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Research Article

Impact Of Project Cost Control On The Financial Performance Of Selected Construction Firms In North-Central Nigeria

Abani Joseph Alu[1*], Dr Frank Alaba Ogedengbe[2]

[1*]Nile University Of Nigeria, alujoseph1@yahoo.com
[2]Nile University Of Nigeria, frank.ogedengbe@nileuniversity.edu.ng

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ABSTRACT

Effective financial performance is crucial for the growth of construction companies, and project cost control plays a key role in achieving this, using financial measures such as Return on Assets (ROA), Return on Equity (ROE), Cost Variance Analysis (CVA), and Earned Value Analysis (EVA). This study examined the impact of project cost control on the financial performance of selected construction firms in North-Central Nigeria. Data were collected from 102 construction professionals using a structured questionnaire, achieving a 100% response rate. Descriptive statistics (mean, frequency, percentage) and multiple linear regression were employed for analysis. The results showed that CVA and EVA significantly influence financial performance, with R-squared values of 69% for ROA and 77% for ROE. The regression models indicate that ROA = -0.012 + 0.605(CVA) + 0.746(EVA), and ROE = 2.359 + 0.087(CVA) - 0.143(EVA). The study concludes that CVA positively predicts both ROA and ROE, while EVA positively but negatively predicts ROE. It is recommended that construction firms enhance their use of project cost control techniques to minimise cost overruns, delays, and quality issues, leading to improved financial performance.

KEY WORDS: Construction Firms, CVA, EVA, Nigeria, North-Central, ROA, ROE

INTRODUCTION

The construction sector is essential to the economic development of any nation, contributing significantly to infrastructure and job creation. In North-Central Nigeria, construction firms face the challenge of balancing project costs with performance outcomes, where financial success is vital to their sustainability. A critical factor influencing the financial performance of these firms is project cost control, which involves monitoring and managing project expenses to ensure costs remain within the approved budget. This study focuses on the impact of project cost control on the financial performance of selected construction firms in the region, examining financial measures such as Return on Assets (ROA), Return on Equity (ROE), Cost Variance Analysis (CVA), and Earned Value Analysis (EVA). Project cost control is the systematic process of managing expenses to ensure actual costs align with the budget. This involves tracking expenditures, forecasting potential cost overruns, and making necessary adjustments. Return on Assets (ROA) is a financial performance metric that measures how efficiently a company uses its assets to generate profits. At the same time, Return on Equity (ROE) assesses how effectively a company uses shareholders' equity to generate returns. Cost Variance Analysis (CVA) is a tool that measures the difference between budgeted and actual project costs and Earned Value Analysis (EVA) compares the planned value of a project to the actual value achieved to assess performance.

Projects are structured undertakings that can vary in size—small, medium, or large—and are designed to achieve specific goals and deliver services to a targeted group. Numerous factors must be considered to ensure the successful execution of a project. According to Madu et al. (2019), highly effective projects are those that are completed on time, adhere to budget constraints, deliver quality to beneficiaries, and remain sustainable over the long term to ensure continued benefits. The key elements of any project include time, scope, and the quality of the final deliverables. Lu (2019) highlighted that successful projects are evaluated based on several aspects of project management, including scope, time, resource management, procurement, and stakeholder engagement. Additionally, communication, resource allocation, and cost management are integral parts of

project success, with a strong emphasis on cost control (Alabi, 2021). Every project incurs costs and requires diverse resources to deliver the expected outcome. Effective cost control is crucial to project managers, as it directly impacts project performance (Karunakaran et al., 2018). This study focuses on how improving cost control can enhance project outcomes, ensuring projects are completed efficiently and effectively within their financial constraints.

The process of managing an organization's operational costs is referred to as cost control (Lawal, 2017). This practice aims to prevent the inefficient use of limited resources while promoting efficiency and cost sensitivity. To maximize available material resources, it is crucial to implement effective cost control measures in business operations (Abubakar et al., 2020). Furthermore, cost control encompasses management strategies designed to ensure that expenses are managed in line with organizational objectives (Bichang'a & Kimutai, 2023). The importance of cost management in maintaining a company's viability cannot be overstated, as it facilitates the efficient monitoring of expenses against the budget and addresses any financial irregularities that may arise (Onubi et al., 2022). In order to succeed in a highly competitive market, companies must maintain reasonable costs, and management must ensure that resources are utilized effectively and intelligently to achieve their goals (Alu et al., 2024).

Wilson (2016) stated that cost management practices are designed to provide project managers with information that aids decision-making and ensures effective control over corporate resources. Johnson (2018) added that these practices involve strategies and concepts essential for making informed decisions among alternative business actions and controlling performance through evaluation and interpretation. Akinleye and Fajuyagbe (2022) emphasized that implementing cost management practices provides timely and accurate information, enabling projects to control costs and improve efficiency. Gao and Goodrum (2022) highlighted that cost management practices help organizations survive in a competitive and constantly evolving environment, as they offer a crucial advantage that guides managerial actions, influences behavior, and supports the values needed to achieve organizational objectives. Aje and Fadamiro (2020) noted that cost management practices primarily focus on internal managerial needs, emphasizing performance evaluation and future standard-setting (Muhammed et al., 2022). According to Igwe et al. (2020), cost management practices are systems designed to align with how products are manufactured, or services are delivered.

Kumar and Varghese (2022) explained that cost management practices consist of methods and techniques for planning, measuring, and reporting, aimed at improving a company's products and processes. Yap and Skimore (2020) viewed cost management practices to ascertain costs for control and decision-making purposes, applicable to decisions like make-or-buy assessments, transaction cost evaluations, and performance measurement of procurement. Kaming et al. (2022) argued that the purpose of cost management practices is to calculate the total cost of production or service provision, helping to control and reduce costs in construction firms.

Problem Statement and Gaps

In the competitive and evolving landscape of business operations, especially in the construction industry, the ability to control costs effectively is critical to the survival and profitability of firms. Cost management practices are essential tools that provide managers with accurate and timely information to make informed decisions, improve efficiency, and maintain control over corporate resources (Wilson, 2016). Despite the importance of these practices, many firms struggle to implement them effectively, leading to project cost overruns, inefficiencies, and ultimately poor financial performance (Johnson, 2018; Akinleye & Fajuyagbe, 2022). In the construction sector, cost overruns can significantly affect project outcomes, delay timelines, and reduce the quality of final deliverables, thereby undermining client satisfaction and project sustainability (Kaming et al., 2022). While there is extensive research on the importance of cost management practices, such as using methods like Cost Variance Analysis (CVA) and Earned Value Analysis (EVA), there is still a gap in understanding how these practices are applied in the construction firms of North-Central Nigeria. Existing studies largely focus on general industrial applications without addressing the specific challenges faced by construction companies in this region, where issues like resource limitations, procurement inefficiencies, and project delays are more pronounced (Gao & Goodrum, 2022; Aje & Fadamiro, 2020). Furthermore, many studies emphasize internal cost control mechanisms but fall short of providing insights into how these practices can be leveraged to enhance external factors, such as stakeholder satisfaction and competitive advantage (Kumar & Varghese, 2022).

Additionally, there is a lack of comprehensive research linking cost management practices directly to financial performance metrics such as Return on Assets (ROA) and Return on Equity (ROE) in construction firms. This creates a gap in knowledge about the extent to which these practices can influence profitability and long-term sustainability (Yap & Skimore, 2020). The current body of literature also underexplores how cost management practices can be tailored to the specific economic, regulatory, and operational challenges faced by construction firms in developing economies like Nigeria (Muhammed et al., 2022; Igwe et al., 2020). This study seeks to

address these gaps by investigating the impact of cost management practices on the financial performance of construction firms in North-Central Nigeria. By focusing on specific cost control measures such as CVA and EVA, the research aims to provide deeper insights into how construction firms can enhance project outcomes, reduce inefficiencies, and improve profitability in a challenging business environment.

Research Objectives

i. Evaluate the effect of Cost Variance Analysis on the Return on Assets of selected construction companies in North-Central Nigeria.
ii. Evaluate the effect of Cost Variance Analysis on the Return on Equity of selected construction companies in North-Central Nigeria.
iii. Assess the effect of Earned Value Analysis on the Return on Assets of selected construction companies in North-Central Nigeria.
iv. Assess the effect of Earned Value Analysis on the Return on Equity of selected construction companies in North-Central Nigeria.

Research Questions

The following are the questions the study aims to answer:
i. How does Cost Variance Analysis (CVA) affect the Return on Assets (ROA) of selected construction companies in North-Central Nigeria?
ii. How does Cost Variance Analysis (CVA) affect the Return on Equity (ROE) of selected construction companies in North-Central Nigeria?
iii. Does Earned Value Analysis (EVA) have any effect on the Return on Assets (ROA) of selected construction companies in North-Central Nigeria?
iv. How does Earned Value Analysis (EVA) affect the Return on Equity (ROE) of selected construction companies in North-Central Nigeria?
These questions focus on examining the relationship between cost control measures (CVA and EVA) and financial performance indicators (ROA and ROE) in the construction sector of North-Central Nigeria.

Research Hypotheses

H01: Cost Variance Analysis has no significant statistical impact on the Return on Assets of selected construction companies in North-Central Nigeria.
H02: Earned Value Analysis has no significant statistical impact on the Return on Assets of selected construction companies in North-Central Nigeria.
H03: Cost Variance Analysis has no significant statistical impact on the Return on Equity of selected construction companies in North-Central Nigeria.
H04: Earned Value Analysis has no significant statistical impact on the Return on Equity of selected construction companies in North-Central Nigeria.

Research Significance

The significance of this study lies in its potential to contribute to both the academic literature and the practical operations of construction companies, particularly in North-Central Nigeria. By investigating the effects of Cost Variance Analysis (CVA) and Earned Value Analysis (EVA) on the financial performance of selected construction firms, this research provides valuable insights into how effective cost control mechanisms can enhance the profitability and sustainability of these companies.

For the academic community, this study fills a notable gap in the literature by specifically addressing the relationship between project cost control measures and financial performance in the Nigerian construction sector. While there is extensive research on cost control and financial performance in developed economies, relatively few studies have focused on developing regions such as North-Central Nigeria. This study contributes to a more nuanced understanding of how CVA and EVA can directly influence key financial indicators like Return on Assets (ROA) and Return on Equity (ROE), thus advancing knowledge in project management, finance, and operations.

Practically, the findings of this study are highly relevant to construction companies operating in an increasingly competitive and resource-constrained environment. The ability to manage project costs effectively can significantly influence a company's bottom line, reduce risks associated with budget overruns, and improve the quality and timeliness of project delivery.

By providing empirical evidence on the effectiveness of CVA and EVA, the study offers managers actionable insights into optimizing resource allocation, improving decision-making, and enhancing overall financial performance. For policymakers and industry regulators, this study can inform the development of guidelines and frameworks that encourage the adoption of robust cost management practices within the construction sector, fostering greater financial accountability and efficiency in a key industry for Nigeria’s economic growth.

LITERATURE REVIEW

Cost Variance Analysis (CVA)

Cost Variance Analysis (CVA) is a crucial method to assess the difference between actual costs incurred during a project or business operation and the projected or budgeted costs. By comparing planned costs to actual expenditures, CVA helps organisations understand and track the financial performance of their projects and operations (Kaming et al., 2022). Regular use of CVA allows companies to identify unnecessary expenditures or potential savings, enabling them to take corrective actions and ensure that their projects or operations remain aligned with budgetary goals (Abbas & Burhan, 2022). This process not only improves budget accuracy but also optimizes cost efficiency and enhances resource allocation, making it an invaluable tool in financial management (Akinleye & Fajuyagbe, 2022).

For project managers, CVA serves as an essential tool for evaluating, analyzing, and controlling project costs. It promotes accountability within the project team by providing clear data on cost performance, facilitates proactive decision-making, and ultimately improves the likelihood of project success. The difference between the Earned Value (EV) and the Actual Cost (AC) of the work completed is referred to as the Cost Variance (CV). CV can be calculated using the formula CV = EV - AC. A negative CV indicates cost overruns, while a positive CV suggests cost savings (Legesse, 2019). This helps project managers assess whether they are on track financially or need to implement cost-saving measures. The Cost Performance Index (CPI) is another critical metric used with CVA to measure how efficiently a project's costs are being managed. It is calculated as CPI = EV / AC. A CPI more significant than 1 indicates favourable cost performance, where costs are being used efficiently. Conversely, a CPI less than 1 signals cost overruns and inefficiency. This combination of CV and CPI allows project managers to gain deeper insights into the financial health of their projects. A positive CV and a CPI more significant than 1 indicate that the project is under budget and performing efficiently, while a negative CV and CPI less than 1 highlight budget issues and inefficiency (Liang et al., 2020).

Cost variances can arise due to several factors, such as inaccurate cost estimation, changes in project scope, unexpected resource costs, or inefficient project execution (Le & Sutrisna, 2023). Identifying the root causes of these variances is crucial for taking appropriate corrective action. For example, if a variance is due to inaccurate cost estimates, project managers may need to adjust the project scope or budget. Similarly, if inefficient project execution is the cause, adjustments to the project plan, such as reassigning resources or renegotiating contracts, may be necessary. Effective variance analysis helps project managers identify these underlying issues and take timely corrective actions to bring the project back on track (Kermanshachi & Pamidimukkala, 2023). CVA is an indispensable tool in financial management and project control. It provides organizations with valuable insights into their financial performance by highlighting discrepancies between planned and actual costs. Through the use of metrics such as CV and CPI, project managers can better understand cost efficiency and make informed decisions to address variances. As a result, CVA not only enhances project accountability but also improves overall project success by fostering proactive management and more efficient use of resources.

Earned Value Analysis (EVA)

Earned Value Analysis (EVA) is a comprehensive project management methodology that evaluates project performance by integrating metrics related to scope, cost, and schedule (Msiska et al., 2022). EVA enables the computation of key performance indices such as the Cost Performance Index (CPI) and the Schedule Performance Index (SPI), which are derived from essential project metrics like Planned Value (PV), Earned Value (EV), and Actual Cost (AC) (McConnell & Quinn, 2021). These indices facilitate variance analysis by providing insights into cost savings through Cost Variance (CV) and schedule efficiency through Schedule Variance (SV). By quantifying these variances, EVA not only aids in analysing current performance but also allows project managers to forecast estimated costs and project completion times, enabling proactive management and effective communication with stakeholders.

One of the key benefits of EVA is its ability to provide real-time data on project performance. When integrated into project management software, EVA allows for continuous tracking and analysis of project metrics. This enables project managers to make informed decisions, identify potential problems early, and ensure the successful delivery of the project within its defined scope, schedule, and budget constraints (Nadir & Ahmed, 2020). EVA's predictive capability, combined with its use of quantifiable metrics, offers managers a more accurate assessment of project health than traditional accounting methods, which typically emphasise actual costs and anticipated expenditures (Adetunji et al., 2019). By focusing on actual achievement, EVA goes beyond merely tracking costs. It helps managers pinpoint areas of risk early, allowing them to develop risk mitigation strategies based on the project's actual cost, schedule, and technological progress. Despite its advantages, EVA is not without its limitations. One key drawback is its reliance on the assumption that the initial project plan remains valid throughout the project lifecycle. If significant changes occur, the initial plan may no longer be an accurate baseline for performance evaluation, which can compromise the precision of the analysis (Maaroof & Naimi, 2023). Additionally, EVA is accuracy heavily depends on the precision of early project estimates.

Inaccurate baseline estimates can lead to misleading performance metrics and forecasts, affecting decision-making.

Nonetheless, EVA remains a powerful tool for project management. By providing an "early warning" system, it helps managers detect and address potential issues before they escalate (Unegbu et al., 2022). This early detection capability is particularly valuable in complex projects where risks are inherently higher. By offering a holistic view of project performance, EVA equips managers with the data necessary to make proactive adjustments, ensuring that projects remain on track and aligned with organisational goals. EVA provides a more robust evaluation of project performance compared to traditional methods by integrating scope, cost, and schedule into a unified analysis. Its ability to predict future performance and identify risks early on enhances decision-making and project success. Despite the challenges related to baseline assumptions and estimate accuracy, EVA remains an indispensable tool for managing project performance and delivering results within predefined parameters.

Return on Assets (ROA) and Return on Equity (ROE) as Financial Performance Measures

Return on Assets (ROA)

Return on Assets (ROA) is a critical profitability ratio that measures how efficiently a company's management uses its assets to generate profits. According to Ummah et al. (2023), ROA is calculated by dividing net income by average total assets, offering insights into how well a business turns investments into earnings. This metric is particularly valuable in assessing a company's operational efficiency and asset utilisation. It helps stakeholders, especially investors, understand how effectively management is leveraging the company's resources to produce financial gains. ROA also serves as a standardised measure for comparing performance across companies within the same industry, providing a transparent benchmark to gauge profitability. Moreover, it identifies areas where asset deployment may be improved, helping to enhance overall profitability. For instance, a low ROA might indicate that a company is not utilising its assets effectively, suggesting the need for better asset management or operational improvements. Conversely, a high ROA signals strong performance, indicating efficient use of assets to generate income. Thus, ROA is crucial in guiding strategic decisions and investment considerations, helping businesses optimise asset utilisation for better financial outcomes (Teshome et al., 2018).

Return on Equity (ROE)

Return on Equity (ROE) is a financial indicator that measures a company's profitability about its shareholders' equity (Ummah et al., 2023). It evaluates how effectively a company uses its equity capital to generate profits by dividing net income by average shareholders' equity. ROE provides valuable insights into management's ability to create value for shareholders, making it a critical metric for investors seeking to assess the company's financial performance and growth potential. Additionally, ROE offers a standardised basis for comparing profitability across companies within the same industry, allowing investors to benchmark a company's performance against its peers (Ummah et al., 2023). As a critical measure of how efficiently a company's equity is utilised to achieve optimal financial results, a higher ROE typically indicates that it effectively uses its resources to generate shareholder returns. Conversely, a low ROE may suggest inefficiencies in equity deployment or lower profitability. By understanding ROE, investors and management can identify opportunities for improving equity utilisation and overall profitability.

Theoretical Review

Transaction Cost Theory

The theory of transaction cost economics was established by Williamson in 1979, with its central focus on maximising economic efficiency by fully utilising the organisational structure and minimising the costs associated with market exchanges. The theory asserts that every transaction in exchanging goods and money comes with inherent costs. These costs arise from negotiating and enforcing agreements between the parties involved. To safeguard against potential opportunistic behaviour from one party, contracts that outline the terms of the exchange, the associated costs, and who will bear those costs are signed. These contracts serve as a protective measure, ensuring neither party can exploit the transaction to their advantage. Alaghehband et al. (2011) emphasised that the foundation of this theory lies in identifying strategies to reduce transaction costs through partnerships, the use of technology and digital systems, and continuous monitoring of the transaction process. In project management, especially for large-scale undertakings, reducing high operating costs becomes crucial for the project's success. Megaprojects often involve significant expenses in acquiring labour, tools, equipment, and raw materials, making the transactions particularly costly. Therefore, project managers must implement cost-cutting measures to ensure economic efficiency. One approach is to assemble dedicated teams to monitor expenses, create systems that reduce operating costs, and streamline the transaction process.

The tendering process should be optimised to ensure high-quality products are obtained from suppliers offering the most competitive bids. Additionally, the use of supply chain components such as bulk purchasing can help organizations take advantage of economies of scale, further reducing costs. Rindfleisch (2020) pointed out that high transaction costs relative to the project's profit margin could significantly diminish profitability

for smaller projects. In such cases, project managers may face the temptation to compromise on material quality, which could ultimately impact the project's or service's final quality. To prevent these issues, managers must estimate transaction costs accurately and implement strict controls to monitor and manage these costs throughout the project's lifecycle. Budgeting for transaction costs and actively managing them ensures that projects remain economically viable without sacrificing quality. This strategic approach to cost management is essential for delivering successful projects while maintaining operational efficiency and profitability.

Resource-Based View (RBV)

The Resource-Based View (RBV) theory focuses on a firm's internal resources as key to achieving sustainable competitive advantage and superior financial performance. According to RBV, a company's ability to leverage its valuable, rare, inimitable, and non-substitutable resources (such as financial assets, technical expertise, and project management skills) is crucial for long-term success. In the context of this study, RBV can explain how effective cost control methods (such as Cost Variance Analysis and Earned Value Analysis) contribute to better financial performance (ROA, ROE) by efficiently utilising the firm's resources. The theory suggests that firms with superior cost management practices are more likely to convert these internal capabilities into sustained financial performance, giving them an edge over competitors.

The Resource-Based View (RBV) is a theory in strategic management that was first introduced by Birger Wernerfelt in 1984 and further developed by Jay Barney in 1991. It argues that a firm's internal resources are key to achieving and sustaining a competitive advantage. Barney's work emphasized that firms possess unique resources that, when effectively utilized, can lead to superior performance. These resources must meet specific criteria, known as the VRIN framework: they must be valuable, rare, inimitable, and non-substitutable. This framework is the cornerstone of RBV, proposing that only firms with such resources can maintain a competitive edge in their respective markets.

The RBV theory is based on two primary assumptions. First, it assumes resource heterogeneity, meaning that firms possess different resources and capabilities, and these differences lead to varying levels of performance. Second, it assumes resource immobility, suggesting that resources are not easily transferred between firms and thus cannot be easily duplicated by competitors. These assumptions underscore the importance of unique resources in achieving long-term success. For example, a firm's ability to manage costs efficiently through techniques such as Cost Variance Analysis (CVA) and Earned Value Analysis (EVA) could be seen as valuable and difficult for competitors to replicate, providing a source of sustained competitive advantage.

One of the strengths of RBV is its focus on internal capabilities, encouraging firms to develop and optimize their unique resources, which can lead to sustained profitability and competitive positioning. This perspective is particularly useful in industries such as construction, where firms with better cost control mechanisms can outperform others. RBV helps managers focus on developing and maintaining resources that offer a strategic advantage, enhancing financial outcomes such as Return on Assets (ROA) and Return on Equity (ROE). Additionally, RBV's emphasis on internal resources provides insights that are applicable across industries, making it versatile for analysing firm performance in various contexts. However, RBV also has some limitations. One weakness is its focus on internal factors, which may overlook the influence of external factors like market conditions, competition, and regulatory environments that significantly impact a firm's performance. Moreover, identifying VRIN resources can be challenging in practice, as managers may struggle to determine which resources meet these criteria. RBV also views resources as static, which may not account for the dynamic nature of modern business environments, where resources can become obsolete due to technological or market changes. Despite these limitations, RBV remains a powerful tool for understanding how firms can leverage their unique resources to achieve long-term success.

The **Transaction Cost Economics (TCE)** theory is the most suitable framework to anchor this study because it aligns directly with the study's focus on project cost control and its impact on financial performance, particularly in construction firms. The primary goal of TCE is to minimize the costs associated with transactions, such as procuring materials, labor, and managing contracts. This is highly relevant to the construction industry, where large-scale projects are common, and controlling these operational and transactional costs is essential for financial success.

In contrast to the **Resource-Based View (RBV)**, which emphasizes internal resources as the key to competitive advantage, TCE centres on reducing the inefficiencies and costs that arise during market transactions. Since the study investigates cost control methods like Cost Variance Analysis (CVA) and Earned Value Analysis (EVA), TCE's focus on minimising transaction costs offers a straightforward, practical approach. Construction firms deal with significant expenses in acquiring materials, equipment, and labour, and the transactions related to these activities can be costly. TCE provides a framework for understanding how efficient contracting, procurement processes, and supplier management can lower these costs, directly affecting the bottom line.

TCE's emphasis on controlling operational inefficiencies particularly applies to construction projects, where cost overruns and procurement delays can severely impact profitability. The theory suggests strategies like bulk purchasing, effective supplier negotiations, and monitoring contract terms to reduce transaction costs. This aligns well with the study's objective, which explores how cost control measures can improve Return on Assets (ROA) and Return on Equity (ROE) for construction firms. TCE also addresses the risk of opportunistic behaviours in contracts, which is crucial in large projects involving multiple stakeholders. By using contracts and transaction monitoring effectively, project managers can avoid cost overruns and ensure that the projects remain within budget, ultimately enhancing financial performance.

While RBV could offer insights into how firms leverage their internal capabilities, such as management expertise or specialised skills, it does not directly address the mechanisms of reducing external transaction costs. Therefore, TCE provides a more comprehensive and relevant theoretical foundation for this study. By focusing on minimising transaction costs, TCE helps explain how effective cost control practices can lead to improved financial outcomes, making it the most appropriate theory for understanding the relationship between project cost management and financial performance in construction firms.

Empirical Review

Alu et al. (2023), analyze the state of project cost control in the Nigerian construction sector today, pinpoint the major variables influencing cost control, and offer suggestions for potential remedies to these problems. Cost overruns, delays, and subpar project performance have been major problems in Nigeria's construction sector, resulting in substantial resource waste and monetary loss. Project managers, legislators, researchers, and other industry participants will find value in the review's conclusions, which will also aid in enhancing cost control procedures in Nigeria's building sector. According to the study, the main problems influencing project cost control in Nigeria are insufficient monitoring and control systems, poor project planning, and ineffective cost control strategies. The review also emphasizes the necessity of adopting emerging technologies in project cost control and moving toward more proactive and integrated cost control approaches. In the end, this study offers suggestions for enhancing project cost control procedures as well as insightful information about the difficulties project managers encounter in regulating project costs in the Nigerian construction sector.

Bichang'a and Kimutai (2023) looked into how water projects in Kenya's Kericho County performed in terms of project cost control methods. The organizational control theory, transaction cost theory, and project management theory served as the foundation for the study variables. Using 16 finished water projects as the unit of analysis, the study used a descriptive research design. Semi-structured questionnaires were used to gather primary data; these were initially pilot tested and proved to be valid and reliable. The results demonstrated that cost estimation using various models, price variations, and forecasts that assisted in lowering cost overruns were responsible for the improvements in the water projects' performance. According to the budget guidelines, the results demonstrated that project budgeting had a significant impact on the water projects' performance by lowering risks, guiding project decisions, and maximizing resource utilization. By regularly assessing how project plans were being implemented and enhancing accountability, transparency, and procedures, the monitoring and evaluation function assisted in enhancing performance.

Fazil et al. (2021) examined cost estimation and its effectiveness in Malaysian construction projects. It was mentioned that cost estimation is a crucial component and useful tool for preventing cost overruns in building projects. The article offered a method of evaluating the effectiveness of cost estimation in the construction industry by utilizing cost estimation aspects. By examining 238 construction cost estimation papers published over the previous 31 years in 23 journals, the researchers gathered secondary data. Of these, only 33 papers focused on the performance and results of cost estimation. Based on components of task-technology fit theory, contingency theory, and organisational control theory, the results determined the factors associated with cost estimation performance. Control themes like control practices, overall project cost, and evaluating costs from prior projects and applying them to the current study formed the basis of the cost estimation framework. The study's use of secondary data from journal reviews and its focus on the Malaysian construction industry resulted in methodological flaws.

Sinigi and Kaburu (2020), focused on the performance, monitoring, and assessment of youth employment initiatives in Kenya's Narok County Government. The 32 projects that were underway from 2014 to 2018 were the main focus. 195 respondents, including project managers, government officials, and young people, completed the questionnaires, and the results were subsequently examined using descriptive and inferential statistics. The study found that M&E significantly impacted the youth employment projects' performance. All stakeholders were involved in raising awareness, playing an oversight role, gathering data, evaluating and reporting findings, and monitoring and evaluation were successful because the staff members were well-trained, informed, skilled, and experienced. The study came to the conclusion that the M&E process functions best when staff members receive training, feedback is freely offered, accepted, and used, there is ongoing improvement, and there are frequent activities for tracking and reporting results. Stakeholder involvement, continuous improvement, smooth feedback, and information sharing are all characteristics of successful

projects. By failing to evaluate the impact of M&E on the youth projects' performance and its contextual background in Narok County, the study introduced conceptual gaps.

Fadare and Adegbie (2020) examined the impact of cost management on the financial performance of publicly traded consumer goods companies in Nigeria. The study's population consisted of twenty-seven (27) consumer goods companies that were listed on the Nigerian Stock Exchange. For the study, ten (10) distinct companies were selected at random. Throughout this investigation, the method that was employed was purposive sampling. The study made use of data that had already been gathered. Data was gathered from a few chosen businesses between 2009 and 2018.
The study used both descriptive and inferential statistical analysis (regression). The cost of sale, the cost of selling and distribution, the cost of administration, and the cost of financing were the criteria used to assess cost management. The net profit margin, return on capital, and earnings per share were used to assess financial performance. The research's conclusions indicate that marketing and distribution expenditures, cost of sale, financing, and administrative costs negatively impacted the net profit margin.

Eyibio and Daniel (2020), investigated the effectiveness of resource budgeting as a project management tool was carried out by. Because of the globalisation of markets, every organisation aims to use as much money and resources as possible to produce high-performing projects that increase project profitability. When it comes to resource budgeting, project management, and performance, the budgeting issue is crucial. Determining the importance of the relationships between efficient resource budgeting and project management, as well as reviewing previous research to gather information and perform a quantitative analysis, were the main goals. The results showed that resource budgets are a useful tool for project management and have a big impact on project success. The study came to the conclusion after reviewing previous research that resource budgeting contributed to the success of Nigerian projects. The current study will link budgeting to project performance, whereas the previous study's conceptual gaps were related to resource budgeting and project management.

Ahn et al. (2020), focus was to assess the effectiveness of CBR models in enhancing construction cost estimation. According to the study, using a case-based reasoning model is a good way to get accurate and dependable project cost estimates, especially in the early phases of a project. Because case-based reasoning (CBR) is based on the recorded information and historical data from similar projects, it works best during the project identification, scope, and design phase. Cost estimation for all project activities and operational areas is then supported by a comparison of the data with the current project. As the case studies and the CBR model relied on absolute error rate, standard deviation of findings, and means for cost estimation accuracy, the researchers focused on multi-family housing complexes. The results showed that using the CBR model to estimate costs improved accuracy and stability and aided in decision-making in the early phases of projects. According to the study, the CBR model can also be applied to time and resource allocation, project scheduling, and estimation. There are conceptual gaps because the study's focus was on the CBR model and failed to evaluate the relationship between cost estimation and project performance.

METHODOLOGY

Research Design

The study employs a survey research design, allowing for the establishment of a connection between the predictor and criterion variables (Creswell & Creswell, 2018). This design was used to examine the relationship between cost management practices and the financial performance of selected construction firms. The population consists of fifteen Nigerian-listed construction companies. A judgmental sampling technique was used to select a sample size of seven construction firms located in Abuja, Niger, Nasarawa, Kwara, Benue, Kogi, and Plateau States. Primary data were collected through a structured questionnaire using a five-point Likert scale, distributed to 102 respondents. After sorting and cleaning, 100% of the responses were deemed suitable for data analysis. Both descriptive and inferential statistics were utilised in the analysis, providing insights into the relationship between the variables under study. Additionally, Cronbach's Alpha was applied to test the reliability of the questionnaires, yielding a minimum value of .74. This indicates that the collected data were reliable for drawing conclusions and making inferences. The study's design, sampling, and statistical methods ensure robust findings on the impact of cost management practices on the financial performance of construction firms in Nigeria.

Model Specification

The study adopts econometric model in investigating the association between cost management practice and financial performance. The functional model was written in explicit form as follows;

$$Y = f(X_1, X_2, \ldots\ldots\ldots\ldots Xn) \ldots\ldots\ldots\ldots \text{equation (1)}$$

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots Xn \ldots\ldots\ldots \text{equation (2)}$$

$$Y_2 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots Xn \ldots\ldots\ldots \text{equation (3)}$$

Where:
Y = Dependent Variable of the study
X1.....Xn = Independent variable of the study

Substituting the variable of this current study into equation 1 above, we have:

$$ROA = f(CVA, EAA,) \ldots\ldots\ldots\ldots (4)$$
$$ROE = f(CVA, EAA,) \ldots\ldots\ldots\ldots (5)$$

Where:
ROA = Return on Asset as a measure of financial performance
ROE = Return on Equity as a measure of financial performance
CVA = Cost Variance Analysis
EAA = Earned Value Analysis
ß = Independent variable
α = Intercept
ε = Error terms

The model can be expressed mathematically as:

$$ROA = \beta_0 + \beta_1 CVA + \beta_2 EAA + \varepsilon \ldots\ldots\ldots\ldots (5)$$
$$ROE = \beta_0 + \beta_1 CVA + \beta_2 EAA + \varepsilon \ldots\ldots\ldots\ldots (6)$$

A regression model will be stated regarding a connection between the predictors and independent variables, X and the response (Performance of Construction Companies) Y.

Data Presentation and Analysis

The data were analyzed and interpreted using a linear regression approach with the aid of the Statistical Package for Social Sciences (SPSS). This method enabled the examination of the relationships between cost management practices and financial performance, offering insights into the predictive influence of the independent variables on the dependent variables. SPSS was crucial in performing the required statistical analyses, ensuring the accuracy and reliability of the results in alignment with the study's objectives.

ANALYSIS AND RESULTS

Respondents Profile

In line with the outcome of table 1 showing the profile of the respondents, the gender of the respondents entails 83 males and 19 females delineating a response rate of 81 and 19 percent respectively. This means that the male gender dominates the Nigerian construction sector reason of which is not unconnected to the muscular and strenuous nature of the construction jobs (Muhammed et al., 2022). The age of the respondents encompasses 25 – 35 years (15), 26 – 45 years (50), 46 – 55 years (30), and 56 and above years (7) depicting a response rate of 15, 49, 29 and 7 percent correspondingly. Also, academic qualification includes BSc/HND (10), MSc/MBA (72) and DBA/PhD (20) representing a response rate of 9, 71, and 20 percent congruently. Furthermore, the participating construction companies includes AG Vision Construction Nig. Ltd (12), Dantata & Sawoe Construction Company Nig. Ltd (10), Ceezali Nig. Ltd (16), Dumez Nig. Ltd. (11), Kadeyprime Group Ltd. (12), Kingfem Nig. Ltd (19) and Kouris Construction Nig. Ltd (22) which represents a response rate of 12, 10, 16, 11, 12, 18 and 21 consistently.

Table 1: Profile of the Respondents

Variables	Frequency	Percentage
Gender of the Respondents		
Male	83	81
Female	19	19
Total	102	100
Age of the Respondents		
25-35 years	15	15
36-45 years	50	49
46-55 years	30	29
56 and above years	7	7
Total	102	100
Academic Qualification		
BSc/HND	10	9
MSc/MBA	72	71
DBA/PhD	20	20
Total	102	100
Participating Construction Companies		
AG Vision Construction Nig. Ltd	12	12

Dantata & Sawoe Construction Company Nig. Ltd	10	10
Ceezali Nig. Ltd	16	16
Dumez Nig. Ltd.	11	11
Kadeyprime Group Ltd.	12	12
Kingfem Nig. Ltd	19	18
Kouris Construction Nig. Ltd.	22	21
Total	102	100

Source: Author's Field Survey, (2023)

Test for Data Normality

Table 2 aims to test the normality of the data used in this study. The population mean of ROA indicates 4.18, ROE shows 2.16, CVA indicates 3.71 and EVA indicates 3.96. The standard deviation of the three variables has revealed that the data are centred on the population mean, indicating 2.863 for project cost control, 2.348 for cost variance analysis and 1.937 for earned value analysis. Hence, the low standard error of the mean shows that the population means of each of the five variables represent the population used in the study (Saunders et al., 2023). However, in order to ascertain the true normality of the data, Kolmogorov-Smirnov and Shapiro-Wilk tests were performed, taking 0.05 as the level of significance. These tests aim to determine if the data are statistically significantly different from the normal distribution, and a higher than 0.05 means it is not statistically different from the normal distribution (Saunders et al., 2023). Hence, in the normality table, the Kolmogorov-Smirnov test has revealed that ROA is 0.208, ROE is .261, CVA is .210, and EVA is .284. Furthermore, the Shapiro-Wilk test has revealed that ROA is .568, ROE is .513, CVA is .526, and EVA is .573. Since all these values are higher than 0.05, we conclude that the data are typically distributed because they are not statistically different from the normal distribution.

Table 2: Test for Data Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
ROA	.208	102	.201	.568	102	.332
ROE	.261	102	.581	.513	102	.231
CVA	.210	102	.313	.526	102	.310
EVA	.284	102	.151	.573	102	.275

Source: Author's Field Survey, (2023)

Multiple Linear Regression Analysis

Study Hypotheses

H_{01}: There is no significant statistical impact of Cost Variance Analysis on the Return on Assets of selected construction companies in North-Central Nigeria.

H_{02}: There is no significant statistical impact of Earned Value Analysis on the Return on Assets of selected construction companies in North-Central Nigeria.

H_{03}: Cost variance analysis has no significant statistical impact on the return on equity of selected construction companies in North-Central Nigeria.

H_{04}: There is no significant statistical impact of Earned Value Analysis on the Return on Equity of selected construction companies in North-Central Nigeria.

Table 3a indicates the coefficients of this study indicate a Sig (<0.05), signifying the rejection of all the hypotheses, such as the H01 and H02 of this study, while the regression line for the model indicates ROA = **-.012 + 0.605(CVA) + 0.746(EVA).** This indicates that CVA and EVA are positive predictors of ROA with an R-Square of .6910, indicating about 69 per cent.

Table 3a: Coefficients[a]

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.012	.148		-.079	.007
CVA	0.605	.029	1.592	55.899	.000
EVA	0.746	.056	.665	23.867	.000

a. Dependent Variable: ROA

Source: Author's Field Survey, (2023)

Table 3b, which indicates the coefficients of this study, indicates a Sig (<0.05), signifying the rejection of all the hypotheses, such as the H03 and H04 of this study, while the regression line for the model indicates **ROE = 2.359 + .087(CVA) - .143(EVA)**. This indicates that CVA is a positive predictor of ROE while EVA is its negative predictor, positing an R-Square of .7731, indicating about 77 per cent.

Table 3b: Coefficients[a]

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.359	.316		7.470	.000
	CVA	.087	.044	.200	1.990	.040
	EVA	-.143	.066	-.251	-2.159	.034

a. Dependent Variable: ROE

Source: Author's Field Survey, (2023)

Discussion

The results indicated that the financial performance of construction firms in the North-Central region is significantly influenced by Cost Variance Analysis (CVA) and Earned Value Analysis (EVA), with R-squared values of 69% for Return on Assets (ROA) and 77% for Return on Equity (ROE). These findings suggest that effective project expenditure control positively affects the financial performance of the firms, aligning with Omotayo et al. (2020), who noted that successful cost control strategies include forecasting, cash flow management, maintaining a working budget, monitoring the costs of labour, materials, equipment, and overhead, and taking corrective action when cost overruns are detected. Consequently, these firms' cost management, control, and monitoring methods significantly enhance project performance.

Similarly, Yismalet and Patel (2018) observed that proper cost and expense control improves project revenues and overall performance. Abobakr (2018) also reported that reducing cost overruns through cost estimation, control, and management improves building projects' performance, boosting construction firms' financial outcomes. Mwaguni et al. (2020) emphasised that high-performing projects result from regular budget reviews, compliance, stakeholder involvement in budget creation, and robust budget controls. Additionally, Kwon and Kang (2019) found that using accurate budgets led to better performance in residential projects within South Korea's construction industry. Eyibio and Daniel (2020) further highlighted that resource budgeting significantly impacts project success and encouraged construction firms to prioritise budgeting with a strong focus on equity.

Chebet (2021) emphasised that project cost estimation significantly affects project performance, as well as the overall performance of construction firms. This view is supported by Ahn et al. (2020), who noted that precise cost estimation plays a critical role in decision-making and contributes to the successful completion of projects. Similarly, Fazil et al. (2021) highlighted that cost control measures, including cost estimation, control procedures, and project cost assessments, help reduce cost overruns. Kermanshachi et al. (2018) agreed that cost estimation positively impacts project success as an essential component of cost management, as highlighted in this study.

Accurately estimating the cost of materials for each project stage, forecasting total project expenses, and making varied estimates are key elements in scheduling tasks that enhance project performance. As Sinigi and Kaburu (2020) found, maintaining precise cost estimates supports the consistent growth of equity, which in turn impacts returns on assets. Their research also revealed that monitoring and evaluation (M&E) significantly influence project performance, affecting both company equity and asset returns. Chebet (2021) further discovered a strong positive correlation between M&E and infrastructure initiatives within construction firms, showing that adopting comprehensive M&E plans, staff competency, and effective data management significantly improves project outcomes. Mokua and Kimutai (2019) underscored the importance of using M&E reports effectively and employing skilled monitoring and evaluation personnel for successful project delivery. This underscores the critical role of M&E in tracking project progress and ensuring that project outcomes align with financial and operational goals, ultimately contributing to the firm's overall financial performance. The combination of precise cost estimation and effective M&E practices fosters better decision-making and enhances the ability of construction firms to meet project goals while maintaining financial stability.

CONCLUSION AND RECOMMENDATIONS

This study, which examined the impact of project cost control on the financial performance of selected construction firms in North-Central Nigeria, concluded that Cost Variance Analysis (CVA) and Earned Value Analysis (EVA) significantly influence both Return on Equity (ROE) and Return on Assets (ROA). The results, with R-squared values of 77% for ROE and 69% for ROA, demonstrated the strong predictive power of CVA and EVA, with p-values below 0.05, indicating statistical significance. The regression equations for ROA and ROE were ROA = -.012 + 0.605(CVA) + 0.746(EVA), and ROE = 2.359 + .087(CVA) - .143(EVA), respectively. These findings highlight that CVA and EVA are positive predictors of ROA. They suggest that improved cost variance analysis and earned value management contribute positively to a firm's ability to generate profits from its assets. While CVA also serves as a positive predictor of ROE, EVA hurts ROE. This suggests that while CVA

enhances equity performance, excessive reliance on EVA may negatively affect shareholder returns, possibly due to cost overruns or inefficiencies. Overall, the study emphasises the critical role of cost management practices in enhancing the financial performance of construction firms, underlining the need for careful implementation and monitoring of these tools for sustained profitability.

Based on the findings of this study, the following recommendations are made to enhance the financial performance of construction firms through effective cost management practices:

1. Strengthen Cost Variance and Earned Value Analysis (CVA and EVA) Practices: Construction firms should continue to utilise CVA and EVA as practical tools for monitoring and controlling project costs. These tools have significantly influenced financial performance, particularly in improving Return on Assets (ROA) and Return on Equity (ROE). Regularly applying these methods will help identify cost variances early and enable timely corrective actions, ensuring projects stay within budget and on schedule.

2. Enhance Project Cost Estimation Accuracy: Firms should invest in improving the precision of their cost estimation processes. The findings indicate that accurate cost estimation is critical for decision-making and project success. Firms should adopt advanced cost estimation techniques, ensure comprehensive project planning, and employ skilled personnel to project costs more accurately, minimising cost overruns.

3. Adopt Comprehensive Budgeting and Cash Flow Management: Effective budgeting practices, including regular budget reviews and the involvement of key stakeholders, are essential for financial performance. Construction firms should prioritise maintaining a detailed and flexible budget that accounts for potential variances. Cash flow management should also be monitored to ensure liquidity and prevent financial strain during project execution.

4. Implement Robust Monitoring and Evaluation (M&E) Systems: Monitoring and evaluation are pivotal in ensuring project success and financial performance. Firms should develop and implement comprehensive M&E frameworks that include frequent project assessments, tracking key financial and operational metrics, and ensuring the alignment of project outcomes with strategic goals. Competent M&E personnel and effective data use will enhance project outcomes and improve returns on equity and assets.

5. Foster Collaboration with Stakeholders in Cost Management: To enhance financial performance, construction firms should engage stakeholders more actively in the budgeting and cost control processes. This includes collaborating with suppliers to negotiate better contract terms and adopting strategies such as bulk purchasing to reduce costs through economies of scale.

6. Encourage Continuous Staff Training in Cost Management Practices: Construction firms should provide ongoing training for their project managers and financial personnel on advanced cost management tools and techniques. Keeping staff updated on the latest cost control strategies and project management tools will improve the firm's ability to execute projects efficiently and within budget, leading to better financial outcomes.

Adopting these recommendations, construction firms can improve their cost management practices, leading to enhanced financial performance, more successful project outcomes, and sustainable growth.

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