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EVALUATION OF THE ELEMENTS INFLUENCING QUANTITY SURVEYORS' USE OF BESMM4 IN THE NIGERIAN CONSTRUCTION SECTOR.

by

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ABSTRACT

The new BESMM4 is required by the development of new construction methods as a result of current technology, the requirement to provide accurate cost information and reduce construction costs, and the management of hazards related to construction operations. The purpose of this study is to determine the elements that make up the new BESMM4 rules. 80 responses—or 65%—of the 135 total—were received after the structured questionnaire was given to the respondents who are quantity surveyors in the corporate organization, government organization and consultant firms in Abuja. Using quantitative analysis, the data was examined with the goal of identifying the elements that make up the new BESMM4 regulations. However, the findings of this study suggest that, among other things, the lack of a clearly defined scope of work, failure to take into account the local climate, the lack of a health and safety advisor, first aid facilities, and cost planning are among the best factors that make up the new BESMM4 rules. The use of BESMM should be a part of every organization to help with the introduction of new techniques like value management, and organizations. Nigerian building industry should review their techniques as the basis for valuing work for the purpose of making payments. It also suggested that there be adequate awareness of the role and importance of BESMM to all Nigerian building industry (mobilization payment, interim payment, final account payment).

Introduction

The Building and Engineering Standardized Method of Measurement (BESMM) fourth edition provides the fundamental standards for precise measurement and description of building, engineering, and industrial activities with the intention of achieving a tender price. The development of new building methods as a result of current technology, the requirement to provide accurate cost information and lower construction costs, and the management of risks connected with construction works all make the new BESMM4 necessary (Timothy and Olaleke, 2016). In order to help the document accomplish its goals more successfully, it will be reviewed, corrected for ambiguities, textual or contextual errors, duplications from earlier editions, and given any new rules that are thought appropriate. The article provided an overview of the measurement and description standards for construction projects and provided an example of how to measure and charge for construction projects using BESMM4. According to the project's findings, the new BESMM4 allows for local content to improve cost management of building projects and complies with similar international standards and best practices (Akinseinde, 2017).

Standard Method of Measurement for Building and Engineering, Second Edition, also known as BESMM 2, was published with the addition of a coding system for references. The first edition of SMM, also known as SMMBWS (Measurement of Building Works and Services Using a Standard Method), was published in 1988 and was revised in 1996 as first impression in 2002. Standard Method of Measurement for Building and Engineering, Third Edition, or BESMM 3, was released in 2008 and includes a coding system for use with AutoCAD and QS software (Akinseinde, 2017). BESMM 3 was a revision of BESMM 2. BESMM 4 is a revision of BESMM 3 that was released in 2015 for take-off in January 2016. Its goal was to correct all context, including typographical errors, insertions, and omissions, remove extraneous features, rearrange contexts and features, and incorporate any additional rules deemed necessary in order to make the document more effective. BESMM 4 was created in accordance with the concepts of comparable worldwide standard techniques of measurement

and best practices (such as NRM2, CESMM 4 and ISMM). Include all of the part 2 (civil and industrial engineering) job items without referencing part 1 (building and the likes). As a result, the study's goal is to pinpoint the variables that make up the new BESMM4 regulations (Dosumu & Aigbavboa, 2017). Consequently, previous studies has identify the factors affecting the use of BESSMM 4 by Quantity Surveyors in Nigeria construction industry which are; Misinterpretation of BESMM Rules, BESMM's too complicated design, Deficiency of focus in BESMM on significant aspects which influence price, and Misperception about the classification structure of BESMM. However, this study aim to determine the elements that make up the new BESMM4 rules.

Approach to Measurement (In Nigeria).

In the construction industry, it is difficult to establish a contractual relationship without the proper papers. Despite the fact that this is generally accepted to be the case, little research has been done to examine the connection among documentation errors as well as the frequently occurring antagonistic interactions between parties to a construction contract (Meng, 2012; Pesämaa, Eriksson, & Hair, 2009). Nevertheless, a number of studies have looked at documentation issues in construction projects (Dosumu & Aigbavboa, 2017; Dosumu, 2018; Dosumu and Adenuga, 2013).

Measurement of Building Works and Services Using a Standard Method (SMMBWS) was the name of the first version of SMM, which was published in 1988. It was amended in 1996 and first used in 2002. With the addition of a coding system for references, BESMM 2, also known as Measurement of Building Works and Services Using a Standard Method, second edition, was produced. The Measurement of Building Works and Services Using a Standard Method, Third Edition, was published in 2008 and includes a coding system for use with AutoCAD and QS software. BESMM 3 was a revision of BESMM 2. BESMM 4 is a revision of BESMM 3 that was released in 2015 for take-off in January 2016. Its goal is to correct all typographical, insertional, and omissional errors in the text and context, as well as to remove unnecessary features, rearrange contexts, and incorporate any additional rules deemed necessary in order to make the document more effective. BESMM 4 was established in keeping with the concepts of comparable worldwide standard techniques of measurement and best practices (such as NRM2, CESMM 4 and ISMM). Without making any cross references to part 1 (building and similar topics), I combine all the job items in part 2 (civil and industrial engineering) (Akinseinde, 2017).

The Reason we Measure

The primary reason we measure is to create Bills of Quantities (BoQ). A bill of quantities is a contract document that completely describes and precisely depicts the amount and caliber of work to be carried out, according to BESMM4 (2015).

To help contractors create accurate and timely bids, the BOQ principally offers a coordinated list of products, together with their identifying description and quantity. Basis for work's value for payment purposes (Mobilization payment, interim payment, final account payment). Basis for valuing various works, etc.

Considering these factors, BESMM tries to:

i. Offer standardized instructions for measuring architectural and engineering works in order to create bill of quantities and achieve a high level of accuracy in measured job.
ii. To aid in the precise creation and analysis of tenders with a uniformly measured BoQ.
iii. To establish a foundation for project cost/value control in accordance with the contract terms in use, establishing all essential provisions in the job descriptions and numbers.
iv. To offer a single, consistent document that promotes best practices for measuring construction and engineering tasks.
v. To offer advice on how to effectively convey information about the amount of work that needs to be done and its description.

The Standard Measurement Method is the most significant standardization in the modern building industry (SMM). It provides a conceptual framework for measuring ideas that can be used to determine the volume of both the design drawing and the final product. As a result, it provides the same measurable indicators to all entities which will be able to minimize any misinterpretation or error between owners and contractors in the Indonesian building industry (Hilman & Arditya, 2016). (2015). Indonesia does not, however,

currently have a standardized system of measurement. Therefore, this study has two objectives, namely (i) to determine the benefits of applying a Indonesian measuring unit standard, and (ii) to determine the difficulties in doing so in the Indonesian construction sector. Field observations and a thorough review of the literature from other nations that have previously implemented this Standardized Measurement Procedure were the research methods employed for this report. The findings are displayed in tables, from which we can draw the conclusion that using this Standardized Measurement Procedure can help the Indonesian building manufacturing advance (Hilman & Arditya, 2004). (2015).

Objections to BESMMs

There are others that criticize BESMM. They have drawn criticism for their unnecessarily high level of complexity, disregard for construction procedure, inability to adhere to price and stakeholder standards, and insufficient manufacturing consultation throughout their development stage (Goh and Chu, 2002). The information supplied in BQs developed in accordance with BESMM did not satisfy specialized subcontractors in the UK, according to Morledge and King's (2005) research. The experts' worries suggested that the relevant BQ item description was insufficient and that the measured items were unable to accurately reflect true costs. Foster (2005) clarified this argument by pointing out that the actual schedule of work for these installations is out of sync with the measuring requirements for electrical and mechanical activities. As an illustration of how to demonstrate this concept, consider how the laws of measurement (British BESMM clause Y61.19 and BESMM5 clause T19) require the measurements of a lighting system as a composite item, which comprises the light fitting together with its cables and carrying wires (containment). In reality, these represent three different activities which happen at various project stages (Akinseinde, 2017). In order to adhere to the guidelines of progressive reimbursement to the electrical subcontractor through intermediate evaluations of a project's progress, the different illumination elements would have to be evaluated separately (or the Advancement payments may require the breakdown of the composite price.). However, most SMMs fail to adhere to this guideline, indicating that their priorities are significantly skewed toward procurement rather than administrative cost containment (Gabriel et al., 2012).

According to a BCIS/RICS survey from 2004, 31% of estimators said there were instances where the BESMM did not correspond to their estimating (price) norms, while 15% of contractors routinely modified (customized) the BESMM to suit their own goals. The BESMM enhancements were only rejected by 10 percent of the consultant, 4 percent of the contractors, and 3percent of the clients. In general, survey participants' remarks suggested a lack of confidence in BESMM's fitness for its intended use. The survey's findings of dissatisfaction included:

i. Misinterpretation of the BESMM Rules, which frequently causes misunderstandings between the parties to a contract. Rule simplification for measurements was proposed.
ii. The BESMM's needless complexity.
iii. BESMM doesn't place enough emphasis on crucial elements that affect pricing, including building process or regional estimate practices.
iv. Uncertainty over the BESMM categorization framework, which respondents believed to be deficient. They thought that the BESMM common layout of works sections was inferior and that classification according to trade sections was preferable. This complexity is significant because it makes it challenging to locate measurement procedures in BESMM for certain tasks or groupings of tasks.

Jaggar et al. (2001) criticized BESMM for failing to pay sufficient attention to the contractors' demands on adherence to construction protocols. This problem is not unique to SMM7, as Wood as well as Kenley (2004) found comparable problems with Australian BESMM. They noted that none of the participants, including quantity surveyors, construction companies, and subcontractors, did feel they have been properly contacted or represented when the Australian Standard Measurement Method of Building Works was developed. The BESMM is hence less useful in the Australian building industry. A simpler BESMM devoid of pointless detail is required, according to Mills et al. (2004), who recommended the South African BESMM to a AIQS as well as RICS as a model for continued development for their respective BESMMs. The South African System of Measurement has been simplified in an effort to

win over the diverse building industry players (Hilman & Arditya, 2016). (2015). BESMMs are criticized on many different fronts, including technology challenges related to construction methods and the streamlining of the measurement system, legal issues (i.e., misunderstandings and complexities that could lead to disputes and litigation), and cultural problems context so as to make stakeholder consultation throughout order to understand and integrate sound ancient traditions along with promote the use of a developed SMM. The parameters for a study of the essential elements of a typical BESMM were set by these criticisms.

Regulations for New Measurements

The NRM suite comprises of 3 volumes that were developed using similar language and a basic structure to UK practice, but with varying levels of complexity and detail to ensure simplicity of use. They are a tool that enables data to be collected and measured in a regular manner but do not give cost data.

i. NRM1 - Ordering of Cost Estimation and Cost Planning for Capital Construction Works (2009 and 2012) - provides a framework for creating cost projections and cost plans before entering into a contract. Customers and industry experts in the construction industry are expected to understand the advantages of clear and transparent cost data, which should make it feasible to compile a database of historical cost information.
ii. NRM2, or Detailed Measurement for Building Works (2012), uses comprehensive breakdowns based on unit rates to price Bills of Quantities. It completely replaces SMM7. Instructions for making a bill of amounts, specific instructions are provided, along with extensive coding and work breakdown structures.
iii. Structured to match NRM1, to aid with life cycle costs, NRM3 - Order of Cost SSAppraising and Cost Design for Facilities Maintenance Services (2014) - is used to account for the building's operating and maintenance costs. Due to the global push for sustainability and government expectations that building owners shoulder greater responsibility, this will become more significant. Predicted expenses within a recognized format are required since it is believed that buildings cost three times as much to operate and maintain as they did to build.

The RICS claims that NRM's application of a standard approach "shall allow every surveyor to measure all form of construction from every era." To promote the adoption of the NRM standards by practitioners, PDFs are freely available to RICS members.

Prior research has identify the factors affecting the use of BESSMM 4, the evaluation of the factors affecting the use of BESSMM 4 by Maritzet al., (2005), and determination of the factors affecting the use of BESSMM 4 by Quantity Surveyors in construction industry by Nani et al., (2008). However, no research has determine the elements that make up the new BESMM4 rules by Quantity Surveyors in Nigeria construction industry. According to Oforeh as well as Alufohai (2017), selection of BESMM4 for any sensitive area of investment in Nigeria deserves careful attention as a wrong selection lead to poor project performance in all its ramifications. Consequently, BESMM4 need a new rule of measurement in compliances with the royal institute of chattered surveyor to avoid poor project performance in all its ramifications. Therefore, this studies intent to determine the elements that make up the new BESMM4 rules by Quantity Surveyors in Nigeria construction industry.

Methodology

This study uses quantitative method, the purpose of quantitative method involves the quantitative data collection procedures to explore phenomena which was explore though professional consultants, including an architect, a builder, a quantity surveyor, an engineer, a project manager, a project developer, a client, and a contracting company in the corporate organization, government organization and consultant firms in Abuja. This research has used the quantitative to identify the variables influencing the use of besmm4 as identified from literature. The literature review must be used to create questionnaire items according to Kumar's definition from 2005. The professional background respondents to the questionnaires identified their understanding of the variables influencing the use of besmm4. 135 questionnaire was distributed randomly to

professional consultants for investigation, 80 was filled and return which is 65% of the total. The focus on the professional consultants is based on the premised that professional consultants play a crucial part in construction industry. With a view to collecting data, key informants were chosen using a purposive sample technique. The benefit of being able to focus the selection of informants to a particular group or groups of persons who can supply the needed information on the issue was the main factor in the adoption of this sampling technique. One is mindful of the inherent limits of this sample size while selecting it, especially with regard to generalizing the results. The survey's findings were thus primarily used to support the analysis and support the state of affairs in the studied area. The used of SPSS analysis package to identify the variables influencing the use of besmm4 by quantity surveyors in Nigeria's construction industry. Many different types of researchers use the statistical package for the social sciences, or SPSS, for advanced statistical data analysis (Andrew Garth, 2008).

Findings

Table: 1 Data Presentation: Demonstrates the Elements that Make up the New BESMM4 Regulations.

Factors	**Frequencies**				
	5	**4**	**3**	**2**	**1**
Cost planning	27	33	15	5	0
Post contract administration	30	22	23	0	5
Coding and work description errors	18	32	20	5	5
ambiguous or undefinable work scope	40	23	17	0	0
not taking the local climate into account when preparing bills	39	30	10	1	0
not taking the local climate into account preparation process	18	32	10	10	10
Low budgets for project	16	24	20	10	10
Worker's negligence	30	20	14	16	0
Health and safety adviser	22	26	30	0	0
First aid facilities	23	37	11	9	10

Source: Questionnaire Administered (2021)

TABLE 2: Demonstrates the Elements that make up the new BESMM4 Regulations.

Factors	**Frequencies**					**Total**	**Mean**	**Ranl**
	5	**4**	**3**	**2**	**1**			
Cost planning	135	132	45	10	0	322	4.03	5th
Post contract administration	150	88	69	0	5	312	3.40	6th
Coding and work description errors	90	128	60	10	5	293	3.66	8th
ambiguous or undefinable work scope	200	98	51	0	0	346	4.33	2st
Not considering the local climate condition when preparing bills	195	120	30	2	0	347	4.34	1nd
Owner changing design criteria late in bills preparation process	90	128	30	20	10	278	3.48	9th
Low budgets for project	80	96	60	20	10	266	3.33	10th
Worker's negligence	150	80	42	32	0	304	3.80	7th

Health and safety adviser	110	104	90	0	0	3.4	3.80	3th
First aid facilities	115	148	33	18	10	324	4.05	4nd

Source: Questionnaire Administered (2021)

Discussion

According to the aforementioned table, cost planning is one of the aspects that quantity surveyors in Nigerian building industry considered when forming the new rule of BESSMM4. 3.08% of respondents said "No," while 90.63% said "Yes," to the question of post-contractual management. 18.31% of respondents said "Yes," while "No," "Error in coding and description of works," and 81.696% were undecided. Undefined or unclear scope of work received 77.85% of the respondents' yes votes compared to 23.15% of the no votes. A high return on investment received 45.38% of the respondents' yes votes and 54.62% of the no votes. Answers from 97.77% of respondents were affirmative, while responses from 2.23% of respondents were negative. 7.69% of respondents chose No, compared to 92.31% who selected Yes. Owner altering design standards unpaid bills 9.23% of respondents chose no, compared to 90.77% who chose yes. low project budgets 39.23% of respondents chose no, compared to 60.77% who selected yes. employee negligence 49.23% of respondents chose no, while 50.77% chose yes. advisor for health and safety A total of 40.77% of respondents said yes, while 59.23% said no. First aid stations 66.23% of respondents chose no, compared to 33.77% who chose yes. According to this study, over 93.59% of respondents approved of the elements that make up the new BESSMM4 rule put forth by quantity surveyors in Nigerian building industry. However, the findings of this study suggest that the lack of a clearly defined or specified scope of work, disregard for the local climate, health and safety advisor, first aid facilities, and cost planning are among the best aspects that make up new BESMM4 regulations.

Conclusion

Finding the elements that make up the new role of BESMM 4 played by quantity surveyors in Nigerian building industry is the main goal of the study. It was evident from the literature analysis on BESMM4 and the construction sector that BESMM4 is focused on increasing worker productivity. Its primary goal is to help clients receive the maximum possible level of productivity from a construction project. The fundamental engineering standard technique of measurement attempts to define productivity for the company and guarantees that it is consistent with the productive system. This aids in ensuring that organizations have a basic understanding of the concepts or processes needed to carry out their projects.

Recommendation

The findings and results lead to the following recommendations:

i. There is a need for sufficient education on the value and relevance of BESMM in the Nigerian building industry.
ii. Every firm should use BESMM to facilitate the adoption of new methodologies like value management.
iii Organizations need to evaluate their methods for valuing work in order to pay employees (Mobilization payment, interim payment, final account payment).
iv. More BESMM4 training seminars and workshops are required in order to inform participants in the construction industry about the concepts, principles, and uniform guidance for measuring building and engineering works in order to create bill of quantities and achieve a high level of accuracy in measured work.

The government must offer instructions on how to effectively communicate information about the volume of work to be done and its description.

REFERENCES

Agyapong A.D. (2014), New opportunities for Quantity Surveyors in Nigerian business Environment, *The 22nd Biennial Conference\General meeting of the Nigerian institute of Quantity Surveyors, Calabar, Nigeria.*

Adagba A.K and Shakpande M.A (2017): Understanding steps in Quantity Surveying Procedure. *Kaduna: Shanshanpublishers ltd.*

Anaele V.E (2012), Techniques of BESMM in the Nigerian Construction Industry, *unpublished Bsc Thesis, Department of Quantity Surveying, Ahmadu Bello University Zaria.*

Andrew Garth (2008), Analysing data using SPSS (A practical guide for those unfortunate enough to have to actually do it.) *Sheffield Hallam University,*

Roy & Stuart (2006), "Imprinting: Toward A Multilevel Theory". Academy of Management Annals: *193–243.SSRN 2198954* .

Akinseinde Olubola Atanda (2017), Practical Demonstration of the use of BESMM4 in Measurement and Billing of Building Works. 2-Day National Seminar on the Application of Besmm4 to Risk Management in Construction Projects. *The Nigerian Institute of Quantity Surveyors (NIQS) Ondo State Chapter. Held at T. Idibiye Auditorium, FUTA on 30th – 31st August, 2017*.

Carlos B. & Soibelman D. (2003): Managing Projects to reduce delivery schedule failures" International conference on Building Education and Research (BEAR). Retrieved on 9thDecember 2014 from the website: http://www.irbnet.de/daten/iconda/CIB11639.pdf

Dosumu D. & Aigbavboa, (2017), The role of quantity surveyor in BESMM, 4TH biennial conference of quantity surveying in the 21st century – Agenda for the future. Nigerian Institute of Quantity Surveyors.

Finch L.A (2012), Principles of forecasting: a handbook for researchers and practitioners. Kluwer Academic Publishers: Norwell, Massachusetts

Foster F.A (2005), Basic Engineering Standard Method Of Measurement Dictionary". PM Hut. Retrieved November 16,2009.

Gabriel N., Peter E., Theophilus A., and Peter A., (2012), Customisation and Desirable Characteristics of a Standard Method of Measurement for Building Works in Ghana. Australasian Journal of Construction Economics and Building. 8(2):30. DOI: 10.5130/ajceb.v8i2.3004

Gelder A.B (2013), BESMM practice in confidence and satisfaction in construction: international conference British University

George G. (2017), Assessing client's confidence and satisfaction in construction professionals in Nigeria'. International Conference on Construction Culture, Innovation and Management, British University, Dubai, United Arab Emirate, 436 - 445.

Nani et al., (2008), Twenty-one sources of error and bias in BESMM handling in project approach l." Transport Policy, 5, pp 1-

Nani et al., (2008): Embrace and Exploit Basic Engineering Standard Method Of Measurement Dictionary Guidelines for Success". *Project Management Institute. Retrieved August 10,2013.*

Morledge and King (2005), Imprinting: Toward A Multilevel Theory". Academy of Management Annals: 193–243.SSRN 2198954

Harris (2002), Great Planning Disasters. Penguin Books, Harmondsworth

Hilman S. A. & Arditya R. S., (2015). "The Importance of Standard Method of Measurement in Indonesian Construction Industry," International Journal of Technology and Engineering Studies, PROF.IR.DR.Mohid Jailani Mohd Nor, vol. 1(4), pages 123-128.

Klang and Paulson (2000), Quality of Professional Service and Ethics. The Quantity Surveyor Vol. 33, 10-18

Kowo, Olalekan and Popoola, 2018), Economic Theory and the Hypothesis of Rationality. The New Palgrave: a dictionary of economics, 2, pp. 69-75.

Kumar, R. (1999), Research Methodology, a Step by Step Guide for Beginners. London: SAGE publishing Limited.

Kuznetsova et al. (2017), Rationality and power of BESMM: Democracy in practice. University of Chicago Press, Chicago.

Lyman et, al (2016), The Changing Politics of Urban Public Investment. Brookings Institution, Washington DC.

Meng (2012), Understanding and facilitating use of basic engineering standard method of measurement in project work AEC industry." Automation in Construction, (2010), pp. 988-999

Maritz, Klopper, & Sigle (2005), Advantages and challenges of use of besmm in project: Acost consultant's perspective. 49th ASC Annual International Conference, (21-25).

Maritz, et al., (2005), The role of quantity surveyor in BESMM, 4TH biennial conference of quantity surveying in the 21st century – Agenda for the future. Nigerian Institute of Quantity Surveyors.

Oforeh and Alufohai (2017), Determining sample size for research activities. EducPsychol Meas.

Paul and Kazmi (2018), IT Through Experiential Learning. ISBN 978-1-4842- 2420-5.

Seeley I.H and Winfield D.A(1998), Quantity Surveying practices (2ed).Britain:Macmillan press limited.

Brook (2008), Building economics. (4ed). Britain: Macmillan press limited.

Rusu, and Avasilcai (2014): Managing Projects to reduce delivery schedule failures" International conference on Building Education and Research (BEAR). Retrieved on 9th December 2014 from the website: http://www.irbnet.de/daten/iconda/CIB11639.pdf

Tarmidi R.S and Arsjah B. (2019), Value, Services of a Quantity Surveyor, The Quantity Surveyor- Vol. 15, pg 17-21, ISSN 116-915X

Team (2013), Megaprojects and Risk: An Anatomy of Ambition. Cambridge University Press, Cambridge.

Timothy O., O. and Olaleke A., A. (2016), Are Quantity Surveyors Competent to Value for Civil Engineering Works? Evaluating QSs' Competencies and Militating Factors. Journal of Education and Practice www.iiste.org ISSN 2222-1735. ISSN 2222-288X. Vol.7, No.16, 2016

Winch, (2010): Underestimating cost in public works Error or Lie? Journal of the American Planning Association, Vol. 68