



Factors Enhancing Cost Management of Construction Project in Nigeria: An Evaluation

Babatunde Gbenga Eziekiel; & Isiyaku Muhammed

Abstract

Construction project cost management is an important aspect considered throughout the project management life cycle. This paper attempt to identify the essential factors related to cost management of construction project in Nigeria and show the degree of severity of these factors to cost management of construction project from the perspectives of the clients, the consultants and the contractors in Nigeria. Structured questionnaires were administered to the targeted respondents in the course of this study. The results of analyzing nineteen factors identified and considered in the questionnaire survey using mean relative important index shown ten most critical factors of cost management of construction project in Nigeria which are; effective project cost budgeting, accurate project cost estimation, effective cost planning and control, Control of variation order, effective resource planning, application of due process, adequate time for project implementation, choice of competent contractor, design adequacies, prompt payment to contractors and consultant, appointment of competent professional, prompt appointment of consultants, effective coordination of contractors. This study also revealed that that both clients, consultants and the contractors generally agree on the critical factors affecting cost management of construction project in Nigeria as there is an intersection of these ten most critical factors in their responses. The paper conclude that this agreement confirms the influential effects of these factors on the cost management of construction project and provides a level of validation for this study and recommended among others that both clients, consultants and the contractors give more attention to the critical factors that affect the cost management of construction project in order to achieve value for money in construction project. Clients, consultants and the contractors should also manage each of these critical factors at their various level of construction project implementation.

Keywords: *cost, cost management, construction, projects, factors*

Introduction

Cost is one of the significant factors in any construction project delivery. Therefore, success or failure of a construction project delivery is dependent on maintaining the total cost of the constructed project within the pre-determined cost (Ajator, 2010, Muhammed, 2015). The preparation of cost estimate of a construction project and its subsequent management at construction stage is one of the most difficult tasks in construction project management (Oberlender in Adnan et al 2013). By this, it implies that cost management of construction project commences from accurate cost estimating and budgeting of construction project. Construction project (building and engineering project) in Nigeria over the years have suffered high cost of construction with a wide gap between the initial cost estimate and the final cost of construction. This is evident in Giwa, (1988) where it was pointed out that there is always a discrepancy between the initial and final contract sum in building and engineering construction project in Nigeria and that construction cost escalation ranges between 61.8% and 186.3% and in some cases up to 600%. Construction cost management sits somewhere between cost planning at pre-contract stage and post-contract cost control, providing avenue for measuring and correcting deviation and involves collecting, analyzing and summarizing all available data related to the construction of the project (Holm et al in Adnan et al., 2013). Defective and Inadequate construction cost management invariably leads to over-trading in some cases and

misallocation of scarce resources (Muhammed, 2015).

An accurate construction cost management generally results in the most economical construction project cost, while defective often leads to greater actual expenditures. Accuracy of construction cost management is heavily dependent on the availability of quality historical cost data and the level of professional expertise, experience of the professional among other things.

Professionals in the construction industry are still facing the challenges of construction project cost management, which is keeping the total cost of construction within the pre-determined cost. The purpose of this paper is to identify, evaluate and rank essential factors of cost management of construction project in Nigeria from clients', consultants' and contractors perspectives with a view to establish the critical factors that affect or influence the total cost of construction project management in Nigeria.

CONSTRUCTION PROJECT COST MANAGEMENT FACTORS: A LITERATURE REVIEW

Various studies have focused on identifying the factors that have some influences on the cost of construction project in Nigeria. Isiyaku, (2015) identified thirty (34) factors influencing cost of construction project in Nigeria to include among other: design inadequacies, late appointment of quantity surveyor, hasty project implementation, non-application of due process, kick-back and corruption, lowest bidding procurement

method, material importation, project scope change, variation order, high interest rate, bureaucracy, mode of project financing, improper planning, market forces, choice of some contractor on specific project, wrong method of cost estimation, lack of coordination of main contractor and subcontractor, incompetence and professional negligence, contractor inefficiency, material mismanagement, leakages, government policy, loss and expense, delay payment to contractor and consultant, inadequate duration of contract period, project complexity, contract condition, poor pre-contract study, dispute on site, adverse effect of weather, poor site investigation, project risk management, technological requirement and project formation.

Elhag, et al in Adnan et al (2013) stated that the technological and project design, the contractor's expertise and management ability and the client's desired level of construction sophistication play important roles in determining the cost of a project and post contract project cost management. According to them, most of the significant factors affecting project cost management are qualitative, such as client priorities (e.g., completion time, procurement methods, market conditions, etc.). Adnan et al (2013) also pointed out five (5) important of project cost estimation and management which are: process design, team experience and cost information, time allowed to prepare estimates, site requirements and bidding and labour climate.

According to Liu and Zhu (2007), two types of factors, control factors and idiosyncratic factors, influence and contribute to the cost of a project. Control factors are the factors that can be controlled by estimators to improve the performance of estimation, while idiosyncratic factors influence cost estimation but are outside the control of the estimators and include market conditions, project complexity, weather, contract size, site constraints, resource availability, type of procurement system and contract work type. These factors identified by various authors are modified to suit the purpose of this study.

Project management body of knowledge (PMBOK) refer to project cost management as the processes required to ensure that the project is completed within the approved budget and it involves resource planning, cost estimating, cost budgeting and post contract cost control.

RESEARCH METHODOLOGY

Targeted respondents are seen as key players in the provision of construction projects in Nigeria that is, the consultants, contractors and the clients. This study has been conducted by means of a survey questionnaire with the objective of appraising the identified factors that affect the total cost management of construction project in Nigeria. The questionnaire were designed to have two part. Part one required preliminary information about the respondents and part two dwelt with study objective. Expert opinion and literature relating to the study were sought for through which a number of factors influencing the total cost of construction project in Nigeria were identified. A total number of nineteen (19) modified cost management factors were considered and analyzed in this study using

statistical tools of relative important index (RII) value to rank the severity of these factors. The questionnaire was design and sent to the targeted respondents that is the contractors, the clients and the consultants. A total number of 105 questionnaire were distributed among the target respondents. 55 number of the questionnaires were sent to the consultancy organization and 42 were returned fill, 30 number of the questionnaires were sent to the contracting organization and 27 were returned fill and 25 number of the questionnaires were sent to various construction project clients and 22 were returned fill. A total number of 91 questionnaire were returned filled from various respondent which were subjected to analysis with a total average response rate of 86.67%. The respondents were asked to rate the extent to which the various identified factors have impact on the total cost management of construction project in Nigeria on a five-point likert scale, where grade 5 is for factor with very high impact (FVHI), 4 for factor with high impact (FHI), 3 for factors with moderate impact (FMI), 2 for factor with little impact (FLI) and I for factor with very little impact (FVLI). Pictorial statistics and Statistical analysis was conducted using relative important index value to rank the severity of the identified factors and chi-square was used to establish the correlation of the top five identified factors and total cost management of construction project in Nigeria.

DATA PRESENTATION, ANALYSIS AND DISCUSSION

Table1: show years of experience of the respondents.

Year	No of Respondents(f)	X	F _x
1-10	38	5.5	209
11-20	32	15.5	596
21-30	17	25.5	433.5
31-40	4	35.5	142
Total	91		1380.5

Average years of experience of the respondents = $1380.5/91 = 15$ years

The average years of experience of the respondents as calculated from the table 1 above was found to be 15 years. This shown that the respondents in this study are well experience in construction cost and management and that the information obtained from them were reliable and fit for this study

Table 1: List of identified Factors of Cost of Management of Construction Project

Factor	Source	Comment
Design adequacies	literature	modified
Prompt appointment of consultant's	literature	modified
Adequate time for project implementation	literature	modified
Application of due process	literature	modified
Limit to Material importation	literature	modified
Control of Variation order	literature	modified
Effective project cost budgeting	literature	selected
Effective cost planning and control	literature	modified
Effective resource planning	literature	selected

Choice of competent contractor	literature	modified
Accurate project cost estimation	literature	modified
Effective coordination of contractors'	literature	modified
Appointment competence professional	literature	modified
Prompt payment to contractors and consultant	literature	modified
Proper pre-contract study	literature	modified
Avoidance of dispute on site	literature	modified
Project risk evaluation and management	literature	modified
Effective Quality plan and quality control	literature	modified
Adherence to construction project duration	interview	selected

Table 2: appraisal of identified factors of cost management using Relative Important Index: *Consultants perspectives*

	FACTORS	FVHI-5	FHI-4	FMI-3	FLI-2	FVLI-1	RII VALUE	RANK
A	Effective project cost budgeting	29	5	4	3	1	4.38	1
B	Effective cost planning and control	26	5	3	2	6	4.02	2
C	Accurate project cost estimation	25	3	4	3	7	3.85	3
D	Effective resource planning	26	2	3	3	8	3.83	4
E	Control of variation order	22	4	6	4	4	3.71	5
F	Adequate time for project implementation	24	3	2	4	9	3.69	6
G	Application of due process	24	2	2	4	9	3.60	7
H	Design adequacy	23	3	3	2	11	3.55	8
I	Prompt appointment of consultants	20	4	2	3	13	3.35	9
J	Appointment of competent professional	18	5	3	2	14	3.24	10
K	Choice of competent contractor	18	5	3	2	14	3.24	10
L	Prompt payment to contractors and consultant	17	4	2	3	16	3.07	11

M	Effective coordination of contractors	15	3	3	4	17	2.88	12
N	Adherence to construction project duration	15	2	1	2	22	2.67	13
O	Proper pre-contract study	14	1	2	3	22	2.57	14
P	Effective quality plan and quality control	14	1	3	6	18	2.55	15
Q	Limit to material importation	12	1	3	6	20	2.50	16
R	Avoidance of dispute on site	10	2	2	8	20	2.38	17
S	Project risk evaluation and management	10	1	1	6	24	2.21	18

Source: Field survey, 2021

Table 2 above shown the analysis of the identified factors of cost management of construction project in Nigeria using the relative important index (RII) from the consultant point of view. The results of the analysis shown that effective project cost budgeting, effective cost planning and control, accurate project cost estimation, effective resource planning, control of variation order, adequate time for project implementation, application of due process, design adequacy, Prompt appointment of consultants, appointment of competent professional, choice of competent contractor, Prompt payment to contractors and consultant are the most critical factors of construction cost management in Nigeria with a cut-off point of 3. This shown that these factors if properly managed in a construction project cycle can enhances construction cost management leading to cost efficiency and value for money in construction project in Nigeria.

Table 3: appraisal of identified factors of cost management using Relative Important Index: Contractor's perspectives

		FVHI- 5	FHI- 4	FMI- 3	FLI- 2	FVLI- 1	RII VALUE	RANK
A	Effective project cost budgeting	21	1	2	2	1	4.62	1
B	Accurate project cost estimation	20	2	2	1	2	4.37	2
C	Control of variation order	20	1	1	3	2	4.25	3
D	Effective resource planning	19	2	1	2	3	4.19	4

E	Effective cost planning and control	19	1	0	1	6	3.96	5
F	Prompt payment to contractors and consultant	17	2	1	2	3	3.74	6
G	Application of due process	15	2	2	3	5	3.66	7
H	Adequate time for project implementation	15	1	2	4	5	3.44	8
I	Design adequacies	14	1	1	4	6	3.37	9
J	Prompt appointment of consultants	13	0	1	5	8	3.18	10
K	Choice of competent contractor	13	1	0	4	9	3.18	10
L	Appointment of competent professional	12	1	0	4	9	3.0	12
M	Effective coordination of contractors	12	0	1	5	9	3.0	12
N	Adherence to construction project duration	10	1	2	4	10	2.88	14
O	Limit to material importation	10	1	1	3	12	2.77	15
P	Effective quality plan and quality control	9	1	2	5	10	2.77	15
Q	Proper pre-contract study	8	1	1	4	13	2.51	17
R	Avoidance of dispute on site	7	1	2	5	12	2.48	17
S	Project risk evaluation and management	7	0	3	0	17	2.30	18

Source: Field survey, 2016

Table 3 above shown the analysis of the identified factors of cost management of construction project in Nigeria using the relative important index (RII) from the contractor's point of view. The results of the analysis shown that are the most critical factors of construction cost management in Nigeria with a cut-off point of 3 are effective project cost budgeting, accurate project cost estimation, control of variation order,

effective resource planning, effective cost planning and control, prompt payment to contractors and consultants, application of due process, adequate time for project implementation, design adequacies, prompt appointment of consultants, choice of competent contractor, appointment of competent professional and effective coordination of contractors. This also shown that these factors if properly managed in a construction project cycle can enhances construction cost management leading to cost efficiency and value for money in construction project in Nigeria.

Table 4: appraisal of identified factors of cost management using Relative Important Index: Client's perspectives

		FVHI- 5	FHI- 4	FMI- 3	FLI- 2	FVLI- 1	RII VALUE	RANK
A	Effective project cost budgeting	18	4	1	1	0	4.59	1
B	Accurate project cost estimation	18	0	0	2	2	4.36	2
C	Effective cost planning and control	17	0	1	2	2	4.27	3
D	Choice of competent contractor	16	0	1	2	3	4.0	4
E	Control of variation order	14	1	1	2	4	3.86	5
F	Appointment of competent professional	14	0	1	1	6	3.68	6
G	Application of due process	13	1	0	2	6	3.59	7
H	Adequate time for project implementation	13	0	0	1	8	3.40	8
I	Design adequacies	12	0	1	2	8	3.40	8
J	Prompt appointment of consultants	12	1	0	1	8	3.36	10
K	Effective resource planning	10	1	2	2	7	3.22	11
L	Prompt payment to contractors and consultant	10	0	2	3	7	3.22	11

M	Effective coordination of contractors	10	1	1	4	6	3.22	11
N	Adherence to construction project duration	8	2	1	2	9	2.90	14
O	Proper pre-contract study	8	1	2	2	9	2.77	15
P	Effective quality plan and quality control	7	1	1	4	9	2.68	15
Q	Limit to material importation	7	1	1	3	10	2.63	17
R	Project risk evaluation and management	7	1	2	1	11	2.63	17
S	Avoidance of dispute on site	6	1	2	2	11	2.04	19

Source: Field survey, 2016

Table 4 above shown the analysis of the identified factors of cost management of construction project in Nigeria using the relative important index (RII) from the client point of view. The results of the analysis shown that effective project cost budgeting, accurate project cost estimation, effective cost planning and control, choice of competent contractor, control of variation order, appointment of competent professional, application of due process, adequate time for project implementation, design adequacies, prompt appointment of consultants, effective resource planning, prompt payment to contractors and consultant and effective coordination of contractors are the most critical factors of construction cost management in Nigeria with a cut-off point of 3. This shown that these factors if properly managed in a construction project cycle can enhances construction cost management leading to cost efficiency and value for money in construction project in Nigeria.

Table 5: Mean analysis of the critical factors of Cost management of construction project in Nigeria: Contractors and Consultants and Clients perspectives

Factors	Contractors		Consultants		Clients		Mean	
	RII	RANK	RII	RANK	RII	RANK	RII	RANK
Effective project cost budgeting	4.62	1	4.38	1	4.59	1	4.53	1
Accurate project cost estimation	4.37	2	3.85	3	4.36	2	4.19	2
Effective cost planning and control	3.96	5	4.02	2	4.27	3	4.08	3
Control of variation order	4.25	3	3.71	5	3.86	5	3.94	4

Effective resource planning	4.19	4	3.83	4	3.22	11	3.75	5
Application of due process	3.66	7	3.60	7	3.59	7	3.61	6
Adequate time for project implementation	3.44	8	3.69	6	3.40	8	3.51	7
Choice of competent contractor	3.18	10	3.24	10	4.0	4	3.47	8
Design adequacies	3.37	9	3.55	8	3.40	8	3.44	9
Prompt payment to contractors and consultant	3.74	6	3.07	11	3.22	11	3.34	10
Appointment of competent professional	3.0	12	3.32	10	3.68	6	3.30	11
Prompt appointment of consultants	3.18	10	3.35	9	3.36	10	3.29	12
Effective coordination of contractors	3.0	12	2.88	12	3.22	11	3.03	13

Source: Field survey, 2021

Table 5 above shown the mean analysis of the identified factors of cost management of construction project in Nigeria using the relative important index (RII) from the contractors, consultants' and clients point of view. The results of the analysis on a five point scale shown that effective construction project cost budgeting has a very high impact on cost management of construction in Nigeria while high impact factors are accurate project cost estimation and effective cost planning and control. The factors considered to have medium impact are control of variation order, effective resource planning, application of due process and adequate time for project implementation. Those factors with a low critical impact are choice of competent contractor, design adequacies, prompt payment to contractors and consultant, appointment of competent professional, prompt appointment of consultants and Effective coordination of contractors.

Table 6: level of Critical of Factors of Cost Management of Construction Project in Nigeria: Contractors and Consultants and Clients mean response

Scale	3.0	3.5	4.0	4.5	5.0
	Low critical factors	High critical factors	Higher critical factors	Highest critical factors	
	Choice of competent contractor, Design adequacies, Prompt payment to contractors and consultant,	Control of variation order, Effective resource planning, Application of due process, Adequate time for project implementation	Accurate project cost estimation, Effective cost planning and control	Effective project cost budgeting	

Appointment of competent professional, Prompt appointment of consultants, Effective coordination of contractors			
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Source: field survey, 2021

Table 6 above shown the categorization of the critical factors of construction cost management In Nigeria from the mean responses of the clients, the consultants and the contractors using a scale chosen between the lowest and the highest critical factors. The table revealed that the highest critical factors of construction cost management is effective project cost budgeting while the higher critical factors of construction cost management factors are Accurate project cost estimation, effective cost planning and control. The moderate critical factors form the table are control of variation order, effective resource planning, application of due process, adequate time for project implementation while what the respondents considered to be the low critical factors are Choice of competent contractor, Design adequacies, Prompt payment to contractors and consultant, Appointment of competent professional, Prompt appointment of consultants, effective coordination of contractors.

CONCLUSION AND RECOMMENDATIONS

An appraisal of factors of cost management of construction project in Nigeria was conducted to determine the relative level of influence of each factor. The ranking of 19 factors using the relative important index from the perspective of the clients, the consultants and the contractors revealed ten critical factors of cost management of construction project. The highest critical factors of cost management of construction project in Nigeria is effective project cost budgeting. Using the mean relative important index from the perspective of the targeted respondents also revealed that accurate project cost estimation and effective cost planning and control are also critical factors with high impact wile control of variation order, effective resource planning, application of due process, adequate time for project implementation are the critical factors moderate impact and the critical factors with low impact are choice of competent contractor, design adequacies, Prompt payment to contractors and consultant, appointment of competent professional, Prompt appointment of consultants, effective coordination of contractors The least influential factors, as evaluated by clients, consultants and the contractors includes project risk evaluation and management, avoidance of dispute on site, limit to material importation etc.

From the above results, it was concluded that both clients, consultants and the contractors generally agree on the critical factors affecting cost management of construction project in Nigeria. This agreement confirms the influential effects of those factors on the cost management of construction project and provides a level of validation for this study.

It is recommended that clients, consultants and the contractors give more attention to the critical factors that affect the cost management of construction project in order to achieve value for money in construction project. Clients, consultants and the contractors should also manage each of these critical factors at their various level of construction project implementation. Clients and consultants should make sure that contract conditions are very clear to both parties.

Finally, it is also recommended that training courses on factors affecting the cost management of construction project should be conducted. These activities would improve the local practice of cost manager

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