

Factors Militating against Implementation of Value Reengineering in the Construction Industry

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Abstract: Production improvement techniques in use by the Construction Industry (CI) in developing countries like Nigerian are yielding sub-optimal value for customers. This necessitated the investigation of techniques to engender maximum efficiency gains. Hence, continuous improvements on new techniques that will give customer satisfaction are required to improve the development of the sector. The adoption of Value Reengineering (VRE) could result in a breakthrough solution in resolving the challenges of customer dissatisfaction in the industry. The subjectivist methodology was utilised to establish critical success factors in thirty-four purposefully sampled building construction operators within Abuja using purposive sampling techniques. The deductive/thematic technique was used to analyse the recorded, transcribed, and interpreted interview data after it had been sorted and coded to develop information about any common pattern among the interviewees' evidence on causes militating against VRE deployment in the CI. The results revealed a significant need for the process to be reengineered through the utility of change enablers and the introduction of assistive technologies. The study further reveals that inadequate employee training to implement VRE, lack of understanding of the implementation requirements, top management commitment, quality standards of contractor's work, and lack of employee consensus to see the implementation through is the key planning, technical and organisational related factors identified. The research concluded that VRE implementation would be achieved if adequate attention is given to the level of awareness of the operator of the technique through training and retraining of operatives in the industry. The study recommends that VRE implementation in all construction projects be encouraged, as it has the potential for the customer to achieve its desired satisfaction on value offering.

Keywords: Value Reengineering, construction industry, implementation, technique, and militating factors

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1. Introduction

The construction sector has always been criticised for lack of efficiency in product delivery to meet customer satisfaction in comparison to other sectors (Olanrewaju et al., 2018). The resistance to change by the sector is due to fragmented markets and the processes involved (Arantes et al., 2015). Addressing the sector challenges, the existing characterisation methods need continuous improvements, and new techniques be implemented to improve the development of the sector (Safa et al., 2015). The need for the industry to meet the requirements of value for money

to customers, and efficiency in product delivery has prompted the adoption of various value techniques to transform the paradigm of the industry from its traditional practices to the current practices (Arayici et al., 2011). However, these techniques are still proven to display a considerable level of value dissatisfaction (Safa et al., 2015).

Ding et al. (2017) recommend Value Reengineering (VRE) implementation in the construction sector to boost the application techniques. VRE adoption, according to Safa et al. (2015), could result to a break through solution

for the Construction Industry (CI) in resolving the challenges of customer dissatisfaction. The challenges of the implementation of innovative techniques remain a constraint in both the planning and execution process (Harini and Widyarti, 2018). Yahaya (2020) attributes some of these challenges to lack of awareness, fear of the outcome of the new innovation and developing interest in exploring the benefits of the new technique.

VRE implementation in developing country like Nigeria is given little attention as a result of the low level of awareness amongst the CI operators (Omidi and Khoshtinat, 2016). Jibrin and Shakantu (2021) advocate that creating awareness for VRE application in projects delivery in CI, a set of parameters were identified for construction management and control, and these are driven by the factors militating against VRE implementation, incremental adoption and customer optimal value satisfaction. Hence, the paper aim at examining the challenging factors militating against VRE implementation in the construction sector. The development of new methods like VRE when applied in the industry of the developing nations in areas of the procurement process, supply chain management, concept designed and process management of construction as well as transportation network would create value for the customer (Oke and Ogunsemi, 2011). Consequently, a study conducted by Songer et al. (2000) revealed that under situational VRE, changing work processes and appropriate cultural environment can result in significant schedule reduction by 35% with no increase in project cost. This however was demonstrated by the model adapted from Kassa (2016) in Fig. 1. Both developed and developing nations of the world have placed an emphasis on growing demand on increasing efficiency, effectiveness and value for money (Olawumi, Akinrata, and Arijeloye, 2016). The construction sector can then become proactive in operation by adopting the VRE process to achieve remarkable improvement in the sector performance of their projects (Eke & Adaku, 2014). The CI experts have the duty to create new methods that will meet the demands in terms of quality and function, waste minimisation, reduce time and cost of the product to the customers (Smyth, Lecoeuvre and Vaesken, 2018).

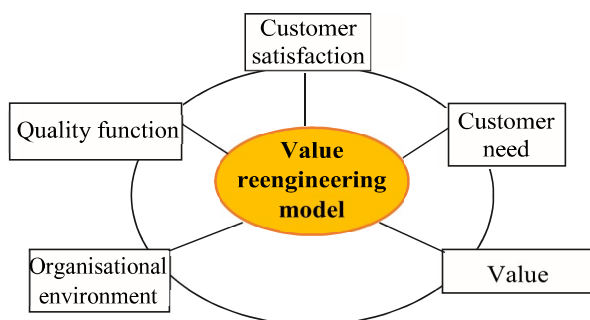


Fig. 1. VRE model (adapted from Kassa, 2016)

Senay and Niyazi (2013) express that VRE implementation in the CI should be applied in developing human capacity, materials resources, specifications of materials, the quality output of the products, design facilities and construction processes. Aghimien and Oke (2015) further, reiterate that implementation of VRE is dynamic in various forms in the construction sector. Chih

et al. (2019) posit that VRE implementation in the construction sector could yield a better value when construction is approached in a manner that incorporates benefits of cost reductions, time savings, waste minimization, quality improvements, and isolation of design deficiencies.

2. Literature Review

2.1. Concept of VRE Implementation in the Construction Industry

Value reengineering concept is defined as meeting customer satisfaction by achieving the value of the product through the fundamental rethink and radical redesign of the value processes to achieve dramatic improvement in critical contemporary measures of performance such as cost, quality, service and speed.

The concept traces its root back to management theories developed in the early nineteenth (19th) century (Holstrom et al., 1999; Ekanayake and Sandanayake, 2017). The purpose of reengineering is to “make all the processes the best-in-class” (Adeyemi and Aremu, 2008). Mao and Zhang (2008) emphasis that the VRE implementation concept has been applied in many industries as well as manufacturing to redesign the work process in achieving customer value for their product. Puruhita (2018) stress that implementation of the VRE concept has been introduced into the CI with varying levels of success for different projects. Soares (2013) expressed that the concepts are tested in new projects that force CI to shift its tradition into project integration. According to Manuel and Garcia (2012), Soares (2012), and Teicholz (2013), three concepts drive VRE implementation in CI from its tradition into project integration in the management process.

2.1.1. Design-built concept

The design-build concept brings back the concept of the Master Builder into play; this brings back integration in the construction process, reduction in costs, increase in collaboration, less waste, and trust (Soares, 2012a; Manuel and Garcia, 2012). Soares (2012b) added that benefits identified by contractors using the design-build concept are quality, time savings, reduced administrative burden, early knowledge of construction costs and improved risk management.

2.1.2. Building Information Modelling (BIM) concept

Building information modelling is a collection of tools, processes, and cultural mindsets (Teicholz, 2013). This concept provides automated quantity takeoffs with material cost and labour estimates. Alumbugu, Shakantu and Tsado (2020) reiterate that efficient outbound logistics channels for construction materials management is critical for customer satisfaction in achieving VRE for the CI.

2.1.3. Lean concept

The concept of lean gives room for integration in which all work and actions are in perfect symbiosis, that generates clear communication, integrated teams, and contributions of knowledge that must be adjusted too, in order to survive economically (Soares, 2013). The lean concept, according to Miller (2009) is a tool to eliminate waste and increase

value. Saidu and Shakantu (2017) believed that rework is the major source of waste and can be accounted for up to 10 % of the cost of a conventional project.

2.2. Factors Affecting VRE Implementation in the Construction Industry

2.2.1. Planning factors

Planning is required in making large scale VRE implementation technique a success (Hussain et al., 2014). More than 70% of VRE implementations fail due to a lack of proper planning from the inception (Maleki and Beikkhakhian, 2011; Bibi et al., 2014). Guimaraes (1995) observed that planning factors could be viewed in the area of the process, human and operational.

2.2.2. Technical factors

The influence of technical factors is jointly considered by Guimaraes (1998), Mohamed and Tucker (1996), Hussain et al. (2014), and Puruhita (2018), as shown in Fig. 2. The symbiotic nature of the construction activities requires the adoption and implementation of VRE in construction projects. Jibrin (2021) stress that the work execution is interrelated with each other, and in other to meet the customer need of value addition, these interrelationships must be closely observed in all the project monitored.

2.2.3. Organisational factors

Poor communication between the VRE team and organisation and failure to effectively monitor the progress of the project according to the schedule are the issues faced by the selected organisation in both VRE implementation and post VRE implementation phase (Fasna and Gunatilake, 2019). Puruhita (2018) viewed the most severe

environmental factors affecting the adoption and implementation of VRE in an organisation as the creation of an unfriendly company environment and lack of communication between top management and other supporting staff.

Fig. 2 demonstrates the interrelationship existing from the factors of VRE through the application of partnering process of value while considering the past record in terms of time, cost, quality, safety, using the QFD in reviewing the design and proposing alternative integrating work packages to have fewer sub-contracting, thereby applying partnering or strategic alliance concepts. The relationship is further strengthened by defining areas of responsibility risk-reward while integrating design and construction process in applying concurrent engineering principles to enhancing information flow through IT tools in minimising rework and improving material flow.

3. Research Methodology

The study adopted a mixed method of qualitative and quantitative to examine the factors militating against the implementation of VRE in the building sector of the CI. The interviews were conducted with 34 key operators in the industry using semi-structured interviews through the qualitative method, and these included 7 Directors, 9 Project managers, 9 Quantity surveyors, and 9 Engineers.

However, according to Leedy and Ormrod (2015), the typical research sample size of the phenomenological study ranges between 5 and 25 participants in unstructured interviews. Therefore, 34 participants are assumed to be adequate.

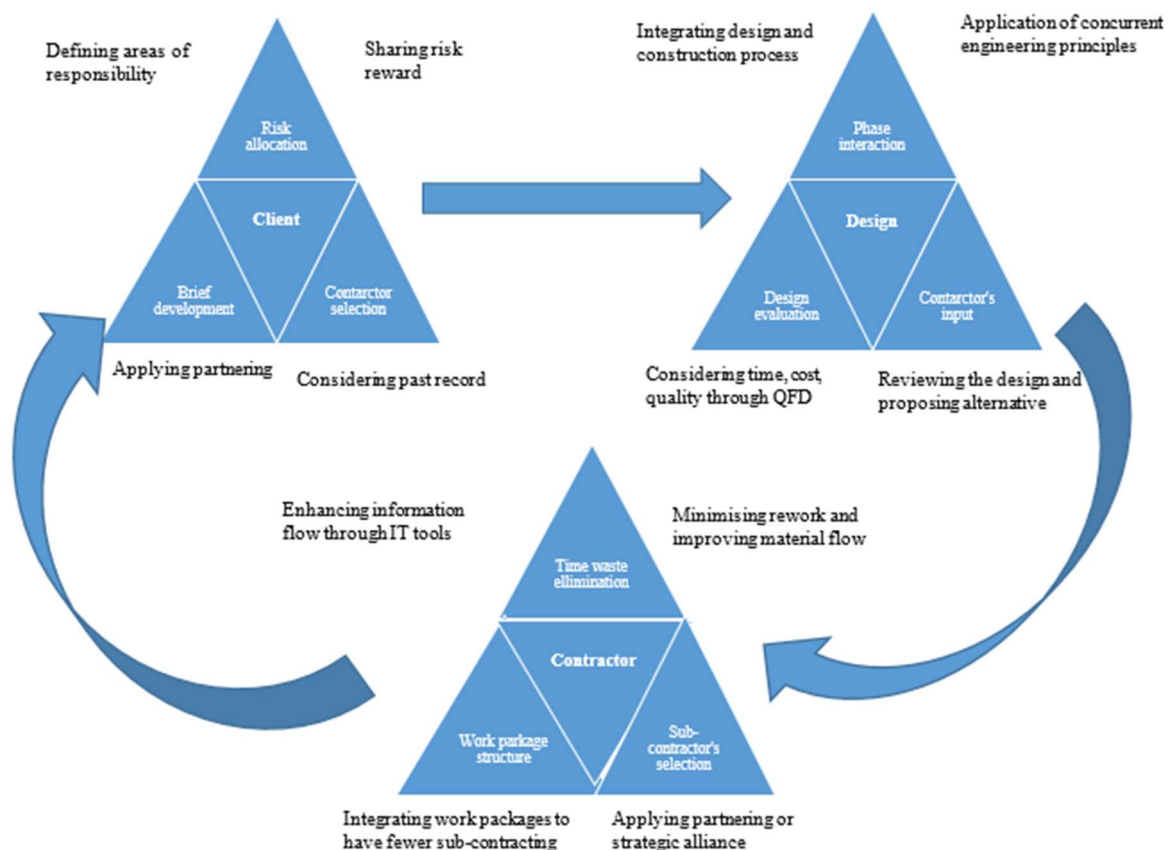


Fig. 2. Mitigating factors affecting VRE implementation Source: adopted from Mohamed and Tucker (1996)

Based on the nature of this research, the study adopted the phenomenological paradigm as it is the most appropriate approach for the study. Data for this research was collected from the interview in connection with a tick-box questionnaire. An interview guide and a tick-box questionnaire were developed on separate documents. As interviews were conducted with the respondents, the researcher ticked the factors highlighted in the questionnaire, in order to assess the rate of occurrence of these factors. Therefore, the results in the tick-box questionnaire are those presented and analysed in section 4 of this article. The interview guide and the tick-box questionnaire are presented in the appendix for more clarification. Interviews were mostly at the interviewee’s offices; and these last from 45 to 75 minutes or more.

Nine (9) different construction firms that have a capital base of about 4.6 million USD (1.8 billion Naira) and above were purposively selected among the firms engaging on both building and civil works. Leedy and Ormrod (2014) maintain that qualitative researchers often employ purposive sampling through which the selection of individuals is made, based on their experiences, in order to yield adequate information about the topic under investigation. However, the rationale behind the selection of purposive sampling technique was employed, to enable the researcher to select participants (operators) from different construction firms based on the perceived experience and survival in business for an investigation that is likely to give the ideal information. The CI domicile in Abuja, north-central Nigeria, is selected because of huge construction going on in the area.

The type of primary data generated in this research was interview recorded by the researcher through unstructured and in-depth interviews with participants. According to Mustafa (2012) collection of primary data can be through personal interviews, telephone interviews, and mailing of questionnaires. However, the secondary data for this study were sourced through published and unpublished books, dissertations and theses, texts, local and international academic journals, articles and conference papers and industrial publications. According to Osuji and Ishola (2013), secondary data are not first-hand information, facts or statistical materials that originated by the researcher.

The interview data were analysed using the thematic/deductive analytical method. It is thematic because data could be presented by transcribing, coding and setting themes from the responses of the interviewees. Hence, for the purpose of this study, the recorded, transcribed and interpreted interview data were analysed by using the deductive approach and the quantitative data was analysed using a descriptive method which included frequencies and percentiles. Data generated in this research were interpreted and presented through descriptive and narrative analysis. Hence, analyses of data are done by altering qualitative data from the interview results obtained into quantitative data. Therefore, implementation of VRE factors is rated, on the basis of cut-off points as highlighted by Saidu (2016) on a five-point Likert scale. The cut-off points, expressed in frequencies are further converted to percentages; consequently, the analyses of the results are expressed in percentage as indicated below, in which the assumption value answer are as follows: 1 = unimportant, 2

= less important, 3 = fairly important, 4 = important and 5 = most important. Militating factors against the implementation of VRE in the building sector of the CI that have a percentage of between 90 to 100 are rated most important; 70 to 89 percent are rated important; 50 to 69 percent are rated fairly important; 30 to 49 percent are rated less important, and 1 to 29 percent are rated unimportant.

4. Results Analysis

4.1. Findings from the Interview

The section presents the research findings of the interview on factors militating against VRE implementation by the respondent, and this is divided into two parts: respondents profile and interviewees results.

4.1.1. Respondents profile

The profile of the respondents that were interviewed during research includes position of the respondents, nature of the work carried out, and years of engagement of the respondents in the organisation.

Table 1. Respondent designation

Position	Respondent	Percentage
Director	7	20.58
Project Manager	9	26.47
Quantity Surveyor	9	26.47
Engineer	9	26.47

Table 1 indicates that 20.6% are in the director’s cadre, while 26.5% were project managers; quantity surveyors; and engineers for the construction firms that were visited.

Table 2. Work classification

Work Classification	No. of Respondents	Percentage of Respondents
Civil Works	6	17.65
Building Works	10	29.41
Both (Building & Civil)	18	52.94

In Table 2, different categories of work been executed by the construction firms visited were classified as 17.7% for civil engineering works; 29.4% are into building construction works, and 52.9% are into building and civil works.

Table 3. Working experience

Years	0- 5	6- 10	11-15	Above 15
Number of Respondents	2	4	16	12
Percentage	5.88	11.76	47.06	35.29

Table 3 shows the years of working experience of the operators interviewed, and this indicates that 82% of the construction operators interviewed have been in the field of building construction sector for more than 11 years, only 18% are in the building sector less than ten years. In view of these, the results show a degree of the high level of reliability.

4.1.2. Factors militating against VRE implementation in CI

VRE in the CI is faced with many factor hindrances to its implementation, leading to customer dissatisfaction. The interviews conducted with building operators on the planning, technical, and organisational related factors are explained as follows.

4.1.2.1. Influence of planning factors

Planning related issues responsible for the implementation of VRE are the principal concern among many construction professionals in the industry. These issues were taken into account by the respondents during the interview and these are planning, human and process operation. In Table 4 it shows that 91.2% of the operators interviewed believed that inadequate employee training to implement VRE is considered the most important planning factor affecting the process implementation, 85.3% equally responded that difficulty to match the best technology with the new process is another planning related factor, while 82.4% of the respondents also believed that workers fear of job loss and lack of understanding the implementation requirements of VRE process with 76.5% respondents are viewed as the main planning related factor militating against the implementation. The result further revealed that top management commitment is 58.8%, collaborative work environment 55.9%, redesigning processes that are obsolete 55.9%, focusing on new technology instead of the value process 52.9%, change in management system 50.0%, uncertainty of project outcome 50.0% and anxiety in the workplace 50.0% are observed to be the fairly important factor in planning, militating against VRE implementation.

Other factors with less impact are forgetting about employee working habits 41.8%, sense of discomfort 44.1%, VRE was much larger than anticipated 35.3%, and lowering the employee morale by 32.4%. However, 29.4% of the respondents viewed conflicts between traditional performance measures and VRE goals as planning related

factors, 26.5% believe making value mistake under pressure to produce a quick result as a factor in the planning process, 23.5% considered trying to change too much quickly to be another factor, 20.6 % view Lowering the productivity of the employee and 17.8% equally view VRE as too disruptive to value operations and are having less Influence in the implementation process.

4.1.2.2. Influence of technical factors

Assessing the impact of technology-related factors on the implementation of VRE in the CI, forty-one parameters are critically examined. From Table 5, important technical factors identified to be militating against the implementation of VRE during the interviews are client incorporation in the design phase so that the incidence of variations and time extension is reduced 88.2%, the quality standards of contractor's work 88.2% form the important challenge as well, other important factors that are rated by the respondents during the interview are: design parameters 73.5%, involvement of design team and client through partnering integration 70.6%, and partnering in the context of a contractor-sub contractor relationship 70.6%.

Moreover, factors equally considered fairly important militating against VRE implementation include: continuous growth and acceptance of change 67.7%, creating conditions and opportunities to make organisational change 67.7%, enhancement of contractor's productivity 67.7%, time consuming 67.7%, adoption of design features to site conditions 64.7%, lack of interaction that affect quality and serviceability of design phase 64.7%, encouraging the employees to learn 61.8%, design and manage 61.8%, QFD to facilitate evaluation of proposed design 61.8%, creating the new view of the organisation 58.8%, financial stability of the contractor 58.8%, existing common goal between the design team and client 55.9%, long implementation time that rendered VRE changes obsolete 55.9%, concurrent design/construction that form the client satisfaction 55.9%, client requirement which should be understood during brief development by the designer 50.0%, and simultaneous consideration of conceptual design phase 50%.

Table 4. Planning related factors

S/no	Militating factors	Percentage
1	Redesigning the processes that are obsolete	55.9
2	Difficulty in matching the best technology with the new process	85.3
3	Focusing on the new technology instead of achieving value process	52.9
4	Forgetting the employee working habits to achieve new process	41.8
5	Lack of understanding the implementation requirements	76.5
6	Conflict between traditional performance measures and VRE goals	29.4
7	Inadequate employee training to implement VRE	91.2
8	Workers' fear of job loss	82.4
9	Uncertainty of project outcome	50.0
10	Sense of discomfort	44.1
11	Anxiety in the workplace	50.0
12	Collaborative work environment	55.9
13	Top management commitment	58.8
14	Changes in the management system	50.0
15	VRE was much larger than anticipated	35.3
16	VRE was too disruptive to value operations	17.8
17	Trying to change too much too quickly	23.5
18	Making value mistakes under pressure to produce quick result	26.5
19	Lower employee productivity	20.6
20	Lower employee morale	32.4

Table 5. Technical related factors

S/no	Militating factors	Percentage
1	Creating the new view for the organization	58.8
2	Creating a shared process vision	17.8
3	Management styles and leadership	20.6
4	Encourage employees to learn	61.8
5	Continuous growth and acceptance of change	67.7
6	Create conditions and opportunities to make organizational change	67.7
7	Client incorporation in the design phase so that the incidence of variations and time extensions are reduced.	88.2
8	Client requirement should be understood during Brief development by the designer	50.0
9	Involvement of Design team and client through partnering integration	70.6
10	Past performance of the contractor	41.8
11	Quality standards of contractor's work	88.2
12	Financial stability or status of the contractor	58.8
13	Lump sum contract	20.6
14	Design and construct	41.8
15	Turn- key contract	2.9
16	Design and manage	61.8
17	Risk issue relative to project participant	35.3
18	Risk strategy adopted by client	44.1
19	Existing common goal between the design team and client	55.9
20	Difficulties in design evaluation	20.6
21	Any formal approach to design evaluation	17.8
22	Core design parameters like time, cost, and quality	73.5
23	Quality Function Development (QFD) facilitate evaluation of proposed design	61.8
24	Allow review design by contractor to eliminate problem	41.8
25	Ease of construction	47.1
26	Adoption of design features to site conditions	64.7
27	Enhancement of contractor's productivity	67.7
28	Ability to substitute materials, components and systems	44.1
29	Lack of interaction may affect quality and serviceability of design phase	64.7
30	Simultaneous consideration of conceptual design phase	50.0
31	Concurrent design/construction are client satisfaction	55.9
32	Work packages by different contractors	41.8
33	Partnering in the context of a contractor-sub contractor relationship	70.6
34	Top management reluctance to commit funds for VRE	41.8
35	Time consuming	67.7
36	Long implementation time rendered VRE changes obsolete	55.9
37	Rework time- variation & error	35.3
38	Material flow	35.3
39	Mode of information systems to support value reengineering infrastructure	32.4
40	Insufficient information	20.6
41	Lack of communication between CEO/top management and Inspection officers/supervisory manager	23.5

Furthermore, other less or unimportant militating factors against the implementation of VRE techniques are: ease of construction 47.1%, risk strategy adopted by client 44.1%, ability to substitute materials 44.1%, past performance of the contractor 41.8%, top management reluctance to commit funds for VRE implementation 41.8%, design and construct 41.8%, allow review design by the contractor to eliminate problem 41.8%, work packages by different contractors 41.8%, risk issue relative to project participant 35.3%, rework time-variation and error 35.3%, material flow 35.3% and mode of information systems to support value reengineering infrastructure 32.4%. Others are lack of communication between CEO/top management and inspection officers/supervisory manager 23.5%, insufficient information 20.6%, lump-sum contract 20.6%, difficulties in design evaluation 20.6%, management style and leadership 20.6%, any

formal approach to design evaluation 17.8%, creating a share process vision 17.8%, and Turn-key contract 2.9%.

4.1.2.3. Influence of organisational factors

Effects of organisational factors militating against the implementation of VRE in the CI are discussed under cultural and environmental issues with thirteen parameters. Table 6 present the result of the interview conducted on cultural and environmental challenges that constitute major important organisational factors militating against VRE implementation in the building sector of the construction industry. 94.1% considered having the capacity and experience for change is a key important cultural factor militating against the implementation of VRE in the sector.

Table 6. Organisational related factors

S/no	Militating factors	Percentage
1	Subjective involvement with the work completion	67.7
2	Stability and behavior of staff originating from fundamental values	85.3
3	Mindful of their mistakes by the customers	58.8
4	Having the capacity and experience for change	94.1
5	Continually improving the organization's ability to value customers	79.4
6	Company environment not conducive to reengineering	38.2
7	VRE created an unfriendly company environment	23.5
8	Downsizing but keeping the old organization structure	26.5
9	Difficult implementation due to subunits communication barriers	17.8
10	Lack of leadership to face confrontations and major business risk	73.5
11	Lack of senior management enthusiasm	38.2
12	Lack of employee consensus to see it through	85.3
13	Lack of management determination to stay on course as problems show	44.1

Continually improving the organisation's ability to value customers are considered with 79.4%, lack of employee's consensus to see VRE implementation through is the culture of the environmental factors with 85.3% respondents view, and 73.5% viewed lack of leadership to face confrontations and major business risk as another environmental key factors affecting VRE implementation process. Subsequently, subjective involvement with the work completion of 67.7% and mindful of the mistake by the customers of 58.8% are unanimously view fairly important factors affecting the implementation of VRE in the building construction sector. However, 44.1% believe that lack of management determination to stay on course as problem shows, 38.2% view company environment not conducive to reengineering and lack of senior management enthusiasm of 38.2% are considered less important factors responsible for non-VRE implementation, and other unimportant factors observed hindrances to the implementation of VRE are downsizing but keeping the old organisational structure with 26.5%, creation of VRE unfriendly environment for the company to operate is 23.5%, while difficulty to implement due to subunits barriers of the communication originating from the industry are 17.8%, these challenging issues have no doubt retired the progress and advancement of building construction sector is facing the trend of the globally competitive market as a result of new techniques that offers the customers quality products with satisfied value offering within the shortest possible time with less cost not been adopted for the growth of the industry.

5. Discussion

This research seeks to identify the factors militating against the implementation of VRE in the CI. It was found that the majority of the factors investigated in Tables 4, 5, and 6 fundamentally influence the implementation of VRE in the CI. Therefore, identifying how these factors influence the implementation of VRE by the CI operators resolved the challenges that are confronted by the operators in the industry. However, the most important planning factors affecting the implementation of VRE in the research are the inadequate employee training to implement the process; difficulty in matching the best technology with the new process; Workers' fear of job loss;

and lack of understanding of the implementation requirement. Therefore, changing the fortune of the CI can be surmounted by the workers having no fear of their job being lost as a result of the new technique, due to the inadequate training received by the operators and also understanding the implementation requirement that would match the best technology with the new process innovation, these, however, is supported by Puruhita (2018) and Fasna and Gunatilake (2019). Consequently, it was found that technical related factors affecting the implementation in the CI are: lack of client involvement in the design phase that results in incidence of variations and time extensions; quality standards of contractor's work; and involvement of design team and client through partnering integration; and partnering in the context of a contractor-sub contractor relationship are also necessary. Findings reveal in the study shows that the influence of technical factors affecting the VRE implementation process in the CI as investigated by these researchers Guimaraes (1995); Mohamed and Tucker (1996); and Hussain et al. (2014) can be annulled by the strategic involvements that can be established based on the underpinning instruments mined through design frameworks. These would go a long way in achieving a significant success of implementation in the process with a limited failure rate when the designed framework is critically followed. Furthermore, organisational related factors militating against VRE implementation in the CI identified in the study indicates that having the capacity and experience for change is the most influencing factor, similarly, lack of employee consensus to see the reengineering through; lack of leadership to face confrontations and major business risk; stability and behavior of staff originating from the fundamental values as well as continually improving the organisation's ability to value customer's needs; and lack of employee consensus to see VRE through, were negated by Soares (2013) as the important factors originating from the organisational factors affecting the implementation of VRE process in the CI.

Hence, VRE implementation by developing countries like Nigeria, Brazil, South Africa, Indonesia and Malaysia, among other nations, would derive the benefits of cost reduction, waste minimisation and completion of the project on schedule through the dramatic improvement by

adopting radical redesign performance process in other to achieve customer value for the projects. Given the nature of VRE in creating fundamental changes in all aspects of strategy, processes, technologies, and human resources, it can be said that this process has a high level of risk and usually, about 70% of reengineering projects fail in action (Nauman, 2013). Omid and Khoshtinat (2016), however, argue that despite the significant growth of value process reengineering concepts, all the organisations that have begun their implementation have not achieved a scientific model that can help them achieve their desired results.

To achieve success in VRE implementation in construction sector, employees should be provided with the essential information that can help the sector to successfully reengineer their value operations like the way it is done in industries, banking, breweries, government organisations, airways, ICT and manufacturing sectors in places like USA, UK, Iran, Malaysia, Kenya, Ghana and Nigeria.

6. Conclusions

The global spread of the VRE technique is limited in most developing countries due to the awareness level of the technique. Based on the findings, it can be concluded that VRE implementation in the CI can be achieved if adequate attention is pay on the awareness level, through training of the competent professional/operatives in the industry by attending seminars, workshops and conferences in other to avail them on the new technologies/techniques that are traded in the global market, and this will be an opportunity for global market competitiveness for the nation's CI. The study recommends that VRE implementation in all construction projects should be enforced, as it has the potential for the customer to achieve its desired satisfaction on value offering.

The study is limited to the factors militating against the implementation of VRE in the CI, focusing on both private and public construction companies executing building and civil engineering work in Abuja. Other limitation of the study was the conduct of using a tick box questionnaire with the interview guide that is ticked by the researcher in order to assess the rate of occurrence of the factors. Furtherance to the limitation of the study is the geographical nature of the study area; since this study covered only one out of the six geopolitical zones of the country, other zones should be studied and compare the results.

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Appendix
Result of tick box used by the interviewer in connection with interview guide
SECTION A: FACTORS MILITATING AGAINST VRE IMPLEMENTATION IN THE CI

S/No	Militating factors against value reengineering implementation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Total	%	
1a	Factors related to process planning	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes		
1.1	Redesigning processes that are obsolete		x		x				x	x	x	x			x	x	x	x		x	x		x	x				x		x							19	56
1.2	Difficulty to match best technology with the new process	x	x		x	x	x	x	x	x	x	x	x	x					x		x		x	x	x	x		x	x	x	x	x	x	x	x	29	85	
1.3	Focusing on a new technology instead of the value process	x		x	x	x	x	x		x	x								x		x	x					x	x	x					x		18	53	
1.4	Forgetting about employee working habits	x	x	x			x								x		x	x			x			x	x							x	x		x	14	41	
1.5	Lack of understanding the implementation requirements		x	x	x	x	x	x		x	x	x	x	x	x	x	x	x			x	x		x	x			x	x	x						26	76	
1.6	Conflict between traditional performance measures and value reengineering goals		x				x		x						x		x	x						x								x		x		x	10	29
1.7	Not enough employee training to implement VRE	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	31	91	
1b	Human related factors	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes	P	
1.8	Workers' fear of job loss	x	x	x		x	x	x			x	x	x	x	x	x	x	x	x	x	x		x	x	x	x			x		x	x	x	x	x	28	82	
1.9	Uncertainty of project outcome		x		x	x	x	x		x	x				x				x		x	x			x			x	x	x				x	x	17	50	
1.10	Sense of discomfort	x	x	x		x	x	x		x	x				x				x		x			x				x								15	44	
1.11	Anxiety in the workplace	x	x	x	x	x	x	x					x				x	x	x		x	x		x											x	17	50	
1.12	Collaborative work environment	x	x	x	x	x		x	x	x		x			x	x	x	x	x		x	x		x					x		x					19	56	
1.13	Top management commitment	x	x	x		x		x		x	x			x					x		x			x	x			x	x	x	x		x	x	x	x	20	59
1.14	Changes in the management system	x	x	x	x	x		x							x		x	x	x		x	x		x					x						x	x	17	50
1c	Process operational Factors	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes	P	
1.15	VRE was much larger than anticipated	x		x						x					x		x	x	x		x			x					x								12	35
1.16	VRE was too disruptive to value operations				x					x					x								x						x								6	18
1.17	Trying to change too much too quickly										x			x			x	x														x		x		x	8	24
1.18	Making value mistakes under pressure to produce quick result		x			x	x	x	x							x						x															9	26
1.19	Lower employee productivity						x												x		x				x				x	x						x	7	21
1.20	Lower employee morale					x					x			x					x		x	x											x		x	x	11	32
1d	Technical	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Total	%	

1di	Process and Change Management	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes			
1.24	Creating a new view of the organization	x	x	x	x	x		x		x				x		x	x	x		x	x			x				x	x				x			20	59		
1.25	Creating a shared process vision	x	x	x		x		x																								x				6	18		
1.26	Management styles and leadership	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x					x						x	x	x	x	x	x	x			24	71	
1.27	Encourage employees to learn	x	x	x		x	x	x		x	x				x			x	x				x	x			x	x	x					x	x		21	62	
1.28	Continuous growth and acceptance of change	x	x	x	x	x	x	x		x	x				x			x	x			x	x				x	x	x						x	x		23	68
1.29	Create conditions and opportunities to make organizational change	x	x	x		x		x		x	x			x	x			x	x			x	x			x	x		x						x		23	68	
1dii	Client perspective	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes	P		
1.30	Client incorporation in the design phase so that the incidence of variations and time extensions are reduced.	x	x	x	x	x	x	x		x	x			x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			30	59	
1.31	Client requirement should be understood during brief development by the designer		x			x	x	x		x	x			x				x	x				x	x				x		x							17	50	
1.32	Involvement of Design team and client through partnering integration	x	x	x	x	x	x	x	x		x	x			x	x					x	x						x	x									24	71
1diii	Appointment of contractors																																						
1.33	Past performance of the contractor	x	x	x		x	x	x						x			x	x	x		x			x	x												14	41	
1.34	Quality standards of contractor's work	x	x	x	x	x	x	x		x	x			x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			30	88	
1.35	Financial stability or status of the contractor		x		x	x	x	x	x		x	x			x	x					x	x						x									20	59	
1div	Selection of contractual system																																						
1.36	Lump sum contract		x		x	x						x										x																7	21
1.37	Design and construct										x		x	x														x	x									14	41
1.38	Turn- key contract						x																															1	3
1.39	Design and manage	x	x	x		x		x			x			x	x			x	x	x	x						x	x										21	62
1dv	Risk sharing	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes	P		
1.40	Risk issue relative to project participant		x		x	x		x			x					x				x								x	x									12	35
1.41	Risk strategy adopted by client	x		x						x		x	x	x					x	x	x	x					x	x										15	44
1dvi	Design evaluation																																						
1.42	Existing common goal between the design team and client	x	x	x		x		x			x			x	x													x	x									19	56
1.43	Difficulties in design evaluation					x					x								x			x						x										7	21
1.44	Any formal approach to design evaluation						x				x			x														x										6	18
1.45	Core design parameters e.g Time, cost, Quality		x		x	x	x	x			x			x	x			x	x	x	x	x	x	x	x	x	x	x	x									25	74
1.46	Quality Function Development (QFD) facilitate evaluation of proposed design		x		x	x	x	x	x		x		x	x				x	x									x										21	62

1dvi i	Constructability analysis	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes			
		1.47	Allow review design by contractor to eliminate problem	x	x	x		x		x			x			x		x	x						x					x	x			x			x		14
1.48	Ease of construction	x	x	x	x	x	x	x						x			x	x		x	x			x								x					16	47	
1.49	Adoption of design features to site conditions	x	x	x		x	x	x			x			x			x	x	x					x					x	x		x	x	x	x		22	65	
1.50	Enhancement of contractor's productivity	x	x	x	x	x	x	x	x		x	x		x	x	x	x	x					x	x					x				x				23	68	
1.51	Ability to substitute materials, components and systems	x		x							x				x		x	x					x	x				x	x			x					15	44	
1dvi ii	Project phase interaction																																						
1.52	Lack of interaction may affect quality and serviceability of design phase		x			x	x		x	x		x	x		x	x	x	x						x	x				x	x						x	22	65	
1.53	Simultaneous consideration of conceptual design phase	x	x	x	x	x	x	x			x								x										x	x				x	x	x	17	50	
1.54	Concurrent design/construction are client satisfaction	x	x	x		x		x			x			x			x	x	x					x				x	x				x				19	56	
1dix	Re-organizing work Packages																																						
1.55	work packages by different contractors		x			x	x	x	x	x			x	x			x												x		x			x				14	41
1dx	Partnering with sub-contractors																																						
1.56	Partnering in the context of a contractor-sub contractor relationship	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					x	x	x			x	x	x		x		x	x		24	71	
1e	Cost, Time and Information	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes	P		
1.57	Top management reluctance to commit funds for VRE						x			x				x	x	x	x				x		x	x			x		x			x					14	41	
1.58	Time consuming	x	x	x		x	x	x		x				x	x		x	x					x					x		x						x	23	68	
1.59	Long implementation time rendered VRE changes obsolete	x	x	x	x	x	x	x	x			x			x	x	x	x																			19	56	
1.60	Rework time- variation and error	x		x			x							x	x		x	x						x					x								12	35	
1.61	material flow	x		x			x				x			x	x		x	x						x													12	35	
1.62	mode of information systems to support value reengineering infrastructure											x			x	x		x	x								x	x		x						x	11	32	
1.63	insufficient information					x					x	x																	x		x							7	21
1.64	Lack of communication between CEO/top management and Inspection officers/supervisory manager										x				x	x		x																				8	24
	Organizational Factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Total	%		
1fi	Environment	D1	D2	D3	D4	D5	D6	D7	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	E1	E2	E3	E4	E5	E6	E7	E8	E9	Codes			
1.65	Company environment not conducive to reengineering	x		x	x						x			x	x		x	x					x					x										13	38
1.66	VRE created an unfriendly company environment	x		x							x			x									x					x	x									8	24
1.67	Downsizing but keeping the old organization structure														x																							9	26
1.68	Difficult implementation due to sub units communication barriers					x									x																							6	17
1.69	Lack of leadership to face confrontations and major business risk	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x							x									25	73

