

## **Evaluation of Causes of Errors in Bills of Quantities for Public Building Projects in Northeast Nigeria**

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### **Abstract**

Bill of quantity remained the major document that offers early cost estimates of construction projects especially in traditional form of contract. It is known for the role of ensuring the achievement of cost, time, and quality performances of construction projects. However, BOQs nowadays were found to encompass errors which if not addressed may affect its sustainability. This research evaluates the causes of errors in BOQs for public building projects in Northeast Nigeria. Quantitative research design was employed where in-depth literature reviews were conducted and questionnaires were used for 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. The relative severity index R.S.I evaluation of the data revealed that; Little/No knowledge of using computer software, Poor communication between quantity surveyor and the client, Inconsistent decision making by the client, Negligence of duties by QSs, and Incorrect dimensions in drawings were the five most severe causes of errors in BOQs. Moreover, the mean relative severity index was found to have influence of 66%. Quantity Surveyors should improve their computer literacy through attending workshops and trainings. Proper line of communications among project stakeholders should be established. Employers should inherit the culture of consistent decision making to avoid mixing up of actions. Finally, all team members involved in the production of BOQs should be up to their responsibilities and improve their services and quality of delivering responsibilities.

**Keywords:** *Bills of Quantities, Causes of Errors, Construction Industry, Public Building Projects, and Nigeria*

## Introduction

Bill of quantities (BOQ) is the main document that offers construction project investors with cost estimates. It is a significant element of contract documents which addresses the main key performance indicators (KPIs) of construction projects that is: cost, time and quality (Gunathilaka and Senevirathne, 2013). Hence, it is generally used in Nigeria and other commonwealth countries that engaged traditional procurement system for tendering purposes (Abdul Rashid, Mustapa and Abd Wahid, 2006; Jalam, Gambo and Dahiru, 2019).

As stated in Brook (2004), BOQ is primarily 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 interim valuation and variation purpose for progress payments.

Despite all the benefits of BOQs to contract practice, its applicability was reported to be waning in the United Kingdom's (UK) construction industry and perhaps it will vanish in the nearby future from the industry (Davis and Baccharini, 2004; Davis, Love and Baccharini, 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 maintain the use of BOQs in construction industry, the challenges encountered by this important document should be evaluated and addressed. The major problem of BOQ is the errors as reported by Dosumu and Iyagba, (2013). Moreover, Davis et al., (2009) opined that errors in BOQs results into conflict, and the risk of conflict that emanate from errors surpasses the benefits of the BOQs.

Also Ogbu and Ebimino (2020) revealed that errors in BOQs causes construction disputes. Error is defined as unintended deviations from correct and acceptable practice that are avoidable (Love, Edward and Irani 2008). Numerous researches were carried out on errors in BOQs in the global context and in Nigeria, e.g. Dosumu & Iyagba, (2013); Dosumu & Adenuga, (2013); Gunathilaka & Senevirathne, (2013); Juszczuk et al., (2014); Musa et al., (2011); and Ogbu & Ebimino, (2020).

However, the aforementioned researches did not evaluate the causes of errors in BOQ in the Nigeria's construction industry. Based on this background, this research is aimed at identifying and evaluating the causes of

errors in BOQs in Nigeria's construction industry.

### **Literature Review**

The research conducted by Gunathilaka and Senevirathne (2013) focused mainly on identifying errors in BOQ in the Sri Lankan construction industry. The study categorizes errors in BOQ into preparation errors and pricing errors. The identified errors from literature were not subjected to any form of analysis so as to evaluate even the frequency of their occurrence in the BOQs and neither does the research evaluate the causes of these errors.

Likewise, 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

analyze the errors been reviewed neither does it evaluate the causes of these errors. Juszczak, Kozik, Les'niak, Plebankiewicz, and Zima, (2014) also identified and classified errors in BOQs in Poland construction industry as formal errors and calculation errors. However, the research did not evaluate the causes of this form of errors.

In Nigeria's construction industry, researches were as well conducted on errors. 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. Table 1 presents the common causes of errors in construction documents.

**Table 1: Common Causes of Errors in Construction Document**

<b>CAUSES</b>	<b>Mean Scores</b>	<b>Rank</b>
<b>Bill of quantities</b>		
Lack of adequate documentation	2.74	1
Poor communication between the professional and the client	2.65	2
Negligence of the professional	2.52	3
<b>Drawings</b>		
Deficient or missing input information	3.14	1
Incomplete drawings	3.14	1
Insufficient Planning and design work	2.86	3
Design error	2.64	4
Negligence of the professional	2.57	5
Incorrect drawings	2.57	5
<b>Specification</b>		
Changes to specification	3.00	1
Incorrect drawings	2.86	2
Insufficient planning and design work	2.77	3
Designer's experience	2.73	4
<b>Form of contract</b>		
Poor cost control method	2.86	1
Availability of detailed information	2.86	1
Lack of adequate documentation	2.77	3
Long period between time of bidding/tendering and award	2.73	4
<b>Schedules</b>		
Availability of information	2.76	1
Professional's experience	2.73	2
Lack of adequate documentation	2.59	3
Lack of adequate computation	2.55	4

**Source:** Dosumu and Adenuga (2013)

The research however, focused broadly on errors in construction documents rather than BOQ as an element and didn't evaluate the causes of errors. Similarly, 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 categorized into three, viz: designer, management, and client sources.

**Table 2: Factors responsible for errors in construction documents**

FACTORS	CATEGORY	MEAN SCORE
Designer experience	Designer	4.36
Lack of design reviews, value engineering studies and constructability	Designer	4.21
Erratic decision making	Management	4.18
Lack of coordination between disciplines	Management	4.18
Lack of planning and inspection of project	Client	4.11
Design management experience	Designer	4.10
Lack of awareness of changes in standards	Designer	4.08
Communications	Designer	4.03
Unclear and ambiguous Requirements for design specifications	Client	4.00
Availability of information	Designer	4.00

**Source:** Dosumu and Iyagba (2013)

The research, like the investigation of Dosumu and Adenuga (2013) broadly covered construction document as a whole and did not evaluate the causes of errors in BOQs as a constituent.

Furthermore, Musa, Ibrahim and Ibrahim (2011) conducted a research on errors in

BOQs. 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 project BOQs were analyzed; The study however, did not evaluate the causes of the uncovered errors.

Again, the study conducted by 'Jalam et al., (2018) assessed the severity of errors found in BOQs, however it didn't evaluate the causes of the uncovered errors. Another two separate researches were conducted by 'Dosumu (2018) and Dosumu and Aigbavboa (2018). In the former, the research revealed that contract drawings contain the maximum number of errors in contract documents, followed by BOQs and then specifications.

Errors in contract documents were found to be moderately predominant. However, overmeasurement in BOQs was predominant in private, institutional and management procured projects. The research focused mainly on prevalence of errors in contract document. In the later, the study found that poor working drawing and lack of coordination among design documents are the main causes of variation. Errors in design calculations and wrong descriptions in specifications are prominent design errors that led to variation. As well, the research assessed the causes and effect of design errors.

Both the two researches however, did not focus on errors in BOQs and neither did they evaluate the causes of errors in BOQs. Moreover, Ogbu and Ebiminor (2020)

determined the sources of errors in BOQs and relationship between errors in BOQs and construction disputes, the research identified sources of errors from various literature and conceptualize that abolition of the sources of errors in BOQs will eventually diminish occurrence of errors in BOQs. The research however did not evaluate the causes of these errors in BOQs.

Additionally, Damtew and Enday (2019) investigated the causes of defects in building construction, the top causes of the defects in building construction in the study area according to the research were inability of consultant timely response and proper solutions; inaccessibility of experts for material management; delay of construction material delivery; scarcity of construction equipment; and deficiency of coordination between professionals during design. The research also did not focus on causes of errors in BOQs and did not evaluate the causes of errors in BOQs.

In a similar manner, Baiburin (2017); Mohammad and Darade (2017); Vondráčková, Voštová, and Nývlt (2017) worked on causes of errors and failures in building construction, their research covered investigation of causes of failure that occur during construction of building

projects. Their researches did not focus on uncovering the causes of errors in BOQs and didn't evaluate the causes of errors in BOQs as against the construction processes as a whole.

Again, the research carried out by Wong, Zhou and Chan (2018) revealed that human error during design of a project contribute to delay and rework which result to cost overrun, it stated that the cost of rework as a result of design errors could add up to the contract sum by 16% and contract duration by 50%. The research further examines the role of Building Information Modelling (BIM) in reducing the frequency of design errors which by implication minimize the amount of rework.

The research paid attention mainly to design errors and not errors in BOQs. Likewise, Choudhry, Gabriel, Khan and Azhar (2018); Fuadie, Rahmawati and Utomo (2017); Shamsudeen and Biodun (2016) investigated the factors, causes and effects of design errors on building construction projects. Their research did not cover errors in BOQs and did not evaluate the causes of errors in BOQs. Based on this literature, this research is aimed at identifying and evaluating the causes of errors in BOQs in Nigeria's construction industry.

### **Research Methodology**

This research employed Quantitative (exploratory and descriptive) research design. 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).

Questionnaires were used to collect data and analyzed by the use of descriptive statistics. The descriptive statistics includes; frequencies, percentages, and severity index. The results were presented in tables. One hundred and forty (140) questionnaires were distributed to respondents for this research, they include: contractors' quantity surveyors, consultants' quantity surveyors and public servant quantity surveyors practicing in Bauchi and Gombe States of Northeast Nigeria.

These two states were chosen because they accommodate up to 74% of the total population of quantity surveyors in the region (NIQS, 2017). These category of

professionals (Quantity Surveyors) 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 conclusions in this research. One hundred and twelve (112) of the questionnaires were returned. This gives a response rate of 80%. Seven out of the returned questionnaires were invalid. Hence one hundred and five (105) questionnaires were used in the analysis for this research, the questionnaires for this research were

adapted from various literature sources as in table 3. Prior to distribution of questionnaires for main data collection, this research as well administered thirty (30) questionnaires to respondents for pilot study as advised by Kothari and Garg (2014), whereby twenty six (26) were returned. The essence was to obtain inputs from respondents for questionnaire improvement. The result of the pilot study presented positive feedback on improving the questionnaire. The pilot survey questionnaire was subjected to reliability test.

**Table 3: Literature Sources of Causes of Errors in BOQ**

S/N	Causes of Errors	Source(s)
1.	Inadequate documentation	Dosumu and Adenuga (2013)
2.	Poor communication between the QS and the client	Dosumu and Adenuga (2013)
3.	Negligence of duties of the QS	Dosumu and Adenuga (2013)
4.	Inadequate site survey information	Zhang <i>et al.</i> (2016)
5.	Poor quality of design drawing	Dosumu and Adenuga (2013)
6.	Unclear depth of foundation of proposed building in drawing	Zhang <i>et al.</i> (2016)
7.	Incompetency of the QS	Dosumu and Adenuga (2013)
8.	Inconsistent decision making by the client	Dosumu and Adenuga (2013)
9.	Poor design assumptions	Dosumu and Iyagba (2013)
10.	Inadequate/Unclear design specifications	Dosumu and Iyagba (2013)
11.	Insufficient details in drawings	Dosumu and Adenuga (2013)
12.	Insufficient fund to create quality document	Dosumu and Iyagba (2013)
13.	Inadequate time for preparing BOQ	Dosumu and Iyagba (2013)
14.	Violation of the provision of BESMM	Musa <i>et al.</i> (2011)
15.	Vested interests	Questionnaire Pre-test (2021)
16.	Inadequate cost information	Questionnaire Pre-test (2021)
17.	Little/No knowledge of using computer software	Questionnaire Pre-test (2021)
18.	Incorrect dimensions in drawings	Questionnaire Pre-test (2021)
19.	Handling too many projects by professionals	Questionnaire Pre-test (2021)

**Source:** Field survey 2021



According to Hinton et al. (2014) the alpha score above 0.75 is generally regarded as highly reliable, from 0.50 to 0.75 is generally accepted as moderately reliable, while score that is less than 0.50 is generally taken as a scale of low reliable.

Reliability test was necessary, to identify variables that need to be deleted in order to

improve alpha value and ensure that constructs achieve reliable alpha (Pallant, 2011). This was to indicate areas that need improvement in pilot survey questionnaire before going to field. Results indicated that a reliable Cronbach's alpha of more than 0.7 was achieved. Table 4 shows the Cronbach's alpha score and the corresponding grade of the construct.

**Table 4: Cronbach's Alpha Score and Grade**

<b>Questionnaire Constructs</b>	<b>No. of Items</b>	<b>Cronbach's alpha Score</b>	<b>Reliability Grade</b>
Causes of Errors	19	0.79	High

This research conducted internal consistency test on the questionnaire to test its reliability using Cronbach's coefficient alpha. Cronbach's alpha which is the most extensively used reliability measurement of questionnaire, provides an internal consistency of a scale or test which ranges from 0 for completely unreliable test to 1 for

completely reliable test (Hinton et al., 2014; Tavakol and Dennick, 2011). the study's construct 'causes of errors' were re-tested to compare the value of Cronbach's alpha with that of the pilot survey. This research adopted a value of 0.70 Cronbach's alpha score as a yardstick for measurement of reliability of the construct, see table 5.

**Table 5: Cronbach's alpha score and grade**

<b>Study's Constructs</b>	<b>No. of Items</b>	<b>Pilot data Cronbach's <math>\alpha</math> Score</b>	<b>Pilot data Error Variance</b>	<b>Field data Cronbach's <math>\alpha</math> Score</b>	<b>Field data Error Variance</b>	<b>Field data Reliability Grade</b>
Causes of Errors	19	0.79	0.38	0.91	0.18	High

From table 5, it is clear that the reliability of the measured construct in this research gained tremendous improvement. The Cronbach's alpha improves from 0.79 in the pilot data to 0.91 in the field data. On the other hand, the percentage of error variance of the construct has reduced drastically from 38% to 18%. This improvement came as a result of taking into consideration all corrections and observation obtained during questionnaire pretest and pilot study.

**Results**

Table 6 show the general information of the respondents. From the table, 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 6: General Information of Respondents**

<b>Category of Professional Quantity Surveyors</b>	<b>Frequency</b>	<b>Percentage</b>
Consultant QSs	20	19.0
Contractors' QSs	32	30.5
Public Servant QSs	53	50.5
<b>Total</b>	<b>105</b>	<b>100</b>
<b>Membership Grade of Quantity Surveyors</b>	<b>Frequency</b>	<b>Percentage</b>
Technician	3	2.9
Probationer	47	44.8
Corporate	55	51.4
Fellow	1	0.9
<b>Total</b>	<b>105</b>	<b>100</b>
<b>Academic Qualifications</b>	<b>Frequency</b>	<b>Percentage</b>
HND	25	23.8
B. Tech / B.Sc	54	51.4
M. Tech / M. Sc	22	21.0
PhD	4	3.8
<b>Total</b>	<b>105</b>	<b>100</b>

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 7, the mean working experience (MWE) of the respondents was calculated to be 11 years. This shows that the respondents have substantial working experience and their opinion could be reliable. The following formula was equally used.

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

**Table 7: Working Experience of the Respondents**

<b>Working Experience</b>	<b>Mid Value (X)</b>	<b>Frequency (F)</b>	<b>Percentage (%)</b>	<b>FX</b>
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
<b>Total</b>		<b>105</b>	<b>100</b>	<b>1,146</b>

The evaluation of the causes of errors was done using three indices namely; Relevancy index, severity index and relative severity index with 1=Not Relevant, 2=Less Relevant, 3=Undecided, 4=Relevant, and 5=Very Relevant (for relevancy index) and

1=Not Severe, 2=Less Severe, 3=Undecided, 4=Severe, 5=Very Severe (for severity index). The table below shows the frequencies for each cause in relation to relevancy index.

**Table 8: Frequencies for the Relevancy of the Causes of Errors**

S/N	Causes of Errors	1	2	3	4	5
1	Poor quality of design drawings	0	0	7	35	63
2	Incorrect dimensions in drawings	0	0	0	25	80
3	Incompetency of the QS	0	0	0	61	44
4	Violation of the provision of BESMM	6	0	6	32	61
5	Poor communication between QS and the client	0	0	6	22	77
6	Inconsistent decision making by the client	0	6	0	22	77
7	Little/No knowledge of using computer soft-wares	0	10	0	6	89
8	Vested interests	16	26	41	22	0
9	Insufficient fund to create quality document	16	16	32	41	0
10	Inadequate time for preparing BOQ	0	0	6	41	58
11	Negligence of duties of the QS	0	0	13	22	70
12	Poor design assumptions	0	35	47	23	0
13	Handling too many projects by professionals	4	6	22	32	41
14	Inadequate site survey information	0	0	19	64	22
15	Inadequate cost information	0	0	41	47	17
16	Unclear depth of foundation of the proposed building in drawings	17	25	13	44	6
17	Inadequate documentations	0	3	19	64	19
18	Insufficient details in drawings	0	0	0	58	47
19	Inadequate/unclear design specifications	2	0	55	32	16

The relevancy index is calculated using formula:  $R.I = \sum_{i=1}^5 (a_i x n_i) / 5N$

i.e  $R.I = (a_1 x n_1) / (5xN) + (a_2 x n_2) / (5xN) + (a_3 x n_3) / (5xN) + (a_4 x n_4) / (5xN) + (a_5 x n_5) / (5xN)$

Where,

a: weight assigned (constant);

n: frequency of each response;

N: total number of responses.

Similarly, the frequencies for the severity of the causes of errors were given in table 9.

**Table 9: Frequencies for Severity of the Causes of Errors**

S/N	Causes of Errors	1	2	3	4	5
1	Poor quality of design drawings	0	0	3	55	47
2	Incorrect dimensions in drawings	0	6	6	28	65
3	Incompetency of the QS	0	0	28	22	55
4	Violation of the provision of BESMM	0	0	10	38	57
5	Poor communication between QS and the client	0	0	11	11	83
6	Inconsistent decision making by the client	0	3	3	19	80
7	Little/No knowledge of using computer soft-wares	3	0	3	7	92
8	Vested interests	6	13	38	32	16
9	Insufficient fund to create quality document	17	19	47	22	0
10	Inadequate time for preparing BOQ	0	0	3	32	70
11	Negligence of duties of the QS	0	0	3	22	80
12	Poor design assumptions	8	22	50	25	0
13	Handling too many projects by professionals	0	3	25	30	47
14	Inadequate site survey information	0	0	15	35	55
15	Inadequate cost information	3	6	22	55	19
16	Unclear depth of foundation of the proposed building in drawings	6	47	9	40	3
17	Inadequate documentations	0	3	12	58	32
18	Insufficient details in drawings	0	0	14	27	64
19	Inadequate/unclear design specifications	17	38	28	22	0

The severity index is as well calculated using formula:  $S.I = \sum_{i=1}^5 (a_i x n_i) / 5N$

i.e  $S.I = (a_1 x n_1) / (5xN) + (a_2 x n_2) / (5xN) + (a_3 x n_3) / (5xN) + (a_4 x n_4) / (5xN) + (a_5 x n_5) / (5xN)$

Where,

a: weight assigned (constant);

n: frequency of each response;

N: total number of responses.

The relative severity index expresses the overview of the causes on both relevancy and severity indices as presented in table 10. It is calculated using the formula:

$R.S.I = R.I \times S.I$

**Table 10: Relative Severity Index (R.S.I)**

S/N	Causes of Errors	Relevancy Index	Severity Index	Relative Severity Index	Rank
1	Poor quality of design drawings	0.9067	0.8838	0.8013	7
2	Incorrect dimensions in drawings	0.9525	0.8895	0.8472	5
3	Incompetency of the QS	0.8838	0.8514	0.7525	10
4	Violation of the provision of BESMM	0.8705	0.8895	0.7743	9
5	Poor communication between QS and the client	0.9352	0.9371	0.8765	2
6	Inconsistent decision making by the client	0.9238	0.9352	0.8640	3
7	Little/No knowledge of using computer softwares	0.9314	0.9524	0.8871	1
8	Vested interests	0.5314	0.6743	0.3583	16
9	Insufficient fund to create quality document	0.5867	0.5410	0.3174	19
10	Inadequate time for preparing BOQ	0.8990	0.9276	0.8340	6
11	Negligence of duties of the QS	0.9086	0.9467	0.8601	4
12	Poor design assumptions	0.5771	0.5752	0.3320	18
13	Handling too many projects by professionals	0.7905	0.8305	0.6565	12
14	Inadequate site survey information	0.8057	0.8762	0.7060	11
15	Inadequate cost information	0.7543	0.7543	0.5689	14
16	Unclear depth of foundation of the proposed building in drawings	0.5943	0.5752	0.3419	17
17	Inadequate documentations	0.7886	0.8367	0.6519	13
18	Insufficient details in drawings	0.8895	0.8952	0.7963	8
19	Inadequate/unclear design specifications	0.7143	0.5048	0.3605	15

**Discussion**

Table 10 shows ranking of the causes according to their severity in causing errors in BOQs. The five most severe causes of errors are; Little/No knowledge of using computer software, Poor communication

between quantity surveyor and the client, Inconsistent decision making by the client, Negligence of duties of the QS, and Incorrect dimensions in drawings. The mean relative severity index is found to be 0.66. This finding is in agreement with that of

Dosumu and Adenuga (2013) whereby poor communication between QS and client, negligence of professionals, incorrect drawings, inadequate drawing details were among the causes of errors in contract document.

It also agree with the finding of Dosumu and Iyagba (2013) in which these causes were categorized according to parties involved in construction projects. Furthermore, this results also concurred that of Musa et al. (2011), as violation of the provision of BESMM was also discovered as a cause of error in BOQs.

However, Dosumu and Iyagba (2013) as well as Dosumu and Adenuga (2013) did not limit their studies to errors in BOQs, but investigated causes of errors in construction documents as a whole, moreover, their respondents constitutes of Builders, Architects, Engineers, and Quantity surveyors; and Consultants and Contractors respectively while this study focused on causes of errors in BOQs alone and only quantity surveyors responded to the research.

The study of Musa et al. (2011) aimed at identifying flaws in BOQs in relation to project cost estimates through document

analysis, on the other hand, this study aimed at evaluating causes of error in BOQs and employed questionnaire method.

### **Conclusion**

This finding implies that the use of BOQs in traditional procurement system is facing great challenges. The inability of quantity surveyors to be conversant with various BOQ preparation softwares, lack of proper communication between professionals and the employer within the construction industry, variations in making crucial decision by relevant stakeholders for a given project, incessant negligent of responsibilities of the quantity surveyors and all concern professionals during preparation of BOQs, and incorporating wrong dimensions for drawings by Architects among other reasons remained the major challenges that results to the drawback of BOQs, and these challenge may diminish its usage as in the opinion of Davis and Baccarini, (2004) and Davis et al., (2009) that applicability of BOQs is beginning to decline.

The result also implies that these causes of errors have the ability of causing errors in BOQs with up to 66%, this effect size is so large and need urgent attention from relevant stakeholders in the construction industry.

### Recommendations

Quantity Surveyors should improve their computer literacy through attending workshops and trainings, local software producers should be encouraged to be producing at cheaper rate, this would give more QSs access to computer software and improve in their professional undertakings. Proper line of communications among project stakeholders should be established, this will ensure doing right things at the right time by the right professional.

Employers should inherit the culture of consistent decision making to avoid mixing up of actions. Finally, all team members involved in the production of BOQs should be up to their responsibilities and improve their services and quality of delivering responsibilities.

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