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The Influence of Project Documents on the Outcome of Construction Projects Procured by Traditional Contracts in Nigeria

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Abstract: This study evaluates the use of project documents in projects procured by traditional contracts and the influence of these documents on the project outcome using a questionnaire survey approach. Data on project documents prepared at the inception, design, tendering and construction stages of projects procured by traditional contracts and the outcome of the projects were collected from a sample of 42 project leaders using a structured questionnaire. The data collected were analysed to determine the levels of use of 21 selected project documents at the inception, design, tendering, construction and overall procurement phases. Respondents' assessment of the delivery time, cost and quality, time and cost overruns and the percentages of time overrun from the initial contract periods and cost overrun from the initial contract sums of the projects were analysed using the percentage, mean and Spearman correlation test. The results reveal that the use of project documents during each project stage and the overall procurement phase in projects procured by the traditional contract method must be improved and that this improvement will enhance the outcome of the projects. The study suggests that developers should ensure that project documents with low levels of use are prepared when they adopt the option to procure projects.

Keywords: Project planning and documentation, Project outcome, Nigeria, Traditional contract method

INTRODUCTION

Procurement methods have become an important issue in the construction industry for two reasons. First, the procurement of construction projects involves a series of interrelated and sequential processes. The effectiveness and efficiency of these processes have a considerable impact on the success or failure of a project. Second, there are several procurement methods available for a developer to adopt when procuring a project. For this reason, one major challenge faced by project developers is deciding which method to adopt among the available procurement options. Alhazini and McCaffer (2000) maintain that each project has its own characteristics and requirements and that, for a project to be successful, the procurement method must address the technical features of the project alongside the clients and contractors' needs.

One of the available options for procuring construction projects is the traditional contract, also referred to as the design-bid-build (DBB) method. This method is most popular option in most developed and developing economies. In a survey of procurement systems used in the United Kingdom (UK), Masterman (1992) estimated that the traditional contract system is used 40% of the time. Ibbs et al. (2003) maintain that the DBB method is the most accepted traditional project delivery system, especially for public projects in the United States (US). Ling et al. (2004) stated that the DBB method is the prevalent procurement method in many countries, including Singapore, the UK and the US. Oyegoke (2004) estimates

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that the DBB method is used 28% to 83% and 49% to 68% of the time in Finland based on the value of contracts executed in Euros and on the number of contracts executed between 1989 and 2001, respectively. He discovers that the method is the most used procurement option in Finland. In Nigeria, research and investigative reports confirm that the traditional contract is the option by which governments and their parastatals, private organisations and individuals execute the majority of construction projects. Reports by the 1980 Ministerial Committee on the causes of expensive government contracts, the 1984 Panel that probed contracts awarded by the Federal Government of Nigeria between 1979 and 1983, the 1985 panel of investigation into the activities of the Federal Housing Authority and the 1999 Panel that investigated contracts awarded by the Petroleum Trust Fund reveal that government projects were mainly procured by the traditional contract method. In a survey of the procurement options used in Nigeria, Ogunsanmi and Bamisile (1997) discover that 65% of projects are procured by the traditional contract method. Ojo, Adeyemi and Ikpo (2000) report that the most frequently used procurement method in Nigeria is the traditional contract method. Furthermore, contract prices were highly inflated, and the prices of government contracts in Nigeria were relatively higher than those in other developing countries (Ministerial Committee on Causes of High Government Contracts in Nigeria, 1982). In a survey of projects procured by direct labour and traditional contract methods, Idoro (2007) discovers that projects procured by the traditional contract method overrun their scheduled delivery time and budget by 49.38% and 28.40%, respectively.

From the studies above, it is clear that the problem with the traditional procurement method in Nigeria is related to the long delays and high cost overruns of the projects. The challenge before researchers and stakeholders in the Nigerian construction industry is determining how to improve the performance of the traditional method and in particular, the high overruns in the delivery time and cost of the projects procured by this method. One of the ways to achieve improved performance in projects procured by the method is to ensure that effective and efficient documentation is completed when projects are procured by the traditional method. Studies conducted by Faniran, Oluwoye and Lenard (1994) and (1998), Kharbanda and Pinto (1996), Elinwa and Joshua (2001) and Naoum, Fong and Walker (2004) show that the success or failure of the procurement method adopted and the projects procured is determined by the level of planning done during procurement.

To determine ways in which the performance of projects procured by traditional contracts can be improved, this study evaluates the influence of the level of use of project documents on the outcome of projects procured by traditional contracts. The objectives of this study are to evaluate the levels of use of 21 project documents when projects are procured by the traditional contract method, the levels of use of project documents at the inception, design, tendering and construction stages and the overall procurement phase and their influence on the outcome of projects procured by traditional contracts. The achievement of these objectives is significant in several ways. First, the evaluation of the levels of use of important project documents when projects are procured by traditional contracts and the levels of use of the documents at each project stage will assist stakeholders in determining the level of effort that they put into the documentation of projects procured by the method and whether these efforts are

adequate. Second, the results will assist stakeholders in evaluating the effectiveness of their efforts on project documentation. Third, the results will assist stakeholders in improving the performance of the procurement option and the projects procured by it.

Traditional Contract Procurement Method

Every construction project is typically procured by a chain of processes referred to as the procurement method. Chan (2000) and Yakowenko (2004) maintain that there are several options by which a project can be procured and that no single option is appropriate for all projects. This study focuses on the traditional contract method, which is the most prominent procurement option in the Nigerian construction industry (Ojo, Adeyemi and Ikpo 2000; Idoro, 2007). Hovet (1996) and Yakowenko (2004) describe the procurement option as the traditional contract procurement method. Naoum and Langford (1984) reflect that the fragmentation and separation between design and construction characterise the DBB procurement method, and this separation places a burden on the management of building contracts. Mohsini and Davidson (1992) describe the traditional contract method as the traditional project delivery system whereby the owner contracts separately with a designer and constructor to design and construct a facility separately. The authors note that in the procurement arrangement, the design and construction groups are both involved as separate entities. Henry and Brothers (2001) suggest that the DBB method is traditionally used for construction in the military, and it follows a three-step regimented process that typically includes the preparation of a comprehensive design package, solicitation of the contract and awarding of the contract to the lowest responsive, responsible bidder. Ibbs et al. (2003) state that in the DBB method, a project is separated into the design and construction phases. With the two well-defined phases, construction begins when the design is completed and the drawings become the basis for bidding.

Project Planning

Project planning is perhaps the most important project management function. Naoum et al. (2004) describe project planning as one of the tools used by stakeholders to ensure that construction projects are successful. Hore et al. (1997) and Faniran, Love and Smith (2000) describe project planning as the systematic arrangement of project resources in the optimal manner so as to achieve the project objectives. Project planning requires that project objectives be defined first, and then the strategies to achieve these objectives are formulated. Project planning can be described as the process of defining project objectives, determining the framework, methods, strategies, tactics, targets and deadlines to achieve the objectives and communicating them to the project stakeholders. The project planning process requires that the client's expectations or requirements and available resources be defined and matched to a set of project objectives. Then the available options are identified and evaluated, and the most appropriate frameworks, strategies and tactics to achieve the objectives are selected. The process involves the preparation of numerous project documents, each representing defined strategies to achieve the defined project objective(s).

Project planning and project performance are two complementary activities in project management and the basis of project success or failure is defined in project planning. Faniran, Oluwoye and Lenard (1998) observe that the objective of project planning is to complete a project within a fixed amount of time, at a previously estimated cost and to specified standards of quality. This assertion implies that the effectiveness of project planning is measured by project performance. Naoum (1991), Ling and Chan (2002) and Thomas et al. (2002) also regard project performance as the basis of evaluating the effectiveness of project planning. Dvir, Raz and Shenhar (2003) identify three levels of project planning: 1) the end-user level, in which planning focuses mainly on the functional characteristics of the project end-product; 2) the technical level, which focuses on the technical specifications of the project deliverables required to support the functional requirements and 3) the project management level, which focuses on planning the activities and processes required to ensure that the technical work proceeds effectively. These three planning levels can otherwise be regarded as project conception planning, project design planning and construction planning, respectively.

Project performance

Project performance remains a prominent issue in project delivery because projects involve defined objectives that must be achieved and numerous resources that need to be efficiently utilised. Robinson et al. (2005) emphasised the need to develop and use tools to measure project performance, and Naoum (1999), Ling and Chan (2002), Thomas et al. (2002) and Josephson and Lindstrom (2007) developed numerous parameters for measuring project performance. Josephson and Lindstrom (2007) identified 250 parameters, while Ling (2004) evaluated 70 potential factors for measuring project performance. These parameters can be classified as subjective and objective parameters. Ling (2004) stated that the performance of a project is multifaceted and may include unit cost, construction and delivery speeds and the level of clients' satisfaction. Pinto and Slevin (1998) classified project performance parameters into (1) internal factors, which are project variables such as schedule, cost and quality, and (2) external factors, which are concerned with the stakeholders' satisfaction with the project performance and the perceived impact on the organisation's effectiveness. Ling et al. (2004) identified two categories of indicators for project success, including product success, which consists of measures of the degree to which quality standards are achieved, and process success, which consists of variables that measure the achievement of time and cost.

For stakeholders' satisfaction, clients remain the most important stakeholder when considering project performance. Neto et al. (2007) stated that matching or exceeding the client's expectations results in a satisfied client. They further stated that the client's satisfaction can reflect on how loyal a client becomes to a provider or brand and can result in higher sales volumes, lower levels of price sensitivity and positive comments about the provider and the brand. Client satisfaction can be measured from several perspectives (Idoro, 2008); however, time, cost and quality have remained the most prominent criteria in research studies. Josephson and Lindstrom (2007) suggested that a project goal considering clients' goals is measured from several perspectives, but the main aim is to

stimulate clients to identify and clearly present their goals and stimulate all of the managers involved to inform and remind everyone of the goals. Hatush and Skitmore (1997) maintained that success in a project is typically operationalised into time, cost and quality. Michell et al. (2007) remarked that the primary concern of construction clients is that their projects are completed within budget, on time and at the required level of quality.

For the objective measurement of a project outcome, schedule and cost are typically mentioned in research studies. Michell et al. (2007) identified time and cost as the principal factors. The third parameter (quality) is not a common objective parameter in research studies because as Vincent and Joel (1995) stated, stakeholders see the goal of quality management as customer satisfaction. From the perspective of previous studies, time and cost overruns remain the prominent indicators when objectively measuring a project outcome. However, these two parameters have their limitations because their values rely on the initial contract period and cost of a project, respectively.

RESEARCH METHODS

A field survey was conducted to collect the data used for the study. A list of 211 organisations consisting of federal government ministries and parastatals, state and local governments and organised private firms from the six geo-political zones (northwest, north-central, northeast, southwest, southeast and south) in Nigeria was first prepared to serve as the population frame for the study. The organisations were identified by conducting a preliminary survey because no reliable data of such organisations were available. From the preliminary survey, 25 organisations were identified in the northwest, north-central and northeast geo-political zones, 40 organisations were identified in the southeast and south, while 56 organisations were identified in the southwest. From this population, a sample of 42 organisations consisting of seven organisations from each zone was selected by stratified random sampling. The project with the highest value among the projects procured by the traditional contract method by each of the sampled organisations was selected for the study.

The variables were classified into project documents and project outcomes. The study used a checklist of 21 project documents representing all of the project documents that the respondents indicated were prepared on their projects. The documents were classified into the inception, design, tendering and construction project delivery stages. The documents selected in the project inception stage are the life-cycle chart, survey plan, value analysis report, clients' cash-flow chart and feasibility and viability report. The documents selected in the project design stage are the project specifications, quality management plan, bill of quantities, OHS management plan, structural drawings, buildability report, architectural, electrical and mechanical drawings and Environmental Impact Analysis (EIA) report. The documents used in the tendering stage are the method statement and project bid or tender. The documents selected in the construction stage are programme of work, material schedule, labour schedule and plant schedule. The parameters selected as project outcome indicators were classified into subjective and objective indicators. Three parameters, the clients' assessment of project duration, cost and quality, were used as subjective indicators of the project outcome

because they are regarded in research studies as the primary concerns of clients (Michell et al., 2007). Four parameters, project time and cost overruns, percentage of time overrun to the initial contract period and percentage of cost overrun to the initial contract sum, were determined to be the principal factors for measuring the performance of construction projects in previous studies and are used as objective indicators of the project outcome (Michell et al., 2007; Idoro, 2008).

The research instrument used for the survey was a structured questionnaire. The data for the study were supplied by the study population, and thus, a structured questionnaire was considered as the most effective instrument. The instrument was administered to the project leaders who were either the project manager or the architect or project officer in charge of the projects. Data were collected on the levels of use of 21 project documents. The documents stated in the variables of the study were classified into the inception, design, tendering and construction project stages. The last project stage in the procurement phase, the handing-over/commissioning phase, was excluded because it is the close of a project. Respondents were asked to indicate whether each of the documents was prepared or not prepared during the delivery of the projects. Their responses were weighted as follows: prepared = 1, not prepared = 0. These two weights were adopted because the study was interested in the documents that were prepared to derive their levels of use. Data were also collected on both the subjective and objective parameters of the project outcome. Data collected on the objective parameters of the project outcome were the initial contract period, initial contract sum, actual contract period and final contract sum of the projects used for the study. The subjective parameters of the project outcome were measured using the ranks of poor, low, moderate, high and very high. Five-rating scales identified from previous studies were adopted to provide a sufficient amount of options that will match the respondents' perceptions. These ranks were weighted as follows: poor = 1, low = 2, moderate = 3, high = 4 and very high = 5. Respondents were asked to indicate their assessment of the duration, cost and quality of their projects based on the ranks provided. In the analysis, the levels of use of the selected project documents were calculated as the number of projects in which a document was prepared divided by the number of respondents. The levels of use of project documents at the inception, design, tendering and construction stages were calculated as the number of documents prepared divided by the number of documents selected in each project stage, and the level of use of project documents in the overall procurement phase was calculated as the total number of documents prepared in the four project stages divided by the total number of documents selected (21). The mean was used to rank the levels of use of the selected project documents in each project stage and derive the levels of use of project documents at the inception, design, tendering and construction stages and the overall procurement phase and the outcome of projects sampled. The data collected were processed and analysed using version 17 of the Statistical Package for Social Scientists (SPSS) software. The Spearman correlation test was used to test for correlations between the levels of use of project documents at the conception, design, tendering and construction stages and the overall procurement phase and the outcome of projects procured by the method.

Hypothesis of the Study

To evaluate the influence of the levels of use of project documents on the outcome of projects procured by traditional contracts, a research hypothesis was postulated. The hypothesis states that the levels of use of project documents at each project stage and the entire procurement phase when projects are procured by the traditional contract method have no significant correlation with the outcome of the projects. The results of the hypothesis are expected to reveal the effectiveness of project documentation in the delivery of construction projects procured by the traditional contract method.

RESULTS OF THE STUDY

The data collected were analysed to achieve the objectives of the study. The results are presented below.

Description of the Sample

The first investigation conducted in the study determines the characteristics of construction projects used for the study. For this investigation, six parameters were used: the construction type, client type, procurement management method, building rise, initial contract period and initial contract sum. The construction type consists of new construction and redevelopment/renovation; client type consists of public and private clients and procurement management methods include traditional contract management, project management and construction management. The building rise refers to the number of floors in a building and is classified as low-rise (1–3 floors), medium-rise (4–7 floors) and high-rise (above 7 floors). The initial contract period refers to the number of weeks proposed for the construction of a project and is classified as short duration (1–26 weeks), average duration (27–52 weeks) and long duration (above 52 weeks). The proposed cost or budget for the construction of a project is classified as N1–25 million, N26–50 million, N51–75 million, N76–100 million and above N100 million, where N is Naira (the official Nigerian currency). The percentages of the types of construction and clients, procurement management methods, building rise categories, scheduled delivery periods and project budgets for the projects were analysed and ranked. The results are presented in Table 1.

Table 1. Descriptive Result of the Characteristics of the Study Sample

Project Characteristic	N	%	Rank	Project Characteristic	N	%	Rank
Construction type				**Client type**			
New construction	38	90.5	1	Private clients	36	85.7	1
Redevelopment/renovation	4	9.5	2	Public clients	6	14.3	2
Total	42	100		Total	42	100	

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Table 1. (*continued*)

Project Characteristic	N	%	Rank	Project Characteristic	N	%	Rank
Construction type				**Client type**			
Management method				**Building rise**			
Traditional contract	42	100	1	Low (1–3 floors)	30	88.2	1
Project management	0	0.0	2	Medium (3–7 floors)	2	5.9	2
Construction management	0	0.0	2	High (above 7 floors)	2	5.9	2
Total	42	100		Total	34	100	
Initial contract period				**Initial contract sum**			
Above 52 weeks	30	75.0	1	Above N100 million	14	38.9	1
1–26 weeks	10	25.0	2	N76–100 million	8	22.2	
17–52 weeks	0	0.0	3	N25–50 million	8	22.2	
Total	40	100		N1–25 million	4	11.1	2
				N51–75 million	2	5.6	3
				Total	36	100	

N = Number of respondents

Table 1 shows that the majority of the projects used for the study are new construction and are procured by private organisations. All the projects used for the study are managed by the traditional contract method, and the majority of the projects are low-rise buildings. The majority of the projects have a long duration, and the cost of the majority of the projects is above N75 million.

Levels of Use of Selected Documents in Projects Procured by the Traditional Contract Method

The study investigated the levels of use of 21 project documents that were prepared during the delivery of the projects sampled. The documents described in the variables of the study consist of five inception stage documents, ten design stage documents, two tendering stage documents and four construction stage documents. The purpose of the investigation is to determine the importance given the documents when a project is procured by the traditional contract method. To achieve this purpose, the level of use of each document was evaluated as the percentage of the number of projects in which the document was prepared out of the total number of projects used for the study. The mean levels of use of the documents were analysed and ranked to determine the importance given to each document at each project stage. The results are presented in Table 2.

Table 2. Levels of Use of the Selected Project Documents in the Projects Procured by the Design-Bid-Build Method

Plan	R	N	%	Rank	Plan	R	N	%	Rank
Inception stage					**Design stage**				
Survey plan	42	42	100	1	Architectural drawings	42	42	100	1
Life-cycle chart	42	30	71.4	2	Electrical drawings	42	38	90.5	2
Feasibility and viability report	42	28	66.7	3	Mechanical drawings	42	38	90.5	2
Clients' cash-flow chart	42	22	52.4	4	Bill of quantities	42	38	90.5	2
Value analysis report	42	16	38.1	5	Structural drawings	42	36	85.7	5
Construction					Project specifications	42	30	71.4	6
Programme of work	42	42	100	1	EIA report	42	30	71.4	6
Material schedule	42	36	85.7	2	Quality management plan	42	22	52.4	8
Labour schedule	42	36	85.7	2	OHS management plan	42	16	38.1	9
Plant schedule	42	26	61.9	4	Buildability report	42	16	38.1	9
					Tendering				
					Tender	42	36	85.7	1
					Method statement	42	28	66.7	2

R = Number of respondents, N = Number of projects in which a project plan was prepared

The results in Table 2 reveal that the survey plan is the most used inception document, followed by the life-cycle chart and the feasibility and viability report. The clients' cash-flow chart is the fourth most used, while the value analysis report is the least used inception document. The extent of use of the documents during the design, construction and tendering stages are also shown in Table 2.

Levels of Use of Documents in the Selected Project Stages and the Overall Procurement Phase in Projects Procured by the Traditional Contract Method

After evaluating the extent to which each project document is used, the study further investigated the extent to which the documents are used in each of the four stages and the overall procurement phase of the projects. For this purpose, the level of use of project documents in each project stage was evaluated as the percentage of the number of documents prepared in the project stage out of the total number of documents selected in each stage (five for the inception stage, ten for the design stage, two for the tendering stage and four for the construction stage). The level of use of project documents in the overall procurement phase in each project was evaluated as the percentage of the total number of documents prepared in the four stages out of the total number of documents investigated (21). The mean levels of use of project documents in each project stage and the overall procurement phase in the projects were analysed, and the results are presented in Table 3.

Table 3 shows that the level of use of project documents at the inception stage for the projects sampled is 78.10%, indicating that approximately four out of the five inception documents used for the study were prepared in the projects sampled. Table 3 also shows that the level of use of project documents at the design stage is 69.52%, indicating that approximately seven out of the ten inception stage documents used for the study were prepared in the projects sampled. Table 3 also shows that the level of use of project documents at the tendering stage is 76.19%, indicating that the method statement and tender were prepared in over half of the projects sampled. Table 3 reveals that the level of use of project documents at the construction stage is 59.52%, indicating that only

about two of the four construction stage documents used for the study were prepared in the projects sampled. The results in Table 3 also reveal that the level of use of project documents in the overall procurement phase of the projects used for the study is 71.90%, implying that about 18 of the 21 project documents used for the study were prepared in the projects sampled.

Table 3. Levels of Use of Project Documents at the Inception, Design, Tendering, Construction Stages and the Overall Procurement Phase in the Projects Procured by the Design-Bid-Build Method

Project Stage	R	Mean
Level of use of documents at inception stage	42	78.10
Level of use of documents at design stage	42	69.52
Level of use of documents at tendering stage	42	76.19
Level of use of documents at construction stage	42	59.52
Level of use of documents in overall procurement phase	42	71.90

R = Number of respondents

Outcome of the Projects Procured by the Traditional Contract Method

The project outcome has been identified as the yardstick for determining the effectiveness of project planning. Based on this criterion, the study attempted to determine the outcomes of the projects used for the study. For this investigation, seven project outcome indicators described in the variables of the study were used. The clients' assessment of the project delivery time, cost and quality were measured using the five ranks described in the methods of the study. The time and cost overruns and the percentages of time overrun to the initial contract period and cost overrun to the initial contract sum were evaluated from the initial and actual contract periods and the sums of the projects sampled, respectively. The mean outcomes of the projects were analysed, and the results are presented in Table 4.

Table 4. Mean Outcome of the Projects Procured by the Design-Bid-Build Method

Project Outcome Indicator	R	Mean
Clients' satisfaction with project duration	42	3.14
Clients' satisfaction with project cost	42	2.38
Clients' satisfaction with project quality	42	2.85
Project time overrun	26	4.84 weeks
Project cost overrun	32	N8.03 m
% time overrun/initial contract period	33	10.87
% cost overrun/initial contract sum	24	8.78

R = Number of respondents, N = Naira (Nigerian official currency), m = million

The results in Table 4 reveal that the mean satisfaction with the project duration by their respective owners is 3.14. The mean satisfaction with the project cost is 2.38,

while that of the project quality is 2.85. The results indicate that the level of satisfaction of the owners with the duration of the projects is moderate, while the levels of satisfaction of the owners with the cost and quality of the projects are low and below moderate, respectively. Table 4 also reveals that the mean time overrun of the projects is 4.84 weeks and the mean cost overrun is N8.03 million. When the time overrun is compared with the initial contract period of the projects, the mean percentage of time overrun to scheduled delivery period is 10.87. When the cost overrun is compared with the initial contract sum of the projects, the mean percentage of cost overrun to the initial contract sum is 8.78.

Correlation between the Levels of Use of Documents in the Selected Project Stages and the Overall Procurement Phase and the Outcome of Projects Procured by the Traditional Contract Method

The main aim of the study is to establish whether the use of project documents can be used to improve the outcome of construction projects procured by the traditional contract method. The results of the study have established the levels of use of project documents in the projects sampled and their outcomes. The study further attempted to determine whether there is a correlation between the results of the levels of use of project documents and the outcome of the projects. This investigation attempts to determine whether the use of the documents can influence the project outcome. A hypothesis of the study was postulated for the purpose of this investigation. The hypothesis states that the levels of use of project documents at each project stage and the overall procurement phase has no significant correlation with the outcome of the projects when projects are procured by the traditional contract method. The hypothesis was tested using the Spearman correlation test with $p \leq 0.05$. The rule for the acceptance or rejection of the hypothesis is that when the p-value > 0.05, the hypothesis is accepted, but when the p-value ≤ 0.05, the hypothesis is rejected. The results of the test are presented in Table 5.

The results in Table 5 show that the p-value for the correlation test between the level of use of inception stage documents and the owners' assessment of project delivery period (0.792), clients' satisfaction with the project quality (0.407), project time overrun (0.887), project cost overrun (0.243) and percentage of time overrun to the initial contract period (0.062) are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables. These results indicate that the level of use of the inception stage documents is not significantly correlated with the clients' satisfaction with the delivery period and quality, the time and cost overruns and the percentage of time overrun to the initial contract period of the projects procured by the traditional contract. These results indicate that the use of project documents at the inception stage does not significantly influence the clients' perception of the project delivery time and quality. However, the p-values for the correlation test between the level of use of the inception stage documents and the clients' satisfaction with the project cost (0.044) and the percentage of cost overrun to the initial contract sum (0.007) are less than the critical p-value (0.05); therefore, the hypothesis is rejected for these variables. These results imply that the level of use of inception stage documents is significantly correlated with the percentage of cost overrun to the initial contract

sum and the clients' satisfaction with the cost of the projects procured by the traditional contract method.

Table 5. Results of the Spearman Test for Correlation between the Level of Use of Project Documents and the Outcome of the Projects Procured by the Design-Bid-Build Method

Variables Correlated	N	R	p-value	Decision
Level of use of the documents at the inception stage and				
Respondents' assessment of project duration	42	–0.042	0.792	Accept
Respondents' assessment of project cost	42	–0313	0.044	Reject
Respondents' assessment of project quality	42	–0.131	0.407	Accept
Project time overrun	26	0.029	0.887	Accept
Project cost overrun	12	–0.365	0.243	Accept
% time overrun/initial contract period	26	–0.365	0.062	Accept
% cost overrun/initial contract sum	12	–0.730	0.007	Reject
Level of use of documents at the design stage and				
Respondents' assessment of project duration	42	–0.500	0.001	Reject
Respondents' assessment of project cost	42	–0.295	0.058	Accept
Respondents' assessment of project quality	42	–0.365	0.018	Reject
Project time overrun	26	–0.007	0.973	Reject
Project cost overrun	12	0.490	0.106	Reject
% time overrun/initial contract period	26	–0.265	0.189	Reject
% cost overrun/initial contract sum	12	0.001	0.999	Reject
Level of use of documents at the tendering stage and				
Respondents' assessment of project duration	42	0.130	0.411	Accept
Respondents' assessment of project cost	42	–0.076	0.632	Accept
Respondents' assessment of project quality	42	–0.076	0.632	Accept
Project time overrun	26	–0.058	0.779	Accept
Project cost overrun	12	0.920	0.001	Reject
% time overrun/initial contract period	26	–0.401	0.042	Reject
% cost overrun/initial contract sum	12	–0.200	0.530	Accept
Level of use of documents at the construction stage and				
Respondents' assessment of project duration	42	0.225	0.152	Accept
Respondents' assessment of project cost	42	0.148	0.349	Accept
Respondents' assessment of project quality	42	0.212	0.177	Accept

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Table 5. (*continued*)

Variables Correlated	**N**	**R**	**p-value**	**Decision**
Project time overrun	26	–0.512	0.008	Reject
Project cost overrun	12	0.465	0.128	Accept
% time overrun/initial contract period	26	–0.082	0.689	Accept
% cost overrun/initial contract sum	12	–0.775	0.003	Reject
Level of use of documents at the tendering stage and				
Respondents' assessment of project duration	42	–0.236	0.132	Accept
Respondents' assessment of project cost	42	–0.196	0.213	Accept
Respondents' assessment of project quality	42	–0.229	0.146	Accept
Project time overrun	26	–0.003	0.988	Accept
Project cost overrun	12	0.801	0.002	Reject
% time overrun/initial contract period	26	–0.413	0.036	Reject
% cost overrun/initial contract sum	12	–0.174	0.588	Accept

N = Number of respondents, R = Correlation value

Table 5 reveals that the p-values for the correlation test between the level of use of design stage documents and the clients' satisfaction with project cost (0.058), time overrun (0.973), cost overrun (0.106), the percentage of time overrun to the initial contract period (0.189) and the percentage of cost overrun to the initial contract sum (0.999) are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables. The result implies that the level of use of design stage documents when the projects are procured by the traditional contract method is not significantly correlated with the clients' satisfaction with their delivery cost and the overruns in their delivery time and cost. However, Table 5 reveals that the p-values for the correlation test between the level of use of design stage documents and the clients' satisfaction with the duration (0.001) and quality (0.018) of the projects sampled are lower than the critical p-value (0.05); therefore, the hypothesis is rejected for these variables. These results imply that the level of use of design stage documents in the projects procured by the traditional contract method is significantly correlated with the clients' satisfaction with the duration and quality of the projects.

Table 5 reveals that the p-values for the correlation test between the level of use of tendering stage documents and the clients' satisfaction with the duration (0.152), cost (0.349), quality (0.177), cost overrun (0.128) and percentage of time overrun to the initial contract period (0.689) of the projects sampled are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables. These results imply that the preparation of a method statement and tender is not significantly correlated with the clients' satisfaction with the duration, cost and quality of the projects sampled, their cost overrun and the percentage of time overrun to the initial contract period. However, the p-values for the correlation test between the level of use of tendering stage documents and the time overrun (0.008) and the percentage of cost overrun to the initial contract sum (0.003) of the projects sampled are lower than the critical p-value (0.05); therefore, the hypothesis is rejected for these variables. These results imply that the

preparation of a method statement and tender is significantly correlated with the time overrun and the percentage of cost overrun to the initial contract sum of the projects.

Table 5 reveals that the p-values for the correlation test between the level of use of construction stage documents and the clients' satisfaction with the duration (0.132), cost (0.213), quality (0.146), time overrun (0.988) and percentage of cost overrun to the initial contract sum (0.588) of the projects sampled are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables. These results imply that the preparation of the programme of work and resources' schedules of the projects sampled is not significantly correlated with the clients' satisfaction with their duration, cost, quality, time overrun and percentage of cost overrun to their initial contract sum. However, the p-values for the correlation test between the level of use of construction stage documents and the cost overrun (0.002) and the percentage of time overrun to the initial contract period (0.036) of the projects sampled are lower than the critical p-value (0.05); therefore, the hypothesis is rejected for these variables. These results indicate that the preparation of programme of work and resources' schedules is not significantly correlated with the overrun in the cost of the projects sampled and the percentage of time overrun to their initial contract period.

DISCUSSIONS

The results of the analysis of the characteristics of the projects used for the study have shown that the majority of the projects are new projects, are low-rise buildings with long delivery periods and have a value above N75 million. These results indicate that although the majority of the projects used for the study are low-rise buildings, their durations are long and their values are high; thus, they may be complex projects.

The results of the study also revealed that the levels of use of inception, design, tendering and construction stage documents are 78.10, 69.52, 76.19 and 59.52, respectively, while that of the overall procurement phase is 71.90. These results indicate that the levels of use of project documents at these four project stages are above 50%; thus, the majority of the documents are prepared when the projects are procured by the traditional contract method. However, the results of the study also imply that some of the documents are not prepared and the priorities given to the documents prepared at the four (inception, design, tendering and construction) stages vary from document to document. For the inception stage documents, while a survey plan is prepared in all of the projects sampled, a life-cycle chart, feasibility and viability report and clients' cash-flow chart are prepared in the majority of the projects. A value analysis report is prepared in a minority of the projects. For the design stage documents, while architectural drawings are prepared in all of the projects, electrical, mechanical and structural drawings, a bill of quantities, project specifications and an environmental impact analysis report are prepared in the majority of projects. An OHS management plan and a buildability report are prepared in a minority of the projects. For the tendering stage documents, both tender and method statements are prepared in the majority of the projects. For the construction stage documents, only the programme of work is prepared in all of the projects. The

three resource schedules are prepared in the majority of the projects procured. The results indicate that not all of the industry players diligently comply with the required documentations in construction projects. If compliance is increased, clients will likely be more satisfied with the end products.

The implication of increasing the levels of use of the documents in each project stage is explained by the correlation between the level of use of the documents in each project stage and the overall procurement phase and the project outcome. The results of the correlation between the level of use of inception stage documents and the project outcome show that the level of use of inception stage documents does not significantly influence the respondents' satisfaction with the cost of the projects or the percentage of cost overrun to the initial contract sum. This result implies that when more inception stage documents are prepared in construction projects procured by the traditional contract method, there will be less overrun in the contract sum of the projects and the clients will be more satisfied with the project cost. This can only be achieved if an adequate number of documents are used and if each document is of high quality. The study also reveals that the level of use of design stage documents significantly influences the respondents' satisfaction with the project duration and quality. This result indicates that when more of the design stage documents are prepared, clients will be more satisfied with the duration and quality of projects procured by the traditional contract method. The level of use of tendering stage documents is significantly correlated with cost overrun and the percentage of time overrun to the initial contract period. This result indicates that when tender and method statements are prepared, there will be less overrun in the budgets and durations of projects procured by the traditional contract method. The level of use of construction stage documents significantly influences the time overrun and the percentage of cost overrun to the initial contract sum. This result also indicates that when the programme of work and the resource schedules required for the successful execution of projects procured by the traditional contract method are prepared, there will be less overrun in the contract sum and project duration. The level of use of project documents in the overall procurement phase significantly influences the cost overrun and the percentage of time overrun to the initial contract period. This result implies that the preparation of all of the documents required in the four project stages will help to minimise the overruns in the contract sum and project duration of projects procured by the traditional contract method. Though the quality of the individual documents is beyond the scope of the present study, it is also believed to play a significant role in minimising schedule and cost overruns.

These results indicate that the parameters for the level of use of documents prepared in each stage are effective. However, the level of use of project documents in each stage does not influence some project outcome parameters. Specifically, the level of use of inception stage documents does not influence the respondents' assessment of project duration and quality, time and cost overruns and the percentage of time overrun to the initial contract period. The level of use of design stage documents does not significantly influence the respondents' assessment of project cost, cost overrun and the percentage of cost overrun to the initial contract sum. The level of use of tendering stage documents has no significant influence on the respondents' assessment of project duration, cost and quality, time overrun and the percentage of cost overrun to the initial contract

sum while the level of use of construction stage documents has no significant influence on the respondents' assessment of project duration, cost and quality, cost overrun and the percentage of time overrun to the initial contract period. These results indicate that the project outcome parameters for the level of use of project documents in each stage are ineffective.

The study has established that the levels of use of project documents at the four project stages and the overall procurement phase significantly influence the respondents' perception of project delivery time, cost and quality and the four project outcome parameters. The validity of the results for the influence of the level of use of project documents on the respondents' perception of project delivery time, cost and quality of the projects is not as high as that of the influence of the level of use of project documents on time and cost overruns and percentages of time and cost overruns to the initial contract period and sum, respectively. This result was expected because the respondents' perception of the project outcome was based on subjective measurements, while the delivery time and cost of the projects were based on hard data.

CONCLUSION

The results of the study have determined the level of use of project documents when projects are procured by the traditional contract method, the outcome of the projects and their relationship. The study specifically found that the majority of the documents required at each project stage are prepared, and the analysis estimated the levels of use of the documents prepared in the four project stages to be between 59% and 78%. The study also reveals that the levels of use of project documents in the four project stages significantly influence the clients' satisfaction with the duration, cost and quality of the projects and the overruns in their duration and budget. From these findings, the study has established that the levels of use of project documents at the inception, design, tendering, construction stages and the overall procurement phase when construction projects are procured by the traditional contract method should be increased and that such an increase will make clients more satisfied with the duration, cost and quality of the projects and reduce the overruns in the projects' durations and budgets. These findings show that the outcome of projects procured by the traditional contract method in Nigeria will be improved with an increase in the level of use of the required project documents. Project stakeholders, especially clients, should therefore strive to ensure that the required documents at each project stage, especially those with low levels of use, are prepared when they procure projects by the traditional contract method to derive the maximum outcome when such projects are completed.

It is recognised that the effectiveness of the documents also depends on their levels of implementation and control, which are not covered in this study. Furthermore, the quality of each document prepared was not investigated. Further investigation is therefore required in these areas.

REFERENCES

Alhazini, T. and McCaffer, R. (2000). Project procurement system selection model. *Journal of Construction Engineering and Management,* 126(3): 176–184.

Chan, A.P.C. (2000). Evaluation of enhanced design: Build system, A case study of hospital project. *Construction Management and Economics,* 18(7): 863–871.

Dvir, D., Raz, T. and Shenhar, J. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management,* 21(2): 1–7.

Elinwa, A.U. and Joshua, A. (2001). Time-overrun factors in Nigerian construction industry. *Journal of Construction Engineering and Management,* 127(5): 409–425.

Faniran, O.O., Oluwoye, J.O. and Lenard, D. (1994). Effective construction planning. *Construction Management and Economics,* 12: 485–499.

———. (1998). Interactions between construction planning and influence factors. *Journal of Construction Engineering and Management*, 124(4): 245–256

Faniran, O.O., Love, P.E.D. and Smith, J. (2000). Effective front-end project management: A key element in achieving project success in developing countries. *Proceedings: The Construction Development Conference*. Bostwana, 2–16 June.

Hatush, Z. and Skitmore, M. (1997). Evaluating contractor prequalification data: Selection criteria and project success factors. *Construction Management and Economics,* 15: 129–147.

Henry, E. and Brothers, H.S. (2001). Cost analysis between saber and design-bid-build contracting methods. *Journal of Construction Engineering and Management,* 127(5): 359–366.

Hore, A.V., Kehoe, J.G., McMullan, J. and Penton, M.R. (1997). *Construction 1: Management Finance Measurement*. London: Macmillan Press Limited,

Hovet, T.D. (1996). *Allowing the Design-Build Project Delivery Method in the Procurement of Public Construction Contracts.* Available at: http:/www.cascadepolicy.org/bgc/build.htm. [Accessed on 7 December 2005].

Ibbs, C.W., Kwak, Y.H., Ng, T. and Odabasi, A.M. (2003). Project delivery systems and project chage: Quantitative analysis. *Journal of Construction Engineering and Management,* 129(4): 382–387.

Idoro, G.I. (2007). A comparative study of direct labour and design-tender-construct procurement systems in Nigeria. PhD thesis. University of Lagos.

———. (2008). Effect of mechanisation on project performance in the Nigerian construction industry. *Proceedings: RICS Construction and Building Research Conference (COBRA 2008)*. Dublin Institute of Technology, Dublin, UK, 4–5 September 2008.

Josephson, P.E. and Lindstrom, J. (2007). Measuring performance in construction projects. In R. Milford and T.O. Haupt (eds). *Construction for Development: Proceedings of CIB 2007 World Building Congress*. Cape Town, ZA, South Africa, 14–18 May. Rotterdam: International Council of Building Research (CIB), 383–394.

Kharbanda, O.P. and Pinto, J.K. (1996). *What Made Gertie Gallop? Learning From Project Failures.* 1st Edition. New York: Von Nostrand Reinhold.

Ling, F.Y.Y. (2004). Key determinants of performance of DBB projects in Singapore. *Building Research and Information,* 32(2): 128–139.

Ling, F.Y.Y. and Chan, S.L. (2002). Performance evaluation of alternative project procurement methods. Research brief. National University of Singapore.

Ling, F.Y.Y., Chan, S.L., Chong, E. and El, P. (2004). Predicting performance of design-build and design-bid-build projects. *Journal of Construction Engineering and Management (ASCE),* 130(1) (Jan/Feb): 10–20.

Masterman, J.W.E. (1992). *An Introduction to Building Procurement Systems.* 1st Edition. London: E & FN Spon.

Michell, K., Bowen, P., Cattell, K., Edward, P. and Pearl, R. (2007). Stakeholder perceptions of contractor time, cost and quality management on building project. *Proceeding: The CIB World Building Conference on Construction for Development.* Cape Town, South Africa, 14–18 May. Rotterdam: International Council of Building Research (CIB), 231–240.

Ministerial Committee on Causes of High Government Contracts in Nigeria. (1982). *Report.* Lagos: Federal Government Press, 5.

Mohsini, R.A. and Davidson, C.H. (1992). Determinants of performance in the traditional building process. *Construction Management Economics,* 10(4): 343–359.

Naoum, S.G. (1991). Procurement systems and project performance. *Occasional Paper 45.* London: Chartered Institute of Building.

———. (1999). An investigation into the performance of management contracts and the traditional method of building procurement. PhD thesis. Brunel University.

Naoum, S.G. and Langford, D.A. (1984). Management contracting: A review of the system. *Proceedings: 4th International Symposium on Organisation and Management of Construction CIB W65.* University of Waterloo, Waterloo, Ontario, Canada, 3 July. Rotterdam: International Council of Building Research (CIB), 1001–1013.

Naoum, S., Fong, D. and Walker, G. (2004). Critical success factors in project management. *Proceedings: International Symposium on Globalisation and Construction CIB 2004, W107, TG23*. School of Civil Engineering, Asian Institute of Technology, Thailand, 17–19 September 2004.

Neto, J.B., Mourao, Y.R., Ferreira de Freitas, A.A. and Aves, T.L. (2007). A method to evaluate and manage client requirements in housing projects. In R. Milford and T.O. Haupt (eds). *Construction for Development: Proceedings of CIB 2007 World Building Congress*. Cape Town, ZA, South Africa, 14–18 May. Rotterdam: International Council of Building Research (CIB), 310–321.

Ogunsanmi, O.E. and Bamisile, A. (1997). Factors affecting the selection of projects' procurement methods. *Builders Magazine,* 7(2): 1–11.

Ojo, S.O., Adeyemi, A.Y. and Ikpo, I.J. (2000). Effects of procurement methods on clients' objectives of time and cost in the Nigerian construction industry. *Journal of Financial Management in Construction and Property,* 5(1&2): 105–108.

Oyegoke, A.S. (2004). *Construction Industry Overview: A Comparative Study of the US, UK, Japan and Finland. Publication 224.* Espoo, Finland: Helsinki University of Technology, Construction Economics and Management.

Pinto, J.K. and Slevin, D.P. (1998). Project success: Definitions and management techniques. *Project Management Journal,* 19(1): 67–71.

Robinson, H., Anumba, C., Carillo, P. and Al-Ghassani, A. (2005). Business performance measurement in construction engineering organisations. *Measuring Business Excellence,* 9(1): 13–22.

Thomas, S.R., Macken, C.L., Chung, T.H. and Kim, I. (2002). *Measuring the Impact of the Delivery System on Project Performance: Design-Build and Design-Bid-Build NIST GCR 02-840.* Austin, US: Construction Industry Institute.

Vincent, K.O. and Joel, E.R. (1995). *Principles of Total Quality*. London: Kogan Page.

Yakowenko, G. (2004). *Mega-Project Procurement: Breaking from Tradition.* Available at: http/www.tfhrc.gov/pubrds/04jul108.htm [Accessed on 7 August 2005].