Mitigating Strategies for High Cost of Construction Projects in Nigeria

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The high cost of construction projects in Nigeria is very disturbing and had been an issue of serious concern to the stakeholders in the construction industry. The paper therefore, aims at establishing the mitigating strategies for the high cost of construction projects with a view of improving project delivery in Abuja. In order to accomplish the aim of the study, quantitative research was adopted through the use of questionnaire survey approach. One hundred and twenty (120) questionnaires were distributed to the Contractors, Quantity Surveyors, Architects, Civil Engineers and Builders in the construction firms in Abuja, Nigeria. However, only one hundred and fourteen (114) questionnaires were filled correctly and returned which represented 95% of the questionnaires and were used for the data analysis. Based on the findings, the followings were established as main the mitigating strategies for high cost of construction projects in Abuja namely: (1) proper supervision and site management, (2) adequate and effective financial control on site, (3) effective and adequate planning and packaging, (4) incorporation of risk management and cost control requirement in the tendering process, and (5) details and accurate estimate (quality take off) before commencement of work. Therefore, the paper suggests that the management of construction firms should ensure there is proper supervision and site management during the course of construction projects in order to reduce the shoddy work, mistakes, reworks and variations that might lead to high cost of construction projects. There is also the need for adequate planning and management right from inception to completion stage of construction projects for effective project delivery.

Keywords: Construction firms, Construction projects, High **c**ost, Project delivery, Mitigating strategies.

Introduction

The high cost of construction projects in Nigeria is a big challenge to the construction industry and thereby leads to inability to complete projects within the stipulated time and cost, total project abandonment and project failure. Nzekwe, et al. (2015) stated that the failure of projects from a cost perspective is a worrisome trend in the construction industry in Nigeria. Whereas in many cases, project cost variation is inevitable because of inflation and other unforeseen events, more often than not, poor project conception and design make it impossible to make credible estimates of the costs of materials and of the project itself. Sometimes, the ultimate cost of the project

after all the variations done is several magnitudes higher than the projected cost at the beginning. In addition, Melayed (2015) condemned and lamented the high cost of construction in Abuja as 'exploitative'. According to Melaved (2015) both Government and construction firms had a hand in fuelling the high cost of executing construction projects in Abuja. and that construction firms have attributed the abnormality to the irregular and selective payments for executed contracts by the FCT administration despite high interest rates and further liabilities incurred by the firms. Egbo (2010) expressed his opinion that construction cost can begin at the design stage to the production stage. At

project conception, the decision of the client to build or not to build is mostly influenced by cost. Also, the scope of construction production is influenced by cost while, production time or construction period is based on the availability of fund. Interestingly, the production cost represents the largest single component of construction It involves the irreversible cost. commitment of funds for the purchase and use of construction resources on the site. American Institute of Architects (2013) stated that construction costs are the portion of hard costs normally associated with the construction contract, including the cost of materials and the labour and equipment costs necessary to put those materials in place. Added to this is overhead costs, which include both job site management and the contractor's standard cost of doing business (office, staff, insurance, etc.).

However, Nigeria has been identified as one of the countries with high cost of construction in the world. Projects in Nigeria have been observed to cost far more than similar projects being executed in other parts of the world. Reasons for escalation in project cost include unforeseen costs, which were not anticipated at the time of preparation of the original estimate (Chitkara, 1998; Eze & Idiake, 2018). It needs not be emphasized that project cost escalation is uneconomic; it is a phenomenon that could result in a loss (Dikko, 2012). Therefore, the aim of the paper is to identify mitigating strategies for the high cost of construction projects in Abuja with a view of improving the project delivery.

Literature Review

Factors responsible for high cost of construction projects

The high cost of construction which resulted in project failure delivery is caused by ineffective construction management and poorly established cost control systems (Sriprasert, 2000). Other factors affecting construction cost include inadequate/inefficient equipment, tools and plant, unreliable sources of materials on the local market and site accidents (Kousliki and Kartam, 2004). Apart from these, other factors are as shown in Table 1.

Mitigating strategies for high cost of construction projects

Jaffari et al. (2019) established that the followings are mitigating strategies for the high cost of construction projects in Dar-Es-Salaam namely: detail and accurate estimate before commencement of construction projects, adequate and effective financial control on site, proper supervision and site management, use of appropriate form of contract and adequate and effective waste control on site. Alkeim (2017) argued that the best measure to reduces the high cost of construction projects is through commitment of top management of construction firms, due process in the award of contract to competent contractor, adequate involvement of core professionals right from the inception to completion stage of the project, clear distinction between a design change and a design development at the outset of project.

Table 1: Factors responsible for high cost of construction projects

Factor	Author/Year of	
	publication	
(1) Price fluctuations, 2) Financing and payments of completed works, 3) Poor contract management, 4) Schedule delay, 5) Charges in site conditions, 6) Inaccurate estimates, 7) Shortage of material, 8) Imported materials and plant items, 9) Additional works, 10) Design changes, 11) Subcontractors and nominated suppliers, 12) Weather, 13) No adherence to contract conditions, 14) Mistakes and discrepancies in contract conditions and 15) Fraudulent practices.	Omoregie and Radford (2006)	
1) Poor site management and supervision, 2) Poor project management assistance, 3) Financial difficulties of owner, 4) Financial difficulties of contractor and 5) Design changes.	Le-Hoai et al. (2008)	
 Increment of materials prices due to continuous border closures, 2) Delay in construction, 3) Supply of raw materials and equipment by contractors, 4) Fluctuations in the cost of building materials, 5) Instability of the local currency in relation to dollar value, 6) Project materials monopoly by some suppliers, 7) Resources constraint; Funds and associated auxiliaries not ready, 9) Lack of cost planning/monitoring during pre-and post-contract stages and 10) improvements to standard drawings during construction stage, design changes and inaccurate quantity take-off. 	Enshassi <i>et al</i> . (2009)	
 Cost overrun, 2) Design changes, 3) Risk and uncertainty associated with projects, 4) Inaccurate evaluation of project's time/duration, 5) Non-performance of subcontractors and nominated suppliers, 6) Complexity of works, 9) Conflict between project parties, 10) Discrepancies in contract documentation, 11) Contract and specification interpretation disagreement, 12) Inflation of prices, 13) Financing and payment for completed works, 14) Lack of proper training and experience of project manager, 15) Low skilled manpower, 16) Unpredictable weather conditions, 17) Dependency on imported materials, 18) Lack of appropriate software, 19) Unstable interest rate, 20) Fluctuation of currency/exchange rate, 21) Weak regulation and control, 22) Project fraud and corruption and 23) Unstable government policies. 	Olawale and Sun (2010)	
1) Lack of experience of contractors, cost of material, 2) Fluctuation in the prices of materials, 3) Frequent design changes, 4) Economic stability, 5) Kickbacks, high interest rates charged by banks on loans received by contractors, 6) Mode of financing, and 7) Bonds and payments as well as fraudulent practices.	Ameh et al. (2010)	

Authors' compilation

Dolage and Pathmarajah (2015) expressed that delay during the course of construction projects contribute significantly to the high cost of construction projects. Therefore, mitigating the delay will reduce the high cost of construction projects, by ensuring the availability of labour and materials, comprehensive articulation coordination and communication between the consultant and contractors, and also directing of the sub-contractor properly to ensure they know what is expected of them in relation to the projects (Soliman, 2017). Awolesi et al. (2015) asserted that causes of high cost of construction projects are due to inadequate planning and management of projects right from inception to the completion and also

mechanism during the course of execution. Therefore, these problems can be properly mitigated by adequate and effective financial control on site, effective and adequate planning and management and incorporation of risk management and cot control requirement in the tendering process. Aibinu and Jagboro (2002) suggested that the speeding up of site activities, and incidental stipend could be applied to reduce high cost of construction projects. Odeh and Battaineh (2002) proposed the following approaches creating and classifying human resources through appropriate training; consideration of capability and experience of contractor

lack of proper supervision and control

more than the price during contract award, adoption of design-build and and construction management contracts. Edwin and Wooyong (2019) added the followings: project's adequate financing and arrangement, previous work experience on similar projects, donors' influence, close project supervision, suitable time estimation skills, availability and quality of the workforce, and availability of materials and equipment as major mitigating strategies to reduce the high cost of construction projects.

Mitigating strategies for high cost of construction projects are as follows: establish risk analysis process specifically for a complete work or activities in a project, utilization of indigenous contractors and consultants, ensure there is comprehensive details design for complex projects before commencement of work, proper supervision and site management, adequate provision of construction cost data and adequate and effective waste control on site (Kesavan et al. 2015; Jeykanthan and Jayawardena, 2012). Furthermore, timely payments of completion certificates, good presentation of information during tendering, finishing the design on time, workers' motivation and morale, capacity building training, good logistic management (Transportation), top management's support, and site location were identified as strategies to mitigate high cost of construction projects (Edwin and Wooyong, 2019).

Research Method

This study adopted quantitative research approach via survey questionnaire to sample stakeholders and professionals from a population with a view towards making statistical inference about the population using the sample (Creswell 2011; Vogt *et al.*, 2012). To pull out stakeholders and professionals in the construction industry opinion, such as beliefs, perception, ideas, views and thought about the mitigating strategies for the high cost of construction projects in Abuja. In order to obtain the require population for this study, the stratified sampling technique was adopted for the selection of the construction firms

that participated in this study. This selection was in line with the concept of Creswell and Tashakkori (2007) that respondents are arranged in strata for the convenience in questionnaire distribution and assessment. In this case, the strata are clients, consultants and contractors. Although, the selection of construction firms was based on the annual turnover, construction firm's capacity and frequency of firm's involvement in the construction project execution. Since the units of measurement are stakeholders and professionals in the construction firms, therefore, simple random techniques were adopted in each of the construction firms for the selection of construction stakeholders and professionals from the strata.

The questionnaire that was used to record the responses of each respondent contained mainly closed ended questions using a fivepoint Likert scale ranged from very high, High, slightly high, Low and None. One hundred and twenty (120) questionnaires distributed to the following were respondents: Contractors ten (10) numbers, Quantity Surveyors thirty (30) numbers, Architects thirty (30) numbers, Civil Engineers twenty-five (25) numbers and Builders twenty-five (25) numbers. However, only one hundred and fourteen (114) questionnaires were filled correctly and returned which represented 95% of the questionnaires and were used for data analysis. Mean score was used to rank the respondents' opinions or responses. In addition, T-test statistic was adopted to test the difference in respondent's views.

Findings and Discussion of Results

The results are presented and discussed below

Years of working experiences of the respondents

Figure 1 indicates that 31.52% of respondents had 1-10 years of experience, 57.60% had 11-20 years of experience, 9.78% had 21-30 years of experience, 1.09% had 31-40 years of experience and 0.01% had Above 40 years of experience respectively. Inferences drawn from this was that the respondents sampled were knowledgeable enough to comprehend the

contents of the questionnaires, thus provide suitable responses.

Educational qualifications of the respondent's

Figure 2 indicates that 14.13% of respondents had National Diploma, 31.52% were holders of Higher National Diploma (H.N.D) and Bachelor of Sciences (BSc), 20.65% of respondents had Post Graduate Diploma (P.G.D), 30.43% of respondents had Master of Sciences (MSc/MTech) and

3.26% of respondents had Philosophy of Doctorates (PhD) respectively.

Types of Respondents

Figure 3 shows 25% of respondents are Quantity Surveyors, likewise, 25% of respondents are Architects, and 20.83% are Builders, with 12.5% of respondents are Civil Engineers. In addition, 8.33% of the respondents are contractors, the same with client representatives.



Figure 1: Years of Experience of Respondents



Figure 2: Educational Qualifications of Respondent



Figure 3: Nature of respondent used for this study

Mitigating Strategies for high cost of construction projects

The mitigating strategies for the high cost of construction projects was evaluated to establish the main strategies to reduce the high cost of construction projects in Abuja. The opinions of the three (3) key stakeholders were ranked based on the mean item scores to aid the decision making. However, the results of three (3) key stakeholders were presented in section 4.4.1 to 4.4.4 below.

Client perception on mitigating strategies for high cost of construction projects.

The decision rules used to rank the mean scores are as follows: (1) 0.00 to 1.49 represent None; (2) 1.5 to 2.49 represent Low; (3) 2.5 to 3.49 represent Slightly High; (4) 3.5 to 4.49 represent High and (5) 4.5 to 5.0 represent Very High. Table 2 shows that proper supervision and site management; adequate and effective financial control on site; details and accurate estimate (quality take off) before commencement of work; effective and adequate planning and packaging; and comprehensive/detail

design for complex projects before commencement of work are the main mitigating strategies for the high cost of construction projects under the clients' perception. These strategies were ranked 1st; 2nd; 3rd; 4th; & 5th with the followings mean scores of 4.79; 4.64; 4.58; 4.51 & 4.46 respectively. The findings are in line with the findings of Jaffari et al. (2019) that established the followings as mitigating strategies for the high cost of construction projects in Dares-Salaam namely: detail and accurate estimate before commencement of construction projects, adequate and effective financial control on site, proper supervision and site management, use of appropriate form of contract and adequate and effective waste control on site. Alkeim (2017) argued that the best measure to mitigate the high cost of construction projects is through the commitment of top management of construction firms, due process in the award of contract to competent contractor, adequate involvement of core professionals' right from the inception to completion stage of the project.

Table 2: Cli	ient perception	s on mitigating	strategies	for high cost	of construction	n projects
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Variables	Mean	Ranks	Remarks
Proper supervision and site management	4.79	1	Very High
Adequate and effective financial control on site	4.64	2	
Details and accurate estimate (quality take off) before commencement of work	4.58	3	
Effective and adequate planning and packaging	4.51	4	
Comprehensive/details design for complex projects before commencement of work	4.46	5	High
Following due process in awarding contract	4.23	6	
Incorporation of risk management and cost control requirement in the tendering process	4.08	7	
Adequate provision of construction cost data	3.83	8	
Use of appropriate forms of contract	3.70	9	
Adequate and effective wastes control on site	3.53	10	
Comprehensive articulation, coordination and communication between the consultants and contractors		10	Slightly High
Availability of labour	3.21	12	
Utilization of indigenous contractors and consultants	2.88	13	
Ensuring clear distinction between a design change and a design development at the outset of project		14	
Directing of the sub-contractors properly to ensure they know what is expected of them in relation to the project	2.63	15	
Establish risk analysis process specifically for a complete work or activities in a project	2.59	16	

Consultant's perception on mitigating strategies for high cost of construction projects

Table 3 shows that details and accurate estimate (quality take off) before commencement of work; following due process in awarding contract; use of appropriate form of contract; adequate and effective waste control on site: comprehensive articulation, coordination and communication between the consultants and contractors; and adequate and effective financial control on site are the main mitigating strategies for high cost of construction projects under consultant's perception. These mitigating strategies were ranked 1st ;2nd; 3rd; 4th & 5th with the followings mean scores of 4.48; 4.46; 4.41; 4.38; 4.35 & 4.33 respectively. Kunya et al. (2008) who recommended that Quantity Surveyors should be conducting market surveys at regular intervals in order to have

current prices of materials to help facilitate realistic construction project costs. Awolesi et al. (2015) asserted that causes of high cost of construction projects are due to inadequate planning and management of projects right from inception to the completion and also lack of proper supervision and control mechanism during the course of execution. Therefore, these problems can be properly mitigated by adequate and effective financial control on site, effective and adequate planning and management and incorporation of risk management and cot control requirement in the tendering process. Dikko (2012) opined that cost auditing is one strategy that could be adopted by Quantity Surveyors in fighting the impact of high cost of construction project. Arah (2012), observed that audit report should be made compulsory as a means to reduce the impact of high cost.

Variables		Ranks	Remarks
Details and accurate estimate (quality take off) before commencement of work	4.48	1	Very High
Following due process in awarding contract	4.46	2	
Use of appropriate forms of contract	4.41	3	
Adequate and effective wastes control o site	4.38	4	
Comprehensive articulation, coordination and communication between the consultants and contractors	4.35	5	
Adequate and effective financial control on site	4.33	6	
Incorporation of risk management and cost control requirement in the tendering process	3.98	7	High
Proper supervision and site management	3.92	7	
Effective and adequate planning and packaging	3.74	9	
Ensuring clear distinction between a design change and a design development at the outset of project	3.65	10	
Adequate provision of construction cost data	3.51	11	
Utilization of indigenous contractors and consultants	3.42	12	Slightly
Comprehensive/details design for complex projects before commencement of work	3.38	13	High
Availability of labour	3.24	14	
Establish risk analysis process specifically for a complete work or activities in a project	3.18	15	
Directing of the sub-contractors properly to ensure they know what is expected of them in relation to the project	3.11	15	

Table 3: Consultant's perception on mitigating strategies for high cost of construction projects

Contractors' perception on mitigating strategies for high cost of construction projects

Table 4 shows that incorporation of risk management and cost control equipment in the tendering process; proper supervision and site management; effective and adequate planning and packaging; and adequate and effective financial control on site are the main mitigating strategies for high cost of construction projects under the contractor's perception. These mitigating strategies were ranked 1st; 2nd; 3rd; 4th & 5th with the followings mean scores of 4.74; 4.62; 4.56; 4.51 & 4.50 respectively. However, the finding was in consonance with the finding of (Olawale & Sun, 2010;

Ashworth & Hogg, 2002) that the mitigating measures to overcome the causes of high cost of construction project is by profitable firms generating their own sources of fund (revenues) from the elimination of waste from trade and professional practice. Edwin and Wooyong (2019) argued that timely payments of completion certificates, good information presentation of during tendering, finishing the design on time, workers' motivation and morale, capacity building training, good logistic management (Transportation). top management's support, and site location were identified as strategies to mitigate high cost of construction projects.

Table 4: Contractors	perception on	mitigating st	rategies for hig	h cost of construction	projects
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Variables	Mean	Ranks	Remarks
Incorporation of risk management and cost control requirement in the tendering process	4.74	1	Very High
Proper supervision and site management	4.62	1	
Effective and adequate planning and packaging	4.56	3	
Utilization of indigenous contractors and consultants	4.51	3	
Adequate and effective financial control on site	4.50	5	
Availability of labour	4.34	6	High
Adequate provision of construction cost data	4.11	7	
Comprehensive articulation, coordination and communication between the consultants and contractors	4.02	8	
Use of appropriate forms of contract	3.86	9	
Comprehensive/details design for complex projects before commencement of work	3.71	10	
Details and accurate estimate (quality take off) before commencement of work	3.63	11	
Directing of the sub-contractors properly to ensure they know what is expected of them in relation to the project	3.54	12	
Adequate and effective wastes control o site	3.51	13	
Establish risk analysis process specifically for a complete work or activities in a project	3.29	14	Slightly High
Following due process in awarding contract	3.18	15	
Ensuring clear distinction between a design change and a design development at the outset of project	2.91	16	

The Overall perceptions of stakeholders on mitigating strategies for high cost of construction projects

Finally, Table 5 indicates the overall perception of stakeholders on mitigating strategies for the high cost of construction projects are high in ranking. This signifies that the above listed mitigating strategies on the high cost construction projects in Table 4 have impact in alleviating the causes of high cost of construction projects in Abuja if adopted and practised. However, the following variables are most significant in ranking, namely: proper supervision and site management; adequate and effective financial control on site, effective and adequate planning and packaging; incorporation of risk management and cost control requirement in the tendering and details and accurate estimate (quality take off) before commencement of work. These variables were ranked 1st, 2nd, 3rd, 4th, 5th & 6th with the following mean scores items of 4.71; 4.63; 4.59; 4.52 & 4.50 respectively.

Since the significance values of T- Test Statistics are less than 0.05 level of significance for all the items, therefore, overall perception of stakeholders on mitigating strategies have impact on high cost of construction projects in Abuja. This was indicated also by the high mean values greater than the average value of 2.50, which confirmed the respondent's positive responses to the items. The finding is in consonance with the findings of Giwa (1988); Arah (2012) and Anago (2012) that proper supervision and site management, incorporation of risk management, sustainable development, and adequate waste control on construction site are the most effective ways of mitigating the impact of high cost of construction projects. The study is also consistent with Egbo (2010) that effective financial control on site was the most effective ways of mitigating the high cost of construction as perceived by the three parties though ranked 2^{nd} in Table 5.

Variables	Mean Scores	Ranks	T value	Sig (2 tailed)
Proper supervision and site management	4.71	1	38.194	.000
Adequate and effective financial control on site	4.63	2	34.731	.000
Effective and adequate planning and packaging	4.59	3	25.143	.001
Incorporation of risk management and cost control requirement in the tendering process	4.52	4	22.338	.000
Details and accurate estimate (quality take off) before commencement of work	4.50	5	19.671	.000
Following due process in awarding contract	4.44	6	19.085	.000
Use of appropriate forms of contract	4.39	7	18.531	.003
Comprehensive articulation, coordination and communication between the consultants and contractors	4.23	8	17.629	.000
Utilization of indigenous contractors and consultants	4.16	9	16.548	.002
Adequate provision of construction cost data	4.02	10	14.670	.000
Adequate and effective wastes control o site	3.92	11	11.498	.001
Comprehensive/details design for complex projects before commencement of work	3.81	12	10.346	.000
Availability of labour	3.73	13	9.283	.000
Ensuring clear distinction between a design change and a design development at the outset of project	3.56	14	8.098	.001
Directing of the sub-contractors properly to ensure they know what is expected of them in relation to the project	3.54	15	7.143	.000
Establish risk analysis process specifically for a complete work or activities in a project	3.51	16	6.317	.004

Table 5: The Overall perceptions of stakeholders on mitigating strategies for high cost of construction projects

Conclusion

The high cost of construction project has been a serious concern to the management of construction firms and the clients in Abuja. In spite of the efforts by the previous researchers to address the issues in different ways. The problems of the high cost of construction projects continue to increase on a daily basis due to lack of mitigating strategies to address the challenges. It was on the basis of the above mentioned that this paper assessed the mitigating strategies for the high cost of construction projects in Abuja. And from the findings, the paper established the followings as major mitigating strategies for the high cost of construction projects in Abuja namely: (1) proper supervision and site management; (2) adequate and effective financial control on the site, (3) effective and adequate planning and packaging; (4) incorporation of risk management and cost control requirement in the tendering and (5) details

and accurate estimate (quality take off) before commencement of work. Therefore, the paper concludes that the major causes of the high cost of construction projects are inadequate planning and management, high demand of construction projects in Abuja and lack of proper monitoring and supervision of construction projects right from the inception to the completion stage of projects. The paper therefore, suggests that the Government and top management in the construction industry should key into the mitigating measures in order to improve or reduce the impacts of the high cost of construction projects in Abuja.

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