



Received: 23-01-2023
Accepted: 03-03-2023

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Mitigation Measures towards Projects Cost Overrun in Road Infrastructure Projects Constructed by Local Firms in Nigeria

¹ Adigwe Ekene Raphael, ² Obi Amara Nkechi, ³ Umeh Anthony Chinedu

¹ Department of Statistics, Federal School of Statistics Amechi-Uno Awkunanaw, Enugu, Enugu State, Nigeria

² Department of Social Sciences, School of General Studies Federal Polytechnic Oko Anambra State, Nigeria

³ Department of Economics, Enugu State University of Science and Technology Enugu Nigeria

Corresponding Author: Umeh Anthony Chinedu

Abstract

The study examined the mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria. The specific objectives are: evaluate the effect of site visitation mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria; ascertain the effect of interim valuation mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria and determine the effect of site meeting mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria. Study Area was South East, Nigeria. The research design of the study was descriptive survey design. The study used structured questionnaire to obtain data. The population of this study comprised of 18 local road construction companies in Nigeria with 116 total numbers of current project in South East, Nigeria. The sample size of 90 respondents was drawn from population of the study which consists of 116 management staff of road

construction companies in South East Nigeria. Research questions were answered using frequency, mean and standard deviation. The hypotheses stated were tested using paired sample statistics. The empirical result of the findings show that site visitation mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria (t-statistics (4.09) > P-value (0.000); interim valuation mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria (t-statistics (3.759) > P-value (0.000) and site meeting mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria (t-statistics (4.374) > P-value (0.000). The study recommends the contractor should employ a reasonable number of skilled labor, e.g. technician to achieve good progress, avoids the poor quality or workmanship, and help supervising unskilled laborers on site.

Keywords: Mitigation Measures, Projects Cost Overrun, Road Infrastructure Projects

Background of the Study

Project construction industry is facing a huge amount of cost overrun because of poor cost management these days. This has become quite a problem for the construction industry. Poor cost management and overrun are the huge problem and very serious issue when they come to project cost in both developed and emerging countries. This is an issue which needs attention, because projects are rarely being finished within budget (Azis, Memon, Rahman, & Karim, 2012) ^[5]. Cost is always one of the most important reasons for the success of a project. Generally, most of the main factors influencing project costs are qualitative like importance of a client on construction time, the planning ability of constructor, locating methods, and some market conditions (Elchaig, Boussabina, & Ballal, 2005) ^[8].

A successful project is one which can overcome the cost limitations applied to it. One of the tools that seems promising to quantify risk ratings is fuzzy risk assessment. This is when the risk effects are unclear and are defined by particular judgments instead of impartial data (Dikmen, Birgonul, & Han, 2007) ^[7]. One of the cost vital tasks for completing a project successfully is to have a good management of construction cost. However, most of the times, it is not possible to achieve good cost management and the project would generally have a considerable amount of cost overrun.

Contractors quoting prices based on their projected estimates are one of the most basic reasons which lead to cost overruns. Unfortunately, many times, the prices change very quickly causing the initial budget figures to become useless. In the recent past, the prices in construction industry have been highly volatile. One of the reasons for this volatility could be higher energy

prices. It is observed that there was a sharp rise in prices of material like iron, steel, cement, and concrete. There have also been reports of shortages for those commodities. It is critical to consider how the vacillations could influence the expense or pace of new advancements in development industry (Burke, 2013) ^[6]. The construction industry is complex in nature, as it contains a number of project team members like the client, consultants, contractors, stakeholders, shareholders, and regulators who are responsible in overseeing the performance and time schedule of any road infrastructure project.

Statement of the Problem

Cost overrun is known as the leading challenge for stakeholders of the construction sector. Like most countries, Nigeria also facing this challenge for the last few decades. Time and cost performance is the fundamental criteria for success of any project. Unfortunately, construction industry in Nigeria has been regarded as industry facing poor performance leading to failure in achieving effective time and cost performance. As a consequence, most of the projects face huge amount of time and cost overrun.

That construction industry world-wide is be-devilled with cost overrun is reflected in the fact that many construction projects do not achieve their cost objective. According to Ade, Aftab, Ismail & Ahmad, (2013) stated that poor cost performance in construction project is a common problem resulting in significant amount of cost overrun. Cost escalation exists globally over the years and it has not decreased, thus it appears no learning seems to take place concerning the subject (Flyvbjerg, Holm and Buhl, 2014) ^[9]. As a result of the pivotal position and significance of cost in construction development chain, there had been concerted efforts among the stakeholders and researchers to curb overrun of cost on construction projects. Despite the invention of various project control tools/techniques and software, the problem persist and distorts the cost and time objectives of many construction projects (Olawale & Sun, 2010) ^[13]. Thus, in recent times, there have been numerous studies aimed at proffering solution to this seemingly intractable problem.

Objectives of the Study

The broad objective of this study is to examine the mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria. The specific objectives are:

1. Evaluate the effect of site visitation mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria.
2. Ascertain the effect of interim valuation mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria.
3. Determine the effect of site meeting mitigation measures towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria.

Conceptual Literature

Mitigation Measures

Managing construction cost is one of the important tasks in achieving successful project completion. Unfortunately, it is very seldom achieving effective cost management and often

experiencing significant amount of cost overrun. Based on understanding of factors causing cost overrun as identified in previous section, this study proposed a total of 15 mitigation measures to control cost overrun factors for achieving effective cost control through interviews. The respondents classified each measure based on three approaches of implementation strategies as proactive, reactive and organizational strategy (Olawale and Sun, 2010) ^[13].

According to Ade *et al* (2013) ^[2], the following mitigating measures can be adopted to reduce or eliminate cost overrun of projects are listed as follows: effective strategic planning, proper project planning and scheduling, frequent project meeting, proper emphasis on past experience, use of experienced subcontract and Suppliers, use of appropriate construction methods, use of up-to-date technology utilization, clear information and communication channel, frequent co-ordination between the parties, perform a preconstruction planning of project tasks and resources need, development of human resources in the construction industry, comprehensive contract administration, systematic control mechanisms, effective site management and supervision.

Projects Cost Overrun

In the construction project, the cost is one of the factors that must be considered throughout the project's life cycle, and it can be viewed as a standout amongst the most vital parameters of the project and the main force of project achievement. Despite its demonstrated significance, construction projects have been failing to accomplish their objectives within the predefined cost. Cost overrun can be defined as the change in contract amount divided by the original contract award amount (Mulenga, 2014) ^[12]. Khabisi (2013) ^[11] states that cost overrun happens when the initial budget has been exceeded when calculating the final cost of the project. As the project progresses during the execution stage, the initial estimate also changes. Consequently, it is essential to be cautious with the budget that will be considered to compute the overrun of the project.

Contextual Literature

Effect of Site Visitation Mitigation Measures towards Cost Overrun in Road Infrastructure Projects

A construction site visit or fieldtrip is an interactive experience where students are transported into a real-world construction environment with the objective of comprehending the current construction practices. Ideally, three fundamental elements, set by the instructor, compose a construction site visit: learning objectives, spatio-temporal occasion, and interactivity forum (Mutinda & Kiruja, 2015). The learning objectives component correspond to the goals the instructor envisioned that students would achieve from attending the site visit; often these are related to visualization of theoretical concepts, understanding of the sequence or duration of activities, and description of the various roles of the project professionals. The spatiotemporal occasion component is directly associated with the contextual information of a site visit (e.g., location of the site, environmental conditions, work progress with respect to schedule, etc.); providing students first-hand exposure to observe, perceive, and understand the complexities at distinct phases (time and physical space) of the industry processes (Mark, Henry and Julnes, 2020).

Finally, the interactivity forum component presents a platform to connect students with construction professionals (e.g., workers, subcontractors, construction management team, and various project consultants); allowing communication and interaction that interrelates the learning objectives and the spatiotemporal occasion. These fundamental elements make construction site visits a successful experienced-based learning opportunity (Govender & Reddy, 2014).

Effect of Interim Valuation Mitigation Measures towards Cost Overrun in Road Infrastructure Projects

Valuation is the process by which the quantity surveyor arrives at the value. It normally involves visiting site and checking that the work has been carried out by visual inspection and/or measurement. Most construction contracts require interim payments to be paid to the contractor. This is to relieve the contractor of the burden of financing the whole of the works until completion; works which may take many months or years to complete (Mark, Henry & Julnes, 2020). Valuation and payment are formal contractual processes and, therefore, they must be processed strictly in accordance with the contract conditions. Within each contract there will be clauses that set out the method of valuing the works, the criteria under which interim payments will be made, the timing of these payments and the administrative rules under which quantity surveyors (cost managers), contract administrators, employers and contractors must operate (Kettner, Moroney & Martin, 2018).

The purpose of interim valuations is to provide advice to the certifier on a construction project for the issue of interim certificates and payment notices. The certifier will be the contract administrator, employer's agent, the project manager or the employer – depending on the contract conditions being used. The quantity surveyor's function is to assess value as distinct from cost, particularly with reference to prices of certain items in the preliminaries section and temporary works (Gransberg & Villarreal, 2012). Interim valuation involves a revaluation of the whole work, not the work done since the last interim certificate or payment notice was issued. The quantity surveyor carrying out the interim valuation must be aware of the overall position of any valuation within a project; to assess what remains of the anticipated final contract value after each interim valuation and ensure that within the terms and conditions of the contract this will be adequate to complete the works. This action is particularly valid towards the end of the contract.

Effect of Site Meeting Mitigation Measures towards Cost Overrun in Road Infrastructure Projects

Site meeting is one of the oldest - and current ways of managing problems emanating from construction projects and enforcing acceptable standard. Site meeting helps to enforce quality standards such as developing a project quality control plan, assess workmanship during construction, increases communication in the construction team, assess the specification used and requires a competent construction manager (Barclay & Osei-Bryson, 2010). In ensuring that construction projects are sustainable, adequate site meetings will ensure that protective clothing, glasses and other wears are used by workers and all stakeholders on construction site, ensure team building, ensures skilled and qualified workers are used on sites; ensure tight but realistic

targets are set and ensure that there is a health and safety officer on site.

Before the execution of any construction project, pre-construction site meeting is held for the purpose of appraising and generally evaluating the site and the work itself. It is an important meeting because discrepancies that many arose on the start date of the construction works are identified and resolved. Most of these discrepancies which are majorly due to lack or incomplete information in construction documentation would cause delays if they are not identified early enough (Mitropoulos and Howell, 2001). Depending on some factors like size of project, type of project, type of client, etc., site meetings are usually scheduled weekly, monthly or twice in a month to monitor initial design and concept in relation to the actual occurrence on site. The aim of site meeting is to document site activities and provide technical and professional answers to prevent disputes that may eventually lead to claims (Gorse and Emmitt, 2003). In essence, building projects are managed from inception to completion using site meetings, dispute is avoided by solving problematic issues that site agents, consultants and sub-contractors comes across during construction.

The essence of site meetings is to facilitate smooth running of project from inception to completion stage. Therefore, it is important for project clients to appoint principal agents to manage their construction works to minimize disputes that may delay the completion of the project. The projects principal agents liaise and brief the project clients from time to time on progress and challenges of projects (Love, *et al.*, 2010). It is also necessary for the client to intimate on the speed of construction and problems encountered by the supervising consultants. If the client has made unrealistic targets concerning any performance indices, the essence of site meetings is to evaluate, scrutinize and arrive at an alternative solution.

Theoretical Literature

General Systems Theory

The theory was proposed by Ludwig von Bertalanffy in the 1940s. This theory is an interdisciplinary theory about complex systems in nature, society, and science, and is a framework by which one can investigate and/or describe any group of objects that work together to produce some result (Mele, Pels, & Polese, 2010). A system consists of elements, attributes and internal relationships. In regard to its elements, a system is composed of people, processes and products; its attributes, composed of the input, process and output characteristics of each component; and its relationships, composed of interactions between components and characteristics (Tien & Berg, 2003). System theory is a set of things that affect one another within an environment and form a larger pattern that is different from any of the parts (Chikere & Nwoka, 2015). In GST, there are two different types of systems: closed and open. Closed systems are systems that are isolated from its environment, and open systems are systems that interact with its environment (Norberg & Cumming, 2008). When a group of people are interacting together in an environment, much more complicated systems develop (Cordon, 2013).

The theory is used to develop a holistic view of a system within an environment and is best applied to situations where the elements within the system inextricably connect and influence one another (Ruwa, 2016). All social systems

receive input from the environment, engage in processes, and generate outputs and in addition to having a structure, serve particular functions. (Latkin, Weeks, Glasman, Galletly & Albarracin, 2010). In applying the theory, the study holds that all systems are interrelated parts constituting an ordered whole and each sub system influences other parts of the whole. This implies that when one part of the system is strengthened, the system improves as a whole (Pillay, 2012). Similarly, when one part of the system is weakened, the part will have negative implications on the whole. These interact and all have a key role in contributing monitoring and evaluation system performance. Neglecting one element is likely to have a negative effect on the M & E system.

Empirical Literature

Samiullah, Abdul and Ashfaque, (2020) ^[15] examined most common factors causing cost overrun with its mitigation measure for Pakistan construction industry. Literature review was conducted and managed to identify 34 factors which contributed to cost overrun in the construction industry. These factors were used as the main content in designing the questionnaire. Respondents were required to rate these factors based on 4-point Likert scale on the degree of commonly occurred. Survey was carried out involving 130 stakeholders of the construction sector to determine main factors of the overrun. Data was collected, analysed statistically using the average index method and found 10 most commonly occurred of cost overrun factors for Pakistan construction industry are financial crisis faced by the client; mistakes in making proper estimation; faults in drawing; delay in getting approval from the client; poor planning by client; incompetency of contractor; poor supervision of the consultant; delay in payment to the contractor; communication gap between parties and natural disaster. These factors were further explained together with its mitigation measure. The findings of this study can help to Pakistani construction community in controlling the cost overrun for their construction projects.

Jaffari, Tesha, Teyanga, Gullamabba and Sylvanus, (2019) ^[10] examined factors affecting performance and time schedule for Multi-Unit Residential Building (MURBs) Construction in Dar-es-salaam Tanzania. This study was designed to obtain views from MURBs project stakeholders, regarding their perception on factors that affects MURBs projects. Purposive sampling was adopted and 50 questionnaires were distributed to Quantity Surveyor, Architects, and Engineers in which 46 were returned. Data were collected through structured questionnaire and literature review, and analyzed using Microsoft Excel while using tables presentation. The finding reveals that 12 factors affect performance and time schedule for MURBs construction projects in Dar-Es-Salaam, Tanzania were late payment, under estimation, inadequate planning and communication, lack of competent project manager, scope change, design change, conformance to the specification were the most factors affecting MURBs performance. Furthermore, it was found that late completion and late payments influence cost overrun, which eventually raise disputes and claims and sometimes arbitration. Moreover, some mitigation measures like ensuring proper planning of work, clear information and communication channels, clear information and hiring skilled labor and committed leadership and management were found to be of great help

in addressing MURBs construction performance if well implemented. The study recommends the management structure of MURBs construction project to resemble the one in Australia, hence helping the Tanzanian construction industry, specifically the MURBs stakeholders.

Al-Keim, (2017) ^[3] conducted a study to examine the strategies to reduce cost overruns and schedule delays in construction projects in Qatar. Primary data were obtained from semi-structured interviews with 3 senior managers from different construction project management companies who have successfully managed construction projects in Qatar. Data analysis process included a modified Van Kaam method. The transcribed interviews were interpreted and coded to generate themes and were validated through member checking and archival documents. The most centralized themes included (a) master planning, (b) processes and procedures, (c) managing design stage, (d) procurement management, (e) use of proper software, (f) setting project cost and time, and (g) deciding clear scope. A construction project may not succeed without appropriate planning for all stages of the project lifecycle. Managing the approval of the project components during the design stage contributes to reducing changes during construction, which is helpful to control cost and time. The project processes and procedures are meaningful roadmaps for the managers and decision makers. The implications for positive social change include the potential to maintain a cleaner Earth by reducing design and construction wastes. Reducing wastes improves the cost of construction and provides opportunities for people to own property at more affordable costs.

Abdussalam and Arumugam (2015) ^[1] conducted a study to examine the major reasons for cost overruns in construction projects in India. Specifically, the study sought to verify the critical success factors that are helping to avoid the cost overruns. The method of data analysis was arithmetic mean and frequency table. Based on them, survey questions and interview questions are prepared. The findings supported the proposed hypothesis, i.e., lack of certain critical success factors leads to cost overruns in construction projects in India. They also confirmed the proposed proactive and reactive strategies of some researchers. The effective critical success factors include appropriate planning in the initial stages, skills of contractors and architects, good relationship and regular coordination among client and contractor, and early contribution of contractor with the project. The ideal methods that help to reduce cost overruns include efficient planning, proper management of site and supervision of the project, suitable planning and arrangement of project, proper methods for construction, regular meetings on development of the project, and hiring proficient subcontractors and suppliers.

Awolesi, Fabi and Akinseinde, (2015) ^[4] conducted a study on assessment of contractors' mitigating measures for cost overrun of building projects in South-Western Nigeria. Specifically, the study examined the mitigating measures employed by contractors in southwest of Nigeria for cost overrun of building projects with a view to determining its adequacy and effectiveness. A sample of 32 project managers of medium sized construction firms selected from the list of 125 contractors on the register of Federation of Building and Civil Engineering Contractors located in South-West Nigeria using Simple Random Sampling method. The methods of data analysis were descriptive statistics and inferential statistics of t-test. The results

obtained revealed that effective site management and supervision with the highest relative importance index (RII) for adequacy of the mitigation measures was at average level and the (RII) for the effectiveness of mitigation measures adopted by contractors was very low. It also revealed that there is significant difference between initial sums and final sums of building projects at 5% significance level where the mitigation measures were taken in to consideration. The study concluded that mitigation measures adopted by contractors have not been adequate and effective in curbing cost overrun of building projects in southwest Nigeria.

Rahman, Aftab, Sasitharan, Qadir and Azis, (2012) [14] conducted a study to assess the time and cost performance of construction projects in Southern and Central Regions of Peninsular Malaysi. Specifically, the sought to assess the time and cost performance of construction projects in Malaysia using structured questionnaire survey. The method of data analysis was arithmetic mean and frequency table. The findings of study revealed that 92% of construction projects were overrun and only 8% of project could achieve completion within contract duration. The amount of time overrun was in between 5-10% as agreed by respondents. In terms of cost performance only 11% of respondents mentioned that normally their projects are finished within the budgeted cost while 89% of respondents agreed that their projects were facing the problem of cost overrun with average overrun at 5-10% of contract price. The major contributors of this poor performance include design and documentation issues, financial resource management and project management and contract administration issues. Further, qualitative study was carried out using semi-structured interviews with the experience personnel involving in managing construction project which resulted in developing 13 mitigation measure to improve time performance and 15 mitigation measure to improve cost performance in construction project. This study will help the practitioners to implement the mitigation measure at planning stage in order to achieve successful construction projects.

Methodology

Study Area was South East, Nigeria. The research design of the study was descriptive survey design. The study used structured questionnaire to obtain data. The choice of location was based on proximity, effective coverage and cost minimization. The population of this study comprised of 18 local road construction companies in Nigeria with 116 total numbers of current project in South East, Nigeria. Slip of paper was used to select five (5) local construction firms namely: Monier Construction Company Nig. Ltd, Reynolds Construction Company, Costain West Africa, Brunelli Construction Company Nig. Ltd and Dantata & Sawoe Construction Company Nig. Ltd. The sample size of 90 respondents was drawn from population of the study which consists of 116 management staff of road construction companies in South East Nigeria. Research questions were answered using frequency, mean and standard deviation. The hypotheses stated were tested using paired sample statistics.

**Data Presentation and Analysis
Summary of Questionnaire Distributed**

Table 1: Questionnaire Distributed

Questionnaires Distribution	Before	After	Total	Total Percentage
Copies of Questionnaire distributed	45	45	90	100
Returned Copies of Questionnaires	44	44	88	98
Not Returned Questionnaires	1	1	2	2

The data were based on the questionnaire returned. 45 copies of questionnaire were distributed before the project and 45 after the project completion getting total 90 (100%) copies of questionnaires. Out of the 45 questionnaires distributed before the project 44 copies were returned and 44 copies were also returned out of the 45 copies distributed after the project completion, giving a total of 88 (98%) while the total of not returned was 2 (2%). Therefore 98% is a good representation.

Data Analysis

Table 2: Group Statistic Mean rating of “Before and After” of the extent to which site visitation mitigation measure towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria

S. No	Questionnaire Items	Before							After								
		VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	Total	\bar{x}	SD	VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	Total	\bar{x}	SD
1	Site visitation provides managers and other stakeholders with regular information on progress relative to targets and outcomes.	20	12	8	3	1	44	4.07	0.024	18	17	6	1	2	44	4.09	0.025
2	It enables managers to keep track of progress of road infrastructure and identify any problems that hinders project success	19	18	5	1	1	44	4.21	0.028	21	10	9	2	2	44	4.05	0.024
3	It provides reports on actual performance against what was planned by collecting, analysing and reporting data of all projects, programmes and policies to support effective management.	14	20	5	3	2	44	4.34	0.030	19	12	9	3	1	44	4.02	0.023
4	Site visitation enables good monitoring system and provides early warning signals so that corrective action can be taken timeously.	21	13	8	2	0	44	4.21	0.028	18	20	4	0	2	44	4.64	0.037
5	It ensures tracking interventions by using the data collected for timeously fulfill or enhance the achievement of the set targets to the satisfaction of the targeted stakeholders.	22	10	8	3	1	44	4.11	0.025	13	22	6	2	1	44	4.00	0.023
	Total							20.94	0.135							20.80	0.132
	Cluster Mean							4.188	0.027							4.160	0.026
	Average Mean							1.96								1.96	

Source: Field Survey, 2022

From the data on the Table 2 above showing mean rating of respondents on the before and after of the extent to which site visitation mitigation measure towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria. The item 1,2,3,4,5 have mean score 4 and above. The study revealed that site visitation mitigation

measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria since site visitation provides managers and other stakeholders with regular information on progress relative to targets and outcomes (grand mean (4.160) is greater than cut-off mean (3.00).

Table 3: Group Statistic Mean rating of “Before and After” of the extent to which interim valuation mitigation measure towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria

S. No	Questionnaire Items	Before							After										
		VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	To tal	\bar{x}	SD	VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	To tal	\bar{x}	SD		
1	Interim valuation provides area of strengths and weaknesses of road infrastructure project and enabling governments and organisations to develop a knowledge base of the types of interventions that are successful	22 110 51	10 40 22	8 24 18	3 6 7	1 1 2	44 181 100	4.11	0.025	13 65 29	22 88 50	6 18 14	2 4 5	1 1 2	44 176 100	4.00	0.023		
2	It provides room for regular feedback on project performance and show any need for ‘mid-course’ corrections and propose solutions to reduce value of money of road infrastructure projects	20 100 45	12 48 27	8 24 18	3 6 7	1 1 2	44 179 100	4.07	0.024	18 90 41	17 68 37	6 18 14	1 2 2	2 2 5	44 180 100	4.09	0.025		
3	Interim valuation determined the degree of achievement of the objectives to reduce value of money of road infrastructure projects	18 90 41	20 100 45	4 12 9	0 0 0	2 2 5	44 204 100	4.64	0.037	19 95 44	18 72 41	5 15 11	1 2 2	1 1 2	44 185 100	4.21	0.028		
4	It generates data that allows for cumulative learning which, in turn, contributes to better designed programmes, improved management and a better assessment of their impact.	19 95 44	12 48 27	9 27 20	3 6 7	1 1 2	44 177 100	4.02	0.023	21 105 48	13 52 30	8 24 18	2 4 5	0 0 0	44 185 100	4.21	0.028		
5	Interim valuation also identifies the problems associated with programme of planning and implementation to reduce value of money of road infrastructure projects	21 105 48	10 40 22	9 27 20	2 4 5	2 2 5	44 178 100	4.05	0.024	14 70 32	20 100 45	5 15 11	3 6 7	2 2 5	44 191 100	4.34	0.030		
Total									20.89	0.133								20.90	0.134
Cluster Mean									4.178	0.027								4.180	0.027
Average Mean									1.96									1.96	

Source: Field Survey, 2022

From the data on the Table 3 above showing mean rating of respondents on the before and after of the extent to which interim valuation mitigation measure towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria. The item 1,2,3,4,5 have mean score 4 and above. The study revealed that interim valuation mitigation

measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria since Interim valuation determined the degree of achievement of the objectives to reduce value of money of road infrastructure projects (grand mean (4.180) is greater than cut-off mean (3.00).

Table 4: Group Statistic Mean rating of “Before and After” of the extent to which site meeting mitigation measure towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria

S. No	Questionnaire Items	Before							After										
		VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	To tal	\bar{x}	SD	VGE (5)	GE (4)	ME (3)	LE (2)	VLE (1)	To tal	\bar{x}	SD		
1	Site meeting enables the early identification of problems so that solutions can be proposed to reduce percentage of time overrun of road infrastructure projects	18 90 41	17 68 37	6 18 14	1 2 2	2 2 5	44 180 100	4.09	0.025	20 100 45	12 48 27	8 24 18	3 4 7	1 1 2	44 179 100	4.07	0.024		
2	It provides of the information needed to co-ordinate the human, financial and physical resources committed to the project or programme to reduce percentage of time overrun of road infrastructure projects	21 105 48	10 40 22	9 27 20	2 4 5	2 2 5	44 178 100	4.05	0.024	19 95 44	18 72 41	5 15 11	1 2 2	1 1 2	44 185 100	4.21	0.028		
3	Project site meeting provides information for setting adjustment of objectives and strategies to avoid time overrun of road infrastructure	19 95 44	12 48 27	9 27 20	3 6 7	1 1 2	44 177 100	4.02	0.023	14 70 32	20 100 45	5 15 11	3 6 7	2 2 5	44 191 100	4.34	0.030		
4	It provides a flow of information for internal use by managers, and for external use by stakeholders who expect to see results, want to see demonstrable impacts to reduce percentage of time overrun of road infrastructure projects	18 90 41	20 100 45	4 12 9	0 0 0	2 2 5	44 204 100	4.64	0.037	21 105 48	13 52 30	8 24 18	2 4 5	0 0 0	44 185 100	4.21	0.028		
5	Site meeting indicated whether or not a programme/system is going in the right direction, as previously planned and reduce percentage of time overrun of road infrastructure projects.	13 65 29	22 88 50	6 18 14	2 4 5	1 1 2	44 176 100	4.00	0.023	22 110 51	10 40 22	8 24 18	3 6 7	1 1 2	44 181 100	4.11	0.025		
Total									20.80	0.132								20.90	0.135
Cluster Mean									4.160	0.026								4.190	0.027
Average Mean									1.96									1.96	

Source: Field Survey, 2022

From the data on the Table 2 above showing mean rating of respondents on the before and after of the extent to which site meeting mitigation measure towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria. The item 1,2,3,4,5 have mean score 4 and above. The study revealed that site meeting mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria since project site meeting provides information for setting adjustment of objectives and strategies to avoid time overrun of road infrastructure (grand mean (4.190) is greater than cut-off mean (3.00).

Test of Hypotheses

The three hypotheses were formulated for this study and will be tested and a decision taken is based on the rule below.

Decision rule: Reject H_0 if P-value > 0.01

Test of Hypothesis one

H_1 : There is no significant difference in the mean ratings of site visitation mitigation measure towards project cost overrun before and after in road infrastructure projects constructed by local firms in Nigeria.

Paired Samples Statistics									
Pair		Mean	N	Std. Deviation	Std. Error Mean				
1	Site Visitation Before Project Success	4.2045	44	.90424	.13632				
	Site Visitation After Project Success	4.1818	44	.94679	.14273				
Paired Samples Test									
Paired Differences									
Pair		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
1	Site Visitation Before Project Success - Site Visitation After Project Success	.02273	1.67733	.25287	-.48723	.53268	4.09	43	.000

Source: SPSS version 20

In testing the hypothesis, the paired t-test statistics showed that site visitation before and after project success with observation number 44 has mean of 0.02273, standard deviation of 1.67733. The analysis showed that the t-statistics was 4.09 with P-value of 0.000. Based on paired t-test statistics the null hypothesis was rejected, and the study concluded that there is significant difference in the mean ratings of site visitation mitigation measure towards project cost overrun before and after in road infrastructure projects

constructed by local firms in Nigeria since t-statistics (4.09) > P-value (0.000).

Test of Hypothesis Two

H_2 : There is no significant difference in the mean ratings of interim valuation mitigation measure towards project cost overrun before and after in road infrastructure projects constructed by local firms in Nigeria.

Paired Samples Statistics									
Pair		Mean	N	Std. Deviation	Std. Error Mean				
1	Interim Valuation on Value for Money Before Project Success	4.0455	44	1.14027	.17190				
	Interim Valuation on Value for Money After Project Success	3.9318	44	1.06526	.16059				
Paired Samples Test									
Paired Differences									
Pair		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
1	Interim Valuation on Value for Money Before Project Success - Interim Valuation on Value for Money After Project Success	.11364	.99337	.14976	.18838	.41565	3.75943		.000

Source: SPSS version 20

In testing the hypothesis, the paired t-test statistics showed that interim valuation before and after project success with observation number 44 has mean of 0.11364, standard deviation of 0.99337. The analysis showed that the t-statistics was 3.759 with P-value of 0.000. Based on paired t-test statistics the null hypothesis was rejected, and the study concluded that there is significant difference in the mean ratings of interim valuation and value for money of

road infrastructure projects constructed by local firms in Nigeria since t-statistics (3.759) > P-value (0.000).

Test of Hypothesis Three

H_3 : There is no significant difference in the mean ratings of site meeting mitigation measure towards project cost overrun before and after in road infrastructure projects constructed by local firms in Nigeria.

Paired Samples Statistics									
Pair		Mean	N	Std. Deviation	Std. Error Mean				
1	Site Meeting on Percentage of Time Overrun Before Project Success	4.0227	44	1.06724	.16089				
	Site Meeting on Percentage of Time Overrun After Project Success	3.9318	44	1.06526	.16059				

		Paired Samples Test					t	df	Sig. (2-tailed)
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
Lower	Upper								
Pair 1	Site Meeting on Percentage of Time Overrun Before Project Success - Site Meeting on Percentage of Time Overrun After Project Success	.09091	1.00737	.15187	.21536	.39718	3.59943	.000	

Source: SPSS version 20

In testing the hypothesis, the paired t-test statistics showed that financial statement on percentage of cost overrun before and after project success with observation number 44 has mean of 0.02273, standard deviation of 0.40282. The analysis showed that the t-statistics was 4.374 with P-value of 0.000. Based on paired t-test statistics the null hypothesis was rejected, and the study concluded that there is significant difference in the mean ratings of site meeting mitigation measure towards project cost overrun before and after in road infrastructure projects constructed by local firms in Nigeria since t-statistics (4.374) > P-value (0.000).

Summary of the Findings

The following are the major findings of the study:

1. The study revealed that site visitation mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria since site visitation provides managers and other stakeholders with regular information on progress relative to targets and outcomes (t-statistics (4.09) > P-value (0.000).
2. The study revealed that interim valuation mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria since Interim valuation determined the degree of achievement of the objectives to reduce value of money of road infrastructure projects t-statistics (3.759) > P-value (0.000).
3. The study revealed that site meeting mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria since project site meeting provides information for setting adjustment of objectives and strategies to avoid time overrun of road infrastructure (t-statistics (4.374) > P-value (0.000).

Conclusion

The study concluded that mitigation measures has positive and significant effect towards projects cost overrun in road infrastructure projects constructed by local firms in Nigeria since site visitation, interim valuation, site meeting have effect on project performance because site visitation enables good monitoring system and provides early warning signals so that corrective action can be taken timeously. Interim valuation provides area of strengths and weaknesses of road infrastructure project and enabling governments and organisations to develop a knowledge base of the types of interventions that are successful. Furthermore, site meeting enables the early identification of problems so that solutions can be proposed to reduce percentage of time overrun of road infrastructure projects. Also, financial statement provides approximate the costs, staffing, and other resources that are required for monitoring and evaluation work to reduce percentage of cost overrun of road infrastructure

projects and increase in overhead project cost, additional payments for contractor and delay in payment influence project completion of road infrastructure projects.

Recommendations

The following recommendations were made from the findings of the study.

1. The contractor should employ a reasonable number of skilled labors, e.g., technician to achieve good progress, avoids the poor quality or workmanship, and help supervising unskilled laborers on site. Proper motivation and safety systems should be established for improving the productivity performance of construction projects, and they are counseled to minimize waste rates through project implementation for improving cost.
2. Contractors should be more interested in conformance to project specification to overcome disputes, time, and cost performance problems. Quality materials should be of a greater interest for contractors in order to improve cost, time, and quality performance. This can be done by applying quality training and meetings that are necessary for performing an improvement.
3. Project managers in cooperation with contractor should make sure that, they conduct several meetings, in order to influence easy feedback mechanism of any matter raised, unlike writing letter to the top management whereby it takes time for the latter to get into the respective person and to get the response back through that chain takes, therefore through a weekly meeting small issue will be discussed and conclusion be made right there, this will saves time used to wait feedback from top management. On the other hand, these meeting will encourage quality performance of construction.
4. Contractors should perform their activities properly to improve productivity which helps improvisation of construction projects. The unit title acts give power to project developers to sale the units found within the same building to different customers; thus, an arrangement should be made for maintenance works.

References

1. Abdussalam Shibani, Kumar Arumugam. Avoiding Cost Overruns in Construction Projects in India. Management Studies. 2015; 3(1):7-8.
2. Ade AA, Aftab HM, Ismail A, Ahmad TA. Controlling Cost Overrun Factors in Construction Projects in Malaysia. Journal of Applied Science, Engineering and Technology. 2013; 5(8):2621-2629.
3. Al-Keim A. Strategies to Reduce Cost Overruns and Schedule Delays in Construction Projects; Walden University Scholar Works, 2017, 12-98.
4. Awolesi AB, Fabi JK, Akinseinde OB. Assessment of Contractors' Mitigating Measures for Cost Overrun of Building Projects in South-Western Nigeria. Journal of Sustainable Development. 2015; 8(9):12-27.

5. Azis AAA, Memon AH, Rahman IA, Karim ATA. Controlling cost overrun factors in construction projects in Malaysia. *Research Journal of Applied Sciences, Engineering and Technology*. 2012; 5(8):2621-2629.
6. Burke R. *Project management: Planning and control techniques* (5th ed.). Hoboken, NJ: Wiley, 2013.
7. Dikmen I, Birgonul MT, Han S. Using fuzzy risk assessment to rate cost overrun risk in international construction projects. *International Journal of Project Management*. 2007; 25:494-505.
8. Elchaig T, Boussabinaine A, Ballal T. Critical determinants of construction tendering costs: Quantity surveyors' standpoint. *International Journal of Project Management*. 2005; 23:538-545.
9. Flyvbjerg B, Holm MK, Buhl S. What causes Cost Overrun in Transport Infrastructure Projects. *Transport Reviews*. 2014; 24(1):13-18.
10. Jaffari SJ, Tesha DG, Teyanga JJ, Gullamabba HM, Sylvanus M. Factors affecting performance and time schedule for Multi-Unit Residential Building Construction in Dar-es-salaam Tanzania; *Paripex - Indian Journal of Research*. 2019; 8(1):12-29.
11. Khabisi LR. Causes and Effects of Cost Overruns in Public Sector Construction Projects in South Africa. Unpublished treatise (Masters). University of Johannesburg, 2013.
12. Mulenga MJ. Cost and Schedule Overruns on Construction Projects in South Africa. Unpublished treatise (Masters). University of Johannesburg, 2014.
13. Olawale YA, Sun M. Cost and Time Control of Construction Projects Inhibiting Factors and Mitigating Measures in practice. *Construction Management and Economics*. 2010; 28(5):509-526.
14. Rahman AI, Aftab HM, Sasitharan N, Qadir BA, Azis AA. Time and Cost Performance of Construction Projects in Southern and Central Regions of Peninsular Malaysia; *IEEE Colloquium on Humanities, Science & Engineering Research Kota Kinabalu, Sabah, Malaysia*, 2012, 3-4.
15. Samiullah S, Abdul AA, Ashfaq AJ. Most Common Factors Causing Cost Overrun with its Mitigation Measure for Pakistan Construction Industry; *International Journal of Sustainable Construction Engineering and Technology*. 2020; 11(2):256-261.