resources and power for private gain. For example, a sitting governor awards projects or contracts without means of its completion only to abandon it by its successor due to personal gains. One government would award projects, build infrastructural facilities while successive one abandons it, awards new contracts at inflated rates rather than maintain and consolidate on the already existing facility.

Leadership: This is the process of influencing others to understand and agree to what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objective (Yukl, 2006). Most of our leaders lack maintenance culture, vision, passion and empathy (Omotehinshe et al, 2015b) which are some of the leadership ingredients required to influence and stimulate people's behavior towards maintaining and sustaining existing facilities.

Implementation/Lack of maintenance policy: Policy is a law, regulation, procedure, administrative action, incentive or voluntary practice of government and other institutions. There is no blue print, program or scheme in the Federal or State level on how public facilities should be maintained.

According to Stephen (2002), building services rarely perform as well as desired. The causes emanate from deficiencies in design, construction, commissioning, tenancy work and maintenance problems which could be classified under three (3) main divisions: those that are initiated during the design stage; those that are initiated during the construction stage; and those that are initiated during the usage state or users carefree attitude (bad maintenance culture). According to Zubairu (2001), the extent to which the various factors contribute to maintenance problems in government office building in Nigeria is as follows: Inadequate architectural design (6%), inadequate structural design (7%), inadequate electrical design (9%), inadequate mechanical design (11%), Poor construction (12%), Poor quality components and materials (14%), Natural deterioration due to age and environment (18%), Misuse of occupants (18%), Others 5%.

Building Maintenance Strategies

There are many philosophies of maintenance; however, this paper limits itself to those that are concerned with facility maintenance, some of which are discussed below.

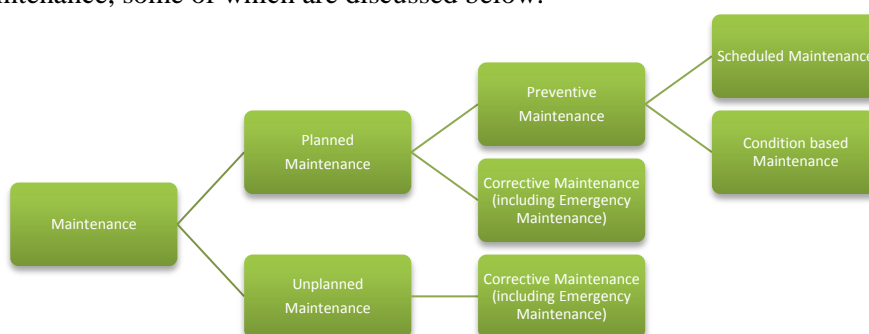


Fig.1 – Classification of Maintenance; Source: British Standard Institute (1974)

Planned maintenance is carried out and organized right from the inception even before any defect was seen. A well planned and fore thought, control and use of records to predetermined plan. Unplanned maintenance is carried out on NO predetermined plan. This is as a result of sudden or evident defect on a facility. Preventive maintenance is carried out at predetermined intervals or corresponding to research criteria and intend to reduce the probability of failure or the performance degradation of an item. This approach to maintenance management is predominately recurring or time driven tasks preformed to maintain acceptable levels of availability and reliability (Mobley, 2002). Comprehensive preventive maintenance schedules repairs, adjustments of machine rebuild for all critical equipment, while more limited programs consist of minor adjustments and lubrication. The scheduling guideline for these programs is the common denomination due to the fact that, all preventive maintenance management programs assumes that equipment will degrade within a certain period of time (Mobley, 2004). Preventive maintenance is cost effective, saves energy, increase component life cycle, and reduces equipment or process failure.

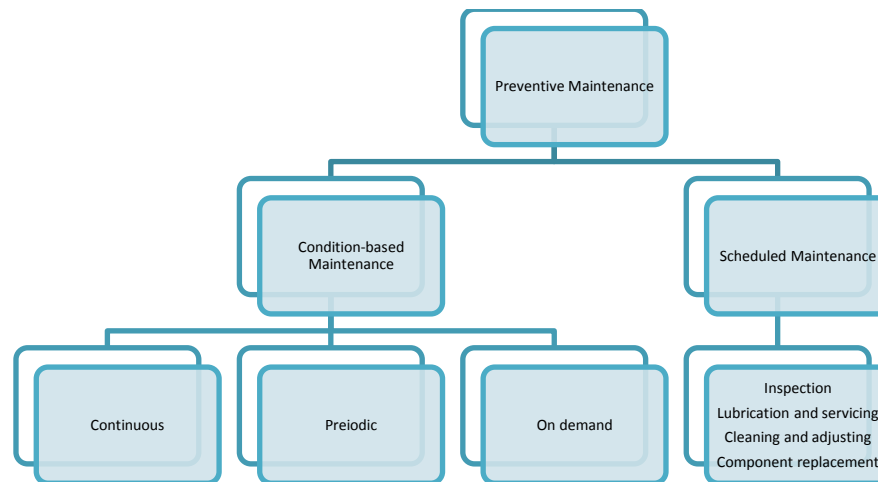


Fig. 2: Subdivisions of Preventive Maintenance; Source: Mobley (2004)

Some Benefits of Maintenance

The management's objectives must be realized in accordance with safety, environmental regulations and also in a cost effective way. The integration of machines, men, methods and means into a well-designed strategy requires indispensable managerial capacity (Waeyenbergh&Pintelon, 2002). Below are some of the accruable benefits if maintenance culture is embraced in our society:

- i. Keeping assets in utmost working condition in order to minimize downtime and disruption to services
- ii. Keeping facilities in a state of good repair for the owner's health and safety
- iii. Keeping assets from deteriorating in appearance and aesthetics
- iv. Keeping facilities so as to optimally achieve their full potential service life
- v. Leveraging efficiencies that can be reflected on the owner's statement of financial position
- vi. Satisfying a legislated duty that is owed to owners, occupants and guests on the property
- vii. Preventing unnecessary damage to assets or facilitation that may result in their performance failure

The purpose of this research was to identify reasons why public buildings are not maintained properly, problems that causes lack of maintenance of public buildings and ways of improving maintenance of public building.

Research Methodology

The study design is the descriptive method. This was used to obtain information concerning the current status of the phenomena and to describe "what exist" with respect to variables or conditions in a situation. This involved the use of questionnaires and physical observation of buildings. This study was carried out using structured questionnaires eliciting information from respondents and physical observation. Target respondents were engineers, builders/building technologists, teachers, Administrative staff, Estate Surveyors, Architect, and Plumbers. Sampling was achieved through the application of Taro-Yamane sampling formula and a total number of questionnaires retrieved back was about 80% of the total population under survey. This percentage is considered sufficient according to Moser and Kalton (1999), that the result of a survey could be considered as biased and little significant if the return rate was lower than 20%. Descriptive statistics such as percentage, mean, variance, standard deviation, co-efficient of variation, charts

and tables were used to analyze the retrieved questionnaires location by location. 5-point Likert scale was used in rating the reasons for lack of maintenance culture in the study area.

Analysis of Result and Discussion

Table 1: Analysis of retrieved questionnaires

Respondents occupation	Number retrieved	Percentage
Engineers	29	18.125
Builders	37	23.125
Teachers	32	20
Admin. Staff	32	20
Estate Surveyors	10	6.25
Architects	5	3.125
Plumbers	15	9.375
Total	160	100

Source: Field study 2019

Table 2: Factors/Issues affecting maintenance culture

S/N	Factors/Issues	5	4	3	2	1	$\sum f$	$\sum fx$	Mean	RII	Rank
1	Lack of or implementation of maintenance policy	45	33	30	35	17	160	534	3.34	0.67	2 nd
2	Inadequate provision of funds for maintenance	10	29	12	70	39	160	381	2.38	0.48	7 th
3	Lack of timely response to maintenance request	5	53	42	36	24	160	459	2.87	0.57	5 th
4	Poor maintenance work done by the maintenance unit	15	53	34	40	18	160	487	3.04	0.61	4 th
5	Corruption	30	57	30	23	20	160	534	3.34	0.67	2 nd
6	Lack of experienced and well trained personnel	7	30	19	64	40	160	380	2.38	0.48	7 th
7	Misuse of facility	13	41	20	50	36	160	425	2.66	0.53	6 th
8	Change of government	4	37	15	62	42	160	379	2.37	0.47	9 th
9	Over-crowding	26	72	7	43	12	160	537	3.36	0.67	1 st
10	Poor architectural/structural design	5	27	30	53	45	160	374	2.34	0.47	10 th

Source: Field study 2019

From the above analysis, it shows that the major factors/issues affecting maintenance culture include overcrowding (3.36), corruption (3.34), lack of maintenance culture policy (3.34), poor maintenance work done (3.04), lack of timely response (2.87), other factors affecting maintenance are misuse of facility (2.66), lack of experienced personnel and inadequate funds (2.38 each), change of government (2.37) and poor architectural design (2.34).

Table 3: Effects of lack of maintenance

S/N	Effects	5	4	3	2	1	$\sum f$	$\sum fx$	Mean	RII	Rank
1	Building collapse	86	40	9	15	10	160	657	4.11	0.82	2 nd
2	Degradation/dilapidation	97	23	18	12	10	160	665	4.16	0.83	1 st
3	Vegetation growth/water stagnation	30	50	6	63	11	160	505	3.16	0.63	5 th
4	Plaster break off	42	35	28	49	6	160	538	3.36	0.67	4 th
5	Wall and floor Cracks/Paint peeling	60	45	10	30	15	160	585	3.65	0.73	3 rd

Source: Field study 2019

Following the analysis above, major effects of lack of maintenance culture in descending order was observed as degradation/dilapidation (4.16), building collapse (4.11), wall and floor cracks (3.65), plaster break off (3.36), and vegetation growth (3.16).

Table 4: Ways of improving maintenance culture

S/N	Ways of Improving	5	4	3	2	1	$\sum f$	$\sum fx$	Mean	RII	Rank
1	Introducing maintenance culture as a subject into school curriculum	50	48	12	30	20	160	558	3.49	0.69	5 th
2	Regular routine checks	30	62	18	45	5	160	547	3.42	0.68	6 th

3	Implementation of maintenance culture policy	69	31	2	48	10	160	581	3.63	0.73	2 nd
4	Proper training of work personnel	40	63	13	28	16	160	563	3.52	0.70	3 rd
5	Proper use of building	32	68	25	20	15	160	562	3.51	0.70	4 th
6	Proper upervision/accountability	48	65	2	37	8	160	588	3.68	0.74	1 st

Source: Field study 2019

From the table above, proper supervision with a mean of 3.68 ranked highest on the chart as the best way of improving maintenance culture followed by implementation of maintenance culture policy (3.36), proper training of personnel (3.52), proper use of building (3.51), introducing maintenance culture as a subject (3.49) and regular routine check (3.42).

Conclusion/Recommendations

From the analysis, we can say that maintenance culture boils down to how individuals live and manage the assets at their disposal. The major factors/issues affecting maintenance culture include overcrowding (3.36), corruption (3.34), lack of maintenance culture policy (3.34), effects of lack of maintenance culture: degradation/dilapidation (4.16), building collapse (4.11), and the best way of improving maintenance culture is by proper supervision (3.68), implementation of maintenance culture policy (3.36), proper training of personnel (3.52). On personal grounds, we as individuals must acknowledge maintenance culture in order to enjoy the best of our assets with a view to enjoying the best of life, the way we use and enjoy our facilities such as buildings, machines, cars, public physical assets or even our bodies, etc., depend largely on how well we have conceded to the culture of maintenance.

Based on the above observations, the following recommendations were put forward:

Public facilities should not be overcrowded as it weakens the strength of the building/facility easily.

Proper supervision/accountability should be put in place whenever maintenance work is to be done.

Implementation of maintenance culture policy should be everyone's business not just those in authority.

Training and retraining of personnel should always be put use in place for artisans built environment professionals.

Maintenance culture, as a course, should be introduced into Educational Curriculum, and

People should be sensitized and encouraged to embrace maintenance culture for the betterment of our nation.

References

Adeleye S. I (2009). 'Maintenance Practice in Nigeria, Policy, Budgeting and Legislative Issue'. A paper presented at „Sensitization Campaign on Maintenance Culture“ Organized by National Orientation Agency, Oyo State Directorate, Ibadan.

British Standard Institution BS 3811, (1974). Glossary of general terms used in Maintenance Organization, London: Butterworth-Heinemann.

Dabara, I. D., Ankeli, I. A., Guyimu, J; Oladimeji, E. J & Oyediran, O. O. (2015). Infrastructure Financing and Urban Development in Nigeria. Proceedings of the International Journal of Arts and Sciences Conference, 2nd to 5th December 2014. Katholische Akademie der Erzdiozese Freiburg Germany, 08 (01), 79 - 86. Available online at <http://www.universitypublications.net/proceedings/0801/pdf/DE4C316.pdf>

El-haram, M.; Horner, R. M. and Munns, A. (1997) "Application of RCM to building maintenance strategies". Proceedings of the 6th international logistics symposium, UK, PP. 133 43.

Kumar, S.A. & Suresh, N. (2008). Production and Operations Management. (2nd Ed). New Delhi: New Age International (P) Limited Publishers.

Mark, C. E., Ogaji, S. O. T & Probert, S. D. (2006). Strategic Maintenance Management in Nigerian Industries. A Journal of Applied Energy, Vol. 83(3) Malaysia: Mc-Graw Hill. Pp. 211-277.

Mbamali, I. (2003) The Impact of accumulation deferred maintenance on selected buildings of Two Federal Universities in the Northwest zone of Nigeria. Journal of Environmental Science 5 (1) 77 – 83.

Mobley, K.R. (2004). Maintenance Fundamentals. (2nd Ed). Elsevier Inc.

Obayelu, A.E. (2007). Effects of Corruption and Economic Reforms on Economic Growth and Development: Lessons from Nigeria. Paper Prepared for 2007 African Economic Conference, Retrieved from: [adb_admin_pg/documents/aec/obayelu's%20paper%20004%20corruption%20modified%20version_pdf](#).

Ogundiya, I.S. (2009). Political corruption in Nigeria: Theoretical perspectives and some explanations. *The Anthropologist*, 11(4). Pp. 281-292.

Omotehinshe, O.J., Okunola, A. S., Akinola, T. G., Ojo G. O. (2015b). Review of Planning Laws and its Level of Implementation in Nigerian Communities – A Case Study of Ede Town in Osun State. A Paper accepted for Publication in “International Journal of Sciences, Engineering and Environmental Technologies (IJOSSET), IJOSEET-01- 2015.

Seeley, I. H. (1997) *Building Maintenance*. Macmillan press Ltd Hampshire, England.

Sidney, R. (1991) *Property Maintenance, planned preventive and the Maintenance contract* vol. 10, No. 2, 12-14.

Stephen, J. H. (2002) *Building services maintenance– The forgotten Discipline*, Aha management Publications www.aha.com.au/energy1.htm

Suwaibatul-Islamiah, A.S., Abdul-Hakim, M., Syazwina, F.A.S. & Eizzatul, A.S. (2012). An Overview Development of Maintenance Culture. *Proceedings from 3rd International Conference on Business and Economic Research*. Pp. 2206-2217.

Waeyenbergh, G. & Pintelon, L. (2002). A Framework for Maintenance Concept Development. *International Journal of Production Economics*, Vol. 77(3). Pp. 299-313.

Yukl, G. (2006). *Leadership in Organizations* (6th Ed.). New York: Pearson-Prentice Hall.

Zubairu S. N. (2001). The Most Frequency Recurring Maintenance Problems In Government Office Buildings In Nigeria. *NIAJ*, Vol. 11, 8 – 12 – Pp. 36.

ARCHITECTURAL SUPERVISION: A VITAL TOOL FOR CHECKMATING BUILDING COLLAPSE

¹Robert Walpole Nwanguma and ²Eneogwe, Innocent C.

¹Department of Architecture, University of Calabar, Cross River State

²Department of Architecture, Abia State University, Uturu Abia State, Nigeria

E-mail: walpole.nwanguma@gmail.com, +2348033249363

Abstract:

Architectural supervision is a technical, vital and effective tool to direct, manage or oversee the building project processes and the co-ordination of all deliverables by appointed consultants for a successful transformation of drawings and specifications to reality just as they have been conceived. This study examines Architectural Supervision as a necessary tool for checkmating building collapse, failure and for the purposes of proper project delivery. A questionnaire, interviews and observations articulated empirically were used as methods to collect data indicators of building collapse and the specific observations the Architect needs to make at site during supervision. The preliminary result of the study shows that one of the best ways of achieving quality project delivery hinges on adequate design and quality of supervision exercised at planning and all other stages of construction process. The conclusion drawn is that a building undergoes progressive collapse when a primary structural element fails, resulting in the failure of adjoining structural element which in turn causes partial or total collapse of the building. Building collapse could also be the result of using sub standard building materials, negligence, omission, quackery, natural phenomena or induced as a deliberate demolition method arising from contravention of building regulations. Following an in-depth analysis of these preliminary results, quality Architectural Supervision at all stages of the building production process is recommended as the professional tool of checkmating building collapse and failure.

Keywords: Architectural Supervision, Building Projects, Building Collapse, Appointed Consultant

Introduction

Among the current and diverse building development issues facing Nigeria as a nation and other countries of the world is building collapse and failure. The frequency of building collapse and failure is undoubtedly, making it a topical, and a most fundamentally discussed issue leading to vexations, when its effects on huge financial losses are contemplated. A building undergoes progressive collapse when a primary structural element fails, resulting in the failure of adjoining structural elements thereby, increasing the risk of failure and if unchecked leads to building collapse. Buildings can also be induced deliberately to collapse as a demolition method resulting from contraventions of building regulations or previous fire damages. Building Collapse Indicators, BCI include, plaster sliding of the walls in large sheets, cracking noise coming from within the building, window, doors, floor slabs and stairs falling out of plum. Building collapse can be due to human errors such as faulty designs, specifications, faulty construction methods, use of substandard building materials, negligence, omissions, ignorance, quackery, lack of comprehensive supervision, corruption and sabotage, superimposition of other floors after design, or change of initial building purpose (illegal conversion of building use) other factors of building collapse include natural occurrence such as flood, earthquake, hurricane, cyclones, landslides, volcanic eruptions. Moreso, absence of soil test to determine adequate foundation type could lead to foundation failure, uncoordinated activities between professional bodies involved in the building delivery process. Non performances on the part of the design team (architect, civil/structural engineer, quantity surveyor) could lead to building collapse (Aluko and Adedeji 2010), and poor monitoring of workforce. All these except the natural causes are borne out of man's negligence and differing opinion on professionals (Oloyede et al., 2010).

Buildings collapse is incalculable, not only in loss of human lives or injuries but also in loss of materials, property and investment that are not recoverable. Though much has been accomplished towards the reduction of the rate of building collapse, little or no result of improvement has been recorded. Under such situation, it is either that the causes have not been identified or stakeholders have remained indifferent to suggested solutions (Ede 2011). Government agencies, professional bodies like Architects Registration Council (ARCON) and Council of Registration of Engineers in Nigeria (COREN) are quick to set up panel of inquiries in the event of any building collapse, causes are identified, published and made public yet building collapse is on the increase as shown below. The pictorial analysis of building collapse is shown below.



Fig. 1: Collapse of Eight Storey Hotel building under construction situated along Musa Yar'Adua Drive Owerri, Imo State – 20th April 2020

The Collapsed Hotel Building at Owerri Imo State

On 20th April 2020, an 8-story hotel building collapsed in Owerri. This hotel building at the time of collapse was still under construction. The investigation survey carried out as to determine the cause of the collapse, revealed the following:

- i. Direct payment to contractor by client without valuation certificates by consultants,
- ii. Sole supplier of materials was the clients brother who deals directly with the contractor. The relationship existing in material supply is contractor-client-brother relationship,
- iii. Replacing missing site book to use of project whatsapp group chat with client, contractor and others involved as participants,
- iv. Illegal addition of extra floor before the penthouse at sixth floor level on Nov. 2019 this request was rejected by the Site Engineer which resulted to the withdrawal of his services as the engineer, and
- v. Poor quality of on-the site supervision.



Fig 2: No 90 Nkwere Street Umuahia
A three storey building (in use) adjacent Voice of Freedom & Grace Tabernacle, Umuahia, June 2020.



Fig 3: No 85 Azikiwe Street Aba.
Collapse of three storey building under construction



Figure 4: Collapse of Multi Storey Exam Hall in Taraba. Source:[http://ireports-ng.com/2013/04/25/](http://ireports-ng.com/2013/04/25/.). Three-secondary-schools-students-killed-200-injured-as-exam-hall-building-collapses-in-Taraba/



Figure 5: Collapse of Three Storey Building in Abuja

Source: <http://saharareporters.com/news-page/breaking-news-three-storey-building-collapses-abuja>

The Collapse of Three Storey Building in Abuja occurred in Naval Quarters in Gwarinpa, Abuja on the 28th of January, 2012. It left several dead and construction workers injured and trapped.



Figure 6: Collapse of One Storey Building in Kano.

Source:<http://www.channelstv.com/home/2012/07/26/>. One-year-old-baby-killed-by-collapsed-building/

Collapse caused by structural failure on 26th of July 2012, at Niger Road Sabongari, Kano leaving one dead and several injured.



Figure 7: Collapse of Twin four Storey Building in Lagos

Source: <http://www.sbs.com.au/news/article/2013/11/05/>.

Collapse of a twin four storey duplex shown in Figure 7 occurred on the 3rd of November, 2013 in Victoria Island leaving four dead and twenty-five injured; cause of collapse unknown.

Architects' Site Supervision

The architects' duties can briefly be summarized as designing of the building, preparation of working drawings and contract documents, the arrangement of the contract, the inspection of the work in progress, the certifying of interim payments and the examination of the final accounts including their checking if no quantity surveyor is appointed (George et al 1981). The concern of the study is supervision which is either on residency where the architect's site visit is once a month or non resident supervision where frequency of visit depends on size, complexity and speed of progress being made. Supervision is by no means the least of the architect's duties. The aim of architectural supervision is to ensure that the building is erected according to the design and specification (Akpabio, 2003). To actualize this aim, the building process must be inspected at all stages of construction because we believe that the building and structural designs were prepared and approved by registered professionals, architectural supervision will be considered under the following headings.

- i. Material supervision
- ii. Process of supervision
- iii. Practical completion supervision and
- iv. Post maintenance supervision.

Material Inspection: On commencement of a building construction, the contractor is required to submit to the architect samples of materials and equipment for physical examination for testing of specimen and approval. Samples may include aggregates, sandcrete blocks, wall panels- aluminum composite panels, cornices, tiles, electrical fittings, sanitary wares, iron mongery, doors, handrails, P.V.C ceilings, any material and equipment that requires testing or selection. Approved samples are to be left with the clerk of works for comparison with subsequent supplies. Material selection involves many criteria/parameters when it comes to choice of building materials but the preference criteria falls into three categories which include physical availability (can it easily be acquired), financial availability (is it affordable and within the contract sum), and environmental availability (is it a good and safe material to use). All materials are however expected to provide a certain degree of performance. The definition of performance criteria comes before the choice of materials. On the first level of importance are basic requirements such as **structural stability** (will the material stand up to the imposed gravitational loadings, wind, thermal movements, etc), **durability** (will the material be able to perform its function long enough), **health and safety** (can the material be guaranteed not to present a health risk during construction and subsequent use), and **Fire** (will the material behave acceptably in the advent of fire?).

These four criteria are of such importance that it requires more than the opinion of the architect to verify other suitability. Because building regulations primary aim is to ensure safe buildings, hence the architect

will lay heavy emphasis on these issues and will therefore require evidence in form of independent certification from manufactures incase of manufactured materials brought to site. The next level of performance criteria falls under what is normally considered to be 'design' decisions and these includes **Appearance** (will the material provide the finish surface required), **Weathering performances** (will the material behave as expected when exposed to local weather conditions?), and **Serviceability**(can the material be maintained and repaired?). There are other issues to be considered by the architect before selecting a material for construction and these include: availability, cost, durability and of prime importance are environmental features. Buildings comprise many different components; some made up and assembled on the site while others are bought in as manufactured items. The above selection criteria are mainly for manufactured items. Tests of samples for concrete are necessary and some of the numerous tests conducted are:

Aggregates test: This is performed to ensure that aggregates for concrete work are clean and graded. Aggregate sizes affects workability of concrete, the smaller the aggregate, the easier it is to compact. Other aggregate tests includes those for determining the silt content, organic impurities, 'bulking' and moisture content of sand.

Cube test: Although concrete is weak in tension, it is strong in compression. Cube test is conducted to determine the compressive (crushing) strength of a concrete specimen. For general structural use the crushing test at 28days is in the range of 20-30 N/mm² (Akpabio, 2003).

Slump test: Slump test is aimed at controlling the workability (water content) of a concrete mix. The extent of the slump depends on the amount of water in the mix; the more the water, the wider the slump. A slump of 25-50mm is acceptable for mass concrete while it could be as much as 40-100mm for reinforced concrete.

All these tests are not only intended to ascertain the quality of the materials but also to ensure that the approved and acceptable quality is maintained throughout the project. The result of the test should be recorded by the Clerk of Works in his diary. As a general rule and for the purpose of cost control, all defective materials or workmanship must be dictated at the earliest point of construction process. The supervising architect need not wait for a wall to be erected using defective materials or workmanship before rejecting it. Otherwise the contractor is expected to make good defective work at his own cost.

Process Supervision

In a more simple term, the objective of site supervision is primarily to ensure that the employers requirement as expressed in the contract documents are correctly interpreted and that the problems which are bound to arise on even the smallest jobs, are satisfactorily resolved. In addition to Clerk of Works role, the architect is expected to visit the site as often as need arises to inspect works and give instruction as necessary. The architect supervision in a more comprehensive term is a technical, vital and effective tool to direct, manage and oversee the building project processes and to coordinate all deliverable by appointed consultants for the successful transformation of drawings and specifications to reality just as they have been conceived. According to the Condition of Engagement and Remuneration for professional architects' services of 21st September, 2011 describes the duties of the architect as a prime consultant to include the appointment of other consultants including the Clerk of Works.

The appointed consultants are the Project Manager, Planning Consultant, Quantity Surveyor, Structural Engineer, Mechanical/Electrical Service Engineers, Surveyors, Geo-technical Engineers etc. The architect should coordinate all deliverables while the appointed consultants will comply with the directives of the architect. On this premise therefore the architect is the leader of the building delivery team. To discharge his responsibility effectively, he must have adequate knowledge of building construction, building services and possess high level of management and administrative skills and above all a personality of impeccable integrity if he must command the confidence of his client and the building team.

Effective Inspection Procedure

Before visiting the site, the architect should study the Clerk of Works report, review the programme of work, (see appendix), identify delays if any and make a list of items he would like to see during the visit. On arrival at the site the architect should first meet with the Clerk of Works who will brief him on the progress of the works, drawing his attention to problem areas that require his personal attention. From the Clerk of Works office, both will proceed to meet the Site Agent and then go on to inspect the project. The architect at his discretion might refuse to allow the site agent lead the inspection to avoid covering up bad workmanship.

However, if the supervision is the one following a site meeting, the architect may decide to first visit the problem areas as discussed at the meeting otherwise he may go to the areas brought to his attention by the Clerk of Works or areas he had earlier listed for the day's inspection.

Standard Supervision Check List

While supervising works in progress, the architect should be looking at every aspect of the works to ensure that the works is been executed in accordance to the drawings, specifications, and statutory/building regulations and as directed by the architect. Some of the items should be inspected jointly with the appointed consultants. Under is a list of some of the checks he should carry out or amplify to suit the nature of the job under supervision.

Preliminary Works

- i. Sitting of workmen's canteens, building of site office and material stores and protection of materials
 - ii. Removal of top soil and location of spoil heaps
 - iii. Perimeter fencing or hoardings
 - iv. Provision for protection of right of way
 - v. Party wall agreements and protection of adjoining property
 - vi. Protection of trees and other special features
 - vii. Site security
 - viii. Ensure that drawings, bills of quantities and other information relevant to the jobs is complete
 - ix. Agree on bench mark or local pegs
-
- i. Setting Out: Confirm building position with special regard to building line and set backs
 - ii. Excavation and Foundations
 - a. Check widths of trenches and depths of excavations
 - b. Nature of ground in relation to trial hole report
 - c. Quality of concrete and thickness of concrete beds
 - d. Suitability of hardcore (must be free from rubbish)
 - e. Quality of sand and ballast (free of loam and of correct grade)
 - f. Damp-proof membranes
 - g. Correct placement of reinforcement, including diameter, bending and spacing of bars
 - h. Placing of concrete
 - i. Consolidation of backfilling, suitability of materials used for backfilling. Laterite to be compacted in layers of 225mm to required level
 - j. Quality of concrete mix, thickness of foundation slab.
 - iii. Block Work Above Damp Proof Course (DPC)
 - a. Check quality of block to confirm to approved sample
 - b. Check quality of mortar
 - c. Check setting out above DPC, Doors and windows position
 - d. Walls to be vertical, corners at right angles unless otherwise stated.
 - e. Formwork to be properly set out to produce correct form of concrete required
 - iv. Reinforced Concrete Floor Slab
 - a. Ensure that shuttering is strong enough to carry the weight of oncoming concrete slab
 - b. Check the positioning of the main and distribution bars
 - c. Ensure proper positioning of conduct pipes
 - d. Curing of concrete and striking of shuttering
 - v. Carpentry and Joinery
 - a. Ensure timber is well seasoned, free from knot, shakes, sapwood and insect attack
 - b. Timber dimensions must be within permissible tolerances
 - c. Ensure proper storage, staking and protection from weather
 - d. Check out for proper jointing, bolting, spiking and notching of carpenters timber.
 - e. Spacing of rafters, noggins, purling and battens

- f. Treatment of timber
- vi. Roofing
 - a. Check the pitch of roof and overhangs
 - b. Spacing of rafters, tie beams, wall plate and battens
 - c. Specified gauge of roofing sheets
- vii. Plumbing
 - a. Inspect sanitary goods to ensure they free from cracks and defects
 - b. Ensure correct falls to waste branches and soil
 - c. Correct location and accessibility to value, stop cocks, traps and rodding eyes.
 - d. Confirm location of inspection chambers, septic tank and soak away pits.
- viii. Electrical Installation
 - a. Check components and positions for switches, fuses, cables, etc against approved specification.
 - b. Ensure the runs of cables and quality of connections
 - c. Ensure that lighting conductors are correctly installed.
 - d. Correct sizes and quality of conduct pipes.
- ix. Plastering
 - a. Preparation of wall surfaces for tiles, painting etc
 - b. Ensure adequate and correct mix
 - c. Adequate workmanship on corners and arises
- x. Steel Work
 - a. Conscious checks on sizes of steel
 - b. Bolting and welding (jointing techniques)
 - c. Ensure priming and protection of steel from corrosion.
- xi. Flooring
 - a. Materials approval
 - b. Preparation of surfaces
 - c. Quality of screeds
 - d. Regularity of joints, skirting and coves and tiles
- xii. Painting and Decoration
 - a. Prepare surface to be free from damp, cracks, holes
 - b. Check and test paint sample against over thinning
 - c. Ensure that finished works is free from runs and brush marks.
- xiii. Specialist Installation
 - a. The architect is to coordinate the services of specialist consultants hence he shall ensure that:
 - b. All specialist drawings are complete and on site
 - c. Unforeseen changes in design of special equipment and are adequately executed.
 - d. Attendance to site and correct sequence of work is maintained to avoid induce delays
 - e. Safety of operatives is secured.
- xiv. External Works
 - a. Ensure that site is graded and well drained
 - b. Define the green areas, walkway and hard surface finishing
 - c. Proper landscape
 - d. General Cleaning
 - e. Windows, doors, floors, handrails are scrubbed and free stains
 - f. Sanitary wares are flushed and washed
 - g. Painted surfaces remain clear
 - h. Plumbing, electrical installation tested and functional
 - i. Doors opening freely with keys
 - j. Scaffoldings dismantled and surroundings cleared of rubbish.

Practical Completion Supervision

The architect, the contractor and the client or his agent is to hold a joint supervision. Before the date for this supervision, the architect should be completely satisfied with the answers to the following questions because this supervision has a very important influence on the contract and any possible legal dispute that may arise. Has the Drawings, Specifications and the architect's instructions been transformed to practical reality as they were conceived? Is the building in a habitable state to be taken over by the client for its full occupation and

for proper use? The purpose of the joint supervision is to ascertain the state of readiness of the building, testing of equipment, services and to dictate defects. Focus of this joint supervision should be on how well stains have been removed from windows, doors and how freely they open, and close, wash hand basins (WHB), Water Closets (WC) and floors.

Also of importance are the testing of all electrical installations, equipment and how efficient the flushing of the WC is. Others include how well the floor tiles were polished and painting/decoration on walls. Where identified defects are major, the contractor is liable to rectify them before the building is taken over by the client but where they are minor, like broken switches, the building can be taken over and the defects made good during the defect liability period.

Post Maintenance Supervision

At the end of the defect liability period, the architect and other services consultants responsible for the work will carry out a detailed supervision. Because this is more or less the last chance for the client to get the contractor to attend to the defects, the client, or his agent should join in the supervision. Alternatively, the architect could use the information collected from the client to build up a comprehensive list of schedule of defects. Copies of this schedule of defects should be distributed as follows: Contractor, Client and the Quantity Surveyor. The contractor is obliged to make good all the listed defects in the schedule within a reasonable time. The architect is legally protected to nominate someone else to make good the defects and the expenditure so incurred will be deducted from the contractor's retention fee.

Conclusion and Recommendations

It is obvious that when the supervision check-lists highlighted above is critically followed and applied by the appropriate professionals, building collapse will be drastically minimized and the associated trauma, loss of lives and property suffered by the affected will equally be reduced and our urban future will be better. To achieve this level of urban satisfaction, architectural supervision should start from the site selection stage, design in collaborator with the structural engineer, quality surveyor and other specialist consultant throughout all stages of the construction process. The supervising architect should carry out his duties in a positive manner and not only as insurance against faulty workmanship or use of materials not in accordance with the specification. The architect in performing his supervisory role should exercise reasonable care and diligence in conformity with the expected level of professionalism and in an impartial manner for the success of the project. From the foregoing, it is established that the supervising architect should be versatile, possess comprehensive knowledge of practical building construction techniques and adequate technical communication skills to convey his instructions in a clear, definite and in undoubted manner. He has to be engaged in writing to function as supervising architects.

This study recommends that every project should have a supervising architect and depending on the project's magnitude and complexity, the supervisory team should include the structural engineer, the services engineers and quantity surveyor for joint supervision. Beside, every project should have a Project Bill Board showing the project title, location and the name of supervising architect/firm among others. All tiers of government should provide the enabling environment for the national building code to work and adequate and clearly defined sanctions for building collapse defaulters. In the same manner, all professional bodies should brace up to this challenge by stipulating and enforcing commensurate sanction on members convicted for building collapse in addition to the government's sanction as a way of upholding the integrity of the profession. Every registered architect should bear in mind that sealing and signing of drawings for all manner of building drawings producers carry unimaginable consequences that could threaten integrity and therefore discouraged. The earlier practice of forming partnership among architects irrespective of age and practical experience is encouraged as this will promote the sharing of ideas. The public does not know that most Development Control Departments of the government have no architects in their employ. This is a great challenge to supervision. It is therefore recommended that professionally qualified architects be employed in all Development Control offices across the country. Finally the government is encouraged to follow due process in awarding contracts and reject the use of political party membership as basis. This system of contract engagement creates room for the use of incompetent, mediocre, quacks and unprofessional characters into the building industry.

References

- Akpabio, M. J. (2003) Building Contract Administration. A Handbook for Architects, Administrators and building professionals, printed by modern business press Ltd Uyo.
- Aluko, O. O. Adediji, Y.M. D. (2010) Building Collapse in Nigeria.
- Architects perspectives International Journal of Engineering and Engineering Technology, Federal University of Technology Akure 6(2) 90-96
- Amadi A. N, Eze, C. J. Igwe, C. O, Okunola, I. A and Okoye N. O. (2012) Architect and Geologists view on causes of building failure in Nigeria. Modern Applied Science 6(6) 31-38
- Author, J. W., George, W. N. B., Christopher, J. W. and Scher, H.P (1981). The Architect in practice, Sixth Edition, British Library Publication Data.
- Ede A. N. (2010) Building Collapse in Nigeria. The trend of casualties, the last decades (200-2010) International Journal of Civil Engineering and Environmental Engineering 10(6), 32-34.
- NIA, (2020) Nigerian Institute of Architect Conditions of Engagement and Remuneration for professional Architect Services
- Normal, W and Joan, Z (2008) Materials, specifications and detailing volume 3, published by Taylor and Frances Group, 2 park Square, Milton Park, Abingdon, OX14 4RN.
- Oloyode, S. A, Omoogun C. B. Akinyare, D. A. (2010). Tackling causes of Frequent Building Collapse in Nigeria sustainable Development 3(3), 127-132
- The Aqua Group (1979) Contract Administration for Architects and Quantity Surveyors, Fourth Edition, Granada Publishing Ltd in Cros by Lockwood Staples.

UYO URBAN IMAGEABILITY AND IMPLICATIONS FOR ENVIRONMENTAL & CULTURAL VALUES

Massodih Effiong and Jacob Atser

Department of Urban and Regional Planning

Faculty of Environmental Studies, University of Uyo, Uyo

Abstract

The ways our urban environments are designed and built affect the environmental quality and cultural values. This paper examined the image of Uyo urban and its implications for environmental and cultural values. Using a graphic approach, this study examined the sensuous quality of Uyo urban environment in terms of its organization using the imageability elements. The result shows that the imageability of Uyo urban is high.

Keywords: *visual character, aesthetic experience, infrastructure, Uyo urban.*

Introduction

The creation of Akwa Ibom State in 1987 brought about the upgrading of Uyo from a provincial and local government headquarters to a state capital. Since then the city has experienced a great influx of people. The growth of urban population in Uyo has had serious implications for the functioning of urban environment, noticeably in the areas of sustained infrastructure and service provisions, which are vital to the wellbeing of the city dwellers. However, the greatest threat to Nigerian urban environment may not be tied to the rate of urbanization being witnessed, but rather to the apathy toward the structure of environment and the consequent blindness to the disorderliness and ugliness of urban growth (Etim, 2007). It is obvious that the way our urban environment functions, looks, smells or sounds has a bearing on our well-being. A well-designed urban environment can positively influence the quality of our urban life by eliminating functional conflicts, providing efficient facilities and services, leisure amenities and creating an environment that makes the urban experience more livable, more relaxing and more fulfilling, and reduces the hassle and constant stress of daily life in the city. The immediate surroundings, such as our residential environment in particular mirror our outdoor values requirements and aesthetic response to the environment the joy of seeing the world around us (Booth & Hiss 1991; Pike 1979; English & Mayfield 1970).

This sensuous quality of the urban environment invariably depends firstly; on the way it is organized to function and secondly, on the aesthetic consciousness of people in maintaining and promoting such quality. In fact, how this environment is organized and maintained is an outcome of this relationship, which is associated with feelings of attachment with that particular environment. There is a kind of psychological link with the environment, which now emphasizes the need for citizen participation in creating and maintaining the urban environment. In Western countries in general, this man-environment relationship is enviably maintained and the beauty of cities portrays with happy acceptance of environmental issues. In such environment, important landscape elements such as building of historical significance and public places of interest as well as distinct architectural and sculptural designs that convey images of power, economy and history are not only created but are well cherished.

On the contrary, a typical Nigerian city is what Adejumo (2002) and Abejide (2002) have exasperatedly described as being 'aesthetically distressing'. This description aptly captures the general disillusionment with the way we build and maintain our cities. A first time visitor to any of the Nigerian cities is confronted with so many strange phenomena. The inefficiency of most of the crystallizing element of the city due to poor design and maintenance gives the impression that little or no attention is paid to city planning and urban design as district areas of professional activity. Added to the disfigured and distorted character of the city's spatial arrangement are the ever-increasing mountains of stinking garbage that punctuate the olfactory and visual sensory of the cityscape. In spite of the severity of these visual phenomena, there seems to be little interest in research efforts pertaining to the images of our cities, portraying a lesser attention currently paid to the three-dimensional realm of development of urban Nigeria (Okedele 2002, Godwin 2002). This paper discuss the relevance of city imageability on environment, security, and culture in the city of Uyo and recommends ways in which city images can be improved for sustained quality of aesthetic experience in our urban environment. The analysis, which uses the five Lynchian city's elements, is based on a critical field survey of a number of images in Uyo capital city.

Concept of Imageability

Lynch (1960, 1968) in his book “Image of the City”, imageability is the figuration of a place that is the quality which confers to a physical object, a high probability of evoking in each observer a vigorous image. Lynch explained what elements in a built structure of a city are important in the perception of the city. What does the city's form actually mean to the people who live there? What can the city planner do to make the city's image more vivid and memorable to the city dweller? To answer these questions, Lynch, supported by studies of Los Angeles, Boston, and Jersey City, formulated new criterion of imageability and showed its potential value as a guide for the building and rebuilding of cities.

To appraise the functional and visual character of Uyo for quality aesthetic experience, People can mentally adapt to any situation, but there are design strategies that can make urban orientation easier. For the purposes of study, the interconnected design elements can be broken down into five categories: paths, edges, districts, nodes, and landmarks. Apart from creating the image of a city, these elements also perform the function of providing comfort and orientation so necessary in the functioning and visual appearance of a city.

Paths: Paths are the transportation routes of the city and are the most common points from which the city is experienced. They can be made distinct and memorable through variation in design and natural setting. To avoid confusion, there ought to be an obvious hierarchy of streets, indicating which carry a higher volume. Each street need not be absolutely straight, but it ought to travel in one general direction and have a directional gradient to communicate where on the line the traveler is. Paths should have well-defined origins and destinations as well as landmarks along the way. This is made up of streets, walkways, tramlines, railway lines and canal. Apart from being the communication channels in the city along which people move and goods are transported, they set the scale and pace of future urban development. It is along the paths that buildings, open spaces and other designed elements are arranged and related. They are therefore a major structural element of the urban landscape. The quality of the path system not only directly influences the volume and orientation of travel within it but also can pre-determine the overall quality of the urban landscape. For a city to achieve a sense of beauty, its major paths and rhythm of views from their principal visual axes must be coordinated. The road profile, choice of color and texture of pavement materials, building facades flanking the paths, street lighting, street trees and/or arrangement of activities that give continuity to the paths can achieve this. It is absolutely important that the paths be properly installed to handle both the vehicular and pedestrian movements with safety, efficiency and comfort to create a sense of aesthetic and orderliness in the city. This is shown in Plates I and II respectively.



Plate I: Flyover at Ikot Ekpene road welcomes you from Abia State into Uyo



Plate II: Ikot Ekpene road after the flyover towards the circus; the city centre

Nodes: Nodes are focal points or activity spaces in a city. They are junctions of paths such as roundabouts, city squares, plazas, places of break in transportation such as bus terminals, airports, harbors etc. How these focal points are built into the urban fabric influences the quality of urban experience. Both the external and internal spaces of these places, their locations, scale and clarity of forms, the visible and tactile characteristics of their walls, floors and facades must be made expressive of their importance. This is shown in Plates III and IV.



Plate III: Edet Akpan Avenue by Nwaniba road, Uyo



Plate IV: Nodal point in Uyo providing access to the town campus of University of Uyo

Edges: These are linear elements or breaks in continuity or visual boundaries between edges of adjacent development. They may be physical boundaries such as walls, or shorelines. The edge element, even though not as dominant as path, is an important organizing feature for many people, particularly in its role of interconnecting generalized areas together, such as the outline of a development by wall. They are lateral references rather than coordinate axes. Such edges may be barriers, more or less penetrable, which close one region off from another; or they may be seams, lines along which two regions are related and joined together. These edge elements, although probably not as dominant as paths, are for many people important organizing features, particularly in the role of holding together generalized areas, as in the outline of a city by water or wall. They provide a spatially distinct constitution to elements of the city. The more visually obvious they are, like a waterfront or park side, the better. Edges can be strong, but planners must ensure they are still penetrable enough to allow connections across them (see plate V).



Plate V: Active Ravine in the northeastern part of Uyo

Landmarks: These are point of reference. Landmarks, such as buildings, signs, natural elements like hills, mountains, are easily identifiable elements, which provide orientation and help to guide people through a city. Their significance lies in the fact that they are unique because of scale, location or some other physical characteristics. Many of the city's landmarks are of historical value, and should be greatly protected and preserved. Their attractiveness is greatly enhanced when streets and nodes are focused on them.



Plate VI: The circus showing Uyo city centre



Plate VII: Akwa Ibom State Stadium

Districts: Districts are the medium to large part of the city with identifiable character. Generally, they are environments symbolically controlled by groups with which unique types of behavior are expressed. Their texture, scale, forms etc. reflect their characteristics, for example, low-income and high-income residential districts. Districts provide the city with places that are diverse but have a clear perceptual identity that is recognizable and vivid. They can be useful in giving direction and may have names, such as Nassarawa; Hausa enclaves in Itam and Eka Street, Ewet housing Estate, shelter Afrique Estate all in Uyo.

Paths, nodes, landmarks and edges are the skeleton of urban structure, which is fleshed out to form various districts in a city. In other words, districts are structured with nodes, defined by edges and penetrated and networked by paths, and punctuated with landmarks. For efficient urban design, the above crystallizing elements must function efficiently together so as to guide the city's users to understand the opportunities the city offers. Where any of these elements is lacking or ineffectively created, not only will the legibility of the city becomes blurred, but its aesthetic experience is also impaired.



Plate VIII: Overview of Government House

Uyo City Image Scene

In using the above elements to analyze Uyo city images, it is evidence that Uyo urban has these elements, interwoven together to embrace order, expressive architecture, and historical significance. The street networks reflect hierarchical arrangements, and public relevant buildings and places have sensuous characteristics depicting their importance and relevance to public activities. In uyo, we both have the indigenous and foreign design models of different images. Examples of these elements are Ibom Plaza called circus in the central part of the city, water fountain at Edet Akpan Avenue by Nwaniba road, barracks road roundabout by Brooks street etc. These areas have become important activity nodes. Other places of interest and attractions include, hill top mansion, Goodluck Ebele Jonathan flyover, active ravine behind Uniuyo town campus. There are quite a number of roundabouts, adorned with sculptural and architectural monuments, including statues to remind people of the heroes and heroines of their cultures. However, the missing dimension of too many of these fantastic monuments and beautiful places is their poor-maintenance and sometimes total neglect. In many instances, they are littered or out-rightly abandoned, paving way for street trading or lunatics or grasses to take over. In fact, these landmarks and places of importance are not treated in a manner that depicts any appreciation of their landscape values. Classical examples include Ibom plaza, Nepa line by Aka road, and others, which have been defaced and long abandoned to street trading.

Among the functional deficiencies in the street system is the overloading of its routes. Difficulties in moving people and goods along these streets often arise from various elements of the circulation system not properly installed or completely absent to reinforce the specific functions for which the paths, as crystallizing element, are meant in the city. Even though many of the streets in most areas were of spontaneous origin, having been inherited from indigenous settlements, those that have been later designed often have more traffic volume and lack of traffic constrictions, making them to take on more than their designed capacity. Consequently, they are crowded with excessive motorists. In many instances, the comparatively long distances between major intersections give drivers a false sense of security and lack of hazard, resulting in excessive speeds. Inconsiderate and inappropriate uses largely as a consequence of poor driving experience and ignorance/absence of traffic regulations are a major contributor to the mess seen daily on the roads. The resultant street scene is, in most cases, hazardous to both pedestrians and motorists.

Improving City Elements in Uyo

Improving the images in the study area may require a three-tier approach. These are design targets, three-dimensional control of city planning, and maintenance. For the city design to be meaningful in Nigeria, it requires a lot of political will from the government and the commitment of design professions. Given the usual limited allocation to physical development by the government, and the fact that the rapid growth of the cities cannot be prevented, there is the need for, the design professionals to seriously pay attention to those areas of the cities, which frequently seem to go wrong, realizing that, it is the things done to the urban environment that matter most. To tackle these problems, the design targets should focus on the crystallizing elements of the city that make it functional and aesthetically pleasing. Design should concentrate on the public buildings and activity spaces such as city squares, malls and plazas and important landmarks. Installation of streetscape elements, particularly the flanking facades of major streets with which the city appearance revolves.

Public regulations and zoning ordinances are the traditional ways of controlling building and open space development in the city. In Nigeria, public regulations of development are too general and are usually directed to a single object-the building of plot. Building heights, density, location, fence walls allowable, material, setback lines, plot geometry and open space requirements all have sensuous bearing on the city skyline and appearance. These regulations will be more effective and translate to visual harmony of these elements if they refer to multiplicity of the objects in the built environment so as to integrate the entire building forms. The architectural design should present a quality image that agrees with desired character of the city character. Individual building design can exhibit a contrast in the use of certain design elements, such as materials, colour, window spacing, roof treatment and basic massing proportions. This can be permitted as long as such design contrasts are not in direct conflict with surrounding buildings or the overall image of the streetscape. In order to facilitate desirable character of urban environment, a shift of attention away from the traditional 2-dimensional urban planning to a 3-dimensional realm of development planning appears timely to ensure functional and aesthetic development of the urban forms. To do this, a process must be instituted that allows the participation of city designers in important decisions concerning the future of the city. They must be present when critical design decisions are made to influence the shape of the city. This will entail creating an urban design department in the relevant ministry specifically for developing concepts and specifications that will regulate specific spatial character of the urban environment.

Maintenance and constant renewal of designs is even more important than their original forms. A design will continue to serve its intended purpose for many years if it is properly maintained. Most projects do not sustain themselves in perfect condition without periodic maintenance and upkeep. Maintenance directly affects the health of design elements and general appearance and cleanliness of design over a period of years. Too often, a design deteriorates due to poor maintenance despite its good initial design qualities.

Conclusion

The issue of re-arranging our cities to achieve some measure of sanity and beauty is more than a matter of creating elements of the city. One of the major challenges facing decent urban environments such as Uyo is how to deal with the fundamental ethical problem of the present-day poor attitude of many citizens toward private and public environments. The issue of poor acceptance of outdoor values by the urban policy makers and individuals can no longer be ignored. We may postpone thinking about it, but it will be thrust upon us by future environmental changes in the on-going globalization process. For any meaningful improvement to

the city appearance to be achieved, city authorities must find better ways of balancing the needs and pressures of urban growth with the opportunities and constraints of the urban environment. Available evidences from the cities worldwide show that one of the fundamental challenges and ways to improve the city appearance has to do with good urban governance. The Nigerian cities can be greatly reshaped if all the stakeholders are observant, aesthetically conscious and disciplined enough to imbibe a maintenance culture and a happy acceptance of environmental values for their well-being and that of the cities.

References

- Abejide, F. (2002), "An Exploratory Description of Forms and Graphics Representation in Urban Aesthetic in Nigeria; in (eds,) Amole, D. et al, *The City in Nigeria: Perspectives, Issues, Challenges, Strategies; Proceedings of a National Conference organized by the Faculty of Environmental Design and Management. Obafemi Awolowo University Ile-Ife, Nigeria*, p. 204-209.
- Adejuno, A. (2002), "Urban Art and Aesthetics in Nigeria" in (eds,) Amole, D. et al, *The City in Nigeria: Perspectives, Issues, Challenges, Strategies; Proceedings of National Conference organized by the Faculty of Environmental Design and Management. Obafemi Awolowo University, Ile-Ife, Nigeria*, p. 212-218.
- Booth, N. K., and J. E. Hiss (1991), *Residential Landscape Architecture: Design Process for the Private Residence*; Prentice Hall, Eaglewood.
- English, P. A. & Mayfield R.C. (1970), *Man, Space, and Environment*; Oxford University Press, New York.
- Etim, E. (2007), "The Challenges of Globalization and the Outdoor Environment of Housing"; Eds. Fadare, W. et al, *Globalization, Culture and The Nigerian Built Environment*, Vol. 2; Faculty of Environmental Design and Management, Obafemi Awolowo University, Ile-Ife, p. 239-245.
- Godwin, J. (2002), "The Challenge of Urban Aesthetics Control in Lagos"; in (eds), Amole, D. et al, *The City in Nigeria: Perspectives, Issues, Challenges, Strategies; Proceedings of a National Conference organized by the Faculty of Environmental Design and Management. Obafemi Awolowo University, Ile-Ife, Nigeria*, p. 65-72.
- Lynch, K. (1960), *Image of the City*; Revised Edition, MIT Press, Cambridge, Mass.
- Lynch K (1968), "City Design and City Appearance": In (eds) Goodman, W and Freund, E; *Principles and Practice of Urban Planning*; International City Managers' Association, Washington D. C, p. 249-276.
- Okedele, N. (2002), "Application of City Design Building Process: Lagos Experience"; in (eds), Amole, D. et al, *The City in Nigeria: Perspectives, Issues, Challenges, Strategies; Proceedings of a National Conference organized by the Faculty of Environmental Design and Management. Obafemi Awolowo University, Ile-Ife, Nigeria*, p. 384-393.
- Pike, J. (1979), *Urban Landscape Guidelines*; Centre for Environmental Planning, The University of Melbourne, Australia.

BARRIERS AND DRIVERS TOWARDS EFFECTIVE USE OF INSURANCE AS A RISK MANAGEMENT TOOL IN BUILT ENVIRONMENT SECTOR IN CALABAR METROPOLIS, NIGERIA

Esuabanga W. Effiong; Osuorji G. Chukwuebuka; Sodangi A. Ahmed & Aboluwarin, T

Nigerian Building and Road Research Institute, Km 10, Idiroko Road, Ota- Ogun State

Correspondence mail: esuabangawilliam@gmail.com

Abstract

The study aimed at assessing barriers and drivers towards effective use of insurance as a risk management (RM) tool in built environment sector in Calabar metropolis. Information were elicited from respondents who are professionals in the sector using questionnaires and it was observed that there is a high level of awareness among the professionals concerning the use of insurance as RM tool based on responses such as highly aware (58.8%) and aware (23.7%). The relative importance index (RII) rating of preferred categories of risk for insurance showed that combination of all risk, physical risk and disaster risk were highly rated with 0.82, 0.81 and 0.76 RII. Unsteady cash flow, lack of enforcement and lack of confidence in the insurance industry were also highly rated as barriers to effective use of insurance as RM tool with 0.84, 0.82 and 0.75 RII respectively. Also improve regulation/supervision, elimination of corrupt practices and strict adherence to ethic were the top rated drivers that influence the use of insurance as RM tool with rating of 0.84, 0.80 and 0.77. Spearman's ranked correlation coefficient revealed a strong and positive relationship between barriers and drivers variables towards effective use of insurance with 0.70. Furthermore, with the calculated t-value of 2.77 > table value of 2.31 at 0.05 level of significance, resulted in the rejection of the null hypothesis (H_0) while the alternative hypothesis (H_1) was upheld. The paper recommends a better synergy between Insurance bodies such as National Insurance Commission (NAICOM) and all the built environment professionals such as Council for regulation of engineering in Nigeria (COREN), Council of registered builders (CORBON), Nigerian institute of Architects (NIA).

Keywords: barriers, built environment, insurance, risk management, drivers

Introduction

Human endeavors including built environment sector is inherent with all forms of risks (Odeyinka, 2000). Beginning from conceptualization, planning, implementation and actualization of the phase of any project, the issue of risk cannot be overemphasized. This calls for professionals within the built environment to keep informed about expected risk at every developmental stage of any project. This has become necessary because over the years, there have been a geometric increase in risk associated with the built environment sector (Babu & Kachanna, 2014). While there are diverse categories of risk management tools, insurance seems to offer one of the best options as far as built environment sector is concerned. According to Kikwasi (2011), insurance is a means by which casualties incurred by a small party are compensate through funds gathered from those who are mutually insured and by this; the insurer reimburses financial loss that has resulted from an insured risk. Despite the fact that insurance has been regarded as one of the best alternative in risk management within the built environment sector, these professionals have down played it with a very low level of patronage (Akinradewo, Aigbavboa, Nwenga, Thwala&Ncube, 2019). This may be due to several barriers that work against the sector. It has become necessary to look at these existing barriers in order to find a way of eliminating them. Moreover, willingness to adopt insurance in risk mitigation has always been expressed but several fears are often rising concerning their mode of operation thereby making it difficult for implementation. Calabar Metropolis has over time witnessed rapid increase in population with corresponding demand for infrastructure facilities in order to meet up with this teeming population. This has also put more pressure on the available built-environment professionals in meeting the infrastructural need within the study area. In order to successfully push forward the frontier of infrastructural development, there is need to put on ground the required risk management tools such as insurance so as mitigate all the potential and existing risk within the industry. This study become necessary in order to identify those factors that act as barriers and drivers towards effective use of insurance as a risk management tool in built environment sector within the study area.

Review of Literature

Insurance, built environment and risk management have had several studies on them. Odeyinka (1999) in his study of the use of insurance in managing construction risk in Nigerian construction industry using questionnaire survey observed that there is a strong correlation between insured sum and the actual replacement cost when there are losses or damages. The result further showed that insurance claims settled

could cater for only 61.1% of the replacement cost of ongoing construction work studied. Akinradewo et al (2019) in their study of efficiency of insurance as a risk management tool in South African construction projects revealed the effectiveness of insurance in construction industry in managing external, financial challenges, health and safety.

Zailani, Abubakar and Muhammad (2019) assess the barrier to risk management implementation in small construction projects in Nigeria. Their study revealed lack of knowledge and experience, tight schedule and cost of projects as the major barriers to RM by managers while increase in understanding of the concept of RM by managers has been expressed as the most effective measure for overcoming lack of implementation of RM in small projects in Nigeria. Other studies in Nigeria has found that poor RM practice have led to time and cost overrun, project abandonment and loss of profit in built environment sector (Windapo, Omeife & Wahap, 2010). Wang, Dulaimi & Aguri, (2013) also identified in their study twenty eight risks that are associated with construction projects in developing countries like Nigeria, using seven degree rating scale. Out of these twenty two risks were ranked as critical while eleven were listed as the most critical risk among the twenty two risk such as; permit approval, changes in law, enforcement of justice, credit worthiness of Local partners, political instability of the country, cost overruns, corruption, interest and inflation rates, policies of government and influence venture. Furthermore their studies categorized the identified risks into three levels such as; country, market and projects where country risk was identified as the most critical. This was seconded by market risk while the least was project.

Uher and Toakely (1999) revealed in their study of the Australian construction industry that although majority of built-environment professionals are aware of insurance as risk management process and techniques required at the conceptual phase of projects, the result showed that they find it reluctant to implement them thereby exposing their projects to all manners of risks. Despite all these studies noted, none has focus on barriers and drivers that influence effective use of insurance as RM tool in built environment sector. This yearning gap became the reason for this study using Calabar metropolis as the study area. The aim of this paper is to assess barriers and drivers towards effective use of insurance as RM tool in built environment with the following objectives viz;

- i. Assess the level of awareness of insurance as a RM tool
- ii. Examine categories of risk preference for insurance cover by built environment professionals
- iii. Evaluate barriers towards effective use of insurance
- iv. Investigate drivers to effective use of insurance as a RM tool
- v. Ascertain the degree of relationship between barriers and drivers towards effective use of insurance as RM tool.

Study Area, Materials and Methods

Calabar Metropolis is the administrative headquarters of Cross River State. It lies between latitude $4^{\circ} 41' 00''$ N and $5^{\circ} 51' 00''$ N and longitude $8^{\circ} 35' 00''$ E and $8^{\circ} 50' 00''$ E. At the North-West and South West, it is bordered with Odukpani and Akpabuyo LGA respectively. Its major rivers are the Calabar and the Kwa rivers. It occupies a total surface area of 157.6sqkm. Based on the 2006 National Population Census figure, it has a population of 371,090 persons. A structured questionnaire instrument tagged - barriers and drivers towards effective use of insurance, as RM tool in built environment (BDEIRMT) was design and use within Calabar metropolis to elicit relevant information from the built environment professionals. Due to difficulty in having the accurate sampling frame, accidental sampling method was use for all the respondents within the study area. According to Udofia (2005), accidental sampling method is effective for a research study where it is difficult to have the required sampling frame. Administered were fifty copies of questionnaire within Calabar municipality and another fifty within Calabar south Local Government Area that made up the metropolis. Out of this, ninety-seven (97) questionnaires were successfully filled and returned. Both descriptive and inferential statistical tools were used to analyze the obtained data. Descriptive statistical tools include percentage, tables, charts and relative importance index (RII) using a five-point Likert scale (Tonidandel & Lebreton, 2011). Spearman's ranked correlation inferential statistical tool was use in examining the relationship between observed variables.

$$\text{Relative Importance Index (RII)} = \frac{\sum fx}{5 (\sum f)}$$

Where fx = weight given to each performance; $\sum f$ = the total number of sample

Spearman's rank correlation formula states as follows;

$$r_s = 1 - \frac{6 \sum d^2}{N^3 - N}$$

Where r_s = spearman's ranked correlation; d = difference between the ranks; N = sample size.

Hypothesis formula used in testing the level of significance (t)

$$(t) = \frac{rs \sqrt{N-2}}{\sqrt{1-(rs)^2}}$$

Results and Discussions

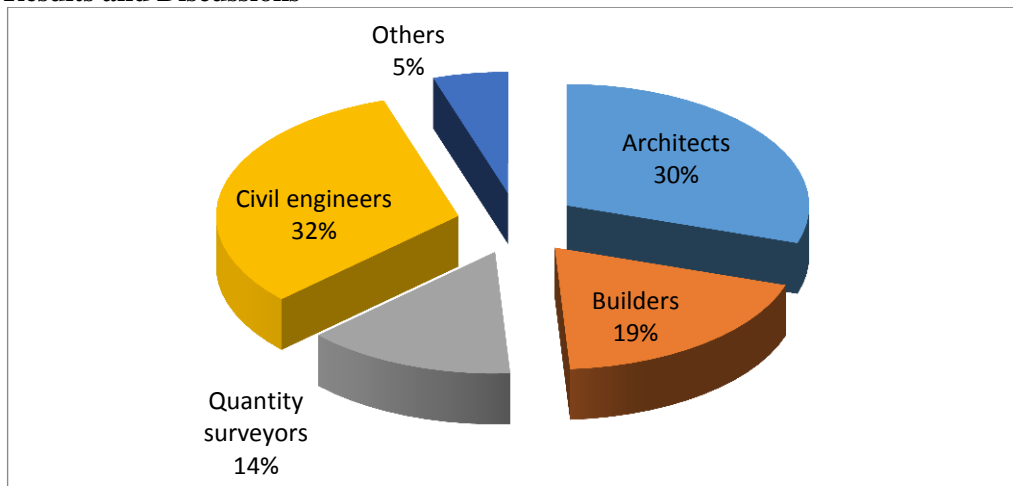


Figure 1: Professional background; Source: Field survey, 2020

From the chart 1 above, civil engineers, architects and builders are the leading professionals involved in the built environment projects with 32%, 29.9% and 18.6% respectively. This calls for a more collaborative effort by built environment professionals in achieving a risk free sector.

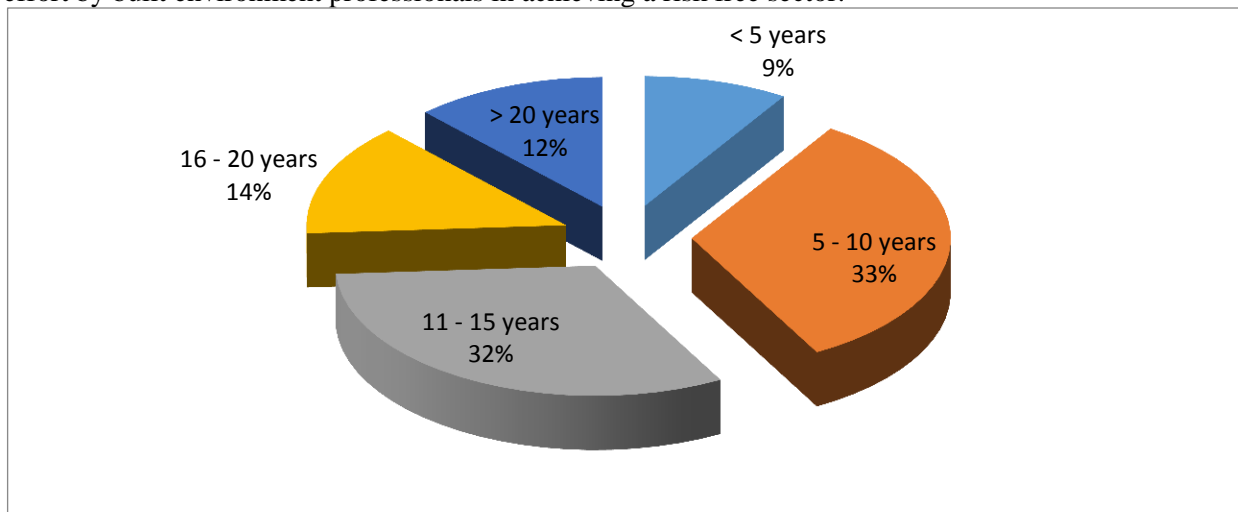


Figure 2: Years of experience in built environment; Source: Field survey, 2020

The years of experience as shown in chart 2, shows that most of these professionals had between 5 – 10 years, 11 -15 years and 16 – 20 years' experience with 33%, 32% and 13.4% respectively. This implies that most of them are highly experienced in the sector.

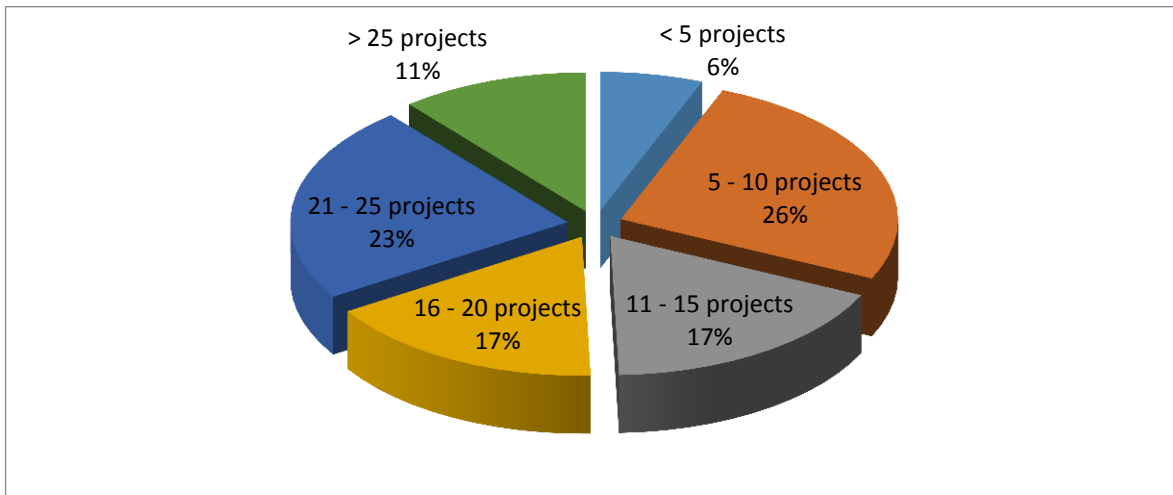


Figure 3: Number of projects handled; Source: Field survey, 2020

The number of projects handled by professionals involved within the sector shows that 5 – 10, 21 – 25 and 11 – 15 projects were leading with 25.8%, 22.7% and 17.5% respectively. This implies that most of these professionals are not novice/amateurs within the sector.

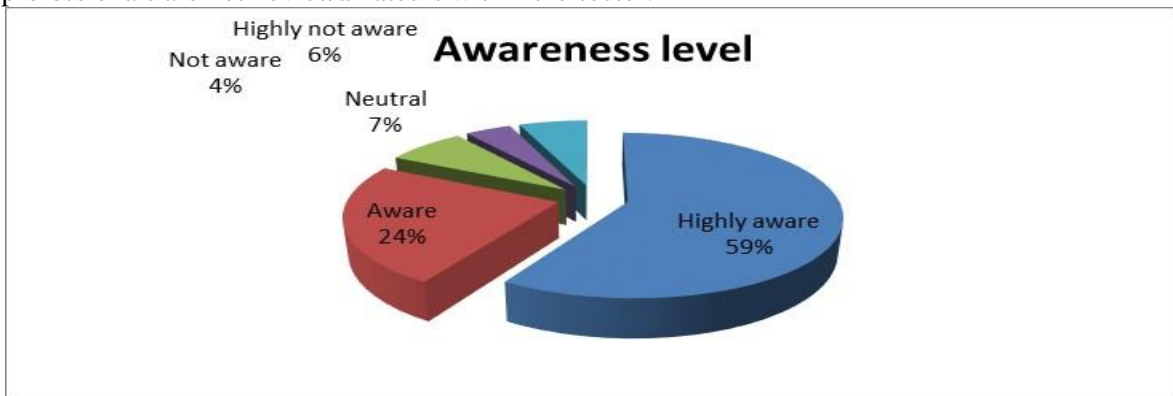


Figure 4: Insurance awareness as risk management tool; Source: Field survey, 2020

From the above chart 4, the level of awareness of insurance as a RM tool ranked highest with 58.8% and 23.7% showing that they are highly aware of insurance as a RM tool. This implies that the issue of awareness in adopting insurance as a RM tool is not the challenge. This agrees with a study conducted by Sola, Arowoju, Taiwo&Abiodun (2013) which revealed that built environment professionals are very much aware of the building risk insurance policy but do not often put construction insurance on project requirement.

Table 1: Relative importance index (RII) of risk preference for insurance cover

Categories of risk	SA(5)	A (4)	N (3)	D(2)	SD(1)	$\sum f$	$\sum fx$	Mean	RII	Rank
Managerial risk	6	9	33	28	21	97	242	2.49	0.49	6th
Financial risk	21	20	17	32	7	97	307	3.16	0.63	5th
Design risk	5	6	12	23	51	97	182	1.87	0.37	8th
Physical risk	48	21	17	8	3	97	394	4.09	0.81	2nd
Administrative risk	3	7	12	17	58	97	171	1.76	0.35	10th
Logistics risk	24	20	18	17	18	97	306	3.15	0.63	4th
Political risk	2	5	21	25	44	97	187	1.92	0.38	7th
Disaster risk	41	22	17	11	6	97	372	3.83	0.76	3rd
Technical risk	4	5	13	26	49	97	180	1.85	0.37	8th
Combination of all risk	48	22	18	7	2	97	398	4.10	0.82	1st

Source: Field statistical analysis, 2020: Strongly agree (5) Agree (4) Neutral (3) Disagree (2) Strongly disagree (1)

Table 1 shows that combination of all risks, physical risk and disaster risk rated highest with 0.82, 0.81 and 0.76 RII respectively. This implies that built environment sector is faced with diverse forms of risk that requires an insurance policy flexible enough to cover majority of these risks within the sector. And since the combination of all risk for insurance cover was what most of the respondents agreed on, it therefore means that insurance product should be designed to cover all categories of risk associated with their projects.

Table 2: RII of Barriers towards effective use of insurance as a RM tool

Barrier variables (X)	SA(5)	A (4)	N (3)	D(2)	SD(1)	$\sum f$	$\sum fx$	Mean	RII	Rank
Inadequate experience	29	16	13	8	31	97	295	3.04	0.60	6th
Unhealthy rivalry	26	13	11	9	38	97	271	2.79	0.55	7th
Low profit margin	33	18	13	9	24	97	318	3.27	0.65	5th
Difficulty in understanding insurance policies	38	24	12	6	17	97	351	3.61	0.72	4th
Time constraints	12	8	5	7	65	97	186	1.91	0.38	10th
Bureaucratic process in claims	21	11	8	16	41	97	246	2.53	0.50	8th
Lack of confidence in insurance industry	4	24	13	7	12	97	366	3.77	0.75	3rd
Unsteady cash flow	51	27	11	6	2	97	410	4.22	0.84	1st
Lack of enforcement	49	26	9	10	3	97	399	4.11	0.82	2nd
Others	17	10	10	14	46	97	229	3.08	0.47	9th

Source: Field statistical analysis, 2020: Strongly agree (5), Agree (4), Neutral (3), Disagree (2), Strongly disagree (1)

Table 2 shows barriers towards effective use of insurance in RM. The result presents unsteady cash flow, lack of enforcement and lack of confidence in insurance industry as top rated RII with 0.84, 0.82 and 0.75 respectively. This implies that most of the built environment professionals often experience irregular cash flow, which makes it difficult for them to embrace insurance as RM tool. Also the least barrier towards effective use of insurance as RM tool was time constraints, other factors not identified as well as bureaucratic process in claims had RII rating of 0.38, 0.47 and 0.50 respectively.

Table 3: Drivers towards effective use of insurance as a RM tool

Driver variables (Y)	SA(5)	A (4)	N (3)	D(2)	SD(1)	$\sum f$	$\sum fx$	Mean	RII	Rank
Improve education /awareness among professionals	41	15	9	8	24	97	332	3.42	0.68	5 th
Encouragement of collaboration among professionals	38	13	8	8	30	97	312	3.22	0.64	6 th
Reduction / delay of payment of claims	21	5	4	5	62	97	209	2.15	0.43	10 th
Strict adherence to ethics of insurance	48	20	11	7	11	97	378	3.89	0.77	3 rd
Elimination of corrupt practices	50	21	13	6	7	97	392	4.04	0.80	2 nd
Improve regulation / supervision of insurance sector	53	24	12	5	3	97	410	4.22	0.84	1 st
Introduction of insurance education at grass root	34	11	7	7	38	97	287	2.95	0.59	7 th
Improve awareness on RM	27	7	5	6	52	97	242	2.49	0.49	9 th
Enforcement by relevant authority	30	10	6	7	44	97	266	2.74	0.54	8 th
Others	43	17	10	9	18	97	349	3.59	0.71	4 th

Source: Field statistical analysis, 2020: Strongly agree (5), Agree (4), Neutral (3), Disagree (2), Strongly disagree (1)

Table 3 shows drivers towards effective use of insurance as RM tool. This shows that conditions such as improve regulation/supervision of insurance sector, elimination of corrupt practices and strict adherence to ethics of insurance ranked highest with 0.84, 0.80 and 0.77 RII respectively. The table also shows that the least variables which are considered by respondents as drivers towards effective use of insurance RM tool were: reduction/delay payment of claims, improve awareness on RM and enforcement by relevant authorities with RII rating of 0.43, 0.49 and 0.54 respectively.

Table 4: Summary of Spearman's ranked correlation and test for significance

d^2	Rs	Calculated t-value	Table value	Significant level
$\sum = 282$	0.70	2.77	2.31	0.05

Source: Field statistical analysis, 2020

Table 4 shows the correlation coefficient (rs) as 0.7 that indicates a very strong and positive relationship between the two variables. This means elimination of the barriers, will lead to an increase in the use of insurance as a RM tool by the built environment professionals and vice versa. Furthermore, in testing the level of significance of the correlation, the Alternative hypothesis (H_1) was upheld while the Null hypothesis

(H₀) was rejected since the calculated value of 2.77 was higher than the table value of 2.31, this definitely implies that the correlation is indeed significant and did not occur by chance.

Conclusion and Recommendation

This research paper assesses the barriers and drivers towards effective use of insurance as a RM tool. The result shows that the leading professionals of respondents are civil engineers, architects, and builders with years of experience ranging from 5 – 20 years. The number of projects handled by the respondents ranges from 5 – 25. The rating of insurance awareness as a RM tool shows that greater number of them had a high level of awareness as indicated on the result. Relative importance index (RII) of preferred categories of risk to be insure showed that combination of all risk, physical risk and disaster risk ranked highest. Barriers towards effective use of insurance revealed that unsteady cash flow, lack of enforcement and lack of confidence in insurance sector were the top three variables. The top leading variables from the drivers are; improved regulation/ supervision of insurance company, elimination of corrupt practice and strict adherence to ethics of insurance. The Spearman's ranked correlation coefficient of 0.70 revealed a strong and positive relationship between barriers and drivers towards the use of insurance as a RM tool within the built environment sector. Based on the findings, it is recommended that more synergy between insurance bodies (NAICOM) and built environment professionals /regulatory bodies (COREN, CORBON, NIA etc.). There is need for insurance companies to ensure that their packages are flexible enough to meet the different categories of risk of the built environment. Besides, supervisory bodies should ensure that all forms of unethical practices that endangers trust in the insurance industry are made away with.

References

- Akinradewo, O., Aigbavboa, C., Ngwenga, L., Thwela, W. & Ncube, T. (2019). *Efficiency of insurance as a risk management tool in South African construction projects* – The 14th International conference of Croatian Association for construction management, Zagreb, Croatia.
- Babu, M. A. & Kanchana, D. S. (2014). *Role of insurance in construction and infrastructure projects*. International Journal of Engineering and Technology, 5 (12): 30 – 31.
- Joshua, O. D. (2010). *On strategies for mitigating risk in construction projects*. The 4th Annual General Meeting/ conference of the Nigerian Institute of Building (NIOB), Asaba, Delta state.
- Kikwasi, H. (2011). *An assessment of risk management practices by consultants in Tanzania*. The 6th conference proceedings of Built environment, Johannesburg, South Africa.
- Odeyinka, H. A. (2000). *An evaluation of use of insurance in managing construction risks*. Construction management and economics, 18 (5): 519 – 524.
- Ojo, G. K. (2010). *On an assessment of the construction site risk – related factors*. The 40th Annual General meeting/conference of the Nigerian Institute of Building (NIOB), Asaba, Delta state
- Sola, J. A., Arowoju-Alagwe, T., Taiwo, M. E. & Abiodun, T. (2013). *Adequacy of builders risk insurance policy in Nigeria building industry*. Pm world journal, 2 (5)
- Tonidandel, S. & lebreton, T. M. (2011). *Relative importance analysis: A useful supplement to regression analysis*. Journal of Business and Psychology, 26 (1): 1 – 9.
- Udofia, P. E. (2005). *Fundamental of social science statistics*. Immaculate publication ltd. Enugu.
- Uher, T. and Toakley, A. (1999). *Risk management in the conceptual phase of a project*. International Journal of Project Management, 17 (3): 161 - 169
- Wang, S.Q., Dulaimi, M.F., & Aguria, M.Y. (2013). *Risk management framework for construction projects in developing countries*. Construction Management and Economics, 22 (3): 237 - 252

Windapo, A. O., Omeife, C., Wahap, L. A. (2010). *Stakeholders perception of key risks in oil and gas construction projects*, 40th Annual general meeting/ conference of the Nigerian Institute of Building (NIOB), Asaba, Delta state

Zailani, M. B., Abubakar, M. & Muhammad, A. (2019). *Assessment of barriers to risk management (RM) implementation in small construction projects in Nigeria*. African Journal of Built environment research, 3 (1): 15 – 28.

ARTICULATING CULTURAL INTERACTION AND INFLUENCES SHAPING CONTEMPORARY ART PRACTICES IN NIGERIA

JOSHUA, John Oyedemi

Department of Fine and Applied Arts, University of Jos, Jos. Nigeria
johnoyedemi@gmail.com 07032103688, 08052513071

Abstract

This paper examines how cultural practices intersect to create visual traditions borrowing from cultures of others. Nigerian artists have been developing arts that are synthesis of cultures seen in certain parlance as contemporary norm even in western world art practices. It is common in the Art Schools in Nigeria to see students and established contemporary artists developed new concepts out of the works of artists like Piet Mondrian (1872 – 1944), Willem de Kooning (b.1904-1997), Paul Klee (1888-1916), and other art movements such as Realism, Impressionism, Conceptualism and Colourfield. Three Nigerian artists (Duke Asidere, Bob Nosa and John Oyedemi) and their works were examined in this article as well as the influences associated with their practices. The result revealed essentially how these influences have been prominent in their works as well as how the peculiarities and varieties of visual experiences from other cultures have made a great impact and inspired these Nigerian artists through individual development to attain personal expression.

Keywords: *Contemporary, Cultural Interaction, Cultural practices, Synthesis of cultures, Visual experiences.*

Introduction

Artists of worth identification are imbedded in their practices and capacities to interpret patterns to create cryptic and iconic designs. Experiences of artists come from the world around them, association, partnership, culture, tradition amongst others and are represented as they appeal to their senses and understanding in different form. They perceived the material world in an understanding of spatial relationships of what it should be. This led to emergence of different art movements that began one after another and some running into each other especially in the 40s to the 60s, which mainly were associated with the New York Art School. Cultural influences are common in the practices of art from time immemorial going by developments of different eras. The artistic currents of the Postmodernists sparked new directions in advancement of culture of free expressions. These influences are noticeable in the works of the six artists under review in and outside the shores of Nigeria. The impact of exponents of contemporary expressionists' artists like Piet Mondrian (1872–1944), Paul Klee (1879-1940), Willem de Kooning (1904-1997) and other art movements attracted experimentation from Nigerian artists in developing new modes of expressions. Three Nigerian painters who relate and interact with contemporary philosophies, writings and paintings of Piet Mondrian, Paul Klee and Willem de Kooning and others are considered for analysis. Their selection is based on observed cultural influence that shaped the peculiarity and consistencies of their art practices over time. One characteristic of their paintings and especially that of postmodernist expressions is the capacity to be a universal language with global outlook and can be heard and understood all around the globe. It cuts across the barriers of creed and languages transcending different epochs.

Studies have shown that most artistic movements came after the other due to deviations from tenets of the trend and personal interest which is an attempt to create ideological differences. An example is Impressionism that captures momentary jiffy that is in 'abbreviation, speed and spontaneity', a departure from the realists' exactitude of pieces. Paul Klee's art is diverged and so markedly from earlier Impressionism. It is said of Klee that 'almost everybody, whether aware or not, was learning from Klee'. Kleiner and Mamiya (2005:879). It is common today to see artists evolved through influences of renaissance, impressionism, surrealism, conceptualism and other isms. Some found it more appropriate to adapt to one of the genres while others two or three types for inspiration. Wolf (2009) observed that, as the 1960s commenced, artists who Clement Greenberg categorized as Post-painterly abstractionists were among the most prominent color field painters like Morris Louis (1912-1962). He created paintings that contained a degree of symmetry, rendered by pouring paint in broad bands across the surface of an unprimed canvas. Writings by different authors, Kleiner and Mamiya (2005) and Wolf (2009), posit that artists were attracted by exponents of earlier contemporary experiments which is a combination of thoughts and concepts freely expressed on various supports without a corporate course. 'These paintings were composed of rhythmic drips, splatters, and dribbles of paint and the mural-sized fields of energetic skeins of pigments envelop viewers'. This kind of influence is evident in the paintings of 'Spillage series' by Jerry Buhari (b.1959), a

liquidize method, an influence of colourfield artists of 1950s where artist like Morris Louis and others held sway.

In Nigeria, Artists like GaniOdutokun (1946-1995) influenced generations of artists both at Zaria Art School and other places. His influence in equestrian form and linear rendering is of great significant especially in the paintings of John Oyedemi and many others. Edosa Egiugo b.1961, never attended the Zaria Art School yet the similarity of brush strokes, movement of lines and speed may allude to influences from Odutokun who was alleged to have made 'Durbar' theme in painting popular in contemporary times considering the number of his art practicing protégés. Influences such as this can also be seen in the Yaba Art School of Kolade Oshinowo b.1948, on most of their graduates like Abiodunolaku b.1958, who has since developed his personal expression as that of a master. Influences of ObioraOdechukwu b.1946, according to Ikwuemesi (2004) played a very important role in the history of art in Nigeria post-war period in changing the face of Nigeria's young modernism at the time. In this vein Nnamele (2011) posits that, Udechukwu accepted UcheOkeke and Ibrahim El Salahi as the two greatest influences on his development after the war. He was likewise inspired by Chinese Li drawing and the Igbo nsibidi designs or symbols.

Review and influences that shaped artist's individual artistic development

The review covers artists' influences in the course of personal interactions and through other medium in the course of art practices. Practices such as these are common in the canon of cultures and has helped in understanding how symbols and motifs result into new aesthetics. Artists create works due to certain influences, which is a trajectory of compelling aesthetic exploration of specific subjects of interest. It is combination of concepts that result to create a new aesthetic understanding in developments. This is evident in all the art pieces (paintings) of three Nigerian artists under review and how certain influences compelled their practices. This review will first look into three artists whose philosophies and practices shaped certain developments in Nigeria local art milieu.

Piet Mondrian (1872 – 1944): Mondrian was regarded as one of the influential abstract painters and leading theorists of abstraction. Mondrian's work owes its foundation to his spiritual and philosophical studies. His attraction to theosophical theory movement (a religious group) helped to birth his major break from representational painting to turn towards a conception of non-objective or pictorial-"pure plastic art" Kleiner and Mamiya (2005:1006). He pioneered what can be referred as 'rigid form of abstraction' a departure from nature to evolve abstract force of horizontal and vertical lines and right angles. His publications in *De stijl* magazine carry his thoughts, theories and the manifesto of Neoplasticism in Paris 1920. The art of Neoplasticism assumed its own characteristics based on works that sought to purify art of natural attributes. Its principle is also devoid of the application of colour harmony with reference for distinctive rendering of basic colour pigmentation. This was achieved through what Jaffe` (2008) refers to as "mathematically controllable technique: dividing their square canvases into a system of smaller squares, and basing their composition on this exact pattern". This influence of Cubism in 1911-12, led Mondrian to a search for simplification as seen in his early experimentation with "Gray Tree" in 1912 (Fig.1). The tree is stretched out in bold dark lines using a restricted palette which create a rhythmic complex structure of movement in the picture plane. His search for a pictorial language using basic elements, straight lines, primary colours, and neutrals of black, white and grey rendered his painting in "a true vision of reality".

According to Mondrian, there are two opposing elements that make us to see art as demonstrating and expressing universal beauty that does not arise from the particular character of form, but from the dynamic rhythm of its inherent relationships. This is reflected in power of equilibrium he sets to achieve in his composition of the vertical and horizontal lines which results to a balanced union. The restriction of his design to horizontals and verticals means the elimination of emotion, curves and other patterns but the creation of an interactive relationship of primary colours, white and black. He eliminated tragedy and all traces of emotion from his canvases in order to create an art of colour relationships and asymmetrical balance and dynamic equilibrium (Selz, 1981). It may rightly be argued that, it is not really possible to eliminate emotion from any canvas; the beholder

determines the encounter and experiences. A white, black or colours on the spectrum may have different sensations when encountered.

Mondrian's art create interlocking relationships of colour planes in a grid of intersecting vertical and horizontal lines. Four elements of painting were employed, line, form, colour and space. With this he created no illusion of space and his colours remain flat on surfaces thereby implying that a painting could be reduced to basic fundamental concentrate. In his paintings (Fig.2) he reveals stages of development that culminate into the use of lines and rectangles suggesting the mechanical precision of the machine made, creating aesthetic order which is as a result of Cubist influence. His concept development in this direction is of great influence in simplified lines and colours in the paintings of John Oyedemi, a Nigerian artist.



Fig 1: Piet Mondrian; The Gray Tree, 1912: Oil on Canvas, 78.5x107.5cm

Paul Klee (1879-1940) was painter, writer and teacher; born in Munchenbuchsee, Switzerland, and is considered both a German and a Swiss painter. His highly individual style was influenced by movements in art that included expressionism, cubism, and surrealism. He was also a student of orientalism. Klee was a natural draftsman who experimented with and eventually mastered colour theory, and wrote extensively about it (<https://paulklee.net/>). His influence is replicated in many artists especially the child-like and linear characteristics. According to Gotthardt (2018), Klee's inventive canvasses and his original approach to painting (illuminated in his extensive writings) inspired a host of famed American abstractionists, from Jackson Pollock and Adolph Gottlieb to Norman Lewis and Robert Motherwell.

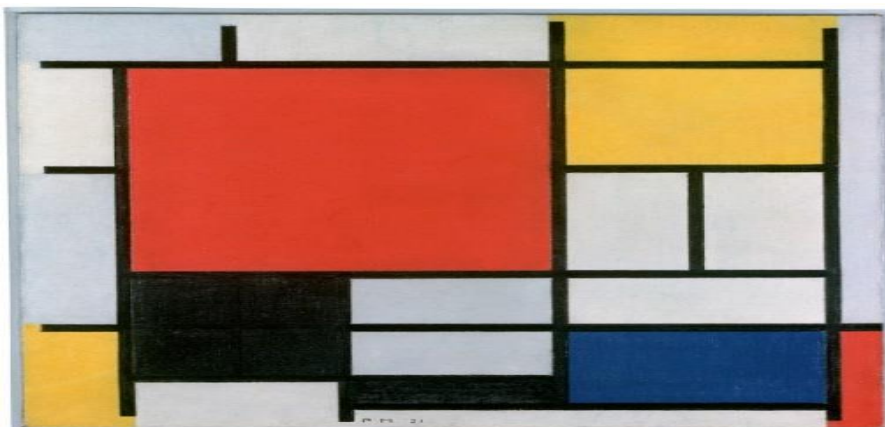


Fig 2: Mondrian, "Composition with Large Red Plane, Yellow, Black, Gray and Blue" 1921, courtesy of Gemeente Museum Den Haag. <https://www.sleek-mag.com/article/mondrian-100-years/>

Klee's application of colour is separated from linear rendering which is represented in patterns of sequential order. Line is a major characteristic of his paintings which display their fragility. Bold definitive dark lines are used to segment and fragment the canvases under review. Klee's representations can be seen as a

childlike art without recourse to formal organization in line, colour and form. Each painting here is carefully calibrated with an austere and restricted palette.

I am expected to do things a clever fellow could easily make. But my consolation must be that I am much more handicapped by my sincerity than by lack of talent or ability. I have a feeling that sooner or later I will arrive at something valid, only I must begin, not with hypothesis, but with specific instances, no matter how minute
(Paul Klee in Read, 1961).

Klee expresses himself in simplified childlike manner in his use of colour, form, and line. To him we do not have to represent the real world as it is or revealed to us but what is behind reality. According to Kleiner and Mamiya (2005:1002), Klee studied the reality behind visible things and nature avidly, taking special interest in analyzing processes of growth and change. He coded these studies in diagrammatic form in notebooks, and the knowledge he gained in this way became so much a part of his consciousness that influenced the “psychic improvisation” he used to create his art. He represented the society from the perspective of a child, a point of nostalgia and return to childhood in Figures 3-4. His art shares a contemporary concern that is rooted in his experiences and sensation to colours. His works are subjective expressions of lyrical patterns modulated in space without perspective. The paintings are characterized by abstract organizations of colours and lines that intersect to create interaction of harmonious entity. He wrote, "Colour has taken possession of me; no longer do I have to chase after it, I know that it has hold of me forever... Colour and I are one. I am a painter." With that realization, faithfulness to nature fades in importance and Klee began to delve into the "cool romanticism of abstraction". This is reflected in his interest and concern on the environment depicted in “After the Floods 1936”. Most of the paintings can only be interpreted by him though a contemplation on societal issues. The works stimulate the imagination of the viewer because of their surrealist characteristics. Noticeable are undefined mysterious patterns and images that make one to ask the question, “What is this?”

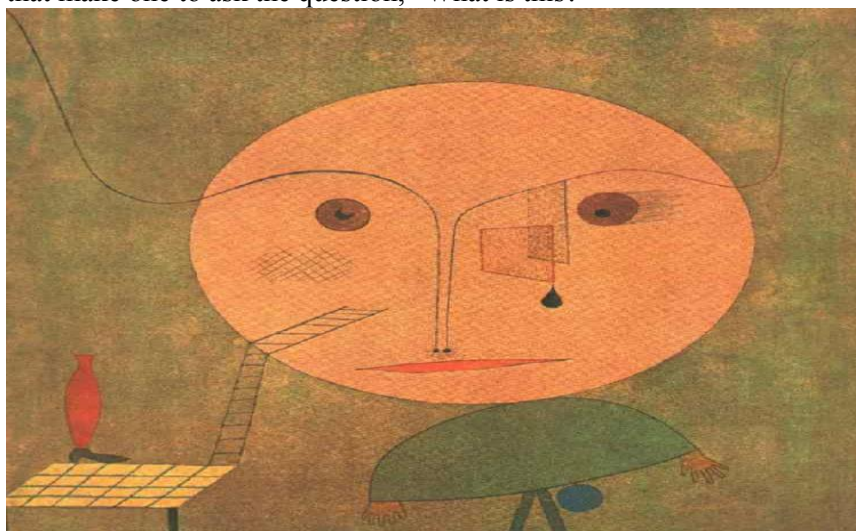


Fig 3: <http://www.paulklee.net/images/paintings/Error-on-Green-1930.jpg>. Retrieved 1/5/2020



Fig 4: <https://anitalaydonmillersmiddlegradeblog.blogspot.com/2010/07/oil-pastel-klee-portrait.html> . Retrieved 1/5/2020

Willem de Kooning (b.1904-1997): An abstract expressionist and part of the New York Art School, de Kooning worked on a restricted palette of colour and black and white. From 1946-49, his works were expressions of what is called 'Urban abstraction' and 'biomorphic abstraction'. 'Black Friday' (Fig.5), is a work which shows how he integrates negative and positive spaces to create surreal effects of dark and light. Wolf (2009) asserts: *By pouring oil and acrylic paints onto unprimed canvas, artists such as Frankenthaler allowed their pigments to soak into the canvas rather than to rest on top of it (as was the case with Willem de Kooning, whose paints actually rise up into small mountainous heaps on the canvas). This technique gave their paintings a uniformity of color and a sense of even, flat consistency, as well as a feathery, ephemeral dreaminess.*

His paintings at this period were shrewdly camouflage without distinct identity. They reflect the interest to depict his environment which is claimed to be inspired by New York City imagery. "Black Friday" signifies a dark and terrible day which is not easily forgotten because of the negative experience of that day. The representation of 'women' thought to be the symbol of beauty; glory and fertility are in a gory state. He was said to have started painting women regularly in the 1940s and by 1950, which he explored in series. One of his works of this series is 'Woman 111, 1953', (Fig.6) characterized by energetic brush strokes and twisted forms that created a dialogue between human imagery and abstraction. "The woman painted with torrents of dripping pigments, created vibrant fabric of colour" (Selz, 1981). This series also shows single figures on each canvas in an imposing framework of angular shapes concealing violently distorted figures with exaggerated female features (breasts and lips) in a combination of various elements boldly outlined. Every stroke of his is aggressive, 'a gesture of violence toward the female body'. He was as if a man hurt by a woman in some way and trying to push his emotions on canvas by gestural brush strokes and energetic application of dark pigments, a fragmentation in the Cubist mannerism. His approach of handling women forms on canvas reveals a direction in a bid to arrive at a point of realizing a mode of expression. According to his wife Elaine, de Kooning was never satisfied with a concept and that there are 'approximately 200 scraped away images on a canvas before the final one'. Other noticeable features in the paintings are wide swaths of colour, densely congested canvas with brush strokes, lyrical loops and twisting lines of colours in a close up study that achieves immediate encounter with no depth which can be classified among a force of Abstract expressionist of the 1950s.



Fig 5: Black Friday, 1948; oil on canvas; Size: 43x38cm



Fig 6: woman 111, 195; oil on canvas Size: 6'3x4'10

John Oyedemi (PhD b.1966): graduate of Ahmadu Bello University, Zaria; is regarded as one of the most prolific painters to have emerged from Zaria Art School. Chidiac-Mastrogiannis and Chukwuma (2019), postulates that those who know Oyedemi call him "Master" painter. His paintings vibrate colours, lines and textural depth in which they are rendered. The organic linear technique influenced by Piet Mondrian seems to have been applied by the artist to create effect that gives his work its unique character. In recent times he employs the usage of wide spaces usually dotted in dominant tones of drops of colours, grey tones and bluish tonality in varying degrees. The influence of Neoplasticism on the paintings of Oyedemi is based on what Hodge (2011:130) calls 'Universal harmony' which became its focus. This concept centers on creating paintings with opposing forces of horizontal and vertical lines to achieve balance, calmness and stability.

Oyedemi also renders his paintings in an impressionistic manner, which is distinguished by his use of palette knife as a tool to create rich tactile effects on surfaces. His paintings in the year 2010 started exploring the

effects of black on other colours in a palette. The inspiration for his research was from a charcoal market where he found that colours within the spectrum assume another life once in contact with the environment. When translated on palette, black devalues other colours and turns them into a grey. His focus is on capturing potential possibilities of charcoal market as an allegory of the society as he investigates daily life and appreciation of cultural influences. The exploration in painting series by Oyedemi presents variety of challenges in colour behavior from one to another. He makes an abstract generalization combined with identifiable entities of various associations that are present for contemplation. This is to expand the perspective of the perception to challenge entrenched views and methodologies in works of influential artists like Piet Mondrian, illustrated by *Composition 11*, (1930) and *Flowering plant* (1912) and Pablo Picasso's works exemplified by *Marie-Therese* (1931). Two techniques were adopted based on the influences of the use of lines as in Rick Stevens (2010) series of works on organic associations, and the mechanical structure of the works of Piet Mondrian (1930) as well as the fragmentation of forms of Pablo Picasso (1908) through Direct and Indirect painting as advanced by Feldman in (1971). Sullivan (2005:151) states that contemporary artists adopt many practices that dislodge discipline boundaries, media conventions and political interest, yet still do so within a realm of aesthetic experience, cultural commentary and educational relevance. He sees the artist as a creator, critic, theorist, teacher, activist, and archivist among others. In view of this fact, because the artist is part of human activity; it now becomes his duty to postulate his understanding of his environment in practice in a way that is personal to him. The outcome of the practice forms an opinion, outlook and a scrutiny of influences of interrelationship on how elements of design function to create a balance scheme. Oyedemi holds the view that every painting is an entity of its own coded with messages, a visual experience from an environment and especially the influence of black (charcoal). It is overwhelming and oppressive, yet creates an association of harmony on the canvas. This association requires transcendental experiences despite the familiarity with the environment in which they occur. Through critical art practice and exploration, visual encounters availed of images of known associations (elements). Suffice it to state that issues of philosophical relevance in the visual field require a deeper inquiry and understanding within the context from which they are drawn. The result is a structure where human motif and lines interface to create an aesthetic whole in the expanse of a gray field; an organic construct in a dialogue in the 'flow of space' (Figures 7-9).



Fig 7: John Oyedemi: *Grays of Life III*, 2012: Oil on Canvas: 140 x 110cm



Fig 8: John Oyedemi: *Contemplation on patterns in Nature VII* 2012 : Oil on Canvas: 130 x 110cm



Fig.9 John Oyedemi: *Selling the Future II*, 2011: Oil on Canvas: 140 x 110cm
Collection of Professor Jari Jacob

Duke Asidere b. (1961): is an artist whose thoughts and works provoke intellectualism of everyone as different writings on him suggest. From Thought pyramid, Alexis' art galleries, Artists, Journalists and many others have a view of him as an unpredictable artist, flexible and dynamic in his approach to his art. He holds a first class degree in Fine Arts and a Masters in Fine Arts from the Ahmadu Bello University, Zaria. Arguably one of most prolific artist from the Zaria Art School, he lectured at the Auchu Polytechnic from 1990 to 1995. Chidiac-Mastrogiannis and Chukwuma (2019) aver that Asidere influences besides the Nigeria contact in and outside school also came from the early 20th century fauvist inspired modern artists, as well as the expressionists. He expresses himself boldly through a wide variety of genre including pencil work, engraving, oil and acrylic on canvas, water colour and pastel on paper. Writing on Asidere from his studio presages him as one who is inspired by the everyday drama of human lives surrounding him, uses thick and bold brush strokes engaging contemporary African politics. Through visual metaphors, he comments on the everyday socio-political events within his home country, Nigeria. <http://dukeasiderestudios.com/>

Sowole (2016) states that Asidere is an advocate of relevant art who maintains, "It's not enough for us to sell art, but we must use art to engage issues." As much as people's right to diversity of political views cannot be denied in a complex setting such as Nigeria's, the posture of some individuals – artists inclusive –Asidere's radical view on art is well known to followers of his art, just as the artist is not a fresher in 'protest art'. Asidere cubist like rendering, an 'association of hardedge' of female figurine is a dominant quest in most of his paintings especially in (Figures.10-11). He has thought-provoking distinct approach which is different and seem academic in representation and understanding. With thick impasto he swiftly craft figures on canvas and draw on with dark thick and in some instance subtle lines. The flexibility with which he handled his lyrical figures resonate their sexuality, a rendition of a master feminist. His theme revolves around the woman folk just as in the paintings of William De Kooning but different in rendering. Female iconography in painting is popular with contemporary artists as it was with masters of different genres. Asidere is in league with those who celebrate womanhood with dexterity in techniques he revolutionize as concept. It is common to see his stylized women with long necks, elongated legs, broad trunk and big rounded breast. In some, the heads are chopped while others are without legs. In his world of fantasies, the paintings are dramatized to reflect the naivety of child art. '...but one should realize that to be as if newborn is not a modest ambition: It is the essential mark of a genius'- Paul Klee in Read (1961).

In another clime his works can be an archetype of a comic rendering in an African locale. The colours are rendered in with high saturation of the primaries complimented by secondary and opposites. As an intelligent painter, his works are highly intellectual that requires proper thoughtfulness for appreciation. Asidere's poetic drawings can be liken to that of Paul Klee lyrical approach and reminiscence of a learner. They can also be interpreted to mean cartoonist construal of real occurrence. He scribbles and doodles on paper and canvas in the course of execution and some after. When an onlooker encounters his works at close proximity, it is not unusual to see writings of his thoughts making a caricature of the leader and the led.



Fig 10: <https://thenationonline.net/wp-content/uploads/2013/05/mumu-banking-122x148-cm.jpg>. Retrieved 27/4/2020



Fig.11: Source- <https://www.omenkagallery.com/wp-content/uploads/2016/05/The-Lady-2011-oil-on-canvas-135x120-cm.jpg>

Bob-NosaUwagboe (b.1974): an artist, a public comic commentator, expressionist branded ‘Protest artists’, a multidisciplinary artist known as ‘leader of the Protest Art Studio’, uses art as a tool to raise pertinent issues in order to begin the cycle that will incite social change. Artists like Uwagboe is inspired by events around him which is of importance in society where apocalyptic images were used to represent the actors. He captures panoramic events in satirical manner usually portraying the grief of humanity using ‘a variety of materials – acrylic, spray paint, crayon, charcoal and oils – and also incorporates everyday objects and materials, including artificial hair, clothes, ropes, sacks and sand’. Colours reflect situation; usually termed as ‘toned down’, gloomy, moody to reflect the situation he sets to portray. Where can his art be appropriated in the art genres?

His artworks carries an ambiance of the paintings of Edvard Munch (1863-1944), art that sought to express inner feelings rather than the impartial external appearances of the impressionists (Hodge 2011;100). Although ‘Protest Art’ can be regarded as one that has been against or deviant of sort responding to oppression, social abuse, inequality, bad leadership, Social injustice wars, amongst others. Mbonu (2018) writing on Uwagboe paintings said, it falls on the radical side of expressionism which draw attention to the sliding values of most African countries, particularly Nigeria, placed on human lives. He is worried that humanity has lost its essence, and needs to be mourned, first and foremost, as a process of recovery. He rapidly develop his art within the context of ‘Protest’ which is a sincere representation of a collapse values and convey his feelings in a summation that is an inference of social injustice. It is a lamentation of an artist, “We must not give up, even within the art profession”. Uwagboe concern for the society can be likened to what Pablo Picasso (1881-1973) had, a political position and maintained a political commitment throughout his life. He said “Painting is not made to decorate apartments. It is an instrument for offensive and defensive war against the enemy”. Events of times present the artists with a herculean task of interpretation using different motifs in semi and complete abstraction in a way that suits their purposes. Visiting his exhibition titled “Obituary” puts one at a conjecture of trying to find out if sanity prevails. Some of the works were thought to be incendiary and sensual. Early artists of the 20th century avant-garde according to Kleiner and Mamiya (2005:964) positioned themselves in the forefront by aggressively challenging traditional and often cherished notions about art and its relation to society. They also hold that artists of this period use their art to criticize political and social institutions.

Reflections on events of human catastrophes in histories are evident in works of concerned artists and writers around the world. Among such are the sad feelings of the human losses due to bombing of Guernica 1930s. Pablo Picasso in 1937 did a commissioned work that reflected all the atrocities and killings that took place in a painting “Guernica 1937”. In the same disposition, ‘Libyan Migrants’ issues became a watershed in the quest for a better life for Nigerian youths which emotional consequence could not be quantified. Headlines of human humiliations, trafficking, kidnappings, Killings, slavery amongst others are all over the papers and news media is sickening the nation. Artist such as Uwagboe was moved by these and said to be sad when he saw ‘disturbing images online’ during Libya immigration crisis, victims of Benue killings, and total disregard for human existence represented in Figures 12-13. In Nigeria, very few artists are still trying to carve a niche in art that critique government policies, social inequality and institutions of oppression. It is not common to find artist with passion of Uwagboe who expresses his thoughts in a way that is inconformity with the establishment. Uwagboe, a forthright artist in his correspondence with Amadi said; *Through my art, I have constantly reminded humanity of the consequences of our ill manners. Death is a forbidden topic to the shallow minded. But it’s an inevitable debt we must all pay. We must be more conscious of our operations here on earth...as we can see. The present time is so surreal like a horror movie. Materialism is on hold and this is what we are all running after. “Rest in Peace” is one of my old works.*



Fig 12: Waka 2018. 122x122cm

COVID-19, Bob-Nosatradamus who saw tomorrow; Source- OsaAmadi, (30th march,2020)
<https://www.vanguardngr.com/2020/03/covid-19-bob-nosatradamus-who-saw-tomorrow/>



Fig.13. The Mourners, 2018

Source:<https://www.vanguardngr.com/2018/11/the-return-of-bob-nosa-uwagboe-with-obituary-for-2nd-solo-exhibition/>

Conclusion

The trio of Piet Mondrian, Paul Klee and Willem De Kooning has kept influencing other artists around the globe with rigid abstraction, lyrical child thoughts, expressive dripping brush strokes and thematic emotional concepts. Artist's influences on one another are significantly playing a great role in artistic development as exemplified in the paintings of Nigerian artists examined. These artists owed their influences to exposure to works of their progenitors and personal experiences through interactions with the environment and going through the formal art learning. Nigerian artists of Asidere Duke, Bob-NosaUwagboe, and John Oyedemi made considerable effort to adapt to artistic influences and movements to create personal aesthetic expressions in painting as evident in the paintings reviewed in this paper. Finally in their search for personal expression some explored thematic concepts that address issues of concern in the society especially in paintings of Bob-Nosa and Duke Asidere, and inspiration from the environment by John Oyedemi. Many other artists in Nigeria are expanding the frontier of art practices and therefore require platforms that could project such through exhibitions writings on them.

References

- Amadi, O. (2020,March 30)COVID-19,Bob-Nosatradamus who saw tomorrow
<https://www.vanguardngr.com/2020/03/covid-19-bob-nosatradamus->
- Baxter,G.(2008). *The Abstract Art of Piet Mondrian Expressionist Abstract Artist*. Amazon.com widegets
- Chidiac-Mastrogiannis, P &Chukwuma, U, (2019), '*MOREMI*' *View from the Masters. A travelling show*. An art exhibition catalogue of Paintings and Sculpture. Alexis Galleries, Lagos.
- Gotthardt, A (2018). *How Paul Klee Influenced a Generation of American Artists, From Pollock to Mother well*. <https://www.artsy.net/article/artsy-editorial-paul-klee->
- Ikwuemesi, C.K, (2004). *Introduction to Spaces and Silences by Obiora and Ada*
- Hodge, S. (2011) 50 art ideas you really need to know.Pp 100,128 *Udechukwu*.catalog of exhibition held at Pendulum ArtGallery. collections.si.edu/search/results.jsp?9...
- Joshua, J.O. (2015) *Exploratory Study of Charcoal Market in Painting Using a Restricted Palette. (Aesthetic Considerations in Developing Concepts in Painting)* A PhD Dissertation Submitted to the Postgraduate School, Ahmadu Bello University, Zaria. Kaduna State, Nigeria. 46-52, 54-56, 64-66.

King (2010) in Akparara, (2015) *Perception and Visual Interpretation of Banana Plant Imagery in Painting*, a PhD dissertation submitted to the Department of Fine Arts, Ahmadu Bello University, Zaria. P 70

Kleiner, S.F. and Mamiya, C. J (2005) *Gardner's Art through the Ages*, Twelfth Edition. Volume II Pp 151, 879, 1002, 1006.

Mbonu, O. (2018, November 18).The return of Bob-NosaUwagboe with Obituary for 2nd solo Exhibition.[https://www.vanguardngr.com/2018/11/the-return-of-bob-nosa-uwagboe-with-Obituary-for-2nd-solo-exhibition/Signature Beyond Gallery, Awolowo Road, Ikoyi, Lagos. On November 18, 201812:22 amIn The Arts](https://www.vanguardngr.com/2018/11/the-return-of-bob-nosa-uwagboe-with-Obituary-for-2nd-solo-exhibition/Signature%20Beyond%20Gallery,%20Awolowo%20Road,%20Ikoyi,%20Lagos.%20On%20November%2018,%20201812:22%20amIn%20The%20Arts)[accessed 28/4/2020]

Nnamele, C. N. (2011) *Aesthetic Linearity: The Drawing Culture of the Modern Igbo Artists*A thesis Submitted to the Department of Fine and Applied Arts, University of Nigeria, Nsukka, in Partial Fulfillment of the Requirements for the Award of Doctor of Philosophy Degree in Art History.Pg187

Selz, P. (1981). *Art in Our Times, A pictorial History, 1890-1980*, Harcourt, Brace, Jovanovich.

Sowole, T. (july 2016)*How Asidere expands protest art with Mental Space*
<https://guardian.ng/art/us-based-duo-roze-earns-don-jazzys-applause/>

Sullivan, G. (2005) *Art Practice as Research, Inquiry into Visual Arts*, 2nd edition. edition California 91320. Sage Publications Ltd.p151

Willem De Kooning; *Black Untitled* (1984.613.7) In Hellbrunn Timeline of Art History. New York:The Metropolitan Museum of Art,2000. <http://www.metmuseum.org/toah/works-of-art/1984.613.7>(october2006)

Wolf, J.(2009) *Colour Field Painting Movement Overview and Analysis* [internet]2020 Compiled by Justin Wolf. Published by The Art Story Contributors [Accessed 20 Apr 2020]
<https://www.theartstory.org/movement/color-field-painting/history-and-concepts/#nav>

TABLE OF CONTENTS

Title page	i
Journal of Environmental Design (JED)	ii
Editorial Comments	iii
Editorial Committee	iv
Editorial Style Guide for Authors	v
Table of Contents	vi
Framework for Outsourcing Facilities Management Services in Public Hospitals: <i>Dubem Isaac Bediashi and Amaka Ogwueleka</i>	1
Assessment of Compliance with Accessibility Policies for Wheel Chairusers in Public Buildings: <i>Oloruntimehin Paul, Akinbogun S.P & Akinbogun O.T</i>	8
Characteristics of Mortars Produced with different Plastering Sands of Yola Metropolis, Nigeria <i>Yusuf U.S., Khalil I.M., & Garba M. M</i>	17
Land Acquisition and Housing Development in Akwa Ibom State: <i>Udeme D. Isa, Timothy O. Adewuyi, Michael G. Oladokun & Jacob Atser</i>	25
Benefits of Digital Transformation of the Construction Industry under the fourth Industrial Revolution: <i>Michael Gbolagade Oladokun, Henry Okpo Asuquo & Adegbenjo David Adelahun</i>	44
Access to Housing Facilities as tools for shaping the Idea of Housing Quality in Benin City, Nigeria: <i>Uyi Ezeanah</i>	55
Modelling the Effect of Corporate Governance on the Sustainability of Construction Firms using Structural Equation Approach: <i>Munday Otali & Uen Udoh</i>	65
Assessment of Factors Responsible for Low Level of Professional Registration by Building Graduates in Nigeria: <i>S. Muhammad, Z. H. Ishaq, and F. E. Afolabi</i>	76
Assessment of Builders' Risk Insurance Implementation in the Nigerian Construction Industry: <i>Fawziyya M. Oyeleke, Shehu Muhammad and Dikko Kado</i>	84
An Assessment of the Impact of Project Risk Factors on Project Completion Time in Nigeria: <i>Z. H. Ishaq, S. Muhammad, M. Abubakar and Y. S. Lawal</i>	93
Factors Affecting Valuation Accuracy For Secured Lending in Abuja, Nigeria: <i>Charles-Afolabi, Christianah Yetunde, Wahab Muktar Babatunde, Uman Jemika & Olaniji Kafilat J.</i>	102
Maintenance Culture Of Public Properties In Nigeria: Case Study Of Ado-Odo/Ota Local Government Area, Ogun State: <i>Osunji G.C., Esuabanga W.E., Igboke I.E. & Sodangi A.A</i>	112
Architectural Supervision: A Vital Tool For Preventing Building Collapse: <i>Robert Walpole Nwanguma & Eneogwe, Innocent C.</i>	118
Uyo Urban Imageability And Implications For Environmental & Cultural Values: <i>Massadih Effiong & Jacob Atser</i>	127
Barriers and Drivers Towards Effective Use Of Insurance As A Risk Management Tool In Built Environment Sector In Calabar Metropolis, Nigeria: <i>Esuabanga W. Effiong, Osunji G. Chukwuebuka, Sodangi A. Ahmed & Abolunwarin T</i>	135
Articulating Cultural Interaction and Influences Shaping Contemporary Art Practices in Nigeria: <i>Joshua, John Oyedemi</i>	142