



PROJECT MANAGEMENT TOOLS AND TECHNIQUES IN PRIVATE CONSTRUCTION COMPANIES IN NIGERIA: A CASE STUDY APPROACH

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Abstract

The application of project management tools and techniques (PMTT) in private sector is increasingly becoming a vital issue in developing countries, particularly in a nation such as Nigeria where project of various magnitude and structures are embarked on. This application is largely applied in organisation in developed nations as a key management strategy in realising projects outcome and organisational objectives within precise time limit as well as budget limits via optimum usage of resources.

In Nigeria, the application of modern PMTT is still not well recognized in private sector, for instance the construction industry. Hence, these results in project failure, budget overrun, low quality of project outcome and delay in project delivery. Therefore the purpose of this research is to identify the reasons why PMTT used in the construction industry in developed economies are not heavily used by Nigerian construction companies and to identify the factors influencing PMTT adoption. To realize this, an initial framework has been developed using resource based view theory (RBV) model as theoretical underpinning for empirical studies and will be further improved in the final phase of this study.

A qualitative research method has been used by adopting semi-structured interviews with major project managers in Nigerian construction companies. Qualitative research gives room for the generation of rich data, providing an insight into the nature of phenomena. In-depth study has been carried out to gain useful preliminary insights into the current practice and the adoption process of PMTT in Nigerian construction companies. 18 project managers had been interviewed in different construction organisations in Nigeria, to investigate factors that influence PMTT adoption process. Results so far have revealed the main challenges project managers face in adopting PMTT especially when it is so sophisticated.

Key words: *Project management, PMTT, Construction Company, Diffusion of Innovation theory, Nigeria*
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Introduction

Project management tools and techniques (PMTT) are inevitable on construction projects, mainly because of the uniqueness of each project and the roles its plays in the execution process of any project irrespective of size and location (Ihesiene, 2014). Deep concern has been expressed about projects in private and public sectors that have been abandoned and delayed in several states in Nigeria, (Teslim, 2014), after making huge investment Olateju et al, (2011). Larger numbers of these projects are in the construction industry and in most cases are sponsored by external organisation such as World Bank.

Several reasons have been pointed out for this unhealthy scenario in the construction industry, the most prominent being inadequate knowledge of PMTT, poor project analysis and management. (Okoye, et al 2015; Teslim, 2014). Secondly, high cost of input caused by lack of material use in construction work. (Okoye, et al 2015). The construction community also have very low adaptation capacity of new innovation added to lack of well-trained human resource required to plan, control, manage, and to implement projects. As the organisations resort to improvise, they encounter regular occurrences of material wastage and project failure (Braith, 2013). According to the literature review, the average wastefulness and failure in construction



project and other factors accounted for about 2.5% of 15% in Nigeria (Okoye, *et al* 2015). In addition, the industry has not been given meaningful research attention, in spite of the vital place it occupies in the nation economy. Based on this light this current study was considered convenient and suitable. The research also highlights diffusion of innovative theory as the underpinning philosophy of this study.

Theoretical Foundation

All sectors whether production, manufacturing or construction have a duty of instilling change in their organisation, in order to enhance effectiveness and remain relevant in their chosen market. However, there are barriers to effective implementation of change and these are insufficient resources, lack of organisational support and resistance to change.

Therefore, this study employed a leading business change theory known as Diffusion of Innovation theory (DOIT) as a theoretical lens to underpin this research.

According to Rogers (2003, p.5), diffusion is defined as a “process in which an innovation is communicated through certain channels over time among the members of the system”. The concept of diffusion is a type of social change that is associated with new ideas, identified as the process whereby alteration happens in the structure and function of the social system. Social alteration occurs when new ideas are conceived, diffused, and adopted or rejected, that leads to a certain consequence (Bollig, 2006).

The process of innovation commence with the appreciation of inadequacy or request for effective service that are not currently provided in an organisation. Hence, innovation development is initiated when a problem or a need is recognised in an organisation (Rogers, 2003).

Though there is a robust knowledge on innovation diffusion, research on DOI in construction industries is rare. Five stages are involved in conceptualising the adoption process (Gao, 2013).

Knowledge stage: The early adopter learns about the new idea and seeks information about the innovation (Ismail, 2006).

Communication process: occurs when participants create and share knowledge with each other in order to reach a mutual understanding, it occurs through channels between sources.

Persuasion stage: acquiring knowledge does not imply the adoption or rejection of innovation. Persuasion suggests that individual attitude toward innovation either favourable or unfavourable (Rogers, 2003).

Decision Stage: at this stage of innovation process, the individual chooses to accept or reject the innovation.

Implementation: an innovation is put into practice at this phase. Innovation communicates newness; however, some degree of indecision is involved in this process.

Overview of project management

Numerous definitions had been given to project by various researchers, because project is considered as a multidisciplinary word with diverse significance from different viewpoint and orientation. For instance, Engineers, Event manager, project manager, Architects, scientist, have their own definition framed out from their experience bases on their profession (Olateju *et al*, 2011). Project is defined “is a temporary activity or endeavour undertaken purposely to create a unique output (product or service) within budget, time and standards” (PMI, 2000; Pinto, 2007)



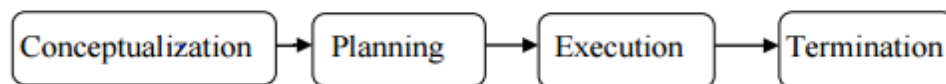
According to the definition, project has certain features that distinguish it from general management. It is design to produce a unique project which has not been undertaken before and is to accomplish a specific objective of an organization. The uniqueness of the project shows that the exact project has not been done before and it has a degree of originality (Tetteh, 2014). The temporary nature of the project indicates that the projects do have a start time and an end time, and requires a project team to carry out the activity. (Olateju *et al*, 2011). Project management on the other hand, according to Kerzner (2009) cited by Newton, (2015) “is the art and science of planning, designing and managing work throughout all the phases of the project life cycle”. It is also observed as a process of planning, designing, scheduling, managing and controlling interrelated project activities in order to realise a precise objectives or goal within a given time, budget and quality (Lewis, 2007).

Project Management (PM) is a ground-breaking management practice that assists managers to accomplish specified objectives within definite time and budget limits through optimum use of resources. (Olateju *et al*, 2011). To achieve this objective, project life cycle is divided into sub- manageable phases. This enhances visibility of the processes and allow for easily monitoring. Each project phase required project management tools and techniques to aid carry out the activities.

Project Life Cycle and PMTT

The four different developmental phases of a project according to Pinto (2007) includes: Conception, Planning, Execution and Termination. A project life cycle presents logical relationships governing a project and form basis for project planning.

Fig. 1. Four-Step Model of Project Life Cycle



Source: Pinto (2007)

Various PMTT are used in managing projects for a required outcome. Some of these PMTT are listed in table1, which includes; Work Breakdown Structure, Gantt Charts, Project Networks (CPM and PERT), Project Sensitivity Analysis, Cost Benefit Analysis, Graphical Evaluation and Review Technique (GERT), Business Case, Benefit Realisation, Stakeholder matrix and Project Software (Hazır, 2015; Krechmer *et al*, 2015; Maloney, 2012; Olateju *et al*, 2011). These tools are commonly used in today business such as manufacturing, information system, and production and construction industry to provide effective and efficient performance (Olateju *et al*, 2011). Drawing from Newton (2015) the existence of PMTT is very vital in today’s business, planning, controlling, resource allocation and staffing are virtually done by these tools. Organisations in the developed countries take advantage of these concepts to increase their resource base and improve their project delivery quality. For Instance Multiplex Construction Company employed these tools during the construction Wembley stadium in 2003 and Utzon, 1964 adopt this tools for Sydney Opera house (Smith, 2015; Porter, 2013). In contract these tool for example WBS, become out-dated quickly on time because project schedule change frequently during the project implementation. Hence, updating the work break structure is overhead that perhaps no project manager does (Elnaz, 2015).



Table 1

Project life cycle and 'selected' PMTT

Project phases	Tools and Techniques	Definition	Author
Conceptualization	Business case	Tools used by the management in guiding the creation of business value and decision making.	Mentor, (2013)
	Benefit realisation	The Benefits Review Plan is a base lined product and it is created in IP defines how and when measurement of achievement of the project's Benefits are expected by the Senior User.	Serra, & Kunc, (2015)
Planning	Microsoft project	A PM tool developed to assist managers in planning, assigning resources to tasks, tracking progress and managing the budget.	Wale <i>et al</i> , (2015)
	Gantt chart	Gantt charts are PM tools used during the entire design process. They are used to plan, monitor, and execute project. They are used to present tasks, deliverables, personnel, and other resources in graphically.	Wren, (2015)
	Programme Evaluation and Review Technique (PERT)	A PERT chart is a PM tool used for scheduling, organizing, and coordinating tasks within a project.	Hazır, (2015)
Execution	Work breakdown structure, (WBS)	WBS deals with breaking down of the projects into manageable components in a hierarchical structure.	Maloney, (2012)
	Critical path method (CPM)	CPM is a project network analysis method used to determine the sequence of different activities in the project.	Santiago, & Magallon, (2009).
	Graphical Evaluation and Review Technique (GERT)	GERT is a network analysis technique used in project management that allows probabilistic treatment of both network logic and activity duration estimates	Nelson <i>et al</i> , (2016)
Termination	Cost Benefit Analysis (CBA)	CBA is one of the most widely accepted and applied model for project appraisal for large scale infrastructure.	Olateju <i>et al</i> , (2011)

Source: Adapted by author from (Olateju *et al*, 2011; Nelson *et al*, 2016; Serra, & Kunc, 2015; Wale *et al*, 2015)



Practically there are several PMTT available to project practitioners. A study by Olateju et al, (2011) highlighted a list of PMTT from 236 project managers in some public institutions that leads to project success in their organisation. These are summarised in Table 2

Table 2

Most frequent use PMTT in PSO

Technique/tools	Percentage (%)	95% Confidence interval
Work Breakdown Structure	26	7.6 – 36.4
Statement of Work	30	15.1 – 46.3
Critical Path Method	3	0.0 – 9.4
Project Sensitivity Analysis	6	0.0 – 12.1
Earned value management,	-	
Cost Benefit Analysis	64	36.6 – 71.5
Gantt Chart	58	52.4 - 83.6
Programme Evaluation and Review Technique (PERT)	-	-
Graphical Evaluation and Review Technique	-	-

Source: Olateju et al, 2011

Table 2 indicates that Gantt chart and Cost Benefit Analysis are the most frequent use tools in an organisation. Research has established that application of current project management approaches and methods has a great influence on private institutions (Olateju et al, 2011). Arnaboldi et al (2004) observed that adoption of PMTT in private sector was due to the pressing need on governments to shift from the bureaucratic system in favour of leaner organisation. The authors considered the projects undertaken at Italian Treasury Ministry using PMTT and find out that proper implementation of PMTT will help in evading project failure, reduction material wastage, budget overrun and project delay (Arnaboldi et al, 2004)

Similarly, Olateju et al, (2011) explored the PMTT employed by construction firm in Jordan by surveying 50 construction firms. The study shows that the use of PMTT among firms is low, but when use efficiently would bring about concrete benefit in all facets of planning, scheduling and monitoring the time, cost and specifications of projects. In Nigeria, the implementation of modern PMTT is still a challenge in private construction firms; these results into project failure and abandonment of project and budget overrun (Teslim, 2014). Studies have recognized social and political systems, cultural blocks and lack of financial support as barriers to successful project planning and execution in Nigerian public sector (Idoro & Patunola-Ajayi, 2009).

Therefore, the conceptual framework guiding this study examines the PMTT being used in Nigerian construction firms, their benefits, obstacles and problems with a view of recommending appropriate framework for the industry. These are illustrated in Figure 2.

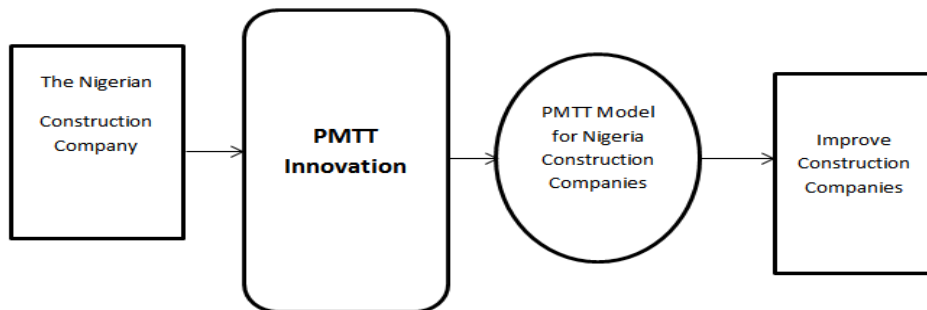


Fig. 2. **The initial conceptual framework.**

Methodology

This research follows a qualitative approach as this allows for better understanding of social or human problems in terms of building a complex, holistic picture with words to report the several views of informants in their natural setting (Creswell, 2012). The unit of analysis form the basis of this sample is the construction company in Nigeria. The research uses a theoretical sampling approach as data is simultaneously collected, coded and analysed in order to develop theory as it emerges (Glaser and Strauss, 2001).

This initial exploratory study consisted of semi-structured interviews with project managers of ten Nigerian construction companies. Eighteen project managers were interviewed two of them were female while the rest were men, using semi-structured interviews to obtained qualitative descriptions of the life world of respondents with respect to interpretation of their meaning. The interviews lasted between 45 minutes to an hour and were for the most part conducted face to face. Initial data is being analysed using the Computer Aided Qualitative Data Analysis Software (CAQDAS) NVIVO 10. CAQDAS packages help the researcher get “closer” to the data, increase accuracy, transparency and overall rigour of the data analysis process and outcomes.

Conclusions

Applying PMTT in private construction firm has become an important issue in many developing countries, due to its successful application in developed countries and its proven efficiency as well as flexibility in achieving project goals and objectives. Nigeria occupies a major set in Common Wealth as a result; the nation is witnessing unprecedented capital projects in all the aspect of developments, which require better application and utilization of efficient, and effective management tools and techniques. Studying the application of PMTT in construction firm in Nigeria would serve as eye openers to the government and other decision maker to better plan their effort toward efficient application of PM tools and techniques. If properly applied, PM tools and techniques would result in concrete benefits in all aspects of project planning, scheduling and controlling the cost, time and quality.

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