E-ISSN: 1116 - 3240 P-ISSN: 3026-9334
MPRI-JAIMR | INTERNATIONAL JOURNAL OF AFRICAN INNOVATION & MULTIDSCIPLINARY RES.
VOL. 14 NO. 2 – OCTOBER, 2026

AN APPRAISAL OF COST MANAGEMENT STRATEGIES EMPLOYED BY BUILDING CONTRACTORS IN KADUNA STATE, NIGERIA

SHEHU ALIYU MURTALA[1], MODU IDRIS[2]; & EMMANUEL ADAMU GADO[1]

[1]Department of Quantity Surveying, Nuhu Bamalli Polytechnic, Zaria Kaduna State, Nigeria. [2]Department of Procurement & Supply Chain Management, Kaduna State University, Kaduna State, Nigeria.

Corresponding Author: samurtala@yahoo.com

DOI: https://doi.org/10.70382/mejaimr.v14i2.0150

Abstract

Globally, the construction sector has proven to be a critical sector that should not be ignored in the life of the economy of any nation, being the economic backbone of nations, as the industry provides jobs and propels growth in other sectors of the economy. The importance of cost management strategies in in the industry cannot be over emphasized. A research was conducted in Zimbabwe which suggests that the strategies instituted to manage project cost and the challenges to such practice are not significantly different from the ones in other developing countries including but not limited to south Africa, Botswana, Nigeria and Uganda. However, there was no empirical evidence to support their suggestion, thus a knowledge hereby exist. Therefore, it is necessary to conduct the same research in Nigeria to verify such statement. The purpose of this research is to appraise cost management strategies employed by building contractors by identifying, examining and recommending the suitable strategies to be used by building contractors in Kaduna State of Nigeria. The methods used for data collection was a semi-structured questionnaire with partly open and partly close questions coupled with 5-likert scale. It was designed and distributed to the targeted respondents generally contractors in Kaduna State. A total number of 75 questionnaires were distributed to different building contractors and 62 were retrieved where two of them found to be invalid and 60 were analysed using statistics package for social science (SPSS). The findings revealed that the most frequently used cost management strategies are value management, management of project resources etc. Challenges faced mostly included material-related issues, inadequate funding etc. The easiest

Keywords: Cost Management Strategies, Construction Cost, Cost Overrun, Cost Control, Building Contractors.

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strategies to implement are cost value reconciliation, variance analysis, cash flow analysis etc. Finally, estimating and budgeting, project resource and planning and cost report are the most effective strategies among others used by building contractors in Kaduna State of Nigeria and thereby recommended their usage as the most suitable strategies for building contractors. Further research can also be conducted in other states and/or countries to see if the results will be similar with the one in Kaduna State of Nigeria.

Introduction

Globally, the construction sector has proven to be a critical sector that should not be ignored in the life of the economy of any nation (Adam,2023) . This is because the construction industry is the economic backbone of nations, as the industry provides jobs and propels growth in other sectors of the economy. Project cost management is the process of controlling the expenditure on a construction project at all stages, from initiation to completion, within the approved budget. (Adam, 2023). Irrespective of the economics generated through effective cost management, most projects are delivered in cost overrun (beyond the initial budget) . Nine out of ten projects faced cost overrun in the range of 50 to 100%. The problems of project cost overrun are considered to be more severe in developing countries where the overrun sometimes exceed 100% of the anticipated cost of project (Chigara et al ,2013). The importance of cost management strategies in construction industry cannot be over emphasize.

In a previous study based on selected building projects conducted in Zimbabwe after the introduction of multi-currency regime, it was noted these projects (at various stages of construction) had overspend their budgets by an average overrun of 34% . Prior to this period, Joina centre, a commercial building in the heart of Harare, had its budget revised several times (Chigara, et al. 2013).

In Nigeria, the rate at which construction projects fail or are abandoned is retrogressive and the minimum average percentage escalation cost of projects was 14%. Such margins on cost overrun are huge when compared against arguments presented by where cost overruns of between 10-15% are considered substantial and has potential to offset the client's overall budget. (Nkwachukuw, et al. 2010).

However, the problem of cost overrun is not peculiar to developing countries. In Norway, the challenge of project overruns is so prevalent that sum of public building projects will always overrun their estimated costs; it's just a question of by how much. And yet a project cost which is out of control affect viability of a construction project and often adds to investment pressure, increases construction cost, reduces investment profit, affects investment decision-making and, above all, it causes disputes that turn down the overall project progress. (Chigara, et al. 2013). It was suggested that the strategies instituted to manage project cost and the challenges to such practice in Zimbabwe are not significantly different from the ones in other developing countries including but not limited south Africa, Botswana, Nigeria and Uganda Chigara, et al. (2013). However, in Nigeria, there was no empirical evidence to support this suggestion. Therefore, it is necessary to conduct the same research in Nigeria to verify such suggestion.

This appraisal is achievable through identification and examining the cost management strategies employed by building contractors in Kaduna, Nigeria.
Upon conducting the research in Nigeria, it may or may not contradict the Zimbabwe's research therefore gives Nigerian construction industries a clearer insight as to the position in terms of cost management strategies.

Cost

Cost can be said to mean the total money, time and resources associated with a purchase or an activity (Anonymous, 2009a). Cost can also mean an amount paid or requiring in payment for a purchase, or the expenditure of something, such as time or labour, that is necessary for the attainment of a goal (Anonymous, 2009b). For consumers, cost describes the price paid for goods and services. Producers look at from the angle of the relationship between the value of production inputs and the level of output.

Cost Management

OGC (2007) defined it as a process of planning, estimating, co-ordination, control and reporting of all cost-related aspects from project initiation to operation and maintenance and ultimately disposal. It was further explained to involve identifying the costs associated with the investment, making informed choices about options that will deliver best value for money and managing those costs throughout the life of the project including disposal.

Quantity Surveying and Cost Management

According to Yusuf (2011), the quantity surveyor is the recognized professional within the construction industry as the cost and value consultant. He is seen as the financial manager of the construction industry. The quantity surveyor has the responsibility of providing accurate and timely cost advice throughout the duration of a project to a variety of organizations including the client and the architect (Cartlidge, 2009). According to Iyorter (2006), the quantity surveyor adds value to the built environment by monitoring the function of cost, time, quality and performance in building and engineering projects on many scales.

Construction Cost Management

Basic Principle; the basic principle of project cost management is to control the relationship between construction project investment, progress, and cost. This is done primarily through the collection and sorting of various information in the project (Oladigbolu, et al 2022). On this basis, corresponding technical tools are used to analyse and deal with construction design changes or other related expenses. Following the principle of "separation of quantity and price" in this procedure entails gathering all data generated during the actual building stage into a single data source (Oladigbolu, et al 2022).
Oladigbolu, et al (2022). Investment estimating involves calculating the entire cost of building projects based on their features and the terms of their contracts using rational and scientific approaches. It contains. The Cost Management strategies to deal with cost management

challenges occurring during the delivery of construction project. Challenges and strategies are referred below:

1. Adhere to the market orientation; information is gathered, processed, and conclusions are formed after analysis; the whole construction project is taken into account, including all design, construction, and completion stages.

2. Based on the assumption of safety, the investment is minimized to the greatest extent possible in order to realize the goals of economic prudence and socially harmonious development, and the characteristics of technical feasibility and maximizing cost investment benefits are taken into account in order to realize overall control and optimal allocation of construction projects.

3. In order to offer, we should utilize modern resources to the fullest extent feasible, increase productivity, cut costs overall, and maximize the use of limited resources. (Chen, 2022.).

Cost Management Strategies

Chigara, et al (2013). Cost management is an approach used to realize decisions made for planning, controlling and developing competitive strategies. Over the years, contractors developed several cost management strategies to assist them to record all financial transactions that occur as well as giving managers an indication of the progress and problems associated with a project.

Some of the strategies, tools and techniques used by contractors to manage cost, include but not limited to: cost-value reconciliation, variance analysis, cash flow forecasting, earned value analysis, the plan and schedule, combination estimate and schedule, project status report, profit and loss at valuation dates or overall and monthly cost reports. Chigara, et al (2013).

Chigara, et al (2013). These tools may be used singularly or in combination. However, apart from earned value, the other cost control techniques suffer from lack of real time reporting. Earned value management has gained more acceptance and use in developed countries. For example, in the USA, it is a requirement that contractors and subcontractors working on defence projects employ earned value analysis. On the other hand, traditional cost control processes, common with most developing countries, are criticized because they simply identify variances by monitoring actual performance against cost estimates. For example, cost projection is not usually taken into consideration. In addition to the above stated strategies, cost control software such as Microsoft Project and Asta Power Project, Project Costing System (PCS), Construction Industry Software (COINS), WinQS, Microsoft Excel, and other bespoke systems are used for cost control. Whilst there is no doubt that effective formal control systems are necessary for effective project control, every day on-going control is even more important, and informal activities are a vital part of this part.

Chigara, et al (2013). The choice of the system depends on, among other factors, economic considerations. In that regard, for a cost control system to be cost effective, cost of control should never exceed the value of control, must operate in a timely manner and should be as simple as is possible to operate.

According to Chigara, et al (2013).The strategies employed by building contractors in zimbabwe are as follows;

i. **Cost-value reconciliation:** This is a process used to compare the value derived from a project or activity with the costs associated with it. It involves assessing whether the

benefits or value generated by the project justify the expenses incurred. This analysis helps in evaluating the return on investment (ROI) and determining the overall success or viability of the project. By reconciling costs with the value generated, stakeholders can make informed decisions about continuing, modifying, or discontinuing the project

ii. **Cost estimating and budgeting**: This are crucial aspects of project management. They involve predicting the expenses associated with a project and allocating funds accordingly. This typically includes identifying and estimating costs for resources, labour, materials, equipment, and other necessary expenses. Effective cost estimating and budgeting help ensure that projects are completed within financial constraints and deliver the expected outcomes.

iii. **Variance analysis:** This is a technique used to compare actual performance to planned or expected performance in various aspects such as costs, revenues, or other metrics. It involves identifying and analysing the differences, or variances, between the actual and budgeted or standard figures. By understanding these variances, project managers can assess performance, pinpoint areas of concern or improvement, and take corrective actions as necessary to keep the project on track.

iv. **Resource management:** This involves efficiently and effectively allocating and utilizing available resources to achieve project objectives. These resources can include personnel, equipment, materials, finances, and time. Effective resource management entails identifying resource requirements, acquiring the necessary resources, assigning them to specific tasks or activities, monitoring their usage, and optimizing their utilization to ensure that project goals are met within constraints such as budget and schedule.

v. **Cash flow analysis and work programmes:** This involves examining the inflow and outflow of cash within a business or project over a specific period. It helps in understanding the timing and amount of cash receipts and payments, allowing for better management of liquidity and financial planning. A work program, on the other hand, outlines the schedule and sequence of activities or tasks required to complete a project. It typically includes timelines, dependencies, resource allocations, and milestones. Integrating cash flow analysis with a work program ensures that financial considerations are taken into account during project planning and execution, helping to optimize cash flow and resource utilization.

vi. **Cost report:** A cost report is a document that provides an overview of the actual expenses incurred during a specific period of time or over the duration of a project. It typically compares the actual costs against the budgeted or estimated costs, highlighting any variances. Cost reports are essential for monitoring project finances, identifying areas of overspending or cost savings, and making informed decisions to keep the project on track financially.

Oladigbolu, et'al (2022) summarises cost management strategies in construction management in Nigeria to be : Project resource and planning; Cost estimating; Cost budgeting; Cost control; Material cost control; Subcontractors; Overheads and Indirect cost; Value management and Management of project resources.

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i. **Project resource planning**: Project resource planning is distinguishing every one of the Projects expected to execute a task improvement cycle and take it to the end. These Projects can be individuals chipping away at the task advancement process, like the project workers or their representatives, and the gear like the specific hardware accessible in restricted supply, enormous development vehicles, and foundation. The following are a couple of things you ought to remember while playing out the undertaking Project resource planning.

- You want to think about each of the authentic information that you have put away from the past ventures in general, similar to, the work and the previous timetables that the group had while dealing with different undertakings.
- You want to take criticism from SMEs and all of the colleagues related with the task cost management process since this kind of cooperative methodology functions admirably in projects that don't have the previous information or data to utilize Although this step ought to be toward the beginning, project supervisors need to represent all of the ground real factors related with the task from the start so there are no issues in regards to cash coming down the line for the task improvement process and the expense the board cycle.

ii. **Cost Estimation**: Cost estimation is the most common way of evaluating each of the expenses related with the assets expected to ensure that the venture advancement process is executed from begin to end. To play out every one of the expense estimations related with the expense the cost management, we will require the following data:

- Cost of each and every asset that will be related with the undertaking improvement process and the expense the cost management strategies.
- The resources necessities that will be given by the process resource planning guide.
- Rundown of every one of the suspicions about the cost management process.
- The time span that every project is expected to work for.
- Understanding into the detailing designs of the organization and the organization's generally financial wellbeing.

iii. **Cost Budgeting**: The Cost budgeting can be seen as a feature of the expense assessment or saw as a different cycle through and through. For a specific timeframe, this cost budgeting is dispensing expenses for a specific piece of the undertaking, similar to modules or individual errands connected with the venture (Wilson, 2022). The idea of a budget describes how an organizational strategy is turned into something tangible through the distribution of financial resources.

The two sides of a budget are expenditure and revenue. Businesses are required to create budgets due to the expanding complexity of the construction sector, much as budgets are needed to manage a nation's economy. The ability to carry out plans is made possible by budgets. Budgets are utilized to translate these plans and strategies into qualitative and monetary measures that serve as the firm's core goals.

Firms employ the budget estimation process to choose between strategies of expansion, contraction, or preserving the statuesque. This procedure aids in forming the firm's policy for

future course of action dependent on the state of the market. Cost management is necessary for contractors to execute any project.

iv. **Cost Control:** Cost control is the method involved with ascertaining each of the expense fluctuations that will occur all through the venture improvement cycle and making a move about them. In the event that there are any ups and down with respect to cash, the project manager can change the extent of work to address the hole.

Cost control is accomplished by the planning and scheduling of projects utilizing various qualitative methodologies offered by the sector. These plans are logically designed to give the contractor the ability to effectively manage his resources. The management team is responsible for ensuring that tasks are completed in accordance with the intended course of action. When adjustments are required and unavoidable, new plans are created. A monitoring system must be started in order to carry out the desired course of action.

v. **Material Cost Control**: Making ensuring that purchases don't go beyond the intended allocation of the project's allocated spending is the main goal of material costing. The building setup defines material control as including realistic design, specification, and excellent procurement as well as their packing, handling, storage, and protection after fixing (Ibrionke, 2004). To make it simple to identify any shortages or surpluses during project execution, the purchase of material is based on the material schedule that was already created during pre-contract planning.

The common standard papers required for material monitoring and control are recovery report forms, purchase orders, and material (storage) requisition forms. Invoices, delivery notes, and guidance notes are a few more crucial papers. All of these steps are taken to guarantee sound financial management and effective material cost control.

Cost management is a crucial goal for every business, and as a result, it is seen as the brain of a successful contracting company.

vi. **Subcontracts:** Subcontractors Performance and price of subcontracts would be handled similarly to materials. For each service to be provided, separate orders would be made, and the accounting would be the same. It is crucial in this situation that the subcontractor submits his estimate fully informed of the system's ramifications and the impact of his operations on the project's duration.

A subcontractor's performance should also be evaluated based on a number of particular events or milestones, and his progress payment should be linked to these control events. It is vital for all parties to work together during the contract's execution to specify and analyse variants quickly so that revisions may be made (Oyebode, 2019).

vii. **Overheads and Indirect cost:** As much as the direct costs previously mentioned, overhead and indirect costs also contribute to the project. The cost of project services (telephone, mail office, maintenance, utilities), indirect labour (materials handling, production control, etc.), and other tasks or areas that contribute to the cost of the work packages but may be challenging to evaluate directly are examples of indirect costs.

Many companies manage these expenses by adding a certain proportion to the direct cost of allocating them pro rata (in proportion to the overall cost of the project) or as part of a work package labour order. Yet, the resources utilized by management and cost managers for

planning, observing, and Project management includes, among other things. (Oyebode, 2019). The Gantt diagram and Network analysis, which consists of Critical path method (CPM) and Performance evaluation and review techniques (PERT).

viii. **Value Management**: Value Management is a multi-disciplinary, group orientated, organized, logical cycle and methodical examination of capability which looks for best worth through the plan and development cycle to meet the client's apparent requirements a proactive, inventive, critical thinking administration to make unequivocal the client's esteem framework. The VM methodology likewise empowers the improvement of a worth culture inside the association which facilitates the way to achieving positive change.

Oladigbolu, et'al (2022) Consequently, it can be summed up as an objective setting process that means to fulfil the client's task necessities as well as it focuses on working on the connection among esteem and the client. Schedule Monitoring Whenever a project is evaluated to see if everything is going according to plan, data collecting in the manner described below is required to determine the kind of issues that one may experience:

- For each activity, gather data on any discrepancies between anticipated and actual start dates.
- For each activity throughout the whole project, ascertain any discrepancies between the estimated and actual completion dates.
- Any unforeseen hold-up or other irregularities that change the project's scheduled completion date. Any action carried out beyond the network's order.
- Any goal-related task that seems impossible to complete.

A number of steps may be taken to correct any condition once the aforementioned data has been gathered and analysed. For instance, one might update a schedule by re-evaluating the length of some activities, or one can rearrange or remove activities that are represented in the most recent version of his or her program chart.

ix. **Management of project resources:** Management of project resources involves efficiently allocating and utilizing the available assets, including people, time, money, equipment and materials to achieve project objectives within constructions. This typically includes planning, scheduling, tracking, and optimizing resources usage throughout the project lifecycle.

Oladigbolu, et'al (2022) There are several types of resources in project management and managing these resources effectively is essential, such as;

i. **Human resources:** The people involve in the project including project managers, team members, stakeholders, and contractors.
ii. **Financial resources:** The budget allocated for the project including funds for salaries, equipment, materials, and other expenses.
iii. **Physical resources:** Tangible assets required for the project, such as, equipment, facilities and materials.
iv. **Information resources:** This has to do with data, documents and knowledge necessary for project planning, execution and decision making.
v. **Technological resources:** This are the tools, software and technology infrastructure used to support project activities and communication.

Factors Affecting Construction Cost

Cost is one out of the numerous variables that must be considered in the assessment of the success of any building project, the others being time and quality. On the other hand, there are few elements that are capable of influencing the cost of construction of building projects. According to American Institute of Architects (AIA) (2007), building cost is influenced by several elements such as location, design, performance requirements, and construction time. This assertion underscored Okpala and Aniekwu (1998) who examined the reasons for construction cost escalation in Nigeria.

The study revealed that delays and direct cost overruns of the project as the main considerations prompting the high cost of construction. An aggregate of 17 elements were also identified as reasons for cost overruns which are outlined as follows; relationship between management and labour; wastage on site; inadequate availability of labour; disputes on site; effects of weather; economic instability; insurance cost; fluctuations in the prices of materials; project financing and payments; inadequate production of construction materials by the contractor; wrong estimation methods; additional work; duration of contract; frequent changes in design; high labour cost; contracting procedure; government policies.

Omoregie and Radfort (2006) in a research that focused on the Nigerian construction industry found 15 variables that cause project delays and construction cost increase through a survey of the perception of contractors, consultants and clients. The study revealed exchange rate as an impediment which influences the costs of construction material and general price level.

Based on the evidence from literature, the causes or factors responsible for increase in the cost of construction projects are subdivided into various divisions as follows:

i. **Environmental Factors:** Construction projects are affected very much by the surrounding environment unlike other industrial products. The environmental factors were subdivided into divisions as; weather effects, social and cultural impact, project location, government policies, level and number of competitors, labourers' nationality, lack of productivity and economic stability (Carr *et al*., 2009).

ii. **Effect of weather:** Nigeria has varied rainy and dry seasons with little rain during the dry season (Ubaid *et al.,* 1991). The climate of the southern part of Nigeria is directly affected by its geographical location. The relative humidity is at the highest at the thick of the rainy summer season in late July to early September. Rainfall is irregular, unreliable and occurring mostly between the months of October and April. Surface winds are at high to medium speed most of the year. These winds are usually accompanied by a rise in temperature and humidity which may cause dust. In a related development. Al-Khaldi (1990) also indicated that in the Eastern Part of Saudi Arabia it has some of the harsh climate conditions that are unfavourable for contractors to work in. So, operations conducted during such climatic conditions suffer a decrease in productivity.

iii. **Project location and site condition:** Project location and site condition affect cost of construction in terms of time, quantities and quality. Factors such as the quality and quantity of available foremen and labourers, harsh working conditions on sites, difficult living condition and heavy traffic congestion should be considered. According to Adonoje (1990), the geographic location of a building site, to a large extent, affect costs of

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construction. The cost of building a structure on a site in some States in Nigeria such as Lagos, Delta, Bayelsa or Rivers would be as much as 30% more expensive than building a similar structure in a remote town in other States. This is due to higher wages, materials, restrictions on the use of mechanical plant and protection of adjoining and adjacent buildings and pedestrians because of the congested nature of the site.

iv. **Construction Management Factors:** The construction processes are divided into conception, design and construction stages. Project conception is the recognition of a need that can be satisfied by a physical structure. The project design phase translates the primary concept into an expression of a spatial form that will satisfy the requirements of the client in an optimum economic manner. Construction operations are the final phase of the three-part process. They create the physical form that satisfies the conception and permits the actual realization of the design (Fisk, 1997). To minimize high cost of construction, overlap conflict between the construction processes should be avoided through the issuing of clear specification, good delegation and smooth communication (Fisk, 1997).

v. **Inadequate planning/packaging:** The planning stage is one of the real stages that influence the cost of construction. Contractors should know about all assets that may be required for the project. The contractor ought to use the assets proficiently. Legitimate planning is vital to use project assets viably else, the project cost will experience an increment in cost.

vi. **Poor financial control on site**: Monetary control of project is not a simple issue on site. All project assets, for example, labour, materials, instruments and supplies should be adequately controlled. It is fundamental for project managers to know about this variable with a specific end goal to have better monetary control on site.

vii. **Relationship between management and labour**: A gap exists between the project management and labour. This gap ought to be as insignificant as could be expected under the circumstances so that the bond existing between management and labour can be reinforced. There ought to be cooperation between the groups in order to assemble a project with least cost. In the event that the relationship between management and labour is sufficiently bad, efficiency will diminish thereby prompting an increment in project cost.

viii. **Contract procedure:** The contract document expresses the principles among all parties (contractor, owner and consultants) to the agreement. The contract procedure is a component of the contract document. The contract procedure demonstrates the sort of agreement, payment technique, requirements and regulations arising from the agreement. The cost of project is influenced by the sort of agreement reached by the parties. Unclear contract agreement will prompt dispute, project deferment and cost overrun (Fisk, 1997).

ix. **Design Related Factors**: Continuous design changes happen generally because of the client's requirements. This design changes may influence the contractor regarding postponement and also cost. Apart from client's requirements, other reasons such as government regulations could bring about design changes. The point of project control in

the construction industry is to guarantee that a project is completed on time, within client's budget furthermore accomplishing different objectives of the project.

It is very clear from literature that high construction cost negatively affects the construction industry generally. The consequences of this are very enormous ranging from: abandonment of project, reduction in building activities, bad reputation to inability to secure fund for projects. However, applying the suitable strategies would restore the trust clients' have in consultants, lessen risks in project and support the practicality and manageability of the construction process generally. In line with this thought, several techniques have been proposed to minimize cost of construction.

However, Cooke and Williams (2003) opined that strategies for reducing cost include the removal or minimization of changes in design and site wastage. Cooke and Williams (2003) elucidated that the strategies will involve the establishment of the requirements and components of the project accurately before beginning, setting up the project team to do its best by keeping the project on the right track, effective human resource management through inspiration, and project tracking including perceiving early the plans that may lead nowhere and applying restorative activities early (Ashworth, 2002). Damnjanovic *et al*. (2009) suggested among other strategies the use of a variant of PPP arrangement which is tagged "availability fee" which may be capable of reducing construction cost and assist in budget planning before the commencement of work.

Table 1: Factors influencing cost management

S/N	Factors influencing cost management	Source(s)
1	Poor leadership and coordinating skills	Fagbenle et al. (2018);Iyer and Jha (2005);
2	Poor resources deployment	Fagbenle et al. (2018);
3	Excessive materials wastages on site	Fagbenle et al. (2018); Enshassi et al. (2006);
4	Complex payment mechanism	Fagbenle et al. (2018);
5	Variations/design changes during construction	Fagbenle et al. (2018); Annor-Asubonteng et al. (2018);
6	Materials theft on sites	Fagbenle et al. (2018); Enshassi et al. (2006);
7	Weak management support and control	Iyer and Jha (2005); Enshassi et al. (2006);
8	the experience and competence of project managers	Divakar and Jebin (2018);Kissi et al. (2016)
9	Unstable construction materials prices,	Iyer and Jha (2005); Zhao et al. (2017);
10	climatic conditions	Iyer and Jha (2005);
11	Impracticable estimates by the estimators	Ikediashi et al. (2014); Divakar and Jebin (2018);
12	Poorly developed project brief	Enshassi et al. (2006); Divakar and Jebin (2018);
13	Poor risks management	Ikediashi et al. (2014); Olawale & Sun (2010);
14	underutilization of plant and equipment	Enshassi et al. (2006); Akinsola et al. (1997);

Source : Adapted from Okereke, et al, 2022.

Benefits of Cost Management Strategies

Oladigbolu, et al (2022) Understanding the importance of cost management is one of the easiest things you can do in the organizational paradigm. Cost management procedures are crucial to development projects since they mean to lay out a financial plan, which is then firmly observed and

controlled. By making a characterized plan and assessment process, these methodologies can assist with overseeing cost assumptions from project origin to the beginning of the task. Precise assessing and vital preparation of expenses are huge moves toward the making of an extensive expense the executives program. Cost conviction and consistency are a definitive objective of an effective expense the board system.

Month to month reports separated into costs per building or region, as well as income investigation, give essential understanding into how intently the financial plan is being followed. Through a constant survey and assessing process, there is improved visibility for workers for hire into the expense and timetable of the whole project (Wilson, 2022).

Table 2: Benefits of Cost Management

1.	**Improve value for money for the parties and this can lead to repeat patronage**
2.	**Lead to Client satisfaction**
3.	**Ensures that project cost performance is monitored**
4.	**Enables the correction of changes that will impact projects outcome**
5.	**The financial health status of businesses is known via cost monitoring**
6.	**Helps companies to make an informed decision that will bring sustainable growth and progress**
7.	**Help to optimise financial planning of the company**
8.	**Improve profit maximization**
9.	**Help project managers make clear business expectations with stakeholders**
10.	**Scope creep is controlled**
11.	**Ensure that return on investment is increases**
12.	**Generates cost data for benchmarking of potential future projects**

Source: Adapted from Oladigbolu, et al, 2022

Method of Data Collection

The research was carried out by reviewing existing literatures on the topic or related from texts, journals, past projects, paper presentations etc, which is the secondary source of data. The study also used semi-structured questionnaires for data collection as the primary source of data and the respondent are practitioners within the construction firms, who includes among others; project quantity surveyors, project managers and project directors operating within Kaduna State.

Research Data Instrument Data Collection and Research Design

The instrument used for data collecting was the questionnaire. A well-structured questionnaire was designed and distributed. According to Osuala (2005) defines questionnaire as an instrument used for getting answers as to a set of questions by using a format which the respondents filled by himself.

The questionnaire consists of 10 questions. Questions 1-4 were designed to collect information about the respondent and 5-10 were focused on the subject matter of the research i.e. identifying and assessing the listed and others 'if any' cost management strategies employed by building

contractors in Nigeria, problems encountered by contractors when managing cost of construction in Nigeria, ranking the effectiveness of the strategies etc. The liker scale that was used in the question section is 5 liker scale. According to Punch (2019), research design refers to the framework used to plan and execute particular research. The research design used for this study is survey design which entails gathering data from a reasonably large number of respondents within a specific time frame (Cooper & Schindler, 2014). For this study, the quantitative research method of survey was employed. Questionnaire was used as the major tool for obtaining information based on the opinions and perceptions of the respondents.

Study Population

Olayiwola (2006), described population as the lager group from which a sample is selected for study. The study focused on building contractors within the construction industries both in the private and public sectors, with the total number of 309 building contractors within Kaduna State.

Sample Design and Size

The sampling technique used for the research was non-random sampling. This sample was selected from a population of some selected construction firms within Kaduna State.

Esan and Okafor (1995) describe sample as a sub-set of population selected to meet specific objectives. They further added that the sample must as much as possible have essential characteristics of the target population. Due to the magnitude of the population, some portion form the large population is being used as the sample. The non-random sampling method was used. From the population of 309, a study sample of 60 was arrived at which was derived from a formula provided by Yamane.

provided by (Yamane 1967): $n = \frac{N}{1+N(0.5)^2}$

Where; n=Denote sample size, N= Denote population size, e= Denote margin error of (±5%).

$$n = \frac{70}{1+70(.05)^2} = \frac{70}{1+70x0.0025} = \frac{70}{1.17}$$

$n = \underline{59.57 = 60}$

The sample mean formula

Sample Mean = (Sum of terms) ÷ (Number of Terms) $= \frac{\sum xi}{N} = \frac{(x1+x2+x3+\cdots+xn)}{N}$

Where: $\sum xi$ = sum of terms and N = numbers of terms

Sources of Data and Analysis

Data obtained from the 5-point Likert scale questionnaire was the primary source of data used while review of literatures, journals, articles, past projects, materials from the internet etc. on the

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related subject area was carried out. The literature review helped in identifying contributions of various authors on the topic in question providing a basis for further investigation. The second method used was a well-structured questionnaire which was based on the information gotten from the literature review conducted. Statistical package for social sciences (SPSS) for Windows version 21.0, was used for the statistical analysis of the data generated from the questionnaire survey. The SPSS software being also use allows the presentation of research results in charts, tables and mean and standard deviations in a simple and comprehensive manner (Field, 2006; Landau & Everitt, 2003). Ranking scales of questionnaire options from (5-1) Strongly agree and very easy (5) Agree and easy (4) Somewhat agree and moderate (3) Disagree and difficult (2) Strongly disagree and very difficult (1)

FINDINGS AND DISCUSSSION OF RESULTS

A total number of 75 questionnaires were administered and 62 questionnaires was returned by the respondents but only 60 questionnaires were used for the analysis because the other two respondent are not part of the targeted respondents, thus is invalid. The data were analysed with the use of statistical instruments. Descriptive analyses were carried out on the data. Percentages and frequencies were used in the descriptive analysis. Statistics package for social science (SPSS) was used in the descriptive analysis and to recommend the suitable strategies to be used by building contractors in Kaduna state Nigeria. The data collected from the survey conducted was presented in tables.

A variety of tools can be used for data presentation and they include tables and charts like pie charts, bar charts, etc. For this study, tables were used.

TABLE 3: Distribution of Demographic Characteristics of Respondents.

Variable	Category	Frequency	Percent (%)
Discipline of respondent	Project Quantity Surveyor	31	51.7
	Project Manager	29	48.3
	Director	0.00	0.00
	Others	0.00	0.00
	Total	**60**	**100**
Firm classification	Large (Above 50 Employees)		
	Medium (25-50 Employees)		
	Small (1-25 Employees)		
	Total		
Years of experience	NO response	1	1.7
	Below 5 years	8	13.3
	5 -10 years	23	33.8
	11- 15years	28	46.7
	16 -20 years	0	0.00
	21 – 25 years	0	0.00
	Total	**60**	**100**

Variable	Category	Frequency	Percent (%)
Participation in Managing Cost of Construction Works	**Yes**	**60**	**100**
	No	**0**	**00**
	Total	**60**	**100**

Presents the majority of respondents in the survey are Project Quantity Surveyors (51.7%) and Project Managers (48.3%), with no participation from Directors or others. Most of the respondents work in small firms with 1-25 employees (75.0%), while a smaller portion is from medium-sized firms with 25-50 employees (25.0%), and none from large firms. In terms of experience, the respondents are mainly experienced professionals with 10-20 years of experience (46.7%) and 5-10 years of experience (38.3%), with very few having less than 5 years of experience (13.3%) and no respondents with more than 20 years of experience. Notably, all respondents (100.0%) have participated in managing the cost of construction works.

TABLE 4 : Making use of the strategies.

Strategies	N	Mean	Std. Deviation	Rank
Value management	60	2.08	0.462	1
Management of project resources	60	1.5	0.504	2
Variance Analysis	60	1.48	0.504	3
Subcontractors	60	1.42	0.497	4
Overheads and Indirect cost	60	1.42	0.497	4
Material cost control	60	1.33	0.51	5
Cost value reconciliation	60	1.25	0.437	6
Estimating and budgeting	60	1.12	0.324	7
Cash flow analysis	60	1.12	0.324	7
Cost report	60	1.12	0.324	7
Cost control	60	1.12	0.372	7
Project resource and planning	60	1.02	0.129	8

Table 4 presents the frequency of use of various cost management strategies by contractors, ranked by their mean scores.

- The most commonly used strategy is value management, with a mean score of 2.08 and a standard deviation of 0.462, indicating it is the most frequently utilized strategy.
- Management of project resources with (mean = 1.50, std. dev. = 0.504) ranking second as the most commonly used strategy.
- variance analysis with (mean = 1.48, std. dev. = 0.504) ranking the third most commonly used strategy.
- Subcontractors and overheads/indirect costs both have a mean score of 1.42, ranking fourth respectively. Material cost control with (mean = 1.33, std. dev. = 0.51) is ranked fifth, while cost value reconciliation with (mean = 1.25, std. dev. = 0.437) is sixth.
- Estimating and budgeting, cash flow analysis, cost report and cost control all share the seventh rank with a mean score of 1.12.

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- Project resource and planning has with (mean =1.02, std. dev. = 0,129) which is ranked eighth which is the least utilized strategy.

Additionally, some respondents mentioned using strategies such as cost estimates, continuous improvement, negotiation, and procurement.

TABLE 5: Problem encountered by contractors in managing project cost.

Problems Encountered	N	Mean	Std. Deviation	Rank
Material related challenges	60	4.28	1.209	1
Inadequate funding	60	3.75	1.348	2
Plant related challenges	60	3.57	1.544	3
Inaccurate cost estimate	60	3.57	2.086	3
Labour related challenges	60	3.53	1.631	4
Deficient cost control system	60	3.5	2.054	5
Organisational problem	60	3.48	1.568	6
Variations	60	3.35	1.388	7

Table 5 highlights the primary problems contractors face in managing project costs, ranked by their mean scores.

- The most significant issue is material-related challenges, with a mean score of 4.28 and a standard deviation of 1.209, making it the top-ranked problem
- Inadequate funding follows as the second major issue with (mean = 3.75, std. dev. = 1.348).
- Plant-related challenges and inaccurate cost estimates are tied for third place, both with a mean score of 3.57 but with different standard deviations (1.544 and 2.086, respectively).
- Labour-related challenges with (mean = 3.53, std. dev. = 1.631) rank fourth, and a deficient cost control system with (mean = 3.50, std. dev. = 2.054) fifth sixth.
- Organizational problems with (mean = 3.48, std. dev. = 1.568) are in sixt place, while variations with (mean = 3.35, std. dev. = 1.388) is the least significant issue among those listed.

The standard deviations indicate that there is considerable variability in how these problems are perceived, particularly for inaccurate cost estimates and deficient cost control systems.

TABLE 6: Easy in putting the strategies into practice / to implement.

Strategies	N	Mean	Std. Deviation	Rank
Cost value reconciliation	60	2.58	0.889	1
Variance Analysis	60	2.47	0.947	2
Cash flow analysis	60	2.18	0.892	3
Subcontractors	60	2.13	0.929	4
Overheads and Indirect cost	60	1.95	1.141	5
Material cost control	60	1.9	0.838	6
Cost report	60	1.75	0.68	7

Strategies	N	Mean	Std. Deviation	Rank
Project resource and planning	60	1.63	0.688	8
Cost control	60	1.63	0.712	8
Value management	60	1.58	1.169	9
Management of project resources	60	1.52	0.651	10
Estimating and budgeting	60	1.37	0.663	11

Table 6 assesses the ease with which various cost management strategies can be implemented by contractors, ranked by their mean scores.

- The most easily implemented strategy is cost value reconciliation, with a mean score of 2.58 and a standard deviation of 0.889, making it the top-ranked strategy.
- Variance analysis follows in second place with (mean = 2.47, std. dev. = 0.947), and cash flow analysis is third with (mean = 2.18, std. dev. = 0.892).
- Managing subcontractors ranks fourth with (mean = 2.13, std. dev. = 0.929), and handling overheads and indirect costs is fifth with (mean = 1.95, std. dev. = 1.141).
- Material cost control is sixth with (mean = 1.9, std. dev. = 0.838), while cost reporting ranks seventh with (mean = 1.75, std. dev. = 0.68).
- Project resource and planning and cost control are tied for eighth place, each with a mean score of 1.63. Value management with (mean = 1.58, std. dev. = 1.169), management of project resources with (mean = 1.52, std. dev. = 0.651), and estimating and budgeting with (mean = 1.37, std. dev. = 0.663) are considered the least easy strategies to implement.

The standard deviations indicate that there is some variability in the ease of implementing these strategies, with overheads and indirect costs, and value management showing higher variability.

TABLE 7: Ranking the effectiveness of the strategies when it is used by building contractors in management cost of building works in Nigeria.

Strategy	N	Mean	Std. Deviation	Rank
Estimating and budgeting	60	4.57	0.698	1
Project resource and planning	60	4.32	0.911	2
Cost report	60	4.28	1.091	3
Cost control	60	3.95	0.946	4
Cash flow analysis	60	3.92	0.869	5
Subcontractors	60	3.83	0.942	6
Cost value reconciliation	60	3.72	0.761	7
Material cost control	60	3.7	0.908	8
Management of project resources	60	3.58	0.907	9
Variance Analysis	60	3.43	0.945	10
Overheads and Indirect cost	60	2.67	2.23	11
Value management	60	0.17	0.905	12

Table 7 ranks the effectiveness of various cost management strategies employed by building contractors in Nigeria, based on their mean scores.

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- The most effective strategy is estimating and budgeting, with a mean score of 4.57 and a standard deviation of 0.698, indicating high effectiveness and consistency among respondents.
- Project resource and planning is ranked second with (mean = 4.32, std. dev. = 0.911), followed by cost reporting with (mean = 4.28, std. dev. = 1.091) in third place. Cost control with (mean = 3.95, std. dev. = 0.946) and cash flow analysis with (mean = 3.92, std. dev. = 0.869) rank fourth and fifth, respectively.
- Managing subcontractors is in sixth place with (mean = 3.83, std. dev. = 0.942), followed by cost value reconciliation with (mean = 3.72, std. dev. = 0.761) and material cost control with (mean = 3.7, std. dev. = 0.908). Management of project resources with (mean = 3.58, std. dev. = 0.907) and variance analysis (mean = 3.43, std. dev. = 0.945) are ranked ninth and tenth.
- Overheads and indirect costs with (mean = 2.67, std. dev. = 2.23) show considerable variability in effectiveness, placing it eleventh.
- The least effective strategy is value management, with a very low mean score of 0.17 and a standard deviation of 0.905, indicating minimal perceived effectiveness and high variability in responses.

CONCLUSIONS

As seen in the analysis and result presentation, the majority of the building contractors that have participated in managing cost of construction work using various strategies are Project Quantity Surveyors and Project Managers, Majority of the respondents have reasonable years of working experience in the construction industry and are from small and medium firms. Value management, Project Resources Management, Variance Analysis, Subcontractors and Overhead and Indirect Cost are the most frequently used strategy among building contractors in Nigeria. This indicates a strong emphasis on optimizing value and monitoring project deviations. Significant obstacles such as material-related issues, inadequate funding, plant related challenges, inaccurate cost estimate and labour related challenges were highlighted among others as the problems usually encountered when managing the cost of construction by building contractors in Nigeria. These challenges underscore the importance of robust procurement practices and securing adequate financial resources throughout project lifecycles. Cost value reconciliation was found to be relatively easiest strategies to implement followed closely by variance analysis, cash flow analysis, subcontractors, overheads and indirect cost, material cost control and cost report. This suggests that contractors may benefit from focusing on methodologies that are straightforward yet effective in controlling project costs.

Estimating and budgeting, project resources and planning, cost report, cost control and cash flow analysis are the most effective strategy for Building Contractors in Nigeria. This finding emphasizes the critical role of accurate cost estimation and meticulous budget planning in achieving cost control.

Based on the findings, the most effective strategies among others used by building contractors in Kaduna State are recommended as the most suitable strategies to be used by building contractors in Nigeria. The following recommendations are also proposed:

i. Enhancement of Value Management Practices: Contractors in Nigeria should focus on improving the application of value management in managing cost of construction effectively to optimize project costs and deliver better value to clients.
ii. Enhancement of Material Management by contractors: Address material-related challenges through better procurement practices, supplier partnerships, and inventory management strategies. This can help mitigate cost overruns and delays caused by material shortages or quality issues.
iii. Improving Funding Strategies: Project stakeholders to explore avenues for securing adequate funding early in the project lifecycle. This could involve leveraging financial instruments, engaging with financial institutions for project financing, or exploring public-private partnerships where applicable
iv. Training and Capacity Building: Project stakeholders to provide training and development opportunities for project teams to enhance skills in cost estimation, budgeting, and value management. This investment can lead to more accurate forecasting and proactive cost management practices
v. Integrate Technology Solutions: Project stakeholders should consider adopting construction management software and digital tools that streamline cost tracking, resource allocation, and reporting processes. These technologies can enhance transparency, efficiency, and decision-making in cost management.

By implementing these recommendations, building contractors in Nigeria can improve their cost management practices, ultimately leading to more successful project outcomes. However, further research can also be conducted in other states within Nigeria and other countries to see if the results will be significant with the one in Kaduna State, Nigeria.

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