Factors Affecting the Maintenance of Higher Education Institutions (HEIs) Buildings in Nigeria

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Abstract

The process needed to retain Higher Education Institutions (HEIs) buildings; their services and facilities to acceptable standards are recently being challenged by the need to sustain their Utilities and values in Nigeria. The absence of appropriate procurement strategies, maintenance methods, and adequate maintenance budget in the HEIs in Nigeria led to keeping a backlog of maintenance and repairs of their built environments (now in dilapidated conditions) which may impact negatively on staff and learners performance, and reduce their productivity levels. This paper seeks to assess and evaluate the works and service departments in higher education institutions in Nigeria by examining the effectiveness of maintenance works being carried out in connection with identifying the maintenance programme , maintenance schedules and jobs specifications (as maintenance control toolkit) have impacted the HEIs, and Proposing a framework to support key decision makers in Nigeria. Using a case study research strategy, adopting purposive sampling technique to select twelve HEIs, the approach is qualitative using a series of data collection employing semi structured interviews with the Directors of works and services from the selected HEIs . The data analysis employed was the thematic analysis of the data collected. It revealed that, a general shortage of financial resources has allowed a backlog of maintenance and repairs of HEIs Buildings to be built up across both the federal and state type. Furthermore, it identified that, within this context of a maintenance backlog, that the following factors exist, namely-low level of overall maintenance budget; delays in releasing fund (maintenance cash); the adoption and use of assets condition surveys and curative maintenance methods; a shortage of in-house technical staff. Based on the findings a framework is proposed to assist key decision makers to develop enduring solutions to such maintenance challenges to HEIs built environment in Nigeria.

Key words: Backlog , Environment, Maintenance, Procurement, Sustainable.

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Taking from The Polytechnic Ibadan,2012.

Figure 1: HEIs Buildings in dilapidated conditions.

1.0Introduction

Chartered Institute of Building (1990) also defines maintenance and refurbishment as "work Undertaken in order to keep, store, or improve every facility, its services and surrounds to currently acceptable Standards and to sustain the utility and value of the facility". The British Standard (BSI,1993) defines building maintenance as combination of any actions required to retain an item in, or restore to acceptable conditions. Alan(1998,p.74-90) defines defects as "ugly spots on both old and new buildings, and such spots reduce the commercial values of the assets as well as their service years".

David (1999,p.122) defines facilities or assets management "as managing a facility to maximise profit or returns on investment to give value for money expended." He explained further that frequencies of maintenance works on a building or asset depends on many factors, such as quality of materials used, quality of workmanship, frequency of use, nature of use, the age of the asset, ecological factors, nature of activities within and around the asset-for example activities that can cause vibrations to occur, such as mining, heavy traffic –vehicle train and air craft movements. David (1999) classifies asset maintenance into three, namely- preventive, predictive and corrective depending on the type of maintenance strategies adopted and used by the individuals or corporate organisations concerned. He explains further that repairs of damaged or worn-out parts of a building is curative and maintenance is preventive. He classifies repairs into two, namely minor and major repairs.

1.1 Justification of the Study

A cursory look at some Higher Education Institutions buildings in Nigeria, especially those built more than five years ago, suggests that they are not well maintained .It is suspected that some Higher Education Institutions (HEIs) have not considered budgeting for maintenance at all. In Nigeria, ownership of Higher Education Institutions (HEIs) can be categorised as being Federal government owned, state owned, and those in private ownership(for the purpose of this study emphasis is on Government owned). In South Western Nigeria (comprising of six states), there are fifteen Higher Education Institutions (public owned).This evidently shows the commitment of the Nigerian gover nment towards ensuring better quality of life for its citizens. However, meaningful skills and knowledge need to be imparted to learners in a very conducive environment. In addition the workplace for academic and other faculty staff must also be conducive. The study needs to evaluate current approaches to asset maintenance in Higher Education Institutions and develop a strategic framework for (HEIs) Works and services departments in HEIs in Nigeria.

1.2 Aim of The Study

The study needs to assess the constraints of Higher Education Institutions works and services departments in Nigeria with a view to evaluating their procurement strategies, maintenance methods, budgets, assets sustainability, and the influence of culture in the execution of projects. The study aims to propose a theoretical strategic framework on asset management in Higher Education Institutions in Nigeria.

1.3 Objectives Of The Study

*To establish current theoretical approaches to assets maintenance management

*To assess and evaluate works and services departments constraints in relation to procurement strategies, maintenance methods, budgets, effective maintenance management, and the influence of culture.

*To develop a theoretical asset maintenance strategic framework for HEIs in Nigeria.

*To validate the framework(through interviews and by attending workshops).

2.0 Research Methodology

Dainty(2008) asserts that there are four philosophical paradigms, namely-1-Ontology,-ii-Epitemology,-iii-Axiology,-iv-and Rhetorology. The author explains further that, the selection of any philosophical paradigm should consists of the three essentials, such as Ontology, Epistemology and Methodology. Crotty(1998) explains that there are three essentials namely, Ontology which is study of being and concerns with what is the nature of existence with the structure of reality, such as "meaning", and realism, epistemology means reality-that is, what it means to know, and that is a way of understanding and explaining how we know what we know and methodology is the strategy, plan of action, process or design underlying the choice and use of particular method and linking the choice and use of methods to the desired outcomes.

2.1 Mixed Method

For the purpose of this study, both the qualitative and quantitative approaches(mixed method research design based on pragmatism) would be adopted and research questions shall be drawn to ensure that the study achieves its objectives. However, for the purpose of this presentation, the researchers used semi-structured interviews(Qualitative) to collected the data been presented now.

2.2 Methodology and Data Collection strategy

In the whole study, both the hard and soft paradigms shall be used. The first phase of data collection shall be carried out by conducting semi-structured interviews(qualitative) for the Directors of works and services departments of the selected HEIs in Nigeria. The second phase shall be by administration of questionnaires(quantitative) for the users of the HEIs built environments. The researchers intend to use triangulation method. Robson(2002) asserts that, triangulation when used removes the bias of the researchers, enable an in-depth knowledge and understanding of the study area, encourages wider coverage, helps in validating the results of the research and finally enhance results credibility.

2.3 Research Design

Bryman and Bell(2003,p.32) define "research design as the ways in which the data will be collected and analysed in order to answer the research questions posed and to provide a framework for understanding the research". The study sampled twelve HEIs out of the entire fifteen of them (Federal and State owned), with one respondent in each HEI(One-Director of works and services) sampled.

2.4 Sources of Data

For the purpose of the study, the researcher used both primary source and secondary source of data collection.

2.5 Limitation of Methodology

The study shall be limited to the selected HEIs buildings in six states of the South Western part of Nigeria. The study shall use semi-structured interviews (qualitative) for the Directors of works and services and surveys for the users of the assets.

3.0 Current Theoretical Approaches to Asset Maintenance Management.

3.1 Maintenance Strategies

Chika(2008) asserts that, no single maintenance method and strategy can effectively provide needed remedies to both natural and artificial defects on buildings. The author recommends the use of a planned maintenance method which is termed as Planned Preventive Maintenance. Olanrewaju et al.,(2011, p.263) asserts that "there is a need for shift from maintenance management principles to value-based initiatives". This argument is calling for an improvement in maintenance management processes.

3.2 Procurement Strategies

Barret and Baldry(2003)describe procurement as the process by which a user employs a separate organisation under a contract to perform a function or to be performed by in- house staff. They conclude that HEIs as Corporate entities cannot stick to adoption of a particular procurement strategy in order to achieve quality of work done and ensure effective project delivery.

Brian and Brook(2009,p.44) assert that, "the choice between in-house and outsource services is not always clear cut". They argue that, the organisation management must consider first the issue of costs. RICS(2009) agrees that, a high degree of expertise is one of the advantages of outsourcing. The report further explains that, in-house technical staff(direct labour) carries out specialist work, especially where breakdowns have to be attended to immediately or where security is a high priority. An investigation must be made into the value of the project before a decision is taken as to which of the two strategies or combination is to be adopted and use (RICS,2009).

3.3 Maintenance Methods

David(1999) classifies building maintenance into three, namely-1-preventive,-2-predictive-3-and corrective maintenance methods. The author explains further that, repairs or replacements of works can be minor or major. Chika(2008) recommends the use of planned preventive maintenance method, while Justine and Keith(2008,p.361) assert that, "in the United Kingdom a stock condition survey(combination of predictive and curative) is the common tool used to assess the need for maintenance. In addition, (Oyewande,1992;Taiwo,2010 and Akinpelu, 2002) recommend the use of preventive maintenance method as a measure to avert eventual collapse of buildings. RICS(2009) asserts that the combination of preventive and corrective maintenance methods are needed for facilities to be durable and perform well. Iwarere and Lawal(2011) assert that, all public facilities can be utilised efficiently and effectively if a combination of preventive and corrective methods are employed.

3.4 Techniques of Maintenance Budget Estimation and Percentage

David(1998,p.215) asserts that, "an annual maintenance budget of about two to four percentage of the Agency annual budget needs to be allocated to the department of works and services for minor repairs and replacements". Justine and Keith(2008,pp.362-363) assert that "maintenance needs are determined by considering the physical conditions of the assets components in compliance with the Decent Home Standard". They assert that, budgetary and specification standards are the challenges being faced in the restoration of assets to normalcy. Olanrewaju, et al.,(2011) assert that, most HEIs based their maintenance budget estimates on the previous year's budget plus allowances for the coming year's budget. RICS(2009,pp.12) in its report that, "maintenance budget should be set up by taking information from the condition surveys and in particular from the prioritised schemes of works".

3.5 Surveys on Users Satisfaction

Emmit and Gorse(2006) assert that, any fault or defect discovered should be recorded and reported for immediate and appropriate actions(correction of the defects).

3.6 Quality Control of Maintenance Projects

Emmit and Gorse(2006) assert that, quality of completed building projects are determined by design process, quality of materials, components and works undertaken. Soderholm et al.,(2007) assert that, quality management aims to increase customers' satisfaction. Brian and Brook(2009) assert that, works and services departments should have a quality system in place and have their project designs, planning and execution stages accredited under ISO9000/9001:2008. RICS(2009) asserts that, many organisations now formally put quality management regimes in place to conform with ISO 9000:2000-now updated to ISO9000:2008.

3.7 Sustainability of the Built Environment

Project performance is considered in terms of cost, time and quality(Ding,2005 and Patermann,199). Alameda(2002) asserts that, sustainability development can be divided into three types, namely-1-build for durability,-2-make the environment safe-3-and use materials from sustainable resources. Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs(Ugwu and Houpt,2007). Spilans(2009) asserts that, the three fundamental aspects of sustainability developments are-i-environmental,-ii-economic-iii- and social. RICS(2009) asserts that, many organisations have put in place local strategies in environmental sustainability, material sourcing, waste disposal and energy management policies in an attempt to set up a framework to achieve a sustainability operation.

3.8 Use of Maintenance Control Toolkit

Olowoake(2006,p.3-9) asserts that the use of maintenance control toolkit, such as maintenance schedule, maintenance programme, job specification and facility register make maintenance project planning, execution, monitoring and evaluation efficient and effective and reduce maintenance costs.

4.0 Research Questions

4.1 Which of the procurement strategies do you adopt and use for-1-maintaining building structures -2-domestic equipment-3-and other services provided?

4.2 Which of the maintenance methods do you prefer to use-and why?

4.3 How do you estimate your annual budget-and what percentage is it of the Institution overall budget?

4.4 How often do you carry out a survey on users satisfaction of the built environment that your department manages?

4.5 How often do you ensure the delivery of quality in your projects-and how do you improve on it?

4.6 What are your department programmes in sustaining the assets that you managed?

5.0 Summary of Current Work Done and Findings on Semi-Structure Interviews(Qualitative) Conducted for Directors of Works and Services of the Selected Twelve HEIs in Nigeria.

The outcome of the recent semi-structured interviews (qualitative) conducted for the Directors of works and services departments of the selected twelve HEIs in Nigeria revealed as follow: All the twelve departments of HEIs in Nigeria adopt and use outsourcing for large and complex maintenance projects, and in –house technical staff for supervision, monitoring and controlling of such projects. In addition, they all use in-house technical staff for small and simple maintenance projects.

*Majority of HEIs works and services departments don't use planned preventive maintenance method, instead, they prefer the use of conditions survey and curative maintenance methods-due to paucity of maintenance funds and delays in releasing same where available.

*Many of the HEIs works and services departments base the estimation of their annual maintenance budgets on consideration for the previous year budget and the prevailing market prices of materials, components and labour plus a percentage or lump sum increase, while some of them use budget forecasting.

*Almost all of the HEIs works and services departments in Nigeria don't carry out surveys on users satisfaction. They rely on letters of complaints from the assets users.

*In general, design of new maintenance projects are carried out by Commissioned Consultants. Such projects are executed via outsourcing, while the in-house technical staff carry out the supervision monitoring and controlling of the projects materials, components and workmanship.

6.0 Suggestions

*The HEIs works and services departments should on yearly basis prepare and attach their maintenance schedules and work programme with their departments annual budgets for their HEIs management approval and release of maintenance funds to time. The department should also create a quality control unit within-comprising of seasoned professionals from the consulting firms and the in-house technical staff (Olowoake 2006;Olanrewaju et al.,2011)

*The HEIs works and services departments should endeavour to carry out reconnaissance surveys of their built environment with a view to identifying likely problematic areas, do the costing, prepare and attach annual maintenance schedules and works programmes for the approval and release of maintenance cash by their HEIs managements(Olowoake 2006;RICS,2009).

*The HEIs works and services departments should twice in a semester (at the beginning and the end) carry out surveys on users satisfaction of the buildings they use. This is necessary to get to know the needs and feelings of the users(David,1998;Justice and Keith,2008;Olowoake,2006;RICS,2009).

*The HEIs works and services departments should create a project control unit within, and the duties of the unit is to supervise, monitor and control maintenance projects materials,

components and workmanship in order to ensure cost saving, quality deliveries of projects within time limit (Olowoake,2006).

*The HEIs works and services departments to sustain built environment effectively, they should endeavour to prepare and use environmental sustainability toolkit-such as – maintenance schedules, work programme, facility register, history record, maintenance planning and others (Brian and Brook,2009; Chika,2008;RICS,2009;Olowoake,2006;Iwarere and.Lawal,2011).

7.0 LIST OF PARTICIPANTS(DIRECTORS OF TWELVE SELECTED HEIs IN NIGERIA.

7.1 Adediran,M.M.(2012) Moshood Abiola Polytechnic, Abeokuta, Nigeria

7.2 Wahab, S.(2012) Lagos State Polytechnic, Ikorodu, Nigeria.

7.3 Oyediran, A.T.(2012) Obafemi Awolowo University, Ile-Ife, Nigeria.

7.4 Oyebanji,M.(2012) The Polytechnic, Ibadan, Nigeria.

7.5 Olaniyan,S.(2012) University of Ibadan, Nigeria

7.6 Layode,K.(2012) Yaba College of Technology, Lagos, Nigeria.

7.7 Ayeye,O.(2012) University of Lagos, Nigeria

7.8 Adenuga,O.(2012) Tai Solarin University of Education, Ijebu-Ode, Nigeria.

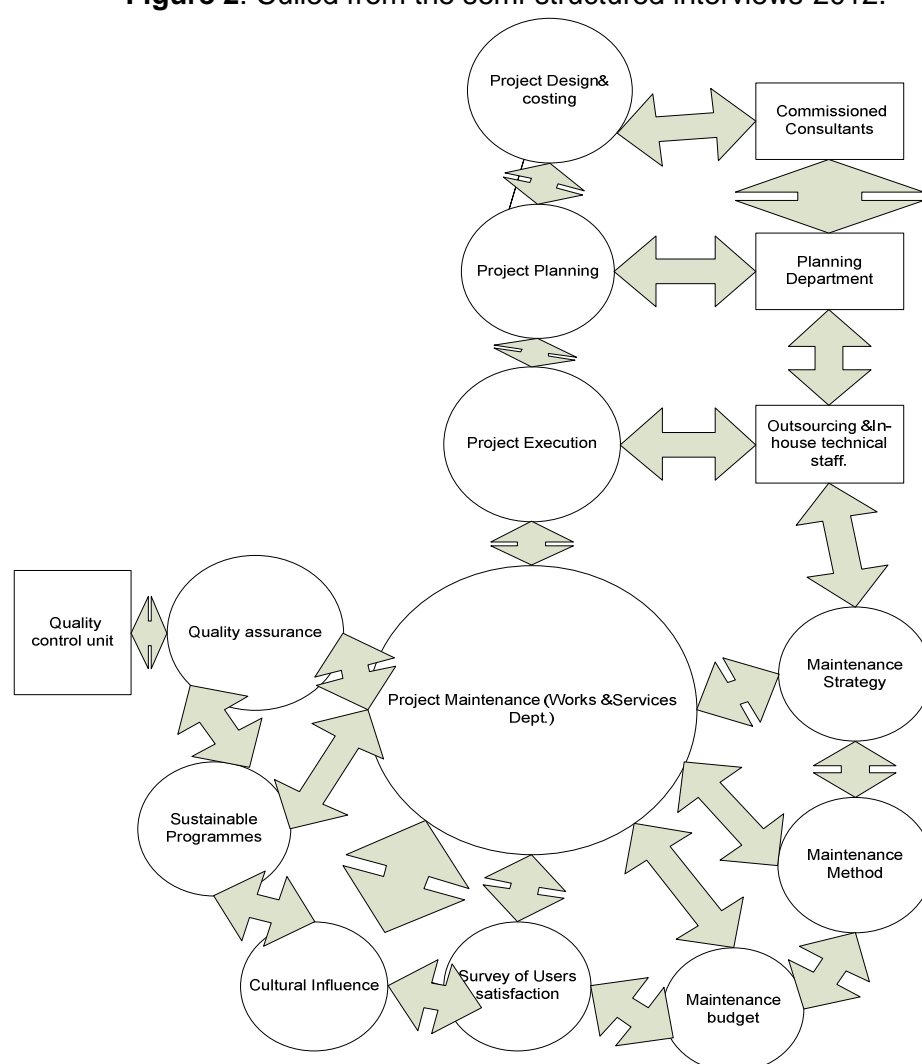7.9 Ogunbadejo, O.A.(2012) Federal Polytechnic, Ilaro, Nigeria.

7.10 Williams, S.T.(2012) Olabisi Onabanjo University, Ago-Iwoye, Nigeria.

7.11Oyekunle, F.A.(2012) Olabisi Onabanjo University, Ago-Iwoye, Nigeria.

7.12 Banjo,O.T.(2012) Federal University of Agriculture, Abeokuta, Nigeria.

8.0 A Theoretical Framework Designed to Support Assets Maintenance Management of Higher Education Institutions (HEIs)Buildings in Nigeria.

Figure 2: Culled from the semi-structured interviews-2012.

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7.11Oyekunle, F.A.(2012) Olabisi Onabanjo University, Ago-Iwoye, Nigeria.

 7.12 Banjo,O.T.(2012) Federal University of Agriculture, Abeokuta, Nigeria.

References

Alameda County(2002) Alameda County Waste Management Authority. New House.

Akinpelu, J.A.(2002) The need for Code of Conduct, Building Regulations and bye-laws for the

Building Industry in Nigeria. The Professional Builder, Nigeria Institute of Buildings,2(1) 11-14.

Alan,P.(1998) *Facilities Management-An Explanation* (Second Edition), Macmillan, England,p.74-90.

Barret, P.and Baldry, D.(2003). Facilities Management, Towards Best Practice, Blackwell Science Ltd, Oxford Ox2 OEL, UK.

Brian, A. And Brooks,A.(2009)*Total Facilities Management.* Third Edition. Blackwell Science Ltd.

Bryman, A. and Bell, E.(2003).*Business Research Methods*, Oxford University Press, Oxford.

BSI(1993) BS 3811-Glossary of Maintenance Management Terms in Terotechnology, British Standards Institute, London, {Manual request} [Infotrieve].

Chika,E.U. (2008) *Professional Practice for Real Estate, TREEM NIGERIA LIMITED, Lagos.* Nigeria,p.34.

CIOB(1990), Maintenance Management-A Guide to Good Practice, Chartered Institute of Building ,Ascot.

CIOB(2011) ISO 9001 Quality management case studies, *Construction Standards Report.* www.ciob.org/Quality

Creswell,J.W.(2003) *Research Design: Qualitative, Quantitative and mixed methods approaches* Second Ed.London:Sage Publications.

Crotty,M.(2005)*The Foundations of social research; meaning and perspective in the research process.* London:Sage publications.

Dainty,A.(2008) Methodological pluralism in construction management research. *In :Knight,A.and, Ruddock*

David,G.C. (1999) *The Facility Management Hand book, American* Management Association, New-York.

David, L. (1998). *Selected Issues in the philosophy of social science.* In S.Cleave (1998), Researching Society andCulture (pp.7-22).London EC 2A.

Ding, G.K.C.(2005). Developing a multicriteria approach for the measurement of sustainable performance. *Building Research and Information* 3391),3-16.

Emmitt, S. and Gorse, C.(2006) *Introduction to construction of buildings.* Blackwell publishing ltd, USA.

Fellows, R. And Liu, A.(1997). *Research Methods for Construction*, Blackwell, Oxford.

Fink,A.(2006) *How to conduct Surveys. A step-by step guide.* Sage publications, 3rd Edition, London.

Hammersley, M.(1996). *The relationship between qualitative and quantitative research*: Paradigm loyalty versus methodological electism, in Richardson, J.T.E.(ed.) Handbook of Research Methods for Psychology and the Social Science, BPS Books, Leicester.

Iwarere, H.T. and Lawal, K.O. (2011). Performance measures of maintenance of public facilities in Nigeria, Research Journal of Business Management.5(1):16-25, 1819-1932.

Layder, D.(1993) New Strategies in Social Research, Policy,Cambridge.

Loosemore, M.,Hall, C. and Dainty,A.R.J.(1996) Excitement, innovation and courage in construction management research-Challenging historical values, in Thorpe, A.(ed.) *proceedings of the 12th Annual ARCOM Conference,* Sheffield Hallam, pp. 418-427, ISBN: 0863396607.

Olanrewaju, A.A.L .,Mohd,F.K. and Arazi,I.(2011) Appraisal of the building maintenance management practices of Malaysian Universities.*Journal of Building Appraisal, a Professional Journal* 6(3/4):262.

Olowoake,M.A.(2006) Building Maintenance Management for Beginners. Excel Design Press,Abeokuta,Nigeria

Oyewande, B.(1992) A search for quality in Construction Industry. Builder Magazine, june/july edn.,Lagos, Nigeria.163-168.

Patermann,C.(1999).The fifth EU framework programme and its consequences for the construction industry. *Building Research and Information,* 27(60,412-418.

Pikutis,R and Seduikyte, L (2006) Estimation of the effectiveness of renovation work .*Journal of Civil Engineering and Management* vol.X11,No 2,163-168.

Popper, K.R.(1963). *The myth of framework.* London Routledge.

ROYAL INSTITUTION OF CHARTERED SURVEYORS (2009) RICS Practice Standards-Building Maintenance strategy; planning and procurement. Second Edition. United Kingdom.

Robson (2002)*Real world research: A research for social scientists and practioner-researchers*, second ed. London: Blackwell publishing Ltd.

Rosenhead, j (1997) *Forward,* in Mingers, J. and Gill, A. (eds) Multimethodology: The Theory and Practice of Combining Management Science Methodologies, Wiley, Chichester.

Runeson,G.(1997) The role of theory in construction management : comment. *Construction Management and Economics*. 15,229-302.

Spilanis,I.,Kizos,T.,Koulouri,M.,Kondyli,J.,Vakoufaris,H., and Gatis,I.(2009).Monitoring Sustainability in Insular Areas. Ecological Indicators,9(1),179-187.

Taiwo, A.A. and Afolami, J.A.(2010) Incessant Building Collapse: A case of a Hotel in Akure, Nigeria. Journal of Building Appraisal, vol.6,(3/4),241-248.

Ugwu, and Haupt, T.C.(2007) Key Performance Indicators and Assessment Methods for Infrastructure Sustainability-A South African Construction Industry Perspective .Building and Environment, 42(20),665-680

West, P.(1990)." The status and validity of accounts obtained at an interview: a contrast between two studies of families with a disabled child ,*Social Science and Medicine,* 30 (11):1229-1239.