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The Explanations for the Low Applications of Value Engineering by Quantity Surveyors in Nigeria

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Abstract
The recent past decades have experienced significant growth in practices and applications of value management in the construction sectors. However, the knowledge and skills of quantity surveying in offering value management services are exceptional. This paper presents a research project that accounts for low expansion of quantity surveyors in offering value management services in the construction industry. Through an online survey questionnaire, comprising 11 reasons and experienced 30 quantity surveyors all the reasons were found to be critical barriers. The Kaiser-Meyer-Olkin measure of sampling adequacy indicated that the strength of the relationships among variables was moderate (KMO=0.63). Bartlett's test of sphericity, which tests the overall significance of all the correlations within the correlation matrix, was significant χ^2 (55) = 114.384, p<0.001), indicating the data were drawn from the same population and that the criteria were related. The results indicate that quantity surveyors were not active in the providing value management services because clients do not want to pay for the extra services due to poor understanding and misconceptions by the clients. To increase application of value management, a modified Cycle of Rejection was presented. The results of the study are useful to all the construction professionals, academic institutions, governments, and other stakeholders in the construction sectors.

Keywords
Benchmarking, Duties and responsibilities, Construction industry, Core services, Rebranding

1. Introduction

The construction sector is multidisciplinary and is comprised of many stakeholders such as clients, design professional, construction professionals, and operational teams. From the time the clients' makes a decision to build / construct to when the clients take the possessions of their built or constructed facilities, many professionals are invited and each play different roles or functions toward delivery best values for clients. One of the techniques the construction sector uses to increase productivity, profits and ensure clients or project owners satisfactions is value engineering. While the value engineering in the construction sector involved all the stakeholders, notably, the architects, engineers and quantity surveyors, the quantity surveyors' expertise are outstanding (Kelly *et. al.*, 2014 and Leung, 2003). In fact, the value management is generally considered as an extension of quantity surveying, or one of the emerging services that quantity surveyors are required to provide for competitiveness (Ellis, *et al.*, 2003, Olanrewaju, et al., 2014 and Sonson and Kulatunga, 2014). Since the 1980s, RICS has funded research project into value management and quantity surveying practices (Kelly and Male, 1988). According to Hogg (1999), professional quantity surveyors are the most active in providing value management services in the UK. This is the situation in most other places, including Australia, Malaysia, Hong Kong and Singapore. While its applications and practices are well accepted in many countries, it levels of applications and practices in the Nigeria construction sector and particularly among the quantity surveyors remain very low. While many of the quantity

surveyors claimed to be familiar with value management, the level of adoption is low and in fact only very few has been involved in the value management programme (Oke and Ogunsemi, 2011). In fact, there is not different to what it was a decade ago (see Olanrewaju and Khairuddin, 2006).Therefore, the question that required considerations are what are the reasons that is accountable for its low practices. Examining the barriers to its implementations and development will pave way for the formulations of measures to expand its practice and expansion.

2. Literature review and background to the study

Quantity surveying is universal. In countries like the USA, quantity surveying is closely related to construction management (Seeley, 1997) or cost engineering. The Royal Institute of Chartered Surveyors describes the quantity surveyors as "… *are the cost managers of construction. They are initially involved with the capital expenditure phase of a building or facility, which is the feasibility, design and construction phases. But quantity surveyors can also be involved with the extension, refurbishment, maintenance and demolition of a facility. Quantity surveyors may also work in process engineering, such as chemical engineering plants or oil rigs, and will understand all aspects of construction over the whole life of a building or facility*" (RICS, 2015). But while this definition/description is not complete, it provides to some extent an indicative of what quantity surveyors represent. Quantity surveyors provide advice on the strategic planning of a project. For a construction project, this advice affects clients' decisions on whether to construct or not, and if the client decides to construct they clarify when, how, where and what to construct. 'Modern' quantity surveyors are diversifying the services they offer into various industries including petrochemical, manufacturing, automobile, mining, telecommunication, shipping, transport, and agriculture. The major impetuses for this diversification are the quantity surveyors' culture of elasticity and changing clients' requirements. There is also increasing awareness of accountability and transparency (Cartlidge, 2011 and Ashworth, et al., 2013).

The construction sector is a large sector of the economy. A number of researchers have investigated the performance, productivity, and profitability of the construction sectors globally. However, because of the poor performance of the construction sectors and the strategic requirements to improve productivity, profits and satisfactions a number of techniques, tools and methods have been adopted, adapted or introduced from wide ranges of disciplines ostensibly from the manufacturing industries. Notably among those are system engineering, concurrent engineering, targush, just in time, six sigma, value engineering, total quality management and, quality function deployment and lean production. Value engineering was formally discovered around the 1945–during the Second World War (i.e. General Electric Company) in the USA due to Lawrence Miles. Value management is defined as an organized set of procedures and processes that are introduced, purposely to enhance the function of design, service, facility or system at the lowest possible total cost of effective ownership, taken cognizance of the client's value system for quality, reliability, durability, conformance, durability, aesthetic, time, and cost (Seeley, 1997 and Kelly, *et al.,* 2014). Some writers tend to distinguish value management with value engineering, value analysis, value planning, and value control. But recently all these terms are seen as sub-sets of the value management methodologies (Olanrewaju, 2013). In this study, all are synonymous with value management. Value management is a problem solving and problem seeking management style that maximizes the functional value of a project's by managing its development from concept stage to operation stage of projects through multidisciplinary value team (Kelly, *et al,* 2014). Value management could be introduced at any stage in the project's life cycle, but it is more beneficial if it is introduced from the pre-construction phase of the projects. The robustness and applications of value management have been tested and well refined as well (Kelly, *et al.,* 2014) on different construction projects in the UK, Australia, Malaysia, Hong Kong, New Zealand, South Africa, Singapore and other places. In fact, in many countries, its applications have been backed by laws and government regulations. According to Hogg (2000), value management is important for the development of the construction industry and indeed the very peculiar towards the improving the services that the quantity surveyors offers.

The Nigerian construction sector is large with a significant contribution to the GDP (Table 1). The value added of the construction sector to its economic growth has expanded by close to 30% for the recorded periods. Because GDP measured new goods and service, if the contributions of the real

estate sector (with the contributions of more than 7% to GDP) are considered, the added value of the construction sector will be higher. In 2012, the construction sector employed 6, 913,536 people (NBS, 2015). The construction sector enjoys two digit growth rates.

Table 1 Gross Domestic Product (At 2010 Constant Basic Prices, USD Million)

Year	Agriculture	Industry	Manufacturing	Construction	Trade	Services	Total GDP
2001	19.89	37.01	6.60	2.90	10.85	29.35	128,771.5
2002	26.99	31.29	6.26	2.64	10.08	28.99	147,577.8
2003	26.38	34.36	6.05	2.62	9.74	26.90	161,601.5
2004	25.38	32.61	6.12	2.21	12.05	27.75	178,475.9
2005	25.40	31.15	6.27	2.32	12.78	28.35	190,984.4
2006	25.58	28.74	6.44	2.46	13.82	29.50	203,829.9
2007	25.53	26.40	6.58	2.58	14.82	30.66	218,746.3
2008	25.31	24.05	6.69	2.73	15.76	32.15	234,494.5
2009	24.73	22.77	6.67	2.82	16.22	33.46	254,082.7
2010	23.89	22.03	6.55	2.88	16.47	34.73	278,321.6
2011	23.35	22.39	7.33	3.16	16.76	34.34	293,094.7
2012	23.91	21.74	7.98	3.32	16.44	34.59	305,421.9
2013	23.33	20.59	9.22	3.59	16.62	35.87	322,182.9
2014	22.90	20.54	9.95	3.82	16.57	36.17	342232.1
2015	23.11	19.30	9.54	3.88	16.95	36.76	351,768.1

Calculated based on CBN, 2016
(The GDP was converted to USD; 1USD to ₦196.22 being the conversion rate at 31 December 2015)

There are many professionals in the Nigerian construction sector. The quantity surveyors are vital members of those professions, for without them, many projects will be delayed, abandoned, cost overruns will be higher, and the dispute will be ramparts. Quantity surveying in Nigeria dated 1960, with the establishment of the Nigerian Institute of Quantity Surveyors (NIQS) in 1969. The Quantity Surveying Registration Board of Nigeria was established by decree 31 in 1986 and currently has 3750 members. There are 5500 professional quantity surveyors in Nigeria. The institute is the largest quantity surveying institutions in Africa and one the oldest construction professionals in Nigeria. The NIQS is a strategic member of the African Association of Quantity Surveyors and a member of the Common Wealth Surveyors. 12 universities and 9 polytechnics were accredited by QSRBN to award BSc./BTech. or HND in QS. Most of the unregistered ones work with contracting organisations and government agencies. The services that Nigerian quantity surveyors offer are mainly limited to the buildings. Traditional procurement strategy is the dominant. Hence the quantity surveyors are only invited when major drawings and specifications are prepared by architects and engineers. Most of the quantity surveyors in Nigeria are members of Project Management Institute, Nigeria and the UK. They are also a member of The Commonwealth Association of Surveying & Land Economy. They are active members of the Nigerian association of arbitrators. Many have returned to college/universities to obtain graduate degrees in project management, construction management or business administration (MBA). But only a few of the quantity surveyors offer service outside Nigeria.

3. Outline of research design

This study combined literature review and a survey questionnaire. The survey was developed from literatures (Seeley, 1997, Kelly, et. al, 2014 and Cartlidge, 2006) and the authors' own experiences. Primary data were collected based on convenience sampling. In the convenience sampling, a survey is administered to the respondents who are accessible, available or willing to participate. It is an appropriate method where sufficient information on population size is not available, but like other nonprobability sampling, its findings may not be generalisable. However, if the respondents are carefully selected with sufficient sample size, the findings could be a representative of the population. Primarily data for this survey were collected through an online survey. The survey commenced in November 2014 through to April 2015. The responding quantity surveyors were asked based on their

current experience to place a tick on the extent to which each of the reasons is obstructing the practice of value engineering/management services by the quantity surveyors on a five continuum scale; where 5 denotes 'strongly agree', and 1 denotes 'strongly disagree'. 2, 3, and 4 were located in between. All reasons are positively worded, and higher scores indicate higher hindrance. Data were analysed with SAS Enterprise Guide 7.1.

4. Analysing the findings

Altogether 200 survey forms were sent to potential respondents, from which 69 valid returned. However, only 30 responses were useful for the purpose of this particular study. The results on the respondents' profiles were contained in Tables 2 and 3. Nineteen of the responding quantity surveyors were BSc/BTech. or Higher National Diploma holders. The remaining 11 have either MSc. or Postgraduate Diploma. 23 of them worked with private engineering, quantity surveying or architectural consulting firms. The others worked with contractors or government agencies. The respondents held strategic positions in their respective organisations. 77% have more than five years working experience, but about 50% have more than 10 years working experience. In the last ten years, 60% of the responding quantity surveyors have been involved in more than 10 construction projects. The apparent interpretations of these statistics are that the respondents have the required knowledge and competencies to provide valid and accurate information on the nature, scope, duties and responsibilities of the quantity surveyors in the Nigerian built environment. Moving forwards, the results of a question asking the respondents to indicate how quantity surveyors were appointed in Nigeria, revealed that, the quantity surveyors were mostly appointed based on the recommendations of the design team member, see Table 4. In fact, the only respondent that opted for 'other' remarked that the quantity surveyors were appointed "based on previous projects".

Table 3Crosstabulation between position and experience

Position	Experience					
	Less than 5	5-10	10-15	15-20	More than 20	Total
Managing directors	0	1	0	0	0	1
Contract managers	0	1	1	0	0	2
Project managers	3	4	3	1	0	11
Principal partner	0	0	1	2	0	3
Partners	0	0	2	1	1	4
Managers	0	3	0	1	0	4
Others	4	1	0	0	0	5
Total	7	10	7	5	1	30

Table 2Crosstabulation between academic and organisations

Academic	Organisation					
	B.Tech	HND	BSc	MSc	PgD	Total
Government	0	0	0	0	1	1
Consultants	9	3	4	6	1	23
Contractors	0	3	0	2	1	6
Total	9	6	4	8	3	30

Table 4 How Quantity surveyors were appointed in Nigeria

Method	Architects	Self-Recognition	Project Managers	Engineers	Manufacturers	Other
Frequency (%)	34.783	30.434	19.565	8.696	2.174	4.484

In order to tests the correctness, truthfulness and consistency of the instruments, validity and reliability tests were conducted. The Cronbach's Alpha reliability test produced a cumulative of 0.833. The average validity score was 0.734. To further confirm the strength of the data, and Bartlest's test were conducted using SPSS.The KMO commutation returned 0.63 (Table 5) signifying the lack of multicollinearity problems among the criteria and that the respondents' were drawn from those with similar experience. Also the Bartlett's Test of Sphericity was significant conforming to the fact that the reasons were related. A one way t-test was conducted, to further examine the measurements of the sample with respect to each of the reasons. For this reason the null hypothesis was that each of the reason was not important to obstacle to the implementation of value engineering among the quantity surveyors (H_0: $U=U_0$) and the research hypothesis was that the reason was important to value engineering implementations of the Nigerian quantity surveyors (H_r: $U>U_0$). U_0 is the population mean. The critical level of point set at 3.5. Table 6 contains the results of the t-test, where it can be found that (i.e. Pr>|t|) of each of the criteria (H_r: $U>U_0$) are significant. The small standard errors, being nearer to zeros suggest that the measurements of the respondents with respects to the criteria are representative.

Table 5 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.634
Bartlett's Test of Sphericity	Approx. Chi-Square	114.384
	df	55.000
	Sig.	0.000

Only 23% of the respondents do not measure these reasons as the major reasons for the low practice of the value management by the quantity surveyors. Otherwise, the other, closely 80% measured their agreements that these reasons are responsible for its low applications and practices. In fact, more than 60% 'strongly agreed' or 'agreed' to this fact. In addition, the average indices of 3.85 on a scale of 1 to 5 suggest these reasons have high implication in the development of value management. Individually, while the least reason (with mean of 3.33) according to the respondents is a time constraint, the highest reason is the lack of regulatory framework (4.31) (Table 6). Follow closely in terms of the reasons accountable for the low practices of value management is the clients' unwillingness to pay. However, the standard deviation (std. dev.) implies that appraisals of respondents are widespread. But the confidence level results mean that the population wills actually appraised the reasons to the main barriers to the VM practice and adoptions. Although while the reasons varies on the extent at which each lead to the low of applications and practice, basically all the reasons are quite significant as none was rated below 50% and their differences are not quite substantial. In fact the standard deviation is 0.6727. Other than this, it is not surprising that clients' unwillingness to pay for the services is significantly rated. This often stems from the poor understanding on the essence of value management services by the clients. These findings are similar to findings from the latest researches (Hogg, 2000, Oke, and Ogunsemi, 2009, Seeley, 1997 and Bowen, et. al, 2010)

Table 6 Reasons for low application and adoption of value management practice in Nigeria

Reason	t Value	Pr > |t|	CL for Mean		Std Dev	Mean
			Lower 95%	Upper 95%		
Lack of regulatory framework	24.96	<.0001	3.957	4.664	0.930	4.310
Clients are not willing to pay for the services	23.04	<.0001	3.918	4.682	1.022	4.300
Results to conflicts and hatred among the design team	19.93	<.0001	3.651	4.487	1.099	4.069
Attitudes of the design consultants	19.66	<.0001	3.584	4.416	1.114	4.000

Client do not request the services	17.85	<.0001	3.512	4.421	1.217	3.967
The recommendations are not implemented	18.37	<.0001	3.4956	4.371	1.172	3.933
The quantity surveyors already provide the services	21.01	<.0001	3.491	4.243	1.008	3.867
Lack of value management skills	14.45	<.0001	3.119	4.147	1.376	3.633
Value management is expensive to conduct	14.4	<.0001	3.060	4.073	1.357	3.567
Because of project's size	13.62	<.0001	2.900	3.927	1.350	3.414
Lack of time	12.23	<.0001	2.7766	3.891	1.493	3.333

5. Summary and recommendations for the quantity surveyors and policy implicatons

The findings of an online survey questionnaire explaining the low adoptions and practices of value engineering by the quantity surveyors are analyzed and discussed. For the last two decades, the chartered quantity surveyors in Nigeria have enjoyed recorded appearance. During this time, there is being increased in the quantity surveyors' service delivery. It is imperative to assert that quantity surveying is not only about cost management anymore. But the cost management is only part of the very important services that quantity surveyors offer and is part of the larger tools used by the quantity surveyors to offer value clients' investments (Olanrewaju and Paul, 2015). Although the concept of adopting Value engineering/management in the Nigerian construction sector is still growing, but it has received profound attention in the last one decade especially among the academia. However, the familiarities of the value management methodologies by the quantity surveyors practitioners are low. The reasons for the apparent low applications and practices of Value Engineering on a greater scale are generally due to lack of knowledge, innovation and culture in the construction industry.

Deductively, if we explore the reasons for the low applications of VM in the Nigerian construction through the lens of the Hofstede' culture model, some useful justifications can be provided.
Power distance- With a score of 80, there is an unequal distribution of power in Nigeria. Thus hierarchy, control and centralized decision making are favored. However, this will discourage VE applications because those in top position (autocratic) especially with public projects we feel that their authorities are being questioned.
Individualism- Nigeria score low (30) on this dimension, meaning that the collective is responsibility highly encouraged. Therefore, because of loyalty to the leaders, the subordinates even if they know that the VE would bring benefits to the projects and organizations the fear of being considered as disloyal would discourage them to suggest its application except if the projects /clients asked for it.
Masculinity- With a score of 60, Nigeria is masculine not feminine. By implications,
the project leaders are assertive and decisive. However, if the project leaders and clients are familiar with VE, this would be a better opportunity to ensure VE is initiated and recommendations are implemented. But its applications would be low due lack of familiarity.
Uncertainty avoidance- VE is about exploring new frontiers though often risky, but Nigeria scores 55 on this dimension. Hence the project's leaders and clients will likely not want to take the risk.
Long term orientation- Nigeria is a normative society with a score of 13. This is very interesting, because it implies that the project stakeholders are still traditional, and not wanting to explore new opportunities in improving project performance because of risk. It also implies the stakeholders are concerned about immediate project completion, thus projects life cycle performances are not considered.
Indulgence – with a score of 84 Nigeria is not a restrained country. This dimension has not clearing implications of the VM applications.

Summarily, as a comparison, the findings of this research are similar to the "Cycle of VM 'rejection'" or (The Hogg diagram (2000). However, an expanded 'rejection cycle' is displayed in Figure 1. This is derived from the cycle of events has described above.

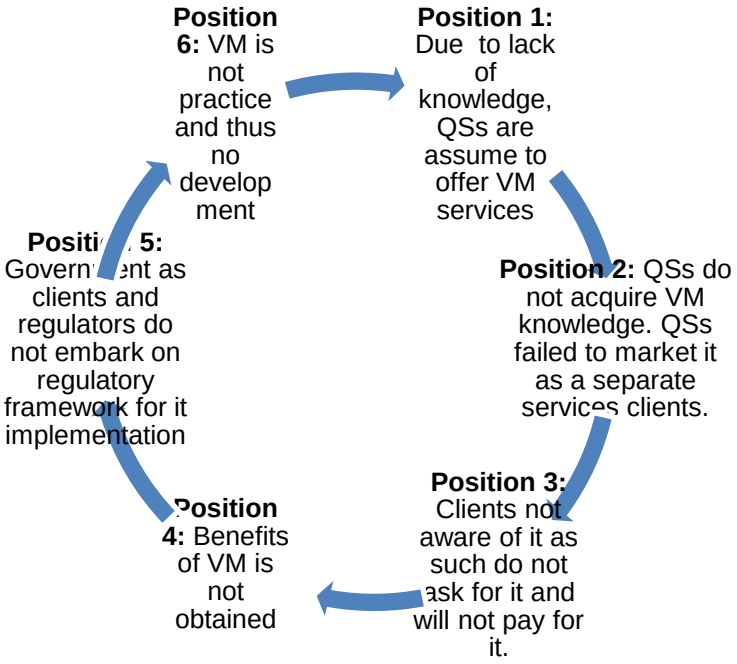

Figure 1 Cycle of Rejection [Modified after Hogg, 2000]

It is time that universities and polytechnics offering quantity surveying in Nigeria to introduce value engineering /management an undergraduate programme. Currently, only very few of the universities and polytechnics that offer quantity surveying seem to include the value engineering /management in their course unit at the undergraduate. But many of those that offer it were as optional. Educating the clients and other stakeholders in the construction sector is very important and this will have a positive impact on its practices and development. It seems the government in Nigeria is yet to understand the benefits of the procuring value engineering /management services. The governments have much to benefits of the value management on public projects. Malaysian government saves more than USD2 billion on 214 projects due to VM applications. The Nigerian Institute of Quantity Surveyors and Quantity Surveying Registration Board of Nigeria need to be proactive and aggressive in marketing the value engineering /management services. Workshops and training are also required for the quantity surveyors on how to conduct value engineering /management services for best results. In between the quantity surveyors need to engage in rigorous marketing strategies to launch their (re) existence in the Nigerian construction market. But it is not appealing to reveal that most of the quantity surveyors were not engaged based on their self-recognition (Table 4). A basic interpretation of this finding is that clients are not cognisance of the duties, knowledge and competencies of the quantity surveyors in Nigeria. On another ground, this has negative implications on the practice of the value management. Firstly, only the cost performance might be achieved. Secondly, the quantity surveyors would not be independent. But like in some countries, the roles of marketing for QS practices would seem to be in their infancy, despite awareness of increasing competitive demands from the client base (Preece, et al., 2008). However, as may be observed, the low response rate to the survey questionnaire is the limitation of this research. Therefore, the findings may not lend itself to generalisation. This notwithstanding, the findings are accounts of the research objectives.

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