Analysis Of Relationship Between Preliminary Estimate, Tender Sum And Final Accounts (A Case Study Of Selected Building Projects In Edo State, Nigeria).

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ABSTRACT
This research provides an analysis of the relationship between preliminary estimate, tender sum and final account of building projects with a view to predicting final account accurately from tender sum and preliminary estimate. To achieve the objectives, the study carried out extensive review of literature and collected data interviews and administration of structured questionnaires. The data collected were analysed using multiple regression, correlation matrix and frequency distribution. The research reveals that there is a significant relationship between preliminary estimate, tender sum and final account of building projects. This research work has contributed to the existing body of knowledge in that it would help to provide reliable estimate for budgeting purposes.
Key Words: Final account, Tender sum and Preliminary estimate

1.0 INTRODUCTION
1.1   BACKGROUND TO THE STUDY

It is a common thing these days as you take a trip from East to West and North to South to see a lot of building projects that have being abandoned. The major reason that is known to be responsible for abandoned projects is lack of funds to finance these projects to completion stage. The question that comes to mind then is that, does it mean that, at the inception of the project, that the client was not aware of the probable cost of financing the project to completion stage? In most cases, we do know that preliminary estimates are carried out for building projects. And the primary function of preliminary estimating is to produce a forecast of the probable cost of future project, before the building will be designed in details and the contract particulars prepared. In this way, the client is made to be aware of the likely financial commitments before extensive design work is undertaken.

The major worries to professional in the construction industry is the wide gap between final account figures, the tender and preliminary estimates earlier arrived at the pre-contract stage. This has caused fear to the building clients in going into building projects and has made the professionals in the industry not to have much credibility before their clients. Also, we should note that what the building client will always remember is the initial estimate, as this will be the sum on which he has based all his calculations.
The paper aims at predicting final account accurately from tender sum and preliminary estimate and examines the relationship between preliminary estimate, tender sum and final account with a view to putting the client mind at rest or eliminating his fear by having prior understanding of the cost implications of proposed building projects.
This paper or research is useful in predicting cost of projects, giving a set of parameters, and changes in any of the key variables or set of parameters would result in corresponding adjustment to the cost of the project. The purpose of predicting final account figures from

tender sums, and preliminary estimate at the inception of a building project is intended to provide an early warning system, altering of possible budget problems in good time for remedial actions to be taken.

2.0   REVIEW OF PAST STUDIES

Seeley (1990) reported a survey undertaken by the Royal Institute of Chartered surveyors (RICS) (quantity surveyor),(Engineering services committee) in 1978 to find out the percentage difference between tender stage and final account stage of bill of quantities tender and specification tenders for mechanical and electrical (M&E)works in (UK).

The finding revealed percentage difference between tender stage and final account stage varying from -8.89% to +16.30% of bill of quantities tender while in the case of drawing and specifications tender, it varies from +15.20% to +54.13%.

Also this research investigated the difference between preliminary estimates and   tender sums and final account of building projects of bill of quantities tender with a view to comparing the result with the one conducted by the RICS in united kingdom.(UK).

Dikko (2002) developed a cost control model for housing and infrastructures development, the objective of his paper was to highlight in general terms the services that could be offered by the quantity surveyors or cost engineers in organizing the available information into a data bank and use it as a basis to plan for future projects.

Numerous studies have been carried out on various cost control and cost management of building project among them are: (Johnson& kalplan 1987) states that traditional management accounting information tends to be too late, too aggregated and too distorted to be relevant for production planning and control because of the environmental, managerial and technological changes that had occurred is the last thirty years. In the face of all these changes, traditional cost accounting information has become mostly irrelevant and even dangerous for managerial purposes (Ploss, 1990).

Particularly in the construction industry the inadequacy of cost accounting systems has resulted in the dissociation between the cost management and production planning and control processes.

In general, construction cost control consists basically of monitoring actual performance against cost estimates and identifying variance. According to Ballard (2000), the traditional control methods based on the detection of variances appears to be apparent, and the appropriate corrective action obvious. As a result, the traditional cost control   system has been much more useful to manage contract than production. (Ballard and Howell, 1998; Koskola, 2000). Larkin *et al* (2012) explore some methods for evaluating risk impact on the variability between contract sum and final account in client-led and contractor-led Design and build projects. Their study concluded that the set of risk factors involved in client-led-D&B projects will be different from those relevant to contractor-led-Design and build projects.

In the light of the above previous studies, it is necessary to develop a cost control and monitoring system that can be useful for both contracts and production. Hence, this research work will serve in this regards. Also, no previous research work has been carried out in the analysis of relationship between preliminary estimate, tender sum and final account of building projects.

2.1   PRELIMINARY ESTIMATE

According to Omole (1999), preliminary estimate is defined as the computation of the probable cost of a new development (i.e. construction) at some stages before the tender documents are produced. Preliminary estimates are those estimates prepared before the bill of quantities is available, or where there is no bill of quantities for the project, then, they are estimates arrived at before the contract or tender sum is obtained.

Ashworth (1994) observed that the purpose of a pre-tender estimate or preliminary estimate is to provide an indication of the probable cost of construction. This will be an important factor to consider in the client's overall strategy of the decision to build. The estimate will also provide the basis for his budgetary and control of the construction cost.

Also, Oborien (2006), stated that preliminary estimate is the forecasting of a probable project cost before detail designs and contract document preparations are made. The building client, through the quantity surveyor is made aware of likely financial commitments before extensive designs are undertaken.

2.1.1   METHOD OF ESTIMATING
Basically, there are two methods being used for estimation namely approximate quantities and cost yardsticks or single rate methods. Cost yardstick includes the unit method, the cubic method, storey enclosure method and square meter or superficial method.

2.2   TENDER SUM
Tender sum is the amount of money the contractor offers to carry out a building project and this amount has being accepted by the client. It is also referred to as the contract sum. When the Joint Contract Tribunal standard form of contract is used, tender sum or contract sum is the amount named in Article 2. The contract sum is the total amount named in the contract bill to cover the quantity and quality of work included in the contract bills.

2.2.3   TYPES OF CONTRACT
Definition
Oseghale and Onojaife (2006) defined a contract as an agreement between two parties whereby one of them undertakes to do something in return for a reward or consideration by the other. The contractor, according to Willis and Willis (1980), ranges from a single individual to a large company who is responsible for carrying out the building works. Ariajegbe (2006) in quoting Ramus (1989) stated that the selection of a suitable contractor to carry out a construction project is an important matter requiring careful thought.
According to Kolawole (1994), the objective of construction contact is to define the agreement of the parties in respect to design, time and cost and also prove a sound, definitive, legal and administrative basis for the construction process.
Building contracts should always be in writing and are normally in three parts;
  a.   Articles of agreement (which when signed or executed by the parties constitute the contract).
  b.   Conditions of contract.
  c.   Supporting contract document e.g. drawings, bills of quantities.
Different types of contract commonly used fall into three categories depending on the way in which the price to be paid for the building are determined. The commonly available types include:
  a.   Lump sum contract
  b.   Measurement contract
  c.   Cost reimbursement contract.

2.3   FINAL ACCOUNT
The final accounts will usually be made up of a number of sections. It is the quantity surveyor's duty to prepare and complete this document in conjunction with the contractor. Final account may contain the following:
  a.   Adjustment of prime cost sums
  b.   Adjustment of provisional sums

c.   Adjustment of provisional quantities
d.   Variation account
e.   Day-works
f.   Claims
g.   Fluctuation.

In order for the quantity surveyor to be able to carry out the final adjustment of contract sum, he will need the following documents:
a.   Priced Bills of Quantity with form of contract and original tender sum.
b.   Original drawings used in the preparation.
c.   All subsequent drawings issued together with every amendment.
d.   Nominated subcontractors and suppliers, original documents and agreed final accounts.
e.   Original dimension.
f.   All site notes and information taken by architect/clerk of works, e.g. sizes and dimensions of work to be covered up.
g.   Day-work sheets.

3.0 RESEARCH METHODOLOGY

In order to examine the analysis of relationships between preliminary estimate, tendered sum and final account of building projects, a total of one hundred (100) questionnaires were designed and administered to obtain information for the study and eighty (80) were received. Three forms of questionnaires were designed and administered. The first one was designed to obtain information from consultants engaged in building projects in Edo state. A total number of twenty (20) questionnaires were administered to the building consultancy firms which include private quantity surveyor firms, architectural firms and structural design firms operating in Edo state.

The second form of questionnaires was designed to obtain information from building contractors registered with University of Benin, Edo State University and Auchi Polytechnic, Auchi and some private contractors operating in the state. A total of sixty (60) questionnaires were administered among these contractors.

The third form of questionnaires were designed and administered to obtain information from clients involved in building project. These clients include university of Benin, Edo state university, Auchi polytechnic, Edo state Government and some private individual having building projects. A total number of twenty questionnaires were also administered to these groups of clients.

The sampling population includes; Building Consultants, contracting firms, and clients operating in Edo state Nigeria. Building projects executed by Edo state Government, University of Benin, Ambrose Ali University, Ekpoma and Auchi polytechnic, Auchi were investigated

These questionnaires were administered to different groups in order to have a collection of opinions from different professions; contractor and clients in the building industry instead of single respondents from one profession or from contractors or clients alone.

Also secondary data were collected from previous projects executed by university of Benin, Ambrose Ali University, Ekpoma, Auchi Polytechnic, Edo State Government, some private building contractors and individual clients to enable the researcher to predict the final accounts from preliminary estimates and tender sums of bill of quantities tender. A Total number of forty cases were used for the prediction of final account figures from preliminary estimate and tenders sum.

4.0   DATA ANALYSIS

4.1. Data presentation *and compilations.*

4.1.1. Respondents working experience.

Table1; Respondents working experience.

Description	Number	Frequency	percentage
Less than 4.999years	1	4	15.38
5yrs-9.999yrs	2	14	53.85
10yrs-14.999yrs	3	7	26.92
Above 15yrs	4	1	3.85
Total		26	100

Source: Field Survey, 2013.

Table1 shows the number of years of respondents sampled both in Building Consult and contracting profession in the building construction industry. 15.38 have less than 5years experience, 53.85 have 5.999-9.999years of working experience while 26.92 have 15years and above in the industry. The implication is that the respondent sampled has the relevant experience in the construction industry to contribute their quota in this research.

4.1.2. Educational qualification of respondents.

Table2. Educational qualification of respondents in Building

Description	NO	Frequency	Percentage
GCE/SSCE O/L	1	3	10.71
OND	2	2	7.14
HND/B.SC	3	18	64.29
PG.D/M.SC/PhD	4	5	17.86

Source: Field survey, 2013.

Table 2 above represents the educational qualification of the respondents sampled. 10.71% of them holds GCE/SSCE O'L,7.14% holds ordinary national diploma, while 64.29% holds HND/BSC respectively. This show that the respondents posses the required qualification in the industry to be able to contribute the quota effectively in the research works.

4.1.3 Profession of respondents

Table 3. Profession of respondents.

PROFESSION	VALUE	FREQUENCY	PERCENTAGE
ARCHITECTS	1	2	9.09
QUANTITY SURVEYOURS	2	6	27.27
BUILDERS	3	8	36.36
ESTATE SURVYOURS	4	1	4.55
CIVIL ENGINEERS	5	5	22.73

Source: Field Survey, 2013.

Table 3 shows the various professions of respondents sampled 9.09% of them were Architect, 27.27 were Quantity Surveyors, 36.36% were Builders, 4.55% Estate surveyors and 22.73% were civil engineers. This shows that the respondents cut across the various profession who posses the required knowledge about the subject under survey to contribute their quota.

4.1.4 Types of clients

Table 4.Types of clients

Types of clients.	value	Frequency	percentage
Private individuals.	1	13	48.15
Federal and state Govt.	2	6	11.11
Govt.parastatals(Universities and polytechnics) Total	3	8 27	40.74 100.00

Source: Field Survey, 2013.

Table 4, shows the type of clients that engages the services of consulting and contracting firms in this survey. Private individuals have the highest percentage of 48.15%, followed by Government parastatals Universities and polytechnics) with 40.47% and state Government having 11.11%.

4.1   MATHEMATICAL MODEL TO PREDICT FINAL ACCOUNT   FROM TENDER SUM AND PRELIMINARY ESTIMATE WITH   THE   AID   OF MULTIPLE REGRESSIONS.

The use of multiple regressions carried out to predict the final account from tender sum and preliminary estimate helps in meeting the first objective of the research.

Y =   Represents Final Account Value Naira (million)

X1 =   Represents Tender Sum Values Naira (million)

X2 =   Represents Preliminary Estimate Values Naira (million)

The regression equation is given as:-

$Y = 1.834963 X1 - 0.805243 X2 - 0.174117$

The predicted final account values were found to be quiet close to the actual final account values. This equation linking final account, tender sum and preliminary estimate will be very useful means of predicting final account figures immediately the tender sums are obtained. This will enable the quantity surveyor, the clients and other professionals to know ahead of time, the likely final account figure before the building project is completed.

4.1.1 Using Correlation Matrix to Test the Relationship between Final Account, Tender Sum and Preliminary Estimate

In order to meet the second objective and second hypothesis 2 of the research, correlation matrix was used to compute the correlation between the variables (final account, tender sum and preliminary estimate).

Table 5**:** Correlation Matrix between Final account, Tender Sum And
     Preliminary Estimate

Correlation	Y	X1	X2
Y	1.0000	.9856**	.4535**
X1	.9856*	1.000	*5794
X2	.4535*	.5794*	1.0000

   Source: Field Survey, 2013.

* = represents the level of significance

Y = represents final account value

X1 = represents the tender sum value

X2 = represents preliminary estimate value

The results show that there is a significant relationship between preliminary estimate, tender sum and final account of building project.

4.2   COMPARISION   OF   PRLELIMINARY   ESTIMATE,   TENDER   SUM   ANDFINAL ACCOUNT

The tabular presentation of the comparison between preliminary estimate, tender sum and final account of selected building projects in the study area is shown in Table 2.

Table 6**: Comparison of Preliminary Estimate, Tender Sum and**
     Final Account

S/N	Preliminary Estimate (Nm)	Tender Sum (Nm)	Final Account (Nm)	% Diff. TS&PE	% Diff. FA&TS	Remark
1	2.67	2.25	3.48	21.72	7.08	-
2	2.00	2.90	3.90	45.00	34.48	More variation and delays
3	4.00	16.00				More additional work
4	2.00	6.00	7.00	200.00	16.67	Price Variation
³	1.00	3.50	4.50	250.00	28.57	Unstable political climate
6	2.00	2.50	2.70	25.00	8.00	-
7	7.40	8.00	10.00	8.11	25.00	Price Variation
8	2.71	3.50	4.40	29.15	25.71	Price Variation

Source: Field Survey. 2013.

FA = Final Account

PE = Preliminary Estimate

TS = Tender Sum

4.3 DISCUSSION OF FINDINGS

Over 80% of the respondents sampled have five (5) years and above experience in the construction industry, and holds HND, B.Sc and other higher educational qualifications. The respondents cut-across professionals in the construction industry i.e. Architects, Quantity

Surveyors, Builders, Estate Surveyors, Civil Engineers both in the consulting and contracting firms and also clients.

In the projects sampled, 68.42% used Bar chart, and 31.58% used C.P.M. in their projects planning and scheduling technique(s) respectively. With the exception of one project, all the projects sampled experienced time over-run. The percentage difference between the final account and tender sum is an average of +29.53% while tender sum and preliminary estimate is an average of +70.87%.

The first objective of the research was met, as the final account of building project can be predicted with the use of multiple regression equation:

$Y = 1.8349663 x_1 - 0.805243 x_2 - 0.174117$

Y = Final Account (Naira Million)

X1= Tender Sum (Naira Million)

X2= Preliminary Estimate (Naira Million)

It was discovered that in all the building projects sampled, the final account values were more than the tender sum values with an average of 21.08% and tender sums greater than preliminary estimate with an average of 109.87%.

The results from the correlation matrix show that there is a significant relationship between preliminary estimate, tender sum and final account of building projects.

5.0 CONCLUSION

In the analysis of relationship among preliminary estimate, tender sum and final account carried out in this study, the study was able to derive a mathematical model to predict final account from tender sum and preliminary estimate. The research reveals that there is a significant relationship between preliminary estimate, tender sum and final account of building projects.

This will help the Quantity Surveyor know with a high level of accuracy the likely final account figure of the building project the moment the tender sums is agreed with the contractor. It will help the consulting team to control the cost of the project effectively, as it will help in reducing the wide gap between final account and tender sum, and also final account and preliminary estimate (initial estimate) early arrived at the inspection of the building project.

This research work has contributed to the existing body of knowledge in that it would help to provide reliable estimate for budgeting purposes. This will in turn assist in facilitating efficient distribution of resources and reduce the incidence of abandoned projects. Also, it would help to provide reliable estimate to be used in feasibility and viability studies for investment purposes or project prioritization.

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