

Application of Project Planning Techniques in Construction Procurement: The Case of Nigerian Indigenous Contractors

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ABSTRACT

Construction projects procurement is more complex than other forms of general procurements. Hence, construction contractors require adequate planning to succeed. Many of the Nigerian indigenous contractors (NICs) are unable to plan their contractual requirements for successful delivery of projects, thus, impeding the Nigerian construction industry from meeting the construction needs of the nation. This study reviews NICs' application of project planning techniques in construction projects procurement. The study used descriptive survey method and collective case study. Questionnaire is the instrument for data collection. Purposive sampling technique and stratified random sampling technique were used to select contractors for the case study. The case study was used to probe the questionnaire responses. Data from the questionnaires were analysed for reliability and significance tests, as well as descriptive statistics. Bloom's taxonomy hierarchy was used to analyse the case study. Result reveals: some NICs' used their central administration instead of their project managers to plan their projects operations, non-application of project planning technique by some NICs', inappropriate application of planning techniques by majority of the NICs' who apply it, and non-adoption of ICT in projects planning. The study recommends among many other that contractors should apply project management techniques, engage competent personnel, embark on continuous training, adopt ICT in their operations, invest in knowledge management; and standard form of contract used in Nigeria should be review to include a clause enforcing contractors to apply the appropriate planning techniques. Appropriate application of projects planning techniques by the NICs' will facilitates their project management performance in the NCI.

Keywords: *Construction industry, Indigenous Contractors, Nigeria, Procurement systems, Projects planning techniques*

INTRODUCTION

The advancement in technology and the speed of execution of modern construction projects involve interrelationship of the voluminous interdependent activities (Chitkara, 2012). Moreover, construction projects procurement is a complex process which is extensive and have diverse systems (Idoro, 2012a; Hughes, 2012; Harris and McCaffer, 2005; Aqua Group, 1999). It process covers every aspect of project

delivery system (Hughes, 2012; Idoro, 2012a; Harris and McCaffer, 2005; Anyadike, 2000; Aqua group, 1999) and its systems; establish the contractual framework that determines the nature of the relationship between the project team within the duration of their interaction (Oyegoke, 2006). The extensive nature of the process and diverse systems of construction procurement makes it more complex than other forms of general procurements. Consequently, the contractor who is regarded as a major player in the project delivery team (Chitkara, 2012; Usman, Inuwa, Iro and Dantong, 2012), is saddled with more roles in contemporary construction procurement beyond their traditional role as integrators in a design-bid-build procurement system (Mbamali & Okotie, 2012; Gollenbeck, 2008), to more complex role in either management oriented systems, integrated systems or, discretionary contracts (Mathonsi and Thwala, 2012; Babatunde, Opawole and Ujaddaghe, 2010; Harris and McCaffer, 2005). Hence, construction contractors require adequate planning to successfully execute their tasks.

In developed countries, contractors have embraced planning because, the results of a well-planned and carefully monitored and controlled contract directly impacts on the performance and profitability of the company (Harris and McCaffer, 2005). But many of the NICs' are unable to plan their contractual requirements for successful delivery of projects (Aniekwu and Audu, 2010; Muazu and Bustani, 2004; Saleh, 2004). Thus, impeding the Nigerian construction industry (NCI) from meeting the construction needs of the nation (Aniekwu and Audu, 2010; Saleh, 2004). According to Achuenu, Izam and Bustani (2000), there is a need to give priority attention to the development of viable indigenous construction firms that will successfully handle all construction works in the country and in the future, compete favourably with international firms both here in Nigeria and globally. In an attempt to develop the NICs' potentials for better performance in the NCI, this study sought to investigate NICs' application of project planning techniques in construction procurement.

Nigerian Indigenous Contractors and Project Management

Indigenous contractors are contracting firms that are fully-owned and managed by Nigerians (Idoro and Akande-Subar, 2008); the nationality of the firms' ownership and management is exclusively Nigeria. The debate on project management performance in the NCI centres mainly on the performances of foreign and indigenous contractors (Idoro and Akande-Subar, 2008). In the views of Ibrahim (2012) and Uduak (2006), the performance of projects managed by NICs' are better and claimed they can be entrusted with large and highly technical projects, whereas, other studies reports that their performance is characterized by features of project management failure emanating from: abandonment, cost and time overruns, poor workmanship, poor management capability, financial difficulties, poor planning, poor mechanization and high frequency of litigation (Oladimeji and Ojo, 2012; Idrus and Sodangi, 2010; Muazu and Bustani, 2004; Achuenu, Izam and Bustani, 2000). Several studies have attributed NICs' poor performance to incompetence, inexperience, poor planning

and the adoption of traditional management approaches; which have proven to be ineffective in the management of construction projects (Ekundayo, Jewell and Awodele, 2013; Adams, 1997). In the traditional management approach, the project coordinator, usually an architect or an engineer performs the role of a project manager but in limited capacity as the overall responsibility and management rest with the client (Ekundayo, et al., 2013). This arrangement gives the project coordinator little authority in decision making as he is only concerned with the communication and coordination of the construction aspect of the project (Ekundayo, Jewell and Awodele, 2013). Under the traditional management approach, work flow according to Kerzner (2000), is arranged vertically, as a result proves difficult for an extensive planning and coordination. It gives little opportunity to workers to work with other functional areas (Kerzner, 2000). This is unlike the project management approach where the project work flows and project coordinations are arranged horizontally and vertically, thus resulting in an extensive planning and coordination (Kerzner, 2000). Project management approach results in improved coordination and communication among employees and managers as well as, generates productivity, efficiency, and effectiveness (Kerzner; 2000).

However, the NICs' adoption of traditional management approach have resulted in poor project planning and low productivity in their project management performance (Ekundayo, Jewell and Awodele, 2013; Kirmani, 1988 in Aniekwu and Audu, 2010; Muazu and Bustani, 2004). The outcome for the industry is: low income generation and redistribution due to expatriates repatriating their profits abroad, an insignificant value addition to construction and local industries supplying construction materials, and consistent contribution of 1% employment over the last decade as against the World Bank's average observation of about 3.2% in other developing countries (Aniekwu and Audu, 2010; Idrus and Sodangi, 2010). This consequently prevents the country from fully benefitting from the industry's contribution to economic growth (Aniekwu and Audu, 2010; Bala, Bello, Kolo and Bustani, 2009; Adams, 1997). Most of NICs' project management performance problems can be addressed through training, pre-construction planning and the application of modern construction techniques (Aniekwu and Audu, 2010) and, these can be generally curbed through the application of project management techniques (Gollenbeck, 2008).

Procurement Systems Application and Performance in Nigeria

From the construction point of view, procurement is broadly divided into two (Ibrahim, 2008), general procurement and construction specific procurement. General procurement is concern with the acquisition of goods and services, while, construction-specific procurement is a series of interdependent operations (process) undertaken within a well-defined framework (system) used in acquiring a construction project (product). Construction procurement systems are broadly classified into traditional and non-traditional (for detail see: Mathonsi and Thwala, 2012; Babatunde, Opawole and Ujaddaghe, 2010; Harris and McCaffer, 2005). A lot of studies has

shown that both traditional and non-traditional procurement systems are currently embraced in Nigeria (Idoro, 2012b; Mbamali and Okotie, 2012; Babatunde, Opawole and Ujaddaghe, 2010; Ikediashi, Mendie, Achuenu and Oladokun, 2012; Ibrahim 2008; Ojo, Adeyemi and Fagbenle, 2006). According to Ojo, Adeyemi and Fagbenle, (2006) direct labour, which is a traditional system, was mainly used during the colonial era all through the 1960s in the execution of construction projects in Nigeria and to date (Ibrahim, 2008), direct labour is still minimally used across the three tiers of government (Federal, States and Local government), primarily for maintenance and new works of minor nature. However, direct labour projects are said to be ineffectively managed resulting to cost and time overruns (Mbamali and Okotie, 2012)

The oil boom in Nigeria and the need for reconstruction and rehabilitation works to mend the havoc resulting from a fratricidal war that ended in 1970, usher in the use of the Design-bid-build (DBB) procurement system (traditional) into the NCI (Mbamali and Okotie, 2012; Ojo, Adeyemi and Fagbenle, 2006). This system was also used by the National Housing Policy (NHP); a policy enacted into law in 1991 by the Nigerian government to provide decent housing accommodation at affordable cost for the country, in adherence to the campaign launched by the United Nations (UN) tagged 'Housing for All by the year 2000'. Though, the Design-bid-build (DBB) method was later discovered to bring long delays in project conception and delivery thus leading to high project cost (Mbamali and Okotie, 2012; Ojo, Adeyemi and Fagbenle, 2006 citing Osemenam, 1992).

Despite the criticism of the performance of DBB system in Nigeria, the system is still used by government establishments and some uninformed private clients (Ojo, Adeyemi and Fagbenle, 2006). The short comings of the traditional systems (Direct labour and Design-bid-build) in Nigeria brought about the emergence of the non-traditional procurement systems amongst which is the design and build (DB) method (Mbamali and Okotie, 2012; Ikediashi, Mendie, Achuenu and Oladokun, 2009 cited in Ikediashi, Mendie, Achuenu and Oladokun, 2010). The DB option, according to Babatunde, Opawole and Ujaddaghe, (2010), is one of the procurement systems that have gained prominence in the NCI, however, its application in Nigeria records high time and cost overrun (Idoro, 2012b).

The use of Management Contracting (MC) in Nigeria, spanned back to the era of the defunct Petroleum (Special) Trust Fund (PTF) mass rehabilitation of key public infrastructure across the country in 1994-1999 (Hassan, 2004 in Ibrahim, 2008). Babatunde, Opawole and Ujaddaghe, (2010) also report that management oriented contracts and PPP/PFI are among the methods used in the execution of construction projects in metropolitan Lagos, but not as much as the Design-bid-build (DBB) method. According to Ibrahim and Musa-Haddary (2010) the immediate past (1999-2008) and present governments (2008 to date) at various levels/tiers in Nigeria encouraged the introduction of public-private partnerships (PPPs) as a way of promoting active private sector involvement in the provision of public infrastructure and services, in an attempt to contain the infrastructure deficits in the country.

According to Mbamali and Okotie (2012) partnering which is a discretionary procurement system has also evolved in Nigeria. However, the NCI has not really derived the comparative advantages of using those procurement systems in use in Nigeria, this according to Idoro (2012b), could be attributed among other things to ineffective and inefficient planning. Planning has a considerable effect on the outcome of projects.

Construction Project Planning Techniques

There are two main levels of planning associated with construction projects: strategic and operational (Harris and McCaffer, 2005). This research is delimited to contractors' projects operational planning at the post-contract stage of a building project. Operations, here, refers to any activity or task a contractor is expected to accomplish in his contractual obligation in any type of construction procurement systems. Projects operations according to Gupta (2010), involves a large number of activities, and their constraints and resources cannot be visualized easily. Hence, it calls for project planning if success is to be attained (Gupta, 2010). Contractors' operational planning involves establishing a method statement for each activity which allows a detailed look at the project's resource requirements, which are not obvious at the strategic level (Harris and McCaffer, 2005).

In addition, a contractor's operational plan incorporates a construction programme of works (Harris and McCaffer, 2005; Gahlot and Dhir, 1992). A programme of works primarily presents the sequence in which the various activities should occur with their associated durations and resource requirements (Harris and McCaffer, 2005). The contractor's development of his programme of work is a requirement stipulated in most conditions of contract used for building projects in Nigeria (Federal Ministry of Housing and Urban Development (FMH & UD), 2006; JCT, 2005a; JCT, 2005b). The contractor's programme of work and method statement are document that conveys the contractor's intention on how to execute his work. To arrive at an effective and efficient method statement and programme of work in construction, project planning techniques are used (Roberts and Wallace, 2004).

However, inadequate technical and managerial know-how of the NICs' and their inability to utilize the appropriate project planning techniques has resulted to projects failure in Nigeria (Mbamali and Okotie, 2012; Aniekwu and Audu, 2010; Muazu and Bustani, 2004). Moreover, the conditions of contracts for building projects do not specify to contractors' what type of planning technique to use for their master programme and method statement (FMH & UD. 2006; JCT, 2005a; JCT, 2005b). There are more than one type of project planning techniques; understanding how they work and their inherent advantage is of paramount importance to contractors. The common project planning techniques are: bar charts and linked bar charts, line of balance, and network method (Bhavikatti, 2012; Chitkara, 2012; Passenheim, 2009; Baily, Farmer, Crocker, Jessop and Jones 2008; Harris and McCaffer, 2005; Seeley, 1986).

Bar Charts and Linked Bar Charts

The Bar chart also refers to as Gantt chart, was developed by Henry Gantt in 1900 originally for industrial production management and has since been widely used in construction management (Bhavikatti, 2012; Abubakar, Grennwood and Osborne, 2008). The bar chart is a pictorial device that consist two co-ordinate axes, one showing the time and the other showing project operations or activities, and each operation (activity) is shown by a bar (Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010; Gahlot and Dhir, 1992). The duration of the activity is indicated by the length of the bar; the left end of the bar shows the beginning of the time, the right end shows the ending time (Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010). The simplicity and visual clarity of the Bar chart makes it a very valuable medium for displaying job schedule information (Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010). It is immediately intelligible to people who have no knowledge of network diagrams (Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010). It provides an easy and convenient way to monitor job progress, schedule equipment and crews, and record project advancement (Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010).

In the words of Chitkara (2012), the bar chart is most useful for presentation of schedules, but not as a planning technique. It is often used for reporting and communicating project schedule status (Passenheim, 2009; Roberts and Wallace, 2004). Passenheim (2009) claims that bar chart serve as a control chart for tracking and trending schedule performance. Its easy-to-understand visual formats according to Passenheim (2009), makes bar chart the favoured tool for communicating schedule. Hence, the bar chart is mostly used as a complement of other techniques, especially the critical path method, and as a rough preliminary plan (Passenheim, 2009; Abubakar, Grennwood and Osborne, 2008; Bailey, Farmer, Crocker, Jessop and Jones, 2008; Roberts and Wallace, 2004).

Nonetheless, bar charts have well recognized and serious shortcomings when used for the original development of project management information (Abubakar, Grennwood and Osborne, 2008). Its shortcomings are (Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010; Abubakar, Grennwood and Osborne, 2008): it does not indicate the interrelationship among the various activities, hence, the effect of delay of an activity on other activities cannot be seen easily; it does not indicate which activity is critical and in which spare is available, consequently it does not convey to managers and workers what consideration must be given to the prerequisite activities; it does not reflect the exact progress of the work on the day of review and; it management does not work effectively, where there are uncertainties in expected time requirement of an activity.

In an attempt to curtail the shortcomings of the bar charts, linked bar charts was introduced. Linked bar chart retains the visual benefits of bar chart with increased emphasis on dependencies (Seeley, 1986). It takes the form of vertical links between the completion of one activity and the start of another, as such emphasised on coordination and construction sequence (Harris and McCaffer, 2005; Seeley, 1986).

This, according to Seeley (1986), allows the technique to be used for large complex projects. However, the float concept is generally missing and there is a limit to the amount of linking that is possible (Harris and McCaffer, 2005; Seeley, 1986). According to Chitkara (2012), the bar chart is most useful for presentation of schedules, but not as a planning technique. It is often used for reporting and communication purposes (Roberts and Wallace, 2004), hence, it is mostly used as a complement of other techniques, especially the critical path method, and as a rough preliminary plan (Abubakar, Grennwood and Osborne, 2008; Bailey, Farmer, Crocker, Jessop and Jones, 2008; Roberts and Wallace, 2004).

Line of Balance

Line of balance (LOB) also referred to as elemental trend analysis is a planning technique for repetitive work, the principles employed are taken from the planning and control of manufacturing processes (Harris and McCaffer, 2005; Seeley, 1986). The LOB technique is represented in a graph that has a horizontal timescale and calendar, with cumulative output shown vertically (Harris and McCaffer, 2005; Seeley, 1986). Bar lines representing the various operations are inclined at different slopes to indicate the rate of working (Harris and McCaffer, 2005; Seeley, 1986). From the graph according to Kraemer, *et al.* (2014), it is easy to interpret the progress of each activity and it gives real information for a possible decision making along the process.

Though, LOB technique according to Seeley (1986), is not so readily understood as the bar chart but it highlights the importance of activity completion, production rates and relationship between selected activities. The technique is suitable for strict operational sequencing and permits a high degree of control (Harris and McCaffer, 2005; Seeley, 1986). However, the LOB planning technique has some limitations due to being originally designed for simple repetitive production process (Kraemer, Henrich, Koskela and Kagioglou, 2014). Firstly, it shows only a limited amount of information and a limited degree of complexity (Kraemer, Henrich, Koskela and Kagioglou, 2014). Secondly, LOB can only identify any delay in a unit or other changes in activities but cannot preview any accompanying delay in the total project completion (Suhail and Neale, 1994 in Kraemer, Henrich, Koskela and Kagioglou, 2014). Contemporary construction projects according to Chitkara (2012) and Hughes (2012), are complex, less repetitive and with a lot of systems. Hence, the LOB technique cannot adequately address its projects planning and controlling requirements, consequently, considered inappropriate for construction projects planning.

Network Method

According to Bhavikatti (2012) the network method involves representing all steps of a project graphically in the form of a network. It is simply a precedence diagram with activity durations added to it Roberts and Wallace (2004). There are two major network systems (Bhavikatti, 2012), program evaluation and review technique (PERT), and critical path method (CPM).

Program Evaluation and Review Technique (PERT)

PERT was developed by the US Navy in 1958 for evaluating the feasibility of schedules of *Polaris*. PERT is suitable for projects that are non-repetitive in nature, in which there is no precise idea about the time required for various activities (Bhavikatti, 2012). In construction (Bhavikatti, 2012), however, determining the time for various activities is not a problem, as a lot of previous data and experience are available. Hence, PERT according to Bhavikatti (2012), is not a preferred technique in planning and scheduling of construction works.

Critical Path Method (CPM)

The CPM was developed in 1960 by the DuPont corporation in order to allow the programming of maintenance work during chemical plant shut down. CPM is a deterministic approach to project planning that uses estimates of activity durations that are known (reasonably accurate) (Roberts and Wallace, 2004). CPM calculates the minimum completion time for a project, along with the possible start and finish times for the project activities (Bhavikatti, 2012; Roberts and Wallace, 2004). CPM offers the following advantages when used in construction project management (Chitkara, 2012; Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010; Kerzner, 2000). It identifies critical activities, so that management can concentrate on these activities to maintain the construction schedule; helps in crashing the project completion period by identifying activities to be crashed; the most economical construction period can be identified and resource scheduling may be prepared to suite that; resource mobilization can be planned well in advance; if something goes wrong, the activities to be speeded up can be identified and necessary actions may be initiated; it helps in identifying the best combination of equipment and labour; it helps in identifying slack times for various activities, which help in distributing labour to retain the labour force; it rationalizes construction, costing and financing and; it provides the basic structure for reporting information.

Nonetheless, the CPM technique is been criticised because (Kerzner, 2000): time, labour, and intensive effort is required to use them and the ability of upper-level management to contribute to decision making have been reduced. In spite of its shortcomings, the CPM according to Olatunji (2010), have the capacity to identify key construction activities of a project and this quality enables it to positively impacts on project delivery. In addition, the CPM is seen by many to be the most preferable planning technique for construction projects, due to its suitability for construction projects planning and scheduling (Bhavikatti, 2012; Krishnamurthy and Ravindra, 2010; Passenheim, 2009; Abubakar, Grennwood and Osborne, 2008; Bailey, Farmer, Crocker, Jessop and Jones, 2008; Roberts and Wallace, 2004).

ICT Application in Project Planning

The application of the appropriate projects planning techniques in modern day construction projects management without the adoption of Information and

Communication Technology (ICT), will not ensure successful project planning (Inuwa, Iro, and Dantong, 2013; Passenheim, 2009; Roberts and Wallace, 2004; Kerzner, 2000). The planning and management of construction project involves and generates a lot of information that need speed in its processing and accuracy in its output that will be used in guiding the project manager's decision (Khatri, 2000 cited in Usman, Inuwa, Iro and Dantong, 2012; Oladapo, 2006; Harris and McCaffer, 2005). ICT is a general expression covering the use and integration of computers, telecommunications and electronics (Browning, 1990 cited in Inuwa, 2006). Computer has promised to be a reliable tool in all spheres of human endeavour (Oyediran and Odusami, 2005 cited in Inuwa, 2006). Its emergence according to Kerzner (2000), has aided companies to implement project management very fast through the use of computer based software for project planning, estimating, scheduling, and control. Project planning software packages have made it much easier to update and reschedule project plans, and they provide the information in the form of both bar charts and network diagrams (Roberts and Wallace, 2004).

Roberts and Wallace (2004) emphasize that the combination of bar charts and network diagram will effectively communicate the project plan. The industrialized countries like the US, UK, Canada, Sweden, Denmark, Finland and New Zealand, among others had for long embraced the use of computers for their construction projects operations and had benefited from it, unlike the developing countries, like Nigeria, where very few achievements in terms of computer usage in indigenous firms operations are recorded (Mbamali and Okotie, 2012; Inuwa, 2006). Hence, the adoption of ICT by the NICs' in projects planning and management is recognized as a very important factor that will enhance their project management performance and will facilitate their attainment of construction best practice (Mbamali and Okotie, 2012; Oladapo, 2006).

METHOD

This study used descriptive (questionnaire survey) and explanatory method (case study). The study targeted medium and large indigenous contractors in the northern geo-political zones of Nigeria. The zones constitute 3 of the 6 geo-political zones of Nigeria (North-central, north-east and north-west), and slightly more than half of Nigeria's 36 States and its Capital (19 States and Abuja), representing almost 80% (744,249.08 sq. km) of Nigeria's total land size (NPC, 2010). It has a population of over 75 million people, representing 54% of Nigeria's total population (NPC, 2010). A study questionnaire was employed to elicit information on contractors' demographic profiles and how they apply project planning techniques when executing their project tasks through open and closed ended questions. Afterwards, an explanatory method through a collective case study approach was used for more extensive probe on specific issues identified in the main questionnaire responses (Guthrie, 2010; McNabb, 2009). A collective case study approach is used to study a group of similar

cases in order to study a particular phenomenon (McNabb, 2009). The design is also used to suggest whether characteristics might be common to larger population of similar cases. The cases selected may be chosen because they are similar or because they are different (McNabb, 2009). This study adopts the collective case study approach because it is studying a group of similar cases (NICs' operational projects planning) and wants to ascertain whether the activities and actions of NICs' projects planning followed the same pattern in Nigeria. A total of 150 copies of questionnaire were evenly administered through purposive sampling technique to indigenous contractors. The contractors' construction/project managers' were targeted to respond on behalf of their respective companies in the cities of Abuja, Bauchi/Gombe (two cities merged) and Kano respectively. These cities are located in the north-central, north-east and north-west geopolitical zones of Nigeria respectively. These cities have the highest concentration of construction activities and contractors in their respective zones (Usman, Inuwa, Iro and Dantong, 2012; Ameh and Odusami, 2010).

The choice of purposive sampling was informed by: non availability of an authoritative sampling frame of active indigenous contractors in Nigeria (Muazu and Bustani, 2004; Achuenu, Izam and Bustani, 2000; Adams, 1997) and the ability to target specific contractors who are best able to respond to the research issues (Ibrahim, 2011). The study records an overall response rate of 46%. This response rate is higher than 25.4% (Emuze, 2011) and 33.5% (Olatunji, 2010) in the construction industry. A stratified random sampling technique was then applied on the returned questionnaire to select 15 contractors for the case study; five from each city. SPSS was used to run: reliability test using Cronbach's Alpha, significance test, frequencies and percentages (descriptive statistics) to analyse the data obtained from the questionnaire responses. Non-parametric one-sample chi-square test was used to test the null hypothesis that, there is disproportionate distribution in the frequencies of responses among indigenous contractors to questions on the application of planning tools for their contractual operations in construction projects procurement in Nigeria at 5% level of significance.

This research used the external and internal criticism techniques to test the validity and reliability of the document used for the case study (Guthrie, 2010). The external criticism technique which is a validity test, is concern with ascertaining the genuineness of a data from a source (Guthrie, 2010). To ensure the genuineness of the data obtained from the clients' custody, all the materials used as a source of data for the research case study bears (Guthrie, 2010), letter heads, titles, file numbers, official stamps, dates and, official signatures. While the internal criticism technique is a reliability test concern with the meaning of a documentary data; whether it present the full picture and whether there is a balance view (Guthrie, 2010). All the project files used for the study were in the custody of the clients representing all correspondence of the parties involved during the execution of the building contracts. The data from the project files were analysed using Bloom's taxonomy hierarchy

(Guthrie, 2010), first, describe then analyse (classify); and draw conclusions or interpret. In describing the data, the study write out the facts the way it is, in clear descriptive reporting, free of adjectival colour and filter out those matter which are not relevant to the research problem (Guthrie, 2010).

RESULTS AND DISCUSSION

Table 1 shows that 52.2% of the contractors surveyed are medium size contractors (B and C), while 47.8% are large contractors (D). These show almost even representation of contractors' contract registration category. The contractors have their companies registered as sole proprietorship (11.6%), partnership (43.5%), private company (40.6%), and public company (4.3%). This shows that majority of the contractors are in partnerships and private companies, while, few are public companies. Almost 86% of the contractors' construction/project managers' hold Bachelor's Degree and Masters, while 14% hold Higher National Diploma. Almost all of the respondents specializes in core construction disciplines (architecture, building, engineering and quantity surveying). Almost half of the respondents have over 10 years' experience, with all respondents having a mean experience of 9.8 years. This reveals that the respondents' are well experienced and educated enough to respond to this research enquiry.

Table 2 reveals that all the contractors involved in the study claimed that they plan their project operations. In almost 68% of the NICs', their construction/project managers are responsible for the planning of their project operations while, virtually a third of the NICs' used their central administration for the planning of their project operations. Majority of the NICs' apply planning techniques in project planning, as against few who do not apply it. One third of the contractors' that apply planning techniques, apply only one type of planning technique; bar chart. Two third of the NICs apply two types of planning techniques on a single project. However, only one third of those who apply two planning techniques, combines the appropriate planning techniques (Chitkara, 2012; Bhavikatti, 2012; Abubakar *et al.*, 2008; Krishnamurthy and Ravindra, 2010; Roberta and Wallace, 2004; Seeley, 1986); bar chart and CPM. More than two third of the NICs' that applied two types of planning techniques, applied it inappropriately (Chitkara, 2012; Bhavikatti, 2012; Abubakar *et al.* 2008; Krishnamurthy and Ravindra, 2010; Roberta and Wallace, 2004; Seeley, 1986). Only a few of the NICs' adopt computer software/application package in planning their project tasks. While, majority of the NICs' do not adopt computer software/application package in planning their project tasks. This result revealed that the NICs' inappropriately apply project planning techniques and their ICT compliance in project planning is poor. Thus, indicating that the NICs' have a poor attitude towards project planning. Table 3 shows detail of the documentary case studies conducted on building projects executed by indigenous contractors. The cases studied are building projects executed between the periods 2003-2013 (10 years),

representing 15 number case studies (CS01-CS15). Fifty three percent of the projects were contracted to large contractors (category D), while 47% were contracted to medium sized contractors (category B & C). Both traditional and non-traditional procurement methods were used to procure the projects. The cases studied reveals that 73.33% of the clients' were public clients', while the remaining 26.67% were private clients'. The planning tool used by 66.67% of the contractors for planning their programme was Bar chart only, while the remaining 33.33% of the contractors did not used any planning tool. None of the contractors combined two type of planning techniques on a project. None of the contractors apply computer software/application package in planning their projects.

These results reveal that most of the indigenous contractors that apply project planning techniques apply only bar chart and do not combine two types of projects planning technique on a single project. Thus, reveals that NICs' apply project planning techniques inappropriately. The result from the case study contradicts some NICs' claims in the questionnaire responses that they combine project planning techniques and adopt ICT in project planning. This research findings show that some of the NICs' central administration was responsible for planning project tasks. This action is in conflicts with the project management requirement which bestowed the responsibility of project planning to project managers (Gupta, 2010; Passenheim, 2009). There are contractors who do not apply planning techniques and those who do, applied it inappropriately. Most of the contractors who apply planning techniques, apply only bar chart. Unfortunately, bar chart is not an appropriate planning technique; it is only appropriate for construction projects planning when used as a complement of the CPM (Chitkara, 2012; Bhavikatti, 2012; Abubakar *et al.*, 2008; Krishnamurthy and Ravindra, 2010; Roberta and Wallace, 2004; Seeley, 1986).

Despite the contractors' project managers' experience, high educational qualification and specialization in core building procurement disciplines, their responses on project planning techniques application exposes their incompetence and poor attitude towards project planning. Thus, confirming the assertions of several authors that indigenous contractors are unable to plan their contractual obligation (Aniekwu and Audu, 2010; Muazu and Bustani, 2004; Saleh, 2004; Achuen, *et al.*, 2000; Adams, 1997). The results also confirm NICs' poor project management capability (Ekundayo, *et al.*, 2013).

In addition, the result reveals that the NICs' do not apply ICT in planning their projects. This corroborates Inuwa (2006); Mbamali and Okotie (2012) claims that the NICs' poorly adopt ICT in the planning and management of their projects. The shortcomings of the NICs' in the application of project planning techniques and poor adoption of ICT revealed in this study confirms Aniekwu and Audu (2010) assertion that most of the NICs' performance problems can be addressed through training, pre-construction planning and the application of modern construction techniques, which Gollenbeck (2008) admits can be curbed through the application of project management techniques.

Table 1: Contractors' Demographic Profiles

Contract Registration Category				
Category	Frequency	%		
B (N5-N15M)	15	21.7		
C (N15-N50M)	21	30.4		
D (Over N50M)	33	47.8		
Total	69	100		
Business Registration Category				
Category	Frequency	%		
Sole proprietorship	8	11.6		
Partnership	30	43.5		
Private company	28	40.6		
Public company	3	4.3		
Total	69	100		
Project Managers' Educational Qualification				
Qualification	Frequency	%		
Higher National Diploma	10	14.5		
Bachelor of Science	37	53.6		
Masters	22	31.9		
Total	69	100		
Project Managers' Specialization				
Specialization	Frequency	%		
Architecture	13	18.8		
Building	19	27.5		
Engineering	12	17.4		
Estate management	1	1.4		
Quantity surveying	15	21.7		
Project management	6	8.7		
Land surveying	1	1.4		
Business Administration	2	3		
Total	69	100		
Project Managers' Experience				
Experience (yrs)	Mid value (X)	Frequency (F)	FX	% F
< 5	2.5	8	20	11.6
5-10	7.5	29	217.5	42.0
10-15	12.5	17	212.5	24.6
> 15	15	15	225	21.7
Total	69	675		

Mean years of experience = 9.78 years. Note: Naira (₦) Nigerian currency; \$1= N160

Source: Field survey, 2013

Table 2: Contractors Planning Tools Application

Contract Operations Planning		
Response	Frequency	%
Yes	69	100
No	0	0
Total	69	100
Persons/Unit Responsible for Planning		
Persons/unit	Frequency	%
Firms construction/project managers'	46	66.7
Central administration	21	30.4
No response	2	2.9
Total	69	100
Project Planning Techniques Application		
Planning tools application	Frequency	%
Yes	61	88.4
No	8	11.6
Total	69	100
Firms' Using One or Two Planning Technique(s) on a Project		
Use of planning tool(s)	Frequency	%
One	21	34.4
Two	40	65.6
Total	61	100.0

Project Planning Techniques (Tools) Combination Types		
Combination	Frequency	%
PERT & Link bar chart	3	7.5
CPM & PERT	8	20
PERT & Bar chart	8	20
Bar chart & Line of balance	2	5
Bar chart & Link bar chart	5	12.5
Bar chart & CPM	14	35
Total	40	100
Usage of Planning Software/application Package		
Usage of planning software	Frequency	%
Yes	10	16.4
No	51	83.6
Total	61	100.0

Source: Field survey, 2013

Table 3: Case Study Data Presentation

Case Study	Contract		Location	Procurement		Planning tool (s) used	Computer software/application package
	category	Year		Client's	Type		
CS01	D	2009-2012	Abuja	Public	DBB	Bar chart	Non
CS02	D	2003-2012	Abuja	Public	DBB	Bar chart	Non
CS03	D	2008-2010	Abuja	Private	DB	Bar chart	Non
CS04	D	2005-2009	Abuja	Public	DBB	Bar chart	Non
CS05	C	2009-2010	Abuja	Private	DB	Bar chart	Non
CS06	C	2011-2013	Bauchi/Gombe	Public	DBB	Bar chart	Non
CS07	B	2007-2009	Bauchi/Gombe	Public	DBB	Bar chart	Non
CS08	C	2005-2006	Bauchi/Gombe	Public	DBB	Non used	Non
CS09	D	2010-2011	Bauchi/Gombe	Public	DBB	Non used	Non
CS10	B	2010	Bauchi/Gombe	Public	DBB	Non used	Non
CS11	D	2006-2007	Kano	Public	DBB	Bar chart	Non
CS12	D	2003-2004	Kano	Public	DBB	Bar chart	Non
CS13	D	2005-2006	Kano	Public	DBB	Bar chart	Non
CS14	B	2004-2005	Kano	Private	DB	Non used	Non
CS15	B	2010-2011	Kano	Private	DBB	Non used	Non

Note:contract category: D-large contractors; C & B medium size contractors; DBB-design-bid-build; DB-design-build

Source: Field survey (2013)

CONCLUSION AND RECOMMENDATIONS

This study investigates NICs' application of project planning techniques in construction procurement using descriptive and explanatory methods in northern Nigeria. This was informed by the inability of the NICs' to plan their contractual requirements for successful delivery of projects. Consequently, impeding the NCI from meeting the construction needs of the nation. The research result reveals: some NICs' used their central administration instead of their project managers to plan their projects operations, non-application of project planning technique by some NICs', inappropriate application of planning techniques by majority of the NICs' who apply it, and non-adoption of ICT in projects planning. Based on the foregoing, the study recommends that contractors should apply project management techniques, engage competent personnel and embark on continuous training, adopt ICT in their operations, invest in knowledge management to keep abreast with global trends in

the construction industry; and the standard form of contract used in Nigeria should be reviewed to include a clause enforcing contractors to apply the appropriate project planning techniques. Appropriate application of projects planning techniques and the adoption of ICT by the NICs' will facilitates their project management performance in the NCI. This research was delimited to indigenous contractors operational planning in northern Nigeria, however, the scope of the research can be extended to cover southern part of Nigeria and more research can be conducted on strategic planning of NICs'.

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