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Assessing the Severity of Errors in Bills of Quantities for Public Building Projects in Nigeria's Construction Industry

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ABSTRACT

Bill of quantity is the major document that provides initial cost estimates of construction projects in traditional procurement system. It helps in addressing the three most essential aspects of construction projects (cost, time and quality). However, BOQ is faced with professional errors which if not addressed may affect its sustainability. This research investigates the severity of errors in BOQs for public building projects in Nigeria's construction industry. Questionnaire and document analysis were employed as instruments of data collection. One hundred and forty structured questionnaires were administered to quantity surveyors. However, one hundred and twelve were returned and one hundred and five were validly used in the analysis. Fifteen BOQs for different public building projects in Nigeria were examined. The severity index analysis of the analyzed questionnaires revealed that the lowest severity indexes are 0.743 (74.3%) and 0.777 (77.7%) for pricing and preparation errors respectively. Document analysis results uncovered that 68% of the items in the BOQs examined had 28% above recommended transited rate while the remaining 32% of the items had 15% lower than the recommended transited rate as a result of error in transition of rate. The research also identified some other forms of errors in the BOQs. It is recommended that quantity surveyors should improve in their skills in BOQ preparation. Architects and Service engineers should also improve in the production of their design drawing.

Key Words: Bills of Quantities, Construction Industry, Error Severity, Nigeria and Public Building Projects,

1. INTRODUCTION

Cost performance is one of the major criteria by which success of building projects are measured (Abusafiya and Suliman, 2017) and (Gligorea, 2014). Accurate BOQ which is widely used in the traditional procurement system for cost estimating and tender purposes (Razali, Tajudin, Fadzli, and Tajuddin, 2014) should improve cost performance of construction project (The Aqua Group, 1992). Efective cost performance of building construction project should increase property and service production for the nation and lessen adversarial relationship among project stakeholders (Ikechukwu, Emoh, and Kelvin, 2017; Prajapati, Gupta, and Pandey, 2016).

However, poor cost performance in many countries has been widely published in the majority of projects and construction management literature (Ali and Kamaruzzaman, 2010; Doloi, 2013). Chen, Jin, Xia, Wu and Skitmore (2015) reported that more than 50% of design and build projects encures cost overrun in the United State of America. A report by Olaniran, Love, Edwards, Olatunji, and Matthews (2015) indicated that 64% of ongoing mega projects are facing cost overrun globbaly, while in developing countries specifically, sometimes 100% of estimated cost of

projects is exceeded (Memon, Abdul Rahman, and Abdul Azis, 2011). Alumbugu, Ola-awo, Saidu, Abdullahi and Abdulazeez, 2014; Ikechukwu *et al.*(2017); Memon *et al.*(2011) opined that national economy, construction industry and projects' stakeholders were the major victim of drawback of this poor cost performance.

Drawback of poor cost performance as reported by Abusafiya and Suliman (2017); Ikechukwu *et al.* (2017) and Prajapati *et al.*(2016) include; project abandonment, decrease in building activities, budget shortfall of project owners, lost of profit for the contractors, tarnishing of the reputation of the professionals, decrease in rate of national growth, waste of national finnance, investment pressure, and higher price to the end user, among others in various studies.

Studies conducted such as that of Alumbugu *et al.*(2014); Davis and Baccarini (2004); Davis, Love and Baccarini (2009); Dosumu and Iyagba (2013); Dosumu and Adenuga (2013); Gunathilaka and Senevirathne (2013); Juszczyk, Kozik, Lešniak, Plebankiewicz and Zima (2014); Musa, Ibrahim and Ibrahim (2011); Offei-Nyako, Tham, Bediako, Adobor and Asamoah (2016); Rashid *et al.*(2016); Razali *et al.*(2014) and that of Zhang, Wu and Zhao (2016) did not relate the effect of errors in bills of quantities to cost performance of building projects. It is therefore likely that poor cost performance is as a result of: inadequate proper management of causes of errors in BOQ, underating the severity of errors in BOQ, lack of assessment of cost performance of building projects, and ignoring the level of effect of errors in BOQ on cost performance. This study intends to investigate the effects of errors in BOQ on cost performance of public building projects in North Eastern Nigeria.

Bill of quantities (BOQ) is the major document that provides construction project stakeholders with initial cost estimates. It is an important component of contract documents for the reason that it addresses the three most essential aspects of construction projects that is: cost, time and quality (Gunathilaka and Senevirathne, 2013). As such it is commonly used in Nigeria and other commonwealth nations that employ traditional procurement system for tendering purposes (Abdul Rashid, Mustapa and Abd Wahid, 2006). According to Brook (2004), BOQ is mainly used in pre-contract and post-contract stage of construction projects. In the former, it is used for tender preparation. While in the latter, BOQ is used for valuation and variation purpose for progress payments.

Despite its benefits, the use of BOQ was reported to be declining in the United Kingdom's (UK) construction industry (CI) and possibly it will disappear in the nearby future from the industry. Also there is substantial decline of professional Quantity Surveyors' (QSs) job connected with the production of BOQ in Australia as a result of growing use of non-traditional procurement route (Abdul Rashid et al., 2006; Davis and Baccarini, 2004; Davis, Love and Baccarini, 2009). These may affect the sustainability of BOQ as a financial decision making document in the construction industry (Gunathilaka and Senevirathne, 2013).

In order to sustain the applicability of BOQs in construction industry, the challenges faced by this vital document should be assessed and addressed. The major challenge of BOQ is the professional errors which are mostly evident in construction documents as reported by Dosumu and Iyagba (2013). Furthermore, Davis et al., (2009) opined that errors in BOQs results in disputation and the risk of dispute that emanate from errors overshadows the advantages of the BOQs. Error is defined as unintended deviations from correct and acceptable practice that are avoidable (Love, Edward and Irani, 2008). Researches were conducted on errors in BOQs in the global context and in Nigeria. However, these researches did not assess the severity of errors in BOQ in the Nigeria's construction industry.

In their research, Gunathilaka and Senevirathne(2013) focused on identifying errors in BOQ in the Sri Lanka construction industry. The research categorises errors in BOQ into preparation and pricing errors. The identified errors from literature were not subjected to any form of analysis to evaluate even the frequency of their appearance in the BOQ and neither does the research assess their severity. Similarly, the research conducted by Olatunji (2011) in Australia apparently reviewed the different form of errors that were found in construction estimating processes. However, the research did not analyse the errors been reviewed. Juszczyk, et.al. (2014) also identified and classified errors in BOQs in Poland construction industry as formal errors and calculation errors. However, the research did not assess the severity of this form of errors.

In Nigeria's construction industry, researches were conducted on errors as well. For example Dosumu and Adenuga (2013) investigated the causes, effect and remedies of errors in Nigeria's construction documents. Causes, common types of errors, effects, and remedies of the errors were classified and ranked using mean score. The research however, focused broadly on construction document rather than BOQ as a component. Moreover, the severity of the common types of errors identified was not assessed.

In the same vein, Dosumu and Iyagba (2013) appraised factors responsible for errors in Nigeria's construction document. Mean score ranking was used to rank the factors responsible for errors based on consultants and contractors perspectives. The sources of factors were also categorised into three, viz: designer, management, and client. The research, just like the investigation of Dosumu and Adenuga (2013) focused on factors responsible for errors. The research also broadly covered construction document and no BOQ as a constituent was studied.

Furthermore, Musa, et.al (2011)conducted a research on errors in BOQ. Specifically, they identified flaws in BOQs in Nigeria's construction industry as an attempt to improve accuracy in cost estimating. The research employed document analysis approach and eventually, seventeen projects were analysed. Errors were uncovered in pricing of some selected items of work; the study however did not assess the severity of the uncovered errors. Based on the background above, this research is aimed at identifying and assessing the severity of errors in BOQs in Nigeria's construction industry.

2. RESEARCH METHODOLOGY

This research employed Positivist (exploratory and descriptive) and Post-Positivist (explanatory) approaches. In the former, extensive literature review (exploratory) was used to gather data directly by the researcher from global literature; literature review is the systematic identification of location, retrieval, analysis and evaluation of documents that are related to the research problem (Kothari and Garg, 2014; McNabb, 2009), and describing some phenomena as a result of information obtained by the use of questionnaire (descriptive) (McNabb, 2009). Data were collected through questionnaire and analysed them by the use of descriptive statistics. The descriptive statistics includes; frequencies, percentages, and severity index. The results were presented in tables and charts.

While in the later, explanatory approach (document analysis) was used in this research. The typical objective of explanatory research include: explaining why some phenomenon occurred and interpreting the phenomenon (McNabb, 2009). Bills of quantities were scrutinised to confluence the responses from the questionnaire. Data were analysed using descriptive statistics and the findings were reported accordingly. According to Bowen (2009); Guthrie(2010) and McNabb (2009), this will provide more proof on issues earlier identified in the questionnaire response.

Different forms of errors in BOQs were identified from global literature. The identified errors were then scrutinised and categorised into BOQ preparation errors and BOQ pricing errors before subjecting them to the opinions of respondents through structured questionnaire. For triangulation, fifteen BOQs for public building construction projects were analysed to confluence the results from the questionnaire.

The respondents for this research comprises of: contractors' quantity surveyors, consultants' quantity surveyors and public servants' quantity surveyors from Bauchi and Gombe States in North Eastern Nigeria. These two states were chosen because they accommodate up to 74% of the total population of quantity surveyors in the region. These category of professionals are responsible for the production of bills of quantities and settlement of final account at different capacities (Davis et al., 2009). The responses from this combination of professional quantity surveyors were substantial for judgements in this research.

3. RESULTS AND DISCUSSIONS

One hundred and forty questionnaires were distributed and one hundred and twelve were returned. This gives a response rate of 80%. However, seven out of the returned questionnaires were invalid. Hence one hundred and five questionnaires were used in the analysis for this research. This tremendous return rate might be as a result of self-administered questionnaire (hand – to – hand) method adopted, patience and perseverance exercised by the researcher. Table 1 below shows the general information of the respondents.

From table 1 below, the result shows that almost more than half of the respondents were working in public sector, with 30.5% working under contractors while the remaining were working independently as consultants. This indicates that the research captured all categories of quantity surveyors needed in public construction projects with a balanced opinion. More than half of the respondents were equally corporate members, and 44.8% were struggling to be inducted as certified professionals with only 2.9% as technicians and 0.9% fellow members. This also means that the respondents have the recognition of Nigerian Institute of Quantity Surveyors (NIQS). As such, their opinion could be reliable.

Table 1: General Information of Respondents

	Frequency	Percentage
Category of Quantity Surveying Professionals		
Consultant QS	20	19.0
Contractor's QS	32	30.5
Public Servant QS	53	50.5
Total	**105**	**100**
Membership Grade of Quantity Surveyors		
Technician	3	2.9
Probationer	47	44.8
Corporate	55	51.4
Fellow	1	0.9
Total	**105**	**100**
Academic Qualifications		
HND	25	23.8
B. Tech/B. Sc	54	51.4
M. Tech/M. Sc	22	21.0
Ph. D	4	3.8
Total	**105**	**100**

In terms of academic qualifications, more than half of the respondents have first degree, while 23.8% were HND holders, and 21% obtained second degree while 3.8% were PhD holders. This indicates that the respondents were intellectually capable to respond to questions asked in this research. From table 2 below, the mean working experience (MWE) of the respondents was calculated. This shows that the respondents have substantial working experience and their opinion could be reliable. The following formula was equally used.

$$\text{MWE (years)} = \frac{1146}{105} = 10.9 \text{ yrs}$$

Table 2: Working Experience of the Respondents

Working Experience	Mid Value (X)	Freq. (F)	Percentage	FX
Less than 6 years	3	15	14.28	45
6 – 10 years	8	25	23.83	200
11 – 15 years	13	37	35.23	481
Over 15 years	15	28	26.66	420
Total		**105**	**100**	**1,146**

As stated earlier, the errors in BOQs in this research were categorised into preparation errors and pricing errors. The severity of errors was analysed using severity index formula as shown below;

$$S.I = \sum_{i=1}^{5} \frac{a \times n}{5N}$$

Where: a = weight assigned for the scale
n = frequency of response
N = total number of participants

The severity was measured according to the scale of the measurement as follows: 1=extremely not severe, 2=not severe, 3=averagely severe, 4= severe and 5=extremely severe. Table 3 and table 4 below present the errors in BOQs ranked based on their severity using Pareto rule that the highest ranked has the greatest influence (Ogwueleka, 2011).

Table 3: Severity Index of BOQ Preparation Errors

Preparation Errors	Severity Index	Percentage	Rank
Incorrect quantities	0.981	98.1	1
Omission of entire element/section in BOQ	0.964	96.4	2
Including irrelevant preliminary items	0.853	85.3	3
Missing items of work	0.847	84.7	4
Insufficient information with descriptions of item of work	0.821	82.1	5
inaccurate item characterization description	0.804	80.4	6
Including unnecessary specifications	0.802	80.2	7
Wrong assumption regarding items in the BOQ	0.786	78.6	8
Inadequate description on actual items of temporary works	0.783	78.3	9
Discrepancies between drawings and the BOQ	0.777	77.7	10
Average	**0.842**	**84.2**	

From table 3 above, the severity of preparation errors shows that incorrect quantities, omission of entire element/section in BOQ, including irrelevant preliminary items, missing item of works, and insufficient information with descriptions of items of work were the five most severe preparation errors in BOQs.

Similarly, table 4 shows the severity of pricing errors in BOQs, where: disregarding evaluation of risk associated with item of work, wrong assumption regarding item of work, rates not built up in accordance with the provision of standard document, using same rate on entirely different item of work, and careless consideration of work method were the five most severe pricing errors in BOQs.

Table 4: Severity Index of BOQ Pricing Errors

Pricing Errors	Severity Index	Percentage	Rank
Disregarding evaluation of risk associated with item of work	0.964	96.4	1
Wrong assumption regarding item of work	0.895	89.5	2
Rates not built up in accordance with the provision of standard document	0.887	88.7	3
Using same rate on entirely different item of work	0.886	88.6	4
Careless consideration of work method	0.855	85.5	5
Ignoring specifications during pricing	0.832	83.2	6
Arithmetic errors despite the usage of devices	0.821	82.1	7
Ignorance of relationships between items of work	0.819	81.9	8
Allocating resources incorrectly for the project	0.815	81.5	9
Assumption on output of a crew based on past performance	0.743	74.3	10
Average	**0.852**	**85.2**	

Fifteen BOQs for public building projects were scrutinised to confluence the questionnaire results. These BOQs were retrieved from different files in ministries

and independent consultancy and contracting firms. Transitional errors were investigated, transitional errors occur during the transfer of pricing rate of item of work measured in particular unit of measurement to identical item of work in another form of unit of measurement (Ramus, Birchall and Griffiths, 2011).

Table 5 below presents the pattern of the analysis, basic rates per cubic meter/square and meter of basic item of work as in the respective BOQs were presented in the first column. Bill transited rates were presented in the second column. While in the third column, corrected transited rates were presented.

Table 5: Transition Errors in BOQs of Public Building Projects

Project No. 1			
Description	**Bill Rate (₦)**	**Erroneous Transited Rate (₦)**	**Corrected Transited Rate (₦)**
0.77 corrugated Aluminium roof covering	**2,800/ M^2**		
Ridge capping; girth 600mm		1,800/LM	1,680/LM
Eave angle; 100mm wide		1,350/LM	280/LM
25mm thick cement/sand (1:4) rendering	**600/ M^2**		
Ditto reveals n.e 150mm wide		200/LM	90/LM
Ditto less than 100mm wide		200/LM	60/LM
Painting on general wall surface	**600/ M^2**		
Ditto reveals 150mm		100/ LM	90/ LM
Project No. 2			
In-situ concrete (1:2:4-20mm aggregate)	**27,000/M^3**		
Ditto 50mm thick		1,000/M^2	1,350/ M^2
Cement/sand (1:4) rendering	**800/ M^2**		
Backing to risers; 150mm high		100/LM	120/LM
Screed bed to treads; 250mm wide		150/LM	200/LM
Block-work reveals n.e 100mm wide		120/LM	80/LM
Cement/sand (1:3) beds and backings	**600/ M^2**		
Screed backing; 100mm high		100/ LM	60/ LM
Project No. 3			
Aluminium roof covering	**3,000/ M^2**		
Ridge capping; girth 600mm		1,500/ LM	1,800/ LM
Vitrified ceramics floor tiles	**4,000/ M^2**		
Ditto skirting; 100mm		1,000/ LM	400/ LM
Project No. 4			
Emulsion paint on wall surface	**650/ M^2**		
Ditto reveals 250mm		330/ LM	163/ LM
25mm thick cement/sand (1:3) rendering	**750/ M^2**		
Ditto reveals n.e 150mm wide		250/ LM	113/ LM
Ditto less than 100mm wide		250/ LM	75/ LM
Unglazed ceramics floor tiles	**3,000/ M^2**		
Ditto skirting; 100mm		800/ LM	300/ LM
Project No. 5			
In-situ concrete (1:2:4-20mm aggregate)	**29,000/ M^3**		
Ditto 75mm thick blinding		2,500/ M^2	2,175/ M^2
Cement/sand (1:3) rendering	**750/ M^2**		
Block-work reveals n.e 150mm wide		200/ LM	113/ LM
Cement/sand (1:3) beds and backings	**800/ M^2**		
Screed backing; 100mm high		120/ LM	80/ LM
Project No. 6			
Aluminium roof covering	**3,200/ M^2**		
Ridge capping; girth 430mm		1,500/ LM	1,376/ LM
Eave angle; 150mm wide		1,500/ LM	480/ LM
Painting on general wall surface	**450/ M^2**		
Ditto reveals 150mm		120/ LM	68/ LM
Project No. 7			
Stone coated aluminium roof covering	**5,200/ M^2**		
Ridge capping; girth 430mm		1,750/ LM	2,236/ LM
Eave angle; 150mm wide		1,000/ LM	1,560/ LM
Cement/sand (1:4) rendering	**2,000/ M^2**		
Block-work reveals n.e 100mm wide		150/ LM	200/ LM
Cement/sand (1:3) beds and backings	**2,000/ M^2**		
Backing; 150mm high		150/ LM	300/ LM
Screed bed to treads; 250mm wide		200/ LM	500/ LM
Screed backing; 100mm high		150/ LM	200/ LM
Project No. 8			
Aluminium roofing tiles	**5,500/ M^2**		
Ridge capping; girth 600mm		1,800/LM	1,680/LM
Eave angle; 100mm wide		1,350/LM	280/LM
Cement/sand (1:4) rendering	**850/ M^2**		
Ditto reveals n.e 150mm wide		200/LM	90/LM
Non-slip terracotta floor tiles	**6,500/ M^2**		
Ditto skirting; 100mm		1,200/LM	650/LM
Painting on general wall surface	**550/ M^2**		
Ditto reveals 150mm		150/LM	83/LM

Table 5 to be continued…			
Project No. 9			
In-situ concrete (1:2:4-20mm aggregate)	**30,000/ M^3**		
Ditto 150mm thick		3,500/M^2	4,500/ M^2
Cement/sand (1:4) rendering	**800/ M^2**		
Backing to risers; 150mm high		100/ LM	120/ LM
Screed bed to treads; 250mm wide		150/ LM	200/ LM
Block-work reveals n.e 100mm wide		120/ LM	80/ LM
Cement/sand (1:3) beds and backings	**600/ M^2**		
Screed backing; 100mm high		100/LM	60/ LM
Project No. 10			
0.77 corrugated Aluminium roof covering	**3,200/ M^2**		
Ridge capping; girth 430mm		1,800/LM	1,680/LM
Eave angle; 150mm wide		1,350/LM	280/LM
25mm thick cement/sand (1:4) rendering	**600/ M^2**		
Ditto reveals n.e 150mm wide		200/LM	90/LM
Sawn formwork	**2,100/ M^2**		
Ditto n.e 150 high		500/LM	315/LM
Prepare and install POP ceiling	**4,500/ M^2**		
Cornices n.e 100mm thick		1,500/LM	450/LM
Painting on general wall surface	**600/ M^2**		
Ditto reveals 150mm		100/LM	90/LM
Project No. 11			
In-situ concrete (1:2:4-20mm aggregate)	**23,500/ M^3**		
Ditto 150mm thick		2,500/M^2	3,525/M^2
Cement/sand (1:4) rendering	**250/ M^2**		
Block-work reveals n.e 150mm wide		100/LM	38/LM
Cement/sand (1:3) beds and backings	**250/ M^2**		
Screed backing; 100mm high		100/LM	25/LM
Project No. 12			
25mm thick cement/sand (1:4) rendering	**600/ M^2**		
Ditto reveals n.e 150mm wide		200/LM	90/LM
Ditto less than 100mm wide		200/LM	60/LM
Painting on general wall surface	**600/ M^2**		
Ditto reveals 150mm		100/LM	90/LM
In-situ concrete (1:3:6-40mm aggregate)	**25,500**		
Ditto 50mm thick blinding		1,000/M^2	1,275/ M^2
Sawn formwork	**950/ M^2**		
Edges n.e 150mm high		250/LM	143/LM
Project No. 13			
Cement/sand (1:4) rendering	**800/ M^2**		
Backing to risers; 150mm high		100/LM	120/LM
Screed bed to treads; 250mm wide		150/LM	200/LM
Block-work reveals n.e 100mm wide		120/LM	80/LM
Cement/sand (1:3) beds and backings	**600/M^2**		
Screed backing; 100mm high		100/LM	60/LM
Emulsion paint on general wall surface	**420/M^2**		
Ditto surfaces n.e 150mm		150/LM	63/LM
Project No. 14			
0.77 corrugated Aluminium roof covering	**2,800/M^2**		
Ridge capping; girth 600mm		1,800/LM	1,680/LM
Eave angle; 100mm wide		1,350/LM	280/LM
25mm thick cement/sand (1:4) rendering	**600/M^2**		
Ditto reveals n.e 150mm wide		200/LM	90/LM
Painting on general wall surface	**600/M^2**		
Ditto reveals 150mm		100/LM	90/LM
Project No. 15			
Cement/sand (1:4) rendering	**800/M^2**		
Backing to risers; 150mm high		100/LM	120/LM
Screed bed to treads; 250mm wide		150/LM	200/LM
Block-work reveals n.e 100mm wide		120/LM	80/LM
Cement/sand (1:3) beds and backings	**600/M^2**		
Screed backing; 100mm high		100/LM	60/LM

Legend:
Project No. 1= Renovation of Existing CSO's Resident, Project No. 2= Construction of Outdoor Kitchen and Laundry, Project No. 3= Renovation of Existing Servant Quarters, Project No. 4= Renovation of Gate House and Generator House, Project No. 5= External Works at VIP 8, Project No. 6= Renovation of VIP 8, Project No. 7= Renovation of ADC's Residence, Project No.8 = Construction of 3-Bedroom Semi-detached, Project No. 9= Construction of Offices at VIP 8, Project No. 10=Renovation of Chief Detail's Residence, Project No. 11= Renovation of Secondary School, Project No. 12 = Construction of Shari 'a Court, Project No. 13= Construction of Primary School, Project No. 14= Construction of Primary School Staff Toilets, Project No. 15= Residential Development. n.e= Not Exceeding

Table 6 below shows the summation of incorrect bill transited rate, the corrected transited rate, the difference between incorrect and corrected transited rates and under-pricing as well as over-pricing in rates as a result of error in transition. The results from the table show that 68% of the total items of work scrutinised in the BOQs were priced above the corrected transition with 28%, while the remaining 32% of the items were less by 15%. This lack of

uniformity of rates was as a result of incorrect rate transition.

Table 6: Summation of Differences in Transited Rates

Projects	Incorrect Transited Rate (₦/M^2 or ₦/M)	Corrected Transited Rate (₦/M^2 or ₦/M)	Rate Difference (N/M2 or N/M)	Reduced Rate (₦/M^2 or ₦/M)	Excess Rate (₦/M^2 or ₦/M)
Project No. 1	1,800	1,680	120		120
	1,350	280	1,070		1,070
	200	90	110		110
	200	60	140		140
	100	90	10		10
Total	**3,650**	**2,200**	**1,450**	**0**	**1,450**
Project No. 2	1,000	1,350	-350	-350	
	100	120	-20	-20	
	150	200	-50	-50	
	120	80	40		
	100	60	40		
Total	**1,470**	**1,810**	**-340**	**-420**	
Project No. 3	1,500	1,800	-300	-300	
	1,000	400	600		600
	1,500	1,800	-300	-300	
Total	**4,000**	**4,000**	**0**	**-600**	**600**
Project No. 4	330	163	167		167
	250	113	137		137
	250	75	175		175
	800	300	500		500
Total	**1630**	**651**	**979**	**0**	**979**
Project No. 5	2,500	2,175	325		325
	200	113	87		87
	120	80	40		40
Total	**2,820**	**2,368**	**452**	**0**	**452**
Project No. 6	1,500	1,376	124		124
	1,500	480	1,020		1,020
	120	68	52		52
Total	**3,120**	**1,924**	**1,196**	**0**	**1,196**
Project No. 7	1,750	2,236	-486	-486	
	1,000	1,560	-560	-560	
	150	200	-50	-50	
	150	300	-150	-150	
	200	500	-300	-300	
	150	200	-50	-50	
Total	**3,400**	**4,996**	**-1,596**	**-1,596**	**0**
Project No. 8	1,800	1,680	120		120
	1,350	280	1,070		1,070
	200	90	110		110
	1,200	650	550		550
	150	83	67		67
Total	**4,700**	**2,783**	**1,917**	**0**	**1,917**
Project No. 9	3,500	4,500	-1,000	-1,000	
	100	120	-20	-20	
	150	200	-50	-50	
	120	80	40		40
	100	60	40		40
Total	**3,970**	**4,960**	**-990**	**-1,070**	**80**
Project No. 10	1,800	1,680	120		120
	1,350	280	1,070		1,070
	200	90	110		110
	500	315	185		185
	1,500	450	1,050		1,050
Total	**5,350**	**2,815**	**2,535**	**0**	**2,535**
Project No. 11	2,500	3,525	-1,025	-1,025	
	100	38	62		62
	100	25	75		75
	2,500	3,525	-1,025	-1,025	
Total	**5,200**	**7,113**	**-1,913**	**-2,050**	**137**
Project No. 12	200	90	110		110
	200	60	140		140
	100	90	10		10
	1,000	1,275	-275	-275	
	250	143	107		107
Total	**1750**	**1658**	**92**	**-275**	**367**

Table 6 to be continued…					
Project No. 13	100	120	-20	-20	
	150	200	-50	-50	
	120	80	40		40
	100	60	40		40
	150	63	87		87
Total	**620**	**523**	**97**	**-70**	**167**
Project No. 14	1,800	1,680	120		120
	1,350	280	1,070		1,070
	200	90	110		110
	100	90	10		10
Total	**3,450**	**2,140**	**1,310**	**0**	**1,310**
Project No. 15	100	120	-20	-20	
	150	200	-50	-50	
	120	80	40		40
	100	60	40		40
	100	120	-20	-20	
Total	**570**	**580**	**-10**	**-90**	**80**
Grand Total	**45,130**	**40,521**	**5,179**	**-6,171**	**11,350**

Legend:
Project No. 1= Renovation of Existing CSO's Resident, Project No. 2= Construction of Outdoor Kitchen and Laundry, Project No. 3= Renovation of Existing Servant Quarters, Project No. 4=Renovation of Gate House and Generator House, Project No. 5= External Works at VIP 8, Project No. 6= Renovation of VIP 8, Project No. 7= Renovation of ADC's Resident, Project No. 8= Construction of 3-Bedroom Semi-detached, Project No. 9= Construction of Offices at VIP 8, Project No. 10= Renovation of Chief Detail's Resident, Project No. 11= Renovation of Secondary School, Project No. 12 = Construction of Shari 'a Court, Project No. 13= Construction of Primary School, Project No. 14= Construction of Primary School Staff Toilets, Project No. 15= Residential Development.

In addition to transition errors, this research also identified some other forms of errors in BOQs. Table 7 below presents the other forms of errors as detected in the BOQs being scrutinised. In other words, same rate on identical item in different location, ignoring specifications during pricing, missing item of work and careless consideration of work method amongst others were detected in all the fifteen BOQs that were investigated.

Table 7: Other Forms of Errors Identified in the BOQs

Errors in BOQs	No. of BOQs Detected	Percentage
Same rate on identical item in different location	15	100
Ignoring specifications during pricing	15	100
Missing items of work	15	100
Careless consideration of work method	15	100
Insufficient information with descriptions of item of work	13	86
Disregarding risk evaluation associated with item of work	12	80
Including irrelevant preliminary items	11	73
Omission of entire element/section in BOQ	6	40

3.1 Discussion of Findings

From the above findings, it could be seen that the results from the questionnaire analysis revealed that both preparation and pricing errors in BOQs were found to be very severe with least of severity index of 0.777 (77.7%) and 0.743 (74.3%) respectively, from the results of BOQs' analysis; transitional errors were detected in BOQS for public building projects. Other forms of errors such as same rate on identical item in different location, ignoring specifications during pricing, missing item of work, and careless consideration of work method were detected as well.

These findings imply that the accuracy and reliability of initial cost estimates of public building project is in doubt. This might perhaps go a long way in affecting the confidence in using BOQs as a financial decision making document. This could equally affect the reputation of the quantity surveyors who are the professionals responsible for the preparation and pricing of BOQs.

4. CONCLUSION AND RECOMMENDATIONS

This research concludes that preparation and pricing errors in BOQs are severe which need to be addressed. Other

forms of errors are evident as well. It is recommended that quantity surveyors should improve in their skills in BOQ preparation. Architects and Services engineers should also improve in their skill in production of their design drawing. The Nigerian Institute of Quantity Surveyors (NIQS) in collaboration with the Nigerian government should improve revisit those laid down policies by ensuring only competent quantity surveyors are engage in any kind of construction projects.

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