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APPLICATION OF LIFE CYCLE MANAGEMENT IN TRANSFORMING BUILDING INDUSTRY IN NIGERIA: POSSIBILITIES AND REALITIES

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ABSTRACT
The building industry is a key player in the transformation of socio-economic development globally. It creates employment and provides shelter and other infrastructural developments. However, issues of quality cost and time overrun are contending factors that leads to building failures, poor infrastructural developments, and insufficient service delivery amongst others. The aim of this study is examine the application ofLife Cycle Management (LCM) in transforming building industry in Nigeria. This can be achieved by investigating the factors influencing LCM in project delivery in the building industry in Nigeria. Data were collected from a population of 350 Architects, 352 Builders, 354 Engineers, 354 Quantity Surveyors, 350 Urban and Regional Planners and 350 Contractors. From each of these populations, a stratified random sampling of 10% was obtained and a formula was used to provide a sample of n = 210. Data was collected by use of standardized questionnaires and interviews. Descriptive statistic was used to analyse the data and in establishing whether there is a statistical significant difference between LCM adoption and how it can influence project performance in transforming the building industry in Nigeria. Chi-Square statistics was used to test for significance difference between LCM and the factors influencing project delivery at 95% confidence level. The results indicated a significant difference meaning that the higher the LCM the adoption, the better the project performance in the building industry in Nigeria. Hence, the possibilities and realities of the state of construction in Nigeria, LCM if fully adopted; can transform the building industry in terms of best practices and better project performance.
Keywords: Building, LCM, Possibilities, Realities, Transformation

INTRODUCTION

The building industry is a key player in the transformation of socio-economic development globally. It creates employment and provides shelter and other infrastructural developments. According to Low & Jiang (2004) the building industry is one of the oldest across the globe. Similarly, Ngowi *et al* (2005) pointed that the building industry relied on environmental resources such as land, climate in which the society participate to create for its living. Akadiri (2011) viewed building industry as an aggregation of business engaged in closely associated activities.

In spite of the achievements recorded in the building industry, the Nigerian economy according to Usman *et al* (2010) has grossly underperformed relative to her enormous resource endowment and her peer nations. Nigeria is endowed with both gas and crude oil. Nigerian rating globally

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stands at the sixth largest gas reserve and the 8th largest crude oil reserve (Kehinde, Aiyetan & Ibrahim, 2002; Idoro, 2012; Inuwa *et al*, 2013).

In addition, Nigeria is endowed in commercial quantities with about thirty seven different solid minerals. Above all, the country has a population of over 150 million (Kabir & Bustani, 2006). Yet, economic performance has been rather weak relative to its endowments and in comparison to her Asian economic peers in the 1970s (Akadiri, 2011). Comparable Asiatic countries, notably, Thailand, Malaysia, China, India, and Indonesia have transformed their economies to a position of becoming major players in the global economic arena.

The major factors accounting for the relative decline of the Nigeria's economic fortunes are conspicuously ascribed to political instability, lack of focused and visionary leadership, economic mismanagement, ineffective physical development control regulation, excessive high construction cost, and corruption (Idoro, 2014; Low& Jiang, 2004; Usman, 2006).

The Nigerian building industry has been described as a sleeping giant on the African continent in terms of service delivery and its capacity to satisfy the needs of its clients (Ibrahim & Musa-Haddary, 2010; Idoro, 2014) because of its inability to delivery services efficiently and effectively (Ibrahim & Musa-Haddary, 2010; Idoro, 2014). For instance, there have been several reports of poor management of projects, the unnecessary rush in project implementation, inadequate planning and budgetary provisions, costly project execution, inefficient service delivery, and abandoned or non-functional facilities and collapsed buildings, poor supervision, high level of corruption, conflict in professional services (Ibrahim and Musa-Haddary, 2010; Idoro, 2014; Usman *et al*, 2014).

LCM has been used successfully in managing many projects (Idoro 2014; Jaafari, 2000) and improving services (Chalfant, 2001; Xie & Simon, 2006). LCM is a management process that helps the project manager to better understand the various steps of a project and the resources required. It reflects every management requirement for successful project delivery and communication between participants(Usman *et al*, 2014). Without a good delivery system, any project in the building industry will not succeed.

Based on previous study, no evidence shows that LCM was used for project delivery in developing countries especially in Nigeria (Kamau *et al*, 2013; Usman *et al*, 2014).This study therefore sets out to examine the application ofLife Cycle Management (LCM) in transforming

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building industry in Nigeria. This can be achieved by investigating the factors influencing project delivery in the building industry in Nigeria.

THE LIFE-CYCLE MANAGEMENT PRINCIPLE

A successful project management process relies on two activities – planning and doing. These two sequential activities form the basis of every project life-cycle, and can be expanded to suit the control requirements in every area of project management application (Asudani & Kloppenborg, 2008). The project life-cycle, characterized by a series of 'milestones' determines when the project starts, the 'control gates' through which it must pass, and when the project is finished (see the conceptual framework – fig. 1).

The project manager makes use of the life cycle concept as a process for better understanding of the stages of a project and the likely resources required for its successful implementation (Nwachukwu& Fedelis, 2011; Usman *et al*, 2014).They added that the life cycle management is used to pictorially explain organisational phases in building the production line and sales life cycle of a product. It is also one of the instruments that help managers conceptualize work and budgetary requirement of the project (Kamau *et al*, 2013).

At the beginning of the project, through planning, research, experience, and expert judgment, the project manager and the project team will plot out when each phase should begin and end, and the related deliverable for each phase, which is referred to as a milestone. This milestone is a significant point in the schedule that allows the stakeholders to see how far the project has progressed—and how far the project has to go to reach completion.

Theoretical Framework

This study employs the theory of project as propounded by Koskela (2000). In its statement, the theory of project is provided by the transformation view on operations. In this view, a project is conceptualized as a transformation of inputs to outputs. There are a number of principles followed for the project management. These principles suggest, for example, decomposing the total transformation hierarchically into smaller transformations, tasks, and minimizing the cost of each task independently.

The theory further contends that understanding of management is based on three sub-theories: management-as-planning, the dispatching model and the thermostat model. In management-as-

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planning, management at the operations level is seen to consist of the creation, revision and implementation of plans. This approach to management views a strong causal connection between the actions of management and outcomes of the organization. The dispatching model assumes that planned tasks can be executed by a notification of the start of the task to the executor. The thermostat model is the cybernetic model of management control that consists of the following elements: a standard of performance; performance measured at the output; a variance between the standard and the measured value which is used for correcting the process so that the standard can be reached.

Realities of the Building Industry

Ofori, 2014 states that the building industry is a conglomeration of participants in diverse fields who then form a sector of the economy. The building industry plays a central role in national welfare, including the development of residential housing, office buildings and industrial plants, and the restoration of the nation's infrastructure and other public facilities. He opined that the importance of the building industry lies in the function of its products, which provide the foundation for industrial production, and that its impacts on the national economy cannot be measured by the value of its output or the number of persons employed in its activities alone.

Chan & Chan (2004) advocated that most industries are dynamic in nature and the building industry is no exception. Its environment has become more dynamic due to the increasing uncertainties in technology, budgets, and development processes. A building project is completed as a result of a combination of many events and interactions planned, over the life of a facility (Usman *et al*, 2014).Sanvido *et al* (1992) opined that this characteristic of building projects being temporal and fragmented is inherent in the building industry and greatly affects the effectiveness of project teams especially the project managers who can complete projects with more favourable outcomes.

However, this concept has remained ambiguously defined among construction professionals. Many project managers still manage and allocate resources across various project areas in an intuitive and ad-hoc fashion (Usman *et al*, 2014).The ability of the building industry to innovate and manage change has been widely debated over the years (Ofori, 2014; Idoro, 2012;Usman, 2006). A range of factors in the building industry have changed over the last 20 years resulting in construction firms moving away from a traditional to a more business approach (Idoro, 2012).

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In order to solve complex issues that confront management in transforming the building industry, Ofori (2014) suggested the use of reasoning and problem-solving skills including the use of physical, technical and human resources tailored to the rapid changes in the building industry and in line with the preferred procurement methods of clients. Such flexibility requires highly innovative and creative problem-solving skills as well as organizational structures and managerial value systems which support and encourage their development (Usman, 2006).

Akidiri (2011) opined that problems in the building industry include corruption during the awarding of contracts, and abandonment of projects owing to severe cash flow problems. As a result, construction operatives have been subjected to a work environment which has not encouraged high levels of efficiency. The non-payment of wages, the interruption of work due to lack of materials or tools and the consequent loss of morale has led to an exodus of traditional craftsmen from the industry. The adoption of appropriate planning, monitoring and valuation techniques in the preparation of master plans for building projects are essential tools for the achievement of success by the contractors in executing construction projects.

According to Odeyinka *et al* (2006), experience has shown that houses built by government are outrageously expensive when compared with similar houses built by non – governmental agencies or private construction firms. Such houses have the following characteristics:-

i) The quality standards are too high
ii) The space standards are too generous
iii) Fees charged by professionals are too high
iv) Project margins of contractors are excessively high

Pheng & Tan 1996 observed that many building firms (indigenous construction firms) are small and cannot raise money through public offers. Lacking in collateral, borrowing costs for such firms are therefore higher and this discourages investment in capital equipment and banks consider small building firms too risky to offer loans. Mbamali 2002 and Idoro2012 argued that the erratic economic conditions which Nigeria witnessed during the second half of the 1980s have made contract overruns in terms of time and money a regular feature of building projects in the country.

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Contract clauses provide the basis for claims; it is the contractor's responsibility to initiate, prepare and present such clauses in a clear and convincing manner according to standard practice. However, Idoro (2012) observed that most contractual claims are either totally rejected or settled with relatively insignificant awards. This leads to lack of substantiating evidence and lack of contractual basis for claims.For instance, huge investment running into several billions of Naira has been put in the building industry in Nigeria through low-cost housing programmes under the Shagari administration (Kehinde, Aiyetan & Ibrahim, 2002) which were underperformed and most were abandoned.

It is interesting to note that both civilian and military administrations have made the issue housing for all (new or improved) a policy or programme that was workable but unfortunately, the implementation was not impressing. Poor management and delays of projects have led to indigenous contractors suffer which affects project delivery.

Possibilities of transforming building industry

The inability to implement policies, plans or projects is widely recognized as a major weakness of contemporary planning in developing countries (Achuenu *et al*, 2000; Idoro, 2012; Kamau *et al*, 2013). If a project does not result in change necessary to achieve desired goals and objectives, it is meaningless. Goals and objectives have to be translated into action and it is their implementation that provides progression from plan to action and to changes in economic, social and physical environments (Usman *et al*, 2014).

Project implementation and management is a means of avoiding the ills inherent in the construction sector and which lead to project failure, incompletion, and abandonment (Idoro, 2012; Idoro, 2014; Kamau *et al*, 2013). However, the success of any building project in public or private sectors depends on the project manager's staff appointment and control, and strict monitoring of time, cost, material, quality and environmental constraints (Nwachukwu and Fedelis, 2011, Kamau *et al*, 2013).

Environment comprises of external, natural, physical and residential conditions which directly or indirectly affect man, and which are influenced by economic decisions and technological development (Chandra, 2010).

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Project implementation can be used to mean the whole process of translating broad policy goals and objectives into visible and specific programmes of action. This forms the interaction between the setting of goals and the actions required to achieve them. However, well formulated a management programme or policy, unless action is taken to implement it, remains only as paper work. Programme implementation is the full range of managerial activities associated with putting the chosen strategy into place, supervision of its pursuit, and achieving the targeted result (Shen *et al*, 2010, Idoro, 2012).

However, if there is no commitment from the organization's leaders to implement a strategic plan and to achieve quality, any effort to actualize it can lead to cynicism and lessen the likelihood of its adoption and success in future. Plan implementation results from administrative decisions on how to do things and create fits between management policies and operations. Kabir & Bustani, (2006) and Idoro (2012) opined that administrative and managerial elements are necessary to put a management policy into place and that full implementation can take several months to years depending on the amount of coordination involved.

Consequently, the possibility of transforming the building industry depends on how well the stakeholders play their roles in implementing the building code and checking against unethical professional practices based LCM principles.

METHODOLOGY

The study was carried out using both qualitative and quantitative techniques. The qualitative design provides a descriptive analysis of the influences of LCM in the building industry in Nigeria. The quantitative analysis provides statistical information and figures with regards to how LCM has affected costs, time, wastages and issues related to durability of projects. A structured questionnaire and interviews were used for collecting data for this research.

The table 1 below indicates the target population comprising of professionals in the built environment. The target population size was obtained from records of professional bodies based on a formula and 10 % sampling margin (Mugenda & Mugenda, 2003; FCDA and Corporate Affairs Commission (Leed & Ormond, 2005). Stratified random sampling was used to sample the respondents. The population was divided by the sample size to obtain the interval scale for each category of the professionals above. 50 respondents were sampled in each category for the purpose of uniformity and to avoid being bias by any profession. The purposive sampling was

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used to obtain the required samples in each of the categories of professionals for the purpose of data analysis.

However, the result of a survey could be considered as biased and of little value if the response was lower than 30 – 40% (Usman, *et al*, 2012[1] and Usman, *et al*, 2012[2]). The response rate for this research is 70% which indicate an unbiased and higher value of survey. The formula used to determine the sample size of the unlimited population (Ayoub & McCuen, 2000; Creative Research System, 2005; Enshassi, *et al*, 2006)

The sample size is 210 professionals, based on a 95% confidence level. To ensure good representation of each category, the sample was distributed as seen in Table 1:

Table `1: Target population and sample

Professionals	**Population based on registration**	**Sample Size**
Architects	350	35
Builders	352	35
Engineers	354	35
Quantity Surveyors	354	35
Town Planners	350	35
Contractors	550	35
Total	**1956**	**210**

Source: Professional Bodies, 2012

Results and Analysis

The objective of the study was to investigate the factors influencing LCM on project performancein the building industry in Abuja, Nigeria. Data was analyzed using ANOVA to test the hypothesis that LCM adoption does not influence project performance in the building industry in Abuja, Nigeria. The results indicate a significant difference between LCM adoption

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and project performance (F= 517.026; alpha =0.05; df = 4, 206; p= 0.000) since it is less than the chosen alpha. This shows that LCM principles greatly influence project performance. Null Hypothesis was rejected and alternative hypothesis was accepted. This was in line with the responses of the interview conducted on the factors that influence project performance were outlined as follows: delays in project approvals, bureaucracy, corruption, non-release of mobilization funds as at when due as well lack of monitoring and supervision among others. These, has greatly affect cost, time and quality standards. This shows noncompliance of LCM principles.

These principles, for instance, if a survey is not carried out correctly at the initial phase, it may affect planning, implementation and completion phase principles of LCM processes; and the possibilities of the building collapsing or facing other structural challenges becomes high. Project Performance is attained through efficiency and effectiveness of cost, time and quality standards. This was in light of the BI inability to deliver services efficiently and effectively (Ibrahim & Musa- Haddary, 2010). According to Kabir *et al* (2009), project delivery is an illusion in Nigeria. Thus, the performance of the building industry in terms of project delivery is far below expectations (Aniekwu *et al*, 2010; Usman *et al*, 2010; Bailey *et al*, 2008). This is as a result of non-release of funds to project activities as and when due, high level of corruption, bureaucracy, inflation and unethical professional practices (Usman *et al*, 2012; Usman, Inuwa & Iro, 2012, Idoro, 2014) among others.

Projects fail or collapsed and abandoned for lack of proper LCM principles. Perhaps that is why projects are rarely complicated within quality standards, cost and time overrun.

The researcher further performed chi- square test to determine whether there is a significant difference between LCM adoption and project performance within the building industry in Abuja, Nigeria. From the Chi-Square analysis, a value of 0.771 was obtained. This suggest that a value of 77.10% of the variability of project performance is been accounted for by proper LCM adoption. It means that project performance can be enhanced by adopting LCM principles.

Conclusion

In spite of LCM's successful use in the building industry globally its use in Nigeria it yet to be browbeaten. This is evident from the underperformance of the BI and its inefficient service delivery. Several questions emerge: is LCM being practical only by a section of the industry in Nigeria or by the entire building industry? Is LCM seen by industry actors as an operational instrument that will ensure quality, cost and time overrun in the building industry? Is there conflict to the application of LCM by the industry? These posed serious contest on the

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performance of projects on quality, cost and time overruns; however, these contests can be alleviated by adopting LCM in the building industry in Nigeria.

Recommendation

Based on the findings, the following recommendations were made:

1. LCM principles should be adopted in the building industry in Nigeria
2. National Building Code should be enforced to all industry players
3. Continuous Professional Development should be maintained
4. Blundering professionals should be punished for unethical practices

REFERENCES

Achuenu, E.; Izam, Y. D. & Bustani, S. A. (2000). Investigating the activities of indigenous contractors in the Nigerian Construction Industry. *Nigerian Journal of Construction Management and Technology*, 3 (!) 91-103.

Akadiri, O. P. (2011). *Development of Multi-Criteria Approach for the selection of sustainable materials for building projects.* University of Wolverhampton: PhD Thesis.

Aniekwu, A. N. & Audu, H. O. (2010). The effects of management on productivity: A Comparative study of indigenous and foreign firms in the Nigerian Costruction Industry. *Proceeding of the West African Built Environment Research (WABER) Conference* (pp. 567-578). Accra, Ghana: WABER.

Assudani, R. and Kloppenborg, J. J. (2008). Using Stakeholder and Social Network, Theories to improve project success. *POMS Annual Conference.* Califonia: Lafolla.

Ayoub, B. M. & McCeun, R. (2000). *Probability Statistics and Reliability for Engineers, Statistics and Scientists.* USA: Chapman and Hall.

Bailey, P.; Farmer, D.; Crooker, B.; Jessop, D. & Jones, D. (2008). *Procurement Principles and Management, Tenth Edition.* London: Pearson Education Ltd.

Chalfant, R. V. (2001). The benefit of Life Cycle Management. *Iron Age New Steel*, 17 (1).

Chan, A. P. C. & Chan, A. P. L. (2004). Key Performance Indicators for measuring construction success. *Benchmarking: An International Journal*, 19, 200-211.

[1] napodanusman@yahoo.com
Usman, N. D[1]., Kamau, P. K[2]., and Mireri, C[3]. (2015) Application of Life Cycle Management In Transforming Building Industry In Nigeria: Possibilities and Realities. In: Mojekwu, J.N., Ogunsumi,L.O., Ojigi,L.M. Atepor, L., Thwala,D.W., Sackey,S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 89-103

Chandra, P. (2010). *Project Planning Analysis, Selection, Financing, Implementation and Review, Seventh Edition.* New Delhi: Tata McGraw-Hill Education, Private Ltd.

Enhassi, A; Al-Hallaq, K. & Mohammed, S. (2006). Causes of Contractors Business Failure in Developing Countries: A Case Study of Palestine. *Journal of Construction in Developing Countries*, 11 (2) 1-14.

Ibrahim, A. D. & Musa-Haddary, Y. G. (2010). Concept of value for money in public infrastructural development. *A Paper presented at a three-day International Workshop on private partnership appraisal to infrastructural development in Nigeria from 13th-15th July at Shehu Yar'Addua International Conference Centre.* Abuja, Nigeria: NIQS.

Idoro, G. (2012). Influence of Project plans on the outcome of construction projects procured by Design-Build in Nigeria. *Journal of Construction in Developing Countries*, 17 (2) 77-99.

Idoro, G. (2014). Address presented by the Co-Chair at the opening Ceremony of CIB Conference held at Orchid Hotels & Events Centre. *Proceedings of CIB Conference.* Lagos, Nigeria: CIB W107.

Inuwa, I. I.; Wanyona, G. & Diang'a, S. (2013). Investigation into Nigerian Indigenous Contractors project planning in construction procurement systems. *SABS Conference-Promoting Sustainable Built Environment: Architechture, Environment, Technology and Society in the Global South.* Nairobi, Kenya: Jomo Kenyatta University of Agriculture and Technology.

Jaafari, A. (2000). Life Cycle Project Management: A Proposed model for development and implementation of capital projects. *Project Management Journal*, 31 (1) 17-27.

Kabir, B.; Bello, A.; Kolo, B. A. & Bustani, S. A. (2009). Factors inhibiting the growth of local construction firms in Nigeria. *ARCOM Conference* (pp. 351-359). Nottingham, UK: ARCOM, 7TH.

Kamau, P. K.; Mireri, C. & Usman, N. D. (2013). An assessment of Life Cycle Manmagement System on Project Performance within the Building Industry in Abuja, Nigeria. *SABS Conference on Promoting Sustainable Built Environment.* Nairobi, Kenya: Jomo Kenyatta University of Agriculture and Technology.

Kehinde, J. O.; Aiyetan, A. O. & Ibrahim, B. (2002). A Study of delays in payment of Public sector building construction in Nigeria. *Journal of Environmental Sciences*, 7 (1) 106-111.

www.ajaroniline.com Vol.1, No.1 ISSN 2408-7920 January 2015
[1] napodanusman@yahoo.com
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Kerzner, H. (2000). *Applied Project Management: Best Practices on Implementation.* New York: John Wiley & Sons.

Koskela, L. (2000). An exploration towards a production theory and its application to construction . *BTT Building Technology Expoo*, 296.

Leed, P. D. & Ormond, D. (2005). *Practical Research, Planning and Design, Eight Edition.* New Jessey: Prentice-Hall.

Low, S. P. & Jiang, H. (2004). Estimation of International Construction Performance Analysis at the Country level. *Construction Management and Economics*, 22 (3) 277-289.

Mbamali, I. (2002). Limiting factors to good claims preparation and presentation by Nigerian Building Contractors. *Journal of Environmental Technology*, 1 (1) 1-6.

Mugenda, O. M. & Mugenda, A. G. (2003). *Reserach Methods, Qualitative and Quantitative Approaches, Revised Edition.* Nairobi, Kenya: African Centre for Technology Studies Press.

Ngowi, A. B.; Piennar, E.; Talukhaba, A. & Mbachu, J. (2005). The globalization of the Construction Industry: A Review. *Building and Environment*, 40 (1) 135-141.

Nwanchukwu, C. C. & Fedelis, I. E. (2011). Building Construction Management Succcess as critical issue in real estate development and investment. *American Journal of Social and Management Sciences*, 2 (1) 56-75.

Odeyinka, H. A.; Oladapo, A. A. & Akindele, O. (2006). Assessing risks impacts on construction cost. *Proceedings of the Annual Research Conference of the Royal Institution of Chartered Surveyors, 7th-8th September.* London: University College.

Ofori, G. (2014). Nature of the Construction Industry, its needs and its development: A Review of four decades of research. *Proceedings of the CIB W107 International Conference, 28th-30th January* (pp. 10-19). Lagos, Nigeria: CIB W107.

Pheng, L. S. & Tan, W. C. K. (1996). The influence of workload instability on quality in the construction industry. *International Journal of Quality*, 13 (3) 12-56.

Robert, A. & Wallace, W. (2004). *Project Management.* Great Brittain: Pearson Education.

Shen, I.; Tam, V.; Tam, I. & Ji, Y. (2010). Project feasibility study: The key to successful implementation of sustainable and social responsible construction management practice. *Journal Cleaner Production*, 18 (3) 254-259.

[1] napodanusman@yahoo.com
Usman, N. D[1]., Kamau, P. K[2]., and Mireri, C[3]. (2015) Application of Life Cycle Management In Transforming Building Industry In Nigeria: Possibilities and Realities. In: Mojekwu, J.N., Ogunsumi,L.O., Ojigi,L.M. Atepor, L., Thwala,D.W., Sackey,S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 89-103

Systems, C. R. (2012, August 15th). *Sample size formulas*. Retrieved from http://www.surveysystem.com

Usman, N. D. (2006). *An appraisal of the effects of financial planning for public construction projects in Nigeria: A Case Study of North-East and North-Central States of Nigeria: MSc Thesis.* Dept. of Building, School of Environmental Studies, University of Jos.

Usman, N. D.; Chen, J. A. & Lodson, J. Y. (2010). Environmental Sciences and the challenges of Collapsed Buildings in Nigeria. *Journal of Environmental Sciences and Agriculture in Developing Countries*, 2 (2 & 3) .

Usman, N. D.; Inuwa, I. I.& Iro, A. I. (2012). The influence of unethical professional practices on the management of construction projects in North-Eastern States of Nigeria. *International Journal of Economic Development Research and Investment*, 3 (2) 124-129.

Usman, N. D.; Inuwa, I. I.; Iro, A. I & Dantong, J. S. (2012). Training of Contractors Craftsmen for productivity improvement in the Nigerian Construction Industry. *Journal of Engineering and Applied Science*, 4, 1-12.

Usman, N. D.; Inuwa, I. I.; Kolawole, R. O.; Kwari, J. M. & Didel, J. M. (2014). Evaluating the impact of housing delivery system on project performance within the building industry in Nigeria. *Journal of Environmental Sciences and Resource Management*, 135-145.

Westlands, J. (2006). *The Project Management Life Cycle: A Complete step-by-step methodology for initiating, planning, execution and closing a project successfully.* United Kingdom: Konan Page Ltd.

Xie, X & Simon, M. (2006). Simulation for Product Life Cycle Management. *Journal of Manufacturing Technology Management*, 17 (4) 486-495.

AFRICAN JOURNAL OF APPLIED RESEARCH (AJAR)
www.ajaroniline.com Vol.1, No.1 ISSN 2408-7920 January 2015
[1] napodanusman@yahoo.com
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Appendix A

Table 2: Summary of the analysis of ANOVA based on professionals responses

Professional Category	**F**	**DF**	**Sig.**	**alpha**
Architects	1204.384	1,33	0.000	0.05
Builders	221.976	1,33	0.000	0.05
Contractors	1273.675	1,33	0.000	0.05
Engineers	395.372	1,33	0.000	0.05
Quantity Surveyors	3899.470	1,33	0.000	0.05
Urban and Regional Planners	245.577	1,33	0.000	0.05

Author, 2014

Table 3: Summary of the analysis of ANOVA based on professionals responses

	F	**DF**	**Sig.**	**alpha**
Combined professions	1829.137	4, 206	0.000	0.05

Author, 2014

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Appendix B

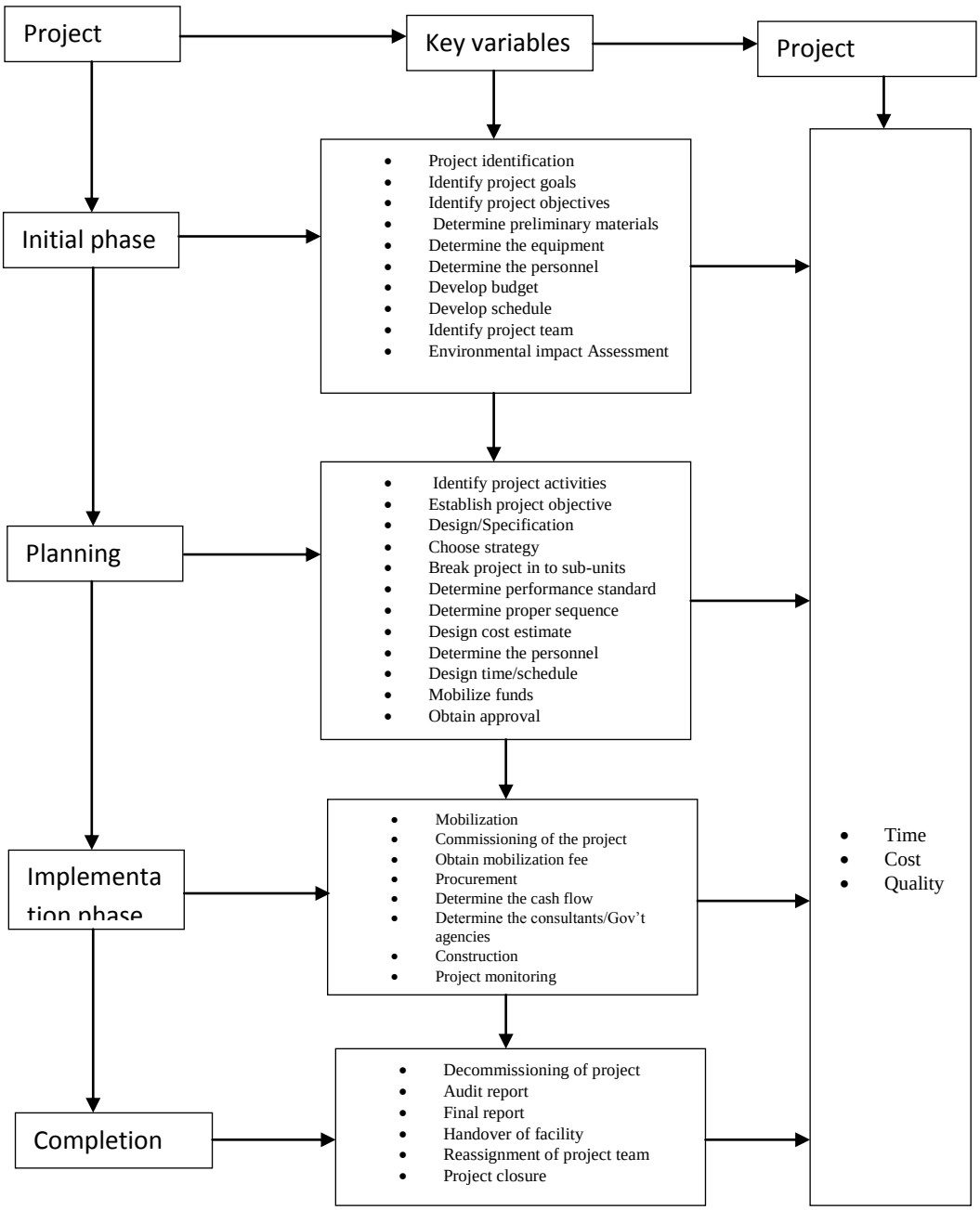

FIG.1: Conceptual Framework of Life Cycle Management
Source: Adapted from Westland, 2006; Robert and Wallace, 2004; Kerzner, 2000