Value Management for Sustainable Built Environment in Nigeria

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Abstract

The Nigerian Architecture, Engineering and Construction (AEC) industry suffers from poor performance especially in the aspect of sustainable construction. Using diverse construction practices available to achieve successful construction- without posing any danger to the environment, society and the economy - is necessary to rectify this menace. One of such practices is Value Management (VM), which has been adopted by some developed and developing countries around the world and has proven to be highly beneficial. This study therefore assessed the adoption of VM and its benefits in the delivery of sustainable construction within the built environment in the country. The study adopted a survey approach in which construction professionals within the six geo-political zones of the country were sampled. Data were collected through the use of questionnaire, while percentage, mean and one-samples t-test were used to analyse the data gathered. Findings revealed that construction professionals have a considerable amount of knowledge as regards VM practice, however, the level of usage of the practice is still on the average. Some of the benefits of the adoption of VM are; ability to identify possible problems early, eliminating unnecessary designs, reduce waste, and ensuring that the project is delivered in the most cost-effective way.

Keywords

Construction projects, Sustainable construction, Sustainability, Project performance, Value Management

1. Introduction

The Nigerian Architecture, Engineering and Construction (AEC) industry faces problem of delivering sustainable construction projects; one that serves not only the present but also future generations (Alabi, 2012; Aje, 2016). This situation is contrary to the recent movement of most countries towards sustainable development through the delivery of sustainable construction. If this is to be adequately addressed, a radical change to the approach of delivering construction projects is needed, while the adoption of diverse tools that will help manage projects and deliver them sustainably is necessary. One of such tools that is gaining popularity among most developed and developing countries in recent time is Value Management (VM).

VM is a structured approach to establish what value means to a client while trying to meet a perceived need, through clearly defining and agreeing on the project objectives and establishing how they can best be achieved (Construction Industry Board, 1997). Mariathasan (2002) viewed the discipline as a process which allows all stakeholders in a proposed construction project to be involved in the decision-making process. The process constitutes a scrutiny of all relevant options for the design and construction of the project, leading to an improvement of the design brief and identification of any budget constraints. Abidin and Pasquire (2005) further observed that in VM, although clients tend to put pressure on cost reduction, their vision would still be the same i.e. value for money, better quality, profitability and positive business image.

Past researches have placed separate focus on VM and Sustainability. However, in the late 90's, researches relating to the importance of sustainability in improving value and the potential of VM to deliver sustainability in

construction projects, started to emerge (Barton *et al.*, 1999; Phillips, 1999; Schneider, 1999; Barton 2002; Yeomans, 2002; Abidin and Pasquire, 2005; Abidin and Ijias, 2006; Oke *et al.*, 2015). Al-Saleh and Taleb (2010) however observed that although VM has been proposed as a potential mechanism for delivering sustainable construction projects in some countries, this idea has not yet been widely put into practice around the world, particularly in developing countries (Bowen *et al.*, 2010, Kim *et al.*, 2016; Kissi *et al.*, 2016). Reasons for this can arguably be attributed to the level of knowledge of VM and its ability to deliver sustainable construction among professionals in the AEC industry. This study is therefore bringing to light, the adoption of VM and its benefits as perceived by construction professionals in the Nigerian AEC industry. The study was conducted across the six geo-political zones of Nigeria as against common practice of selecting a particular region or state to represent the entire country. The findings therefore apply not only to the country but can also be generalised for other developing ones, especially in Africa where construction projects are executed through similar method, style and approach. Subsequent parts of the paper include the review of literatures relating to the subject matter, the methodology used and the findings of the study. At the end conclusions were drawn from the findings and necessary recommendations were made thereof.

2. Concept and Benefits of VM

VM originated in the industrial sector of the USA by Miles at General Electric in late 1940s and was used in the construction industry in the early 1960s (Zimmerman and Hart, 1982). It was born due to the shortage of products component which was an aftermath of the World War II. At this time, alternative components were sort, but as a result of the war, these sort alternatives were often unavailable, hence leading to a search for a means of fulfilling the function of the needed components by an alternative method. It was later observed that this method produced low-cost products without reducing quality. At the end of the war, this system was maintained as a means of both removing unnecessary cost from products and improving design, hence, birthing value engineering (now known as value management) process based on analysis of function (Palmer *et al.*, 1996).

Oke and Ogunsemi (2013) submitted that the use of VM in most developed countries of the world became widespread in the 1970s, and it was often mandatory for general services administration contracts in the United States, and considerable success in its use was recorded. Some countries such as the UK adopted the VM approach and changed it to fit the country's culture and the markets, while others such as Saudi Arabia used the American VM approach without making significant changes (Alalshikh and Male, 2009). In Malaysia, the implementation of VM was made compulsory for all public projects exceeding RM50 million by the Economic Planning Unit (Jaapar *et al.*, 2012). However, the case is different in Nigeria, as VM has not been fully embraced in the construction industry. Oke and Ogunsemi (2011) observed that only very few number of VM workshops have been organised so far and according to investigation, most of the workshops were subsequently concluded prematurely.

Olanrewaju (2013) stated that VM makes client value system explicitly clear at the project's conceptual stage and it seeks to obtain the best functional balance between cost, quality, reliability, safety and aesthetic. According to Ezezue (2015), the application of VM provides immense benefits such as: providing an unbiased outside opinion, and senior expertise has inputs to the design process, thereby increasing the resources available to develop the project; documenting that all reasonable measures have been taken to minimize project cost and maximize the return on investment for delivery; identifying design criteria that are poor value, thereby allowing the project decision makers and stakeholders to re-evaluate project criteria; enhancing and promoting the team spirit; it identifies constraints, issues and problems which might not otherwise be obvious or have been considered; it improves understanding and ownership of outcomes; elimination of unnecessary functions and features and incorrect assumptions regarding other requirements.

The role of VM in the delivery of sustainable construction has been observed by several researches. Oke *et al.*, (2015) observed that huge economic sustainability can be achieved when VM is used on a project as participants have opportunities to ensure that construction projects create avenue for achieving value for money. However, in doing this, care must be taken not to create an imbalance between the three pillars of sustainability (environmental, economic and social). Yeomans (2002) observed that sustainable construction with respect to the three sustainability pillars can be achieved through VM as it is the most robust mechanism to deliver a balance between the society, environment and economy. In similar vein, Abidin and Ijias (2006) submitted that application of VM helps in effective decision making, and it holds a strategic position in incorporating sustainability issues into construction projects.

Hayles (2004) carried out three case studies and concluded that the use of VM tools can contribute toward achieving sustainable construction solutions and strategies. Noor *et al*. (2015) opined that the overall objectives of VM and sustainability tend towards the same direction. While VM attempt to achieve optimum value based on the projects objectives, sustainability strives to achieve value not just economically, but as well as environment and the social aspects of the projects. Aghimien and Oke (2015) also established that VM identifies and eliminates areas of unnecessary designs which affects cost and has no functional benefits, reduce construction cost and time and enhance value for money, thereby giving an overall satisfaction to the client. By doing this, not only is economic sustainability achieved, but also environmental sustainability is attained as wastage is reduce through the elimination of unnecessary designs.

3. Research Methodology

This study set out to assess the adoption of VM and its benefits in the delivery of sustainable construction within the built environment. The study was conducted in Nigeria and the respondents were gathered from the 6 geo-political zones in the country. This includes, South-West (SW), South-South (SS), North-Central (NC), North-West (NW), South-East (SE) and North-East (NE). The study employed a survey of the view of construction professionals that are directly involved with construction process. These professionals are; Architects, Builders, Engineers and Quantity surveyors and their details which aid their assessment were gotten from their respective organisational bodies. The research instrument used was structured questionnaire designed based on information gathered from the review of related literatures. The questionnaire was designed in sections, with the first section designed to gather information on the respondent's background and level of knowledge in VM practices. The questionnaire was designed in sections, with the first section designed to gather information on the respondent's background, level of knowledge in VM practices, as well as their perception of the level of adoption of VM in the country. Respondents were provided with the benefits of VM in the second section, and were asked to rate the level of their significance using a 5-point Likert scale, with 5 being very high, 4 being high, 3 being average, 2 being low, and 1 being very low. The questionnaire was self-administered, through the help of trained field assistants and also through the use of electronic questionnaire means. A total of 330 questionnaires were administered out of which a total of 246 retrieved and ascertained fit for analysis. This represents a response rate of 75%, which is far above the usual response rate of 20-30% for questionnaire surveys (Moser and Kalton, 1999). Reason for the high response rate recorded can be attributed to the time taken for the study as data collection spanned a period of 4 months and 2 weeks.

Pilot study was conducted to pre-test the survey. According to Fellows and Liu (2008) a research instrument should be piloted in order to test whether the questions are intelligible, easy to answer and unambiguous, as well as providing an opportunity to improve the questionnaire and determining the time required in completing the exercise. Pilot survey for this study was carried out through sending out of the first draft of the questionnaire to 12 randomly selected construction professionals and the final draft of the questionnaire was adjusted based on the result gathered. Cronbach's alpha test was further used to test the reliability of the research instrument. This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach alpha value is between 0 and 1, and the higher value, the higher degree of internal consistency. The Cronbach's Alpha value of 0.925 was derived and this shows that the instrument is highly reliable since the degree of reliability of an instrument is more perfect as the value tends towards 1 (Moser and Kalton, 1999). In analysing the data gathered, frequency and percentage was used in analysing the background information while Mean Item Score was used in ranking the benefits, and one samples t-test was used to determine the importance attached to each of the identified benefits and their associated level of significance.

4. Findings and Discussions

4.1 Background Information

Result in Table 1 shows that most of the SW region has more construction professionals (32.9%) participating in the study. This is followed by SS (25.6%), NC (16.3%) and NW (13.4%). The least represented regions are the SE (6.5%) and NE (5.3%). The most represented construction professionals are Quantity surveyors with 36.2% followed by Architects with 26.8% and Engineers 21.1%. The Builders were the least represented professionals with 15.9%. Most of the respondents have between 6 to 10 and 11 to 15 years working experience in the built environment. On the average, the years of working experience of all the respondents is calculated as 11.6years. This

implies that the respondents for the study are well experienced and information gathered from them can be relied upon.

Table 1. Background information of respondents

Category	Classification	Frequency	Percentage
Region of Respondents	SW	81	32.9
	SE	16	6.5
	NC	40	16.3
	NW	33	13.4
	SS	63	25.6
	NE	13	5.3
	Total	246	100.0
Profession of Respondents	Architecture	66	26.8
	Building	39	15.9
	Engineering	52	31.1
	Quantity	89	26.2
	Surveying	246	100.0
	Total		
Years of experience	0-5	73	15.9
	6-10	59	24.0
	11-15	39	29.7
	16-20	33	13.4
	Above 20	42	17.1
	Total	246	100.0
	Average	11.6	

4.2 Level of Knowledge and Adoption of VM Practices

Pertaining the knowledge of the respondents in terms of VM practice, a scale of between 0 - 20% was set for a very low knowledge, 21 - 40% for low knowledge, 41 - 60% for average knowledge, 61 – 80% for high knowledge, and above 80% for a very high level of knowledge. A similar approach was adopted by Oke (2010). Result in Table 2 shows that a high level of knowledge of VM exist in SW (77%), NC (73%) and SS (75.2%) regions. An average level of knowledge of VM can be seen to exist among professionals in SE (57.6%), NW (51.6%) and NE (63.4%). Reason for this result can be due to the fact that SW has Lagos State which is the country's commercial city with lots of construction companies and construction activities taking place on a daily basis. The NC has the Federal Capital Territory which is the country's administrative city, and the SS has cities like Port Harcourt which as a result of its oil production is undergoing a facelift with considerable number of constructions being carried out, and Calabar which is known for its recreation and attraction of people (construction professionals inclusive). Thus, these areas are bound to have a high number of construction professionals with higher level of knowledge in construction and its related practices. Generally, it is evident that the respondents have a considerable amount of knowledge of VM as a percentage level of knowledge of 66.3percent was observed. Finding of this study contradicts the Hayatu (2015) submission that construction professionals sampled in Nigeria had fair knowledge of the concept of VM. Reason for the disparity in the result of both studies can be attributed to their scope. While Hayatu (2015) studied only covered three northern states in the country, this present study takes a broader look at the subject by assessing construction professionals' knowledge in all the six regions in the country. Thus, it is not unlikely that the higher the population covered, the higher the chances of getting more professionals that are knowledgeable in the subject matter.

Table 2. Level of Knowledge of VM practices among respondents

	Level of Knowledge of VM					
Region of Respondents	Low	Average	High	Total	Mean	Percent
SW	16	30	35	81	3.85	77.0
SE	6	4	6	16	2.88	57.6
NC	0	26	14	40	3.65	73.0

NW	14	0	19	33	2.58	51.6
SS	0	48	15	63	3.76	75.2
NE	1	12	0	13	3.17	63.4
Total/Average	37	120	89	246	3.32	66.3

Respondents were asked about their perception of the level of adoption of VM practices Nigeria AEC industry. In ascertaining this, a scale of between 0 - 20% was set for a very low adoption, 21 - 40% for low adoption, 41 - 60% for average adoption, 61 – 80% for high adoption, and above 80% for a very high level of adoption. Result in Table 3 shows that respondents in the SE, NW and NE believe the level of adoption of VM in the country is considerably high as a percentage of 61.2, 66.6 and 61.6 was derived from these three regions. However, those within the SW and SS regions believe the adoption of the practice is only on the average as a percentage of 58.8 and 55.2 was derived. However, those within the NC believe the adoption level is rather low as a percentage of 40.2 was derived. On the overall, the level of adoption of VM practices within the country is perceived to be on the average with a 56.2percent adoption level being recorded. This finding shows a bit improvement when compared to Oke and Ogunsemi (2011) findings that showed that the adoption of VM in Nigeria is low. Reason for this improvement can be associated with the time gap between both studies. However, if sustainable construction is to be achieved by AEC industry in the country through the use of VM, then more need to be done with regards to its level of adoption. It has been stated that though VM has been proposed as a potential mechanism for delivering sustainable construction projects in some countries, this idea has not yet been widely put into practice around the world, particularly in developing countries (Al-Saleh and Taleb, 2010; Bowen *et al.*, 2010, Kim *et al.*, 2016; Kissi *et al.*, 2016). Findings of this study confirms this submission as only an average adoption level was recorded in the study.

Table 3. Perception of the Level of Adoption of VM

	Level of Adoption of VM					
Region of Respondents	Low	Average	High	Total	Mean	Percent
SW	23	40	18	81	2.94	58.8
SE	5	5	6	16	3.06	61.2
NC	39	1	0	40	2.03	40.3
NW	3	16	14	33	3.33	66.6
SS	15	48	0	63	2.76	55.2
NE	0	12	1	13	3.08	61.6
Total/Average	85	122	39	246	2.81	56.2

4.3 Benefits of Value Management

In determining the perceived benefits of VM in the delivery of sustainable construction, respondents were given certain benefits of VM identified from literatures and were asked to rank them based on their significance. One sample t-test was then used to ascertain the significance of each of the identified benefits and the importance attached to each of them by the respondents. Result in Table 4 shows the mean for each identified benefits including their associated standard deviation and standard error. Drawing from Ahadzie *et al.* (2008) a null hypothesis which states that a benefit is unimportant when the mean value is less than or equal to the population mean (H_0: $U = U_0$) was set, while the alternative hypothesis was that the driver was important when its mean is greater than the population mean (H_a: $U > U_0$). Where U_0 is the population mean fixed at 3.5 and the significance level set at 95% in accordance with conventional risk levels. Based on this, a benefit is said to be considered important if it has a mean of 3.5 and above.

Table 4. One sample t-test statistics for the benefits of VM

Benefits	N	Mean	Std. Deviation	Std. Error Mean
Encourage the use of local sustainable materials in construction	246	3.82	0.708	0.045
Eliminate unnecessary cost and achieve value for money	246	3.87	1.239	0.079
It enhances the competitive edge for the contractor	246	3.41	1.167	0.074
Ability to identify possible problems early in the project	246	4.24	0.807	0.051
Improves communications and enhance mutual trust, relationship and confidence in the industry	246	3.87	1.239	0.079
Ensures that projects are delivered in the most cost-effective way	237	4.09	0.911	0.059
It encourages challenging the status quo and developing innovative design solutions	246	3.13	0.836	0.053
Eliminates unnecessary designs and reduces waste and defects	231	4.13	0.780	0.051
Enhanced value and benefits for end users	246	3.84	0.616	0.039
Clearer briefs and improved decision modes	246	3.65	0.739	0.047
Better quality system and performance	246	3.44	1.165	0.074
Future profitability can be assessed if the life cycle cost is known at an earlier stage	241	3.24	1.421	0.092
Reduces project abandonment	246	3.52	0.907	0.058
Improves functional space quality of projects	246	3.29	1.159	0.074
Improves efficiency/effectiveness in the utilization of resources	246	3.78	1.053	0.067
Promotes adaptability and flexibility	246	3.12	0.328	0.021

According to Field (2005) standard error is the standard deviation of sample means and it is a measure of how much a sample represents the entire population. A large standard error shows that there is a lot of difference between means of different samples while a small standard error shows that most sample means are similar to the population mean and so the sample is likely to be an accurate reflection of the population. Result in Table 5, shows that the standard error associated with all the means are close to zero showing that the sample chosen is a true reflection of the population. In similar vein, the standard deviation of 9 out of the 16 assessed benefits are less than 1.0 which indicates that there is little variability in the data and consistency in agreement among the respondents with respect to these 9 benefits. However, there might be some differences to how the remaining 7 benefits were interpreted by the respondents since their standard deviation is above 1.0. Result also shows the p-value which represents the significance of each identified benefits of VM. This significant p-value which is for a two-tailed test was divided by two as shown in Table 6 in order to get the significant value for a one-tailed test as regards the test hypothesis (i.e. $U > U_0$).

Table 5. One sample t-test statistics for the benefits of VM

	Test Value = 3.5					
					95% Confidence Interval of the Difference	
Benefits	t	df	Sig. (2-tailed)	Mean	Lower	Upper
Encourage the use of local sustainable materials in construction	7.025	245	0.000	0.317	0.23	0.41
Eliminate unnecessary cost and achieve value for money	4.684	245	0.000	0.370	0.21	0.53
It enhances the competitive edge for the contractor	-1.202	245	0.230	-0.089	-0.24	0.06
Ability to identify possible problems early in the project	14.467	245	0.000	0.744	0.64	0.85
Improves communications and enhance mutual trust, relationship and confidence in the industry	4.684	245	0.000	0.370	0.21	0.53
Ensures that projects are delivered in the most cost-effective way	10.016	236	0.000	0.593	0.48	0.71

It encourages challenging the status quo and developing innovative design solutions	-7.019	245	0.000	-0.374	-0.48	-0.27
Eliminates unnecessary designs and reduces waste and defects	12.266	230	0.000	0.630	0.53	0.73
Enhanced value and benefits for end users	8.701	245	0.000	0.341	0.26	0.42
Clearer briefs and improved decision modes	3.191	245	0.002	0.150	0.06	0.24
Better quality system and performance	-0.821	245	0.413	-0.061	-0.21	0.09
Future profitability can be assessed if the life cycle cost is known at an earlier stage	-2.788	240	0.006	-0.255	-0.44	-0.07
Reduces project abandonment	0.422	245	0.673	0.024	-0.09	0.14
Improves functional space quality of projects	-2.806	245	0.005	-0.207	-0.35	-0.06
Improves efficiency/effectiveness in the utilization of resources	4.239	245	0.000	0.285	0.15	0.42
Promotes adaptability and flexibility	-18.083	245	0.000	-0.378	-0.42	-0.34

Result in Table 6 shows the summary of the t-test conducted with the rankings of each identified benefits of VM. From the table it can be seen that the ability to identify possible problems early in the project, eliminating unnecessary designs and reduces waste and defects, and ensuring that the project is delivered in the most cost-effective way, are the three top ranked benefits of VM in achieving sustainable construction. The least ranked benefits are encouraging challenging the status quo and developing innovative design solutions, and promoting adaptability and flexibility. However, following the hypothesis set (H_a: $U > U_0$ and $U_0 = 3.5$), it can therefore be said that only the first 10 benefits are considered important by the respondents. These include; ability to identify possible problems early in the project (*p-value =0.000*), eliminating unnecessary designs and reduces waste and defects (*p-value =0.000*), ensuring that the project is delivered in the most cost-effective way (*p-value =0.000*), eliminate unnecessary cost and achieve value for money (*p-value =0.000*), enhanced value and benefits for end users (*p-value =0.000*), encourage the use of local sustainable materials in construction (*p-value =0.000*), improves efficiency/effectiveness in the utilisation of resources (*p-value =0.000*), clearer briefs and improved decision modes (*p-value =0.001*), and reduction in project abandonment (*p-value =0.337*). It is important to note that although the benefit of VM in reducing project abandonment is ranked as an important benefit in the delivery of sustainable construction, there is no significance attached to it as a p-value greater than 0.05 was derived. Reason for this can be associated with the fact that project abandonment can occur as a result of several other underlying factors.

Findings has revealed that the use of VM will provide an opportunity of identifying possible problems early in the project, provide an avenue to eliminate unnecessary designs and ensure project delivery in the most cost-effective way. This is in tandem with the findings of Aghimien and Oke (2015) and Oke and Ogunsemi (2011) that VM provides reduction of cost while maintaining function as well as identification and removal of unnecessary materials, process and workmen time. It is therefore evident that if VM is properly implemented it can identify possible problems early in the project. It will also provide management with authoritative evaluations and supporting information of the project brief or design and their related capital and operation cost as observed by Locke *et al.* (1994) and Norton *et al.* (1995). Oke *et al.,* (2015) observed that huge economic benefit can be achieved when a VM is adopted on a project as participants have opportunities to ensure that construction projects create avenue for achieving value for money. The findings of this study agrees with this submission, as eliminating unnecessary cost and achieving value for money was discovered to be an important benefit of VM with a high level of significance attached to it by construction professional. Bowen *et al.* (2009) identified one of the benefits of VM to be the provision of good engineering judgement in the production of better projects for clients. Findings of this study agrees with this observation as it was discovered that the adoption of VM can lead to improved decision makings by participants in the delivery of construction projects that are sustainable and satisfies the client.

Table 6. Summary of t-test showing ranking of the benefits of VM

Benefits	Mean	Std. Dev.	Rank	Sig. (1-tailed)
Ability to identify possible problems early in the project	4.24	0.807	1	0.000
Eliminates unnecessary designs and reduces waste and defects	4.13	0.78	2	0.000
Ensures that the project is delivered in the most cost-effective way	4.09	0.911	3	0.000
Improves communications and enhance mutual trust, relationship and confidence.	3.87	1.239	4	0.000
Eliminate unnecessary cost and achieve value for money	3.87	1.239	5	0.000
Enhanced value and benefits for end users	3.84	0.616	6	0.000
Encourage the use of local sustainable materials in construction	3.82	0.708	7	0.000
Improves efficiency/effectiveness in the utilization of resources	3.78	1.053	8	0.000
Clearer briefs and improved decision modes	3.65	0.739	9	0.001
Reduces project abandonment	3.52	0.907	10	0.337
Better quality system and performance	3.44	1.165	11	0.206
It enhances the competitive edge for the contractor	3.41	1.167	12	0.115
Improves functional space quality of projects	3.29	1.159	13	0.003
Future profitability can be assessed if the life cycle cost is known at an earlier stage	3.24	1.421	14	0.003
It encourages challenging the status quo and developing innovative design solutions	3.13	0.836	15	0.000
Promotes adaptability and flexibility	3.12	0.328	16	0.000

5. Conclusion

This study set out to assess the adoption of VM and its benefits in the delivery of sustainable construction within the built environment in Nigeria. Through the survey of construction professionals in the different regions of the country, the study has been able to determine the level of knowledge and adoption of VM in the AEC industry. It has also been able to ascertain the perceived benefits of the adoption of VM in the delivery of sustainable construction projects within the country. Based on the findings, the study concludes that, construction professionals have a considerable amount of knowledge as regards VM practice, however, the level of usage of the practice is still on the average. If the level of adoption of VM is increased, then sustainable construction projects can be achieved as the adoption of VM promises immense benefits such as: ability to identify possible problems early in the project, eliminating unnecessary designs and reduces waste and defects, ensuring that the project is delivered in the most cost-effective way, eliminate unnecessary cost and achieve value for money, enhanced value and benefits for end users, encourage the use of local sustainable materials in construction, improving efficiency/effectiveness in the utilisation of resources, clearer briefs and improved decision modes. The study therefore recommends the need for various professional bodies within the built environment to encourage the use of VM among their members. This will to a large extent increase the use of this practice. Also construction clients can be enlightened by these professionals as regards the immense benefits of adopting this practice.

The strength of this study lies in its focus on the six geo-political zones of the country with a view to eliminate bias. The findings therefore show a true reflection of the knowledge, adoption and benefits of VM in the country. It is believed that the findings of this study will assist the government in understanding the need to create strategic policies that will aid the adoption of VM in the delivery of sustainable built environment in the country. By so doing, clients, both public and private, can get of value for money. While this study was limited to Nigeria, studies on the adoption and benefits of VM can be extended to other developing countries were such studies have not been carried out.

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