FACTORS INFLUENCING ACCURACY OF SPECIAL SUB-CONTRACTORS PRELIMINARY ESTIMATE

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ABSTRACT

The purpose of the study is to investigate factors influencing the accuracy of specialist sub-contractors cost estimate in public construction projects. To achieve this, the researchidentifyfactors affecting the accuracy of the estimate, methods used and people involved in preparing specialist sub-contractors cost estimation. The population for the study included 91 quantity surveyors working in public and private organization. Convenient sampling technique was used in selecting the respondents. A cross-sectional survey was conducted within the Birnin-Kebbi metropolis.The data collected were subjected to mean score analysis. Three significant factors were identified as influencing the accuracy of specialist sub-contractors in the study area, namely; quantity surveyors exclusion in preparing special sub-contractors estimate in building projects (8.7%), sources of cost information (7.7%) and level of experience of the quantity surveyor (7.5%) respectively. Cost estimating for special subcontractors is a neglected area within the construction industry and therefore poses serious challenge to quantity surveyors proficiency in the discharge of his various professional duties.It was concluded that estimation process and other core duties of quantity surveyors particularly in the area of specialist works are graduallytaking over by special subcontractors in the construction industry.Itwas therefore recommendedthat an enlightenment workshop be prepared by the Quantity Surveyors within the regionson the effects of specialist sub-contractors estimations on quantity surveying profession in arriving at reliable and accurate total cost of construction estimation in public and private construction projects.

Keywords: Specialist,accuracy,factors,construction,Quantity Surveyor

INTRODUCTION

Specialist sub-contractors for mechanical and electrical services are often under pressure by client, contractors, and quantity surveyors to provide a reliable and accurate cost estimate in building projects.The task of arriving precise value for the supply and installation of mechanical and electrical services is not an easy one due to the level of specialization and variance within this sector of the industry (Mitchell, 2015). A realistic cost estimate is one of the significant factors in determining the success of building projects, the need for more realistic and accurate specialist sub-contractor cost estimate in building projects become imperative.

Previous research efforts have shown that reliability and accuracy issues of specialist sub-contractors estimate are responsible for the majority of project failures (Gould, 2007; Said,

2006;Mitchell,2015&Babalola, 2007). Despite the efforts of quantity surveyors in arriving at realistic and accurate estimates, specialist sub-contractors estimation process has been marred with inaccuracies, and this is recognized as a big challenge to quantity surveyors and contractors. A good estimator must be aware of all the factors that could affect the accuracy of an estimate and be able to manage all these factors in order to arrive at an accurate estimate (Olufemi, 2015). Mitchell (2015) found that the level of specialized knowledge and changing technology have prevented the quantity surveyors from taking a firm hold on the cost estimation of mechanical and electrical services.

Although previous studies have addressed issues relating to the accuracy (Garold, 2007), inaccuracies (Said, 2006),accuracy of pretender cost estimation (Mitchell,2015) and level of accuracy (Babalola, 2007), not much efforts have been made to investigate factors influencing the efficiency of specialist sub-contractors estimate in Nigeria construction sector. A qualitative study is needed to investigate the factors influencing the accuracy of the estimates at tender stage and to provide responses to questions such as; who prepares the estimate, which method was used, and what could be done to correct this unethical exclusion of quantity surveyors.

Therefore, the purpose of the study is to investigate factors influencing the accuracy of specialist sub-contractors cost estimate in public construction projects. Three objectives were used; to identify factors influencing the accuracy of the estimate, methods used, and people involved in preparing specialist sub-contractors cost estimate. The result of this study will be beneficial to the client, contractors, specialist sub-contractors and quantity surveyors both in academics and the industry. The study identifies major factors influencing the accuracy of specialist sub-contractors cost estimation with a particular interestin mechanical specialist sub-contractors. The study acknowledges the limitation of lack of generalization of the results due to the scope of the research and method of data collection and the issues of representativeness with questionnaire survey.

LITERATURE REVIEW

According to Holm, Schaufelberg, Griffin &Cole (2005),cost estimation in the construction industry, is the process of predicting the costs required to perform the work within the scope of the project. Shane etal., (2009) stressed that accuracy and comprehensiveness in cost estimation are delicate issues and can be easily affected by many different parameters; and each parameter must be properly addressed in order to maintain an acceptable level of accuracy during the process. Accurately cost estimation is,therefore, crucial to ensure the successful completion of construction projects.

Albogamy, Scot,&Berks, (2013) highlighted two types of challenges facing the construction cost estimation asthe impossibility of conducting cost estimation manually and the effects of incorrect cost estimation.Accuratecost estimation could lead to many problems such as; change order, construction delay, over and underestimation and may sometimes end up in litigation. Construction cost estimation methods play important roles in the success or otherwise of the delivery of projects (Olufemi, 2015).

It is observed that there are various methods of construction cost estimating available from the literature. Some are different from each other in principle, others in terms of terminology;even though their processes largely remain the same (Society of Cost Estimating and Analysis (SCEA) (2013).

A number of studies have been conducted to examine specialist sub-c9ontractors and contractors estimation challenges in the construction industry. For example,Mitchell(2015) investigated current estimating practice by trade contractors using a questionnaire survey and interview with mechanical and electrical construction contractors. The research found that almost half of the respondent do not routinely utilize and rely upon historical cost data provided as site feedback when producing estimates. Said (2006) reports that inaccurate in the estimateis inherently related to the lack of available information whereas others are related to lack of disciplined behavior in cost estimation processes.Someare related to the skills and behavior of the estimators in relation to practice.

Garold(2007) found that the accuracy of an estimate is measured by how well the estimated cost compares to the actual total installed cost and depends on four determinants: who was involved in preparing the estimate; how the estimate was prepared; what was known about the project and other factors considered while preparing the estimate. Inaccurate early estimates can lead to lost opportunities, wasted development effort, and lower than expected returns (Garold, 2007). James and Carolyn (2007) studied Estimating as a profession in UK construction and found that to provide a project cost that is accurate and competitive requires knowledge, needing a high level of study to achieve, skill and ability, which are among the many criteria expected of a modern profession.

Babalola (2007) studied the level of accuracy of electrical services cost estimate in Nigeria. Through the distribution of questionnaire administered to 225 electrical engineers estimators in construction and consultancy firms. The research found that themethod frequentlyuses in estimation was the special area method and that the estimator sources their cost data from a market survey. Mitchell (2015) stressed that determining an accurate value for the supply and installation of mechanical and electrical services is a difficult task due to the level of specialization and variance within this sector of the industry.

Mitchell (2015) conducted a study on the accuracy of pretender cost estimation of consultant quantity surveyors in Nigeria. Using a structural questionnaire administered to consultant quantity surveyors firms practicing in Nigeria for 82 selected building projects carried out between 2005 and 2008. The study found that quantity surveyors are not thorough in preparing pre-tender cost estimates of smaller projects as compared to the large ones. The study also found that smaller project is more bias than the large ones and thatprivate sector projects are more bias than those ofpublic sector projects.Olufemi (2015) observed that more works need to be done to achieve estimation objectives. These studies identified propose a range of approaches on cost estimation practices and accuracies that have helped the quantity surveying profession, contractors, specialist sub-contractors (mechanical and electrical), client and construction industry at larger.

METHODOLOGY

The study adopted content analyses and survey research design toidentify factors influencing the accuracy of special subcontractors' estimate.Structured questionnaires were distributed toquantity surveyors working in both public and private construction projects across the North WesternNigeria.Purposive sampling was used in which 150constructions sitesthat employ the services of quantity surveyorswere identified and analyzed.A total of 91 questionnaires were collected while 59were not returned.The data collected from the respondent were analyzed usingMicrosoftExcel to calculate the frequencies. The questionnaire consists of two parts A and B. Section A consists of the respondents profile while section B generates data on the influencing factors, the method used in preparing estimate and personnelinvolved.

RESULT AND DISCUSSION

The analysis of the data collected through the questionnaire is presented in a tabular form with frequencies ofresponses and percentages columns with accompanying interpretations. One hundred and fifty (150) questionnaire were distributed, while 91 were retrieved and used for the analyses.

Table 1: Factors Influencing The Accuracy of the Estimate

S/N	Factors	frequencies	Percentage	Valid percentage	Cumulative percentage
1	Experience quantity surveyor	6	7.5%	6	6%
2	Exclusion of QS in preparing estimates	8	8.7%	8	14%
3	Sources of cost information	7	7.7%	7	21%
4	Tendering method	2	2.1%	2	23%
5	Method of contract	3	3.2%	3	26%
6	Size of the project	2	2.1%	2	28%
7	Type of client	2	2.1%	2	30%
8	Type of construction	1	1.0%	1	31
9	Contract period	1	1.0%	1	32
10	Likely design changes	2	2.1%	2	34
11	Scope changes	3	3.2%	3	37
12	Supervision	3	3.2%	3	40
13	Anticipated Profit	5	5.4%	7	47
14	Estimation method	5	5.4%	6	53
15	Variation	5	5.4%	6	59
16	interim payment	5	5.4%	6	65
17	Sufficient time for estimation	4	4.3%	5	70
18	Site feedback	1	1.0%	1	71
19	Experience of the specialist sub-contractors on the job	4	4.3%	5	76
20	Estimator's inexperience	5	5.4%	6	82
21	Project information	1	1.0%	1	83
22	Incomplete drawings	6	7.5%	7	90

23	Politics	2	2.1%	2	92
24	Ability to appraise tenders	3	3.2%	3	95
25	construction knowledge	3	3.2%	3	98
26	Information technology skills	1	1.0%	1	99
27	Risk management	1	1.0%	1	100
	TOTAL	91	100%	100	

Source:fieldsurvey,2018

From table 1 respondents (8) which represent (8.7%) of the total respondents ranked "quantity surveyors exclusion" in preparing special sub-contractors estimation in building projects among the major factors influencing the accuracy of their estimation. This is followed by "sources of cost information" (7.7%) and "experience quantity surveyor" with (7.5%) respectively. The implication to the quantity surveying profession is that gradually, some of the core duties of the QS profession have been taking over by other professionals.

Therefore, to remain in the competitive construction industry market, quantity surveyors must identify the influencing factors relating tothe accuracy of the special subcontractors' estimation and take full responsibilities of the process.James and Carolyn (2007) suggested that to provide a project cost that is accurate and competitive required knowledge, needing a high level of study to achieve skill and ability, which are among many criteria of a modern profession. Olufemi (2015) posited that a good estimator must-have versatile construction industry experience; up-to-date in construction cost data and have adequate published manuals on material prices. Quantity surveyorsare in a better position of preparing cost estimate across all facets of construction works as they are trained and it is part of their core duties.

Table 2:Methods Used in Arriving at the Probable Cost Estimate

S/N	Estimation Method	Frequencies	Percentage	Valid frequency	Cumulative
1	Traditional Method of Estimation	2	2	2	2
2	Unit rate method	12	13	13	15
3	Comparison base on Personal experience	11	12	12	27
4	Comparison with Past similar project	17	18	18	45
5	Assembly pricing techniques or work module pricing	18	20	20	65
6	Rapid pricing or aggregate Pricing	5	6	6	71
7	Constant market survey	3	3	3	74
8	Up-to-date pricing	4	5	5	79
9	Site feed back	7	8	8	87
10	Cubic method	2	2	2	89
11	Story enclosure method	1	1	1	90
12	Superficial	2	2	2	92
13	Approximate quantities	7	8	8	100
	TOTAL	**91**	**100**	**100**	

Source:fieldsurvey,2018

Table2 indicates that respondents settled on “comparison with similar projects" followed by “assembly of pricing items” and “units methods” with 20%, 18% and 13% as the methods used by special subcontractors in arriving at a cost estimate. The implication of this is that some of these methods are not in use in preparation of construction cost estimate, while some are only applicable at preliminary stage.

Choosing a reliable estimating method is the starting point in arriving at an accurate estimation of special sub-contractors cost in the construction projects. The implication of allowing special sub-contractors prepare estimation in the construction projects is that it has negativeeffectingthe client, contractor and quantity surveyors because it contributes to over and underestimation in a given project.

Table 3: People involved in preparing specialist sub-contractors cost estimation

S/N	People involved	Frequency	Percentage	Valid frequency	Cumulative Percentage
1	Quantity surveyors	12	13	13	13
2	Mechanical engineers	25	27	27	40
3	Electrical engineers	9	10	10	50
4	Foremen/ supervisors	17	19	19	69
5	Electricians	11	12	12	81
6	Consultant engineers	3	3	3	84
7	Special Estimator	14	16	16	100
	TOTAL	91	100	100	

Source:fieldsurvey,2018

Table 3 indicated the people involved in preparing special subcontractors estimation as perceived by mechanical and electrical subcontractors. Respondents ranked “Special sub-contractors” with(27%) followed by “foremen and supervisors" (19%) and “special estimators” with(16%). These suggested that for special sub-contractors to arrive at accurate and realistic estimates they should engage the right personnel for the right job. The implication to the construction industry is that;as long as QS is not rightly assigned to carry out their functions, the construction industry in Nigeria will continue to face problems of construction cost dissatisfaction from different quarters. Due to poor regulation among professionals duties in the construction industry, theissue of over and underestimation in special subcontractors will be a difficult task to achieve. Michael (2015) found that level of specialization, knowledge and changing technology prevented QS from taking firm hold on the cost estimation of special subcontractors’ estimation.

CONCLUSION

Choosing an appropriate estimation method is crucial to the accuracy of the estimates due to its importance to the client and the viability of the projects.The study aim at identifying factors influencing the accuracy of special subcontractors’ estimation from the view of quantity surveyors

in Northwestern Nigeria .This was achieved through distribution of questionnaires to quantity surveyors working in both public and private organization. From the results the study found that majority of special sub-contractors do not engage the services of quantity surveyorsand the unit method was used in preparingestimation.The study also found that special sub-contractors engaged persons other than the QS to prepare estimate in specialized building works such mechanical and electrical works. The study is limited to method of data collection and sampling technique and lack of covering the whole country.

RECOMMENDATIONS

From the study, the following recommendationsare made:

1. To avoid interface conflict among the professionals, Quantity surveyors should be engaged in all aspect of construction estimations in the construction industry.
2. An enlightenment workshop should be prepared by the state chapter of Nigeria institute of Quantity Surveyors on the effect of specialist sub-contractors estimations in arriving at a reliable and accurate total cost of construction estimation in public and private construction projects.
3. The government which is a major source of construction projects in collaboration with professional bodies such as Nigeria Institute of Builders (NIOB), Nigeria Institute of quantity surveyors (NIQS) should ensure adherence to professional ethics by each professional.
4. There is a need for special sub-contractors to understand detailed construction methods as the building projects are becoming more complex and information technology (IT) oriented.

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