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Examining the Effectiveness of Cost Management in Road Construction Projects: A Case Study of Constituency Development Fund Implementation in Chawama Constituency, Lusaka, Zambia

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Abstract

Effective cost management is a critical determinant of success in project implementation, especially in large-scale infrastructure projects such as road construction, which typically involve significant financial investment, complex logistics, and multiple stakeholders. The ability to plan, estimate, allocate, and control project costs effectively determines whether a project is delivered within its approved budget and timeline. In developing countries like Zambia, Cost Management presents a persistent challenge due to a combination of factors such as limited financial resources, inadequate planning, poor procurement practices, inflation, and weak regulatory oversight. These challenges often result in cost overruns, extended project durations, and compromises in the quality of work delivered. Road construction projects are particularly vulnerable to Cost Management issues due to their scale and susceptibility to unforeseen variables such as weather conditions, land disputes, and fluctuating material and labor costs. Inadequate cost forecasting and ineffective monitoring mechanisms further exacerbate the risk of misallocating funds or incurring unplanned expenditures. This study focused on examining the effectiveness of Cost Management practices in the implementation of road construction projects, using the Chawama Constituency in Lusaka as a case study. The study embraced a cross-sectional survey study design, employing a quantitative methodology for gathering primary data. STATA was used for data entry and data analysis. Descriptive statistics, including frequencies, percentages, and means, was used to summarize data. The study found that budgeting and cost control are the most widely applied with MS Excel dominating as the cost management tool. Major challenges include delayed disbursements, price inflation, design changes, inadequate reporting, weak oversight, and political interference, limited digital tools, and weak institutional accountability, which collectively hinder effective Cost Management. The study finds that CDF-funded road projects in Chawama rely heavily on traditional cost management methods and manual tools, resulting in moderate budget adherence but limited precision and real-time monitoring. Recommendations focus on adopting digital tools, building staff capacity, strengthening institutional oversight, improving procurement, and establishing centralized cost data systems to enhance efficiency, transparency, and proactive financial control.

1. Introduction

Cost Management is a fundamental aspect of Project Management that encompasses the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget (Hanioglu, 2022). In the context of road construction, effective Cost Management is essential to ensure that infrastructure projects are delivered on time, within budget, and to the required quality standards. However, cost overruns remain a persistent issue globally and locally, raising concerns about inefficiencies in project implementation and resource utilization (Asiedu, 2021). Other factors include from the local context include lack of transparency, inadequate project planning, and corruption (Biber, 2025). This is despite policies and frameworks such as the Zambia Public Procurement Act and the National Transport Policy.

Globally, road infrastructure projects often suffer from cost overruns due to inaccurate cost estimates, inflation, poor risk management, and weak financial controls (Ammar, 2022). According to the World Bank and International Monetary Fund (IMF), over 60% of transport infrastructure projects in developing countries experience significant cost escalations (Ochieng, 2020).

This study examines the effectiveness of Cost Management practices in road construction project implementation, using a case study approach.

The findings are expected contribute to a better understanding of existing cost control mechanisms, their limitations, and provide evidence-based recommendations to enhance cost efficiency and accountability in infrastructure development.

1.1 Statement of the Problem

Cost Management in road construction projects continues to present a major challenge in Zambia, particularly in the effective implementation of large-scale infrastructure developments (Changala, 2024). Despite the existence of policies and Project Management frameworks aimed at ensuring value for money, many road projects suffer from persistent cost overruns, poor financial planning, weak institutional capacity, limited transparency, corruption in procurement, contract administration processes, and inadequate monitoring and control mechanisms (Sichone, 2020) [19] The magnitude and recurrence of cost-related inefficiencies indicate a systemic problem that not only affects infrastructure quality and economic growth but also undermines public confidence in government accountability (Ahmad, 2024).

This study is therefore necessary to bridge the existing knowledge gap by critically examining the cost management processes in a real-world road construction project.

The findings inform policy-makers, contractors, and project managers on effective strategies to enhance cost performance, promote financial discipline, and improve service delivery in infrastructure projects. Given the significant investment in road construction this phenomenon warrants urgent and targeted research to foster sustainable project execution and fiscal responsibility (Cheelo, 2020).

1.2 General Objective

Examining effectiveness of Cost Management in project implementation: A case study road construction in Chawama Constituency in Lusaka, Zambia.

1.2.1 Specific Objectives
1. To identify and categorise the various cost management techniques employed in the implementation of Constituency Development Fund (CDF) road construction projects.
2. To critically evaluate the effectiveness of cost management strategies in meeting project objectives in CDF-funded road construction projects.
3. To analyse the relationship between cost management and overall project management practices in the delivery of CDF road projects.
4. To examine the key limitations and challenges affecting the application of cost management in CDF-funded road infrastructure projects.

1.3 Conceptual Framework

The framework identifies Cost Management techniques as the Independent Variable, which include practices such as budgeting, cost estimation, financial reporting, and cost control and monitoring (Tembo, 2024). The Dependent Variable in this framework is project goal achievement. These techniques are central to managing project expenditures and ensuring that financial resources are utilized efficiently and transparently.
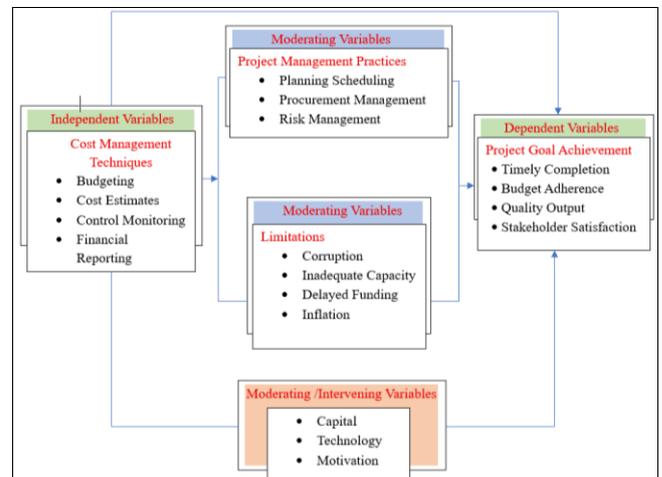
Source: Researcher

Fig 1: Conceptual Framework Illustrating the Relationship Between Cost Management Techniques, Project Management Practices, Challenges, and Project Goal Achievement in CDF Road Construction Projects

2. Literature Review

2.1 Types of Cost Management techniques that are currently used in the road construction Project

Effective Cost Management is critical in ensuring that road construction projects are delivered within budget, without compromising quality or timelines (Obuo, 2024). In CDF-funded road projects, where financial resources are often limited and community expectations are high, applying the right cost management techniques is essential for project success. The following are the most commonly used techniques:

Budgeting is a critical component of Project Management that involves the strategic allocation of estimated costs to various phases, tasks, or components of a project (Kaaca, 2020). It provides a structured financial framework within which a project is executed, ensuring that resources are distributed in a manner that supports the achievement of project goals (Rashid, 2020).

When cost overruns are detected, prompt corrective actions are necessary to keep the project on track. This might involve rescheduling tasks, revising procurement strategies, or reallocating budgets between project components (Daudi, 2023) [4].

The Bills of Quantities (BoQ) is an essential document in the field of construction, particularly in road construction projects, as it serves as a comprehensive listing of all the materials, parts, and labor required for the successful completion of a project (Abbas, 2024). It is a detailed breakdown of quantities and costs for each component of the project, offering a clear and structured approach to estimating and managing construction costs.

Performance-based Contracts, on the other hand, link payments to the Contractor's performance, providing incentives for timely and high-quality work. These

Contracts often include milestones, where the contractor receives payments upon meeting specific performance criteria, such as completing a phase of the project or achieving certain quality standards (Mesioye, 2024).

Findings revealed that risk monitoring was generally ineffective due to several factors: lack of continuous supervision, reliance on ad hoc methods, inexperienced project staff, poor communication, inadequate stakeholder involvement, absence of dedicated on-site risk managers, failure to adopt best practices, and weak reporting systems.

2.2 Effectiveness of Cost Management strategies in achieving project goals on road projects

A well-constructed budget serves as the baseline for monitoring and controlling costs throughout the Project (Hughes, 2022). Early budget preparation allows project. A comprehensive budget lays the foundation for controlling costs and helps set expectations, both internally and externally, aligning all stakeholders toward common financial objectives (Chhelo, 2020).

Cost Management tools such as Earned Value Management (EVM) are employed to provide a comprehensive view of how much value has been earned for the money spent, highlighting any discrepancies between Cost and Progress (Abbas, 2024).

Risk Management is another area where cost management and project management are interrelated. In road construction projects, risks such as price fluctuations, regulatory changes, labor strikes, or natural disasters can lead to unexpected costs. Both Cost Managers and Project Managers work together to identify potential risks during the planning phase and develop strategies to mitigate their impact (Daudi, 2023) [4]. This could involve setting aside contingency funds, securing fixed-price contracts with suppliers, or implementing flexible project schedules that can accommodate potential delays.

The study concludes that robust cost control measures are essential to avoiding budget overruns and achieving project success. It recommends that Project Managers adopt modern tools for cost scheduling and enhance cost control through continuous monitoring and reporting. It also suggests further research into the role of external factors and technology in strengthening cost management across various infrastructure projects (Obuo, 2024).

2.3 Analyse the relationship between Cost Management and Project Management in the effective management of road projects

The relationship between Cost Management and Project Management is crucial for the successful execution of road projects, as both elements are deeply intertwined in ensuring projects are completed on time, within budget, and to the required quality standards (Obou, 2024). The integration of Cost Management into the broader project management framework is vital in achieving the desired outcomes, ensuring that road projects are not only financially viable but also meet technical, environmental, and safety requirements (Gitonga, 2022).

Project Managers and Cost Managers work together to develop a budget that aligns with the project's overall goals and objectives. Effective cost management techniques, such as the development of a Bill of Quantities (BoQ) or a Work Breakdown Structure (WBS), allow the project team to have a detailed understanding of the cost components associated with each phase or task (Cerezo, 2020).

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2.4 Investigate the limitations and challenges of Cost Management Road Projects

Cost Management is a vital component in the successful delivery of road projects. However, despite the availability of tools and strategies designed to control and monitor project expenditures, road construction projects often face significant limitations and challenges in maintaining effective cost control (Alkhawaja, 2023).

At the core of this issue is the reliance on preliminary or incomplete project data during the planning phase. Many road projects begin with concept-level or pre-feasibility studies that provide only general information about project scope, site conditions, and requirements (Akpe, 2024). Due to time or financial constraints, detailed design work, geotechnical investigations, and environmental assessments may not be conducted at this stage. As a result, estimates are not precise. (Ahmed, 2023).

Another contributing factor is poor scope definition. In many instances, the full extent of the work required for a road project is not clearly outlined in the initial phases. Without a well-defined scope, estimators may overlook critical activities such as utility relocation, drainage installations, or pedestrian infrastructure (Bagshaw, 2021). Furthermore, the failure to consider maintenance or future expansion requirements can result in underestimated lifecycle costs, which negatively impact the long-term financial sustainability of the project (Daudi, 2023) [4].

Additionally, Estimators often rely on historical cost data from past projects, which may not be directly comparable due to differences in location, project size, or complexity (Kadir, 2020). This can lead to inaccurate cost benchmarks, especially when inflation rates or market dynamics have shifted significantly since the reference project was completed. The volatility of global markets particularly in relation to fuel, steel, cement, and bitumen means that even a small delay between the estimation and actual procurement can result in substantial cost increases (Karaca, 2020). Currency fluctuations, particularly in countries dependent on imported construction materials or equipment, can further exacerbate this problem. Moreover, political or institutional pressures can sometimes lead to deliberate

underestimation of costs, a phenomenon known as "strategic misrepresentation."

To mitigate these challenges, it is essential for project teams to invest in comprehensive feasibility studies, incorporate robust risk allowances in early estimates, and adopt modern cost estimation tools such as Building Information Modeling (BIM), cost simulation software, and data-driven analytics (Matikiti, 2024) [11]. Additionally, engaging multidisciplinary teams, including Engineers, Economists, and Quantity Surveyors, in the estimation process can enhance accuracy by capturing a broader range of technical and financial variables (Lee, 2022).

Scope Creep and design changes represent persistent challenges in the effective cost management of road construction projects. These issues often arise during the implementation phase and can have a significant impact on project budgets, timelines, and resource allocation (Moshood, 2024). Scope Creep refers to the gradual expansion of a project's scope without corresponding adjustments in the project budget, schedule, or resources (Muyaloka, 2024). This usually happens when additional tasks, features, or requirements are added to the project after the initial planning and budgeting phase has been completed.

To manage scope creep and design changes effectively, road project managers must implement proactive change management procedures (Bagshaw, 2021). This includes establishing a clear scope definition from the outset, engaging stakeholders early and continuously, and integrating a formal process for evaluating, approving, and documenting changes

Traditional fixed-price Contracts, for instance, offer little room for accommodating unexpected changes without incurring cost penalties or triggering claims from contractors (Wadhwa, 2024). Moreover, disputes may arise over whether a change falls within the original scope of work, further complicating negotiations and delaying resolution (Akpe, 2024).

Unforeseen ground conditions and environmental factors are among the most unpredictable and financially disruptive challenges encountered in road construction projects (Lee, 2022). These unexpected conditions can severely impact project timelines, budgets, and even safety, making effective cost management particularly difficult (Faten, 2020). During the design and planning phase, soil surveys and Geotechnical Investigations are usually conducted to assess ground composition, load-bearing capacity, and potential hazards (Lee, 2022). However, such Surveys often cover only a limited sample of the construction corridor and may miss problematic areas. As a result, Contractors may encounter soft clay, expansive soils, loose sands, or rock layers that were not previously identified (Nguyen, 2024).

In addition to sub-surface conditions, unforeseen factor is the discovery of hidden infrastructure such as old utility lines, pipelines, or septic tanks, especially in urban or previously developed areas (Kerzner, 2025) [8], environmental factors like adverse weather also pose serious threats to road project efficiency and cost control. To mitigate the impact of unforeseen ground conditions and environmental factors, road Project Managers must invest in comprehensive site investigations, risk assessments, and contingency planning (Ahmed, 2023). Allocating Contingency Funds, employing flexible contract mechanisms, and maintaining a responsive change

management process are all critical strategies. Additionally, leveraging technology such as ground-penetrating radar, drones, and GIS mapping can enhance early detection and monitoring capabilities (Akpe, 2024).

Inflation and market volatility present significant challenges to effective cost management in road construction projects. These economic variables often operate outside the direct control of project managers and stakeholders, yet they have a profound influence on overall project budgets and timelines. Construction materials such as bitumen, cement, steel, aggregates, and fuel are particularly susceptible to price fluctuations driven by inflation, changes in global supply and demand, geopolitical events, and economic instability. These unpredictable market dynamics can dramatically increase costs during the implementation phase of road projects, placing substantial financial pressure on even well-planned initiatives.

Despite the inclusion of contingency allowances in most project budgets, prolonged or extreme inflation often exceeds the buffer set aside for unexpected costs. This can render original cost estimates outdated and force project managers to either scale down the scope of the project or seek additional funding (Kirira, 2020). In cases where the contract does not include escalation clauses or inflation-indexed pricing, contractors may face losses, disputes may arise, or progress may stall altogether.

To mitigate these risks, project planners can adopt a number of strategies (Senic, 2025). These include securing long-term supply agreements with fixed pricing, incorporating escalation clauses into contracts to adjust for inflation, and using hedging mechanisms for critical inputs. Regularly updating cost estimates based on current market trends and maintaining flexible funding structures can also enhance the project's ability to adapt to volatile economic conditions (Matikiti, 2024) [11].

Corruption and lack of transparency further compound procurement challenges. In some instances, project funds are misallocated or embezzled due to collusion between public officials and contractors. Inflated pricing, kickbacks, and favoritism in tendering processes not only waste public resources but also lead to overpricing and unnecessary cost burdens (Panchal, 2024).

Institutional inefficiencies such as lack of autonomy, poor coordination between departments, lack of skilled personnel and institutional capacity (Nguyen, 2024). and weak governance structures further obstruct cost control efforts. Corruption and mismanagement can also flourish in environments where oversight is weak and personnel are underqualified or overwhelmed by workload (Casey, 2021).

One of the most direct impacts of delayed funding is the inability to make timely payments to contractors, subcontractors, and suppliers. Contractors depend on regular payments to sustain their operations, including labor wages, material procurement, and equipment maintenance (Gitonga, 2022). When payments are not made as scheduled, contractors may halt or slow down work due to financial constraints, triggering significant delays in project execution. These interruptions not only extend the project timeline but also generate additional costs in the form of idle labor, equipment rental fees, and contractual claims for compensation due to non-payment (Obuo, 2024).

Moreover, delayed disbursement of funds often results in legal and financial disputes between project owners and contractors. Contractors may seek compensation for interest

on delayed payments, extension of time claims, or cost escalation clauses built into the contract (Obuo, 2024). These claims can become costly for the project owner and further strain the already limited budget. Additionally, the administrative burden of resolving such disputes often slows down decision-making and diverts attention from core project management tasks (Pabchal, 2024). Irregular cash flow also affects the procurement process. In road construction, materials such as cement, steel, bitumen, and aggregates must be procured in a timely and planned manner to keep the construction process continuous.

Building Information Modeling (BIM) has introduced a technological transformation in construction project execution, significantly improving both project management efficiency and cost-effectiveness. BIM enhances overall project efficiency by delivering accurate quantity takeoffs, optimizing timelines, minimizing project risks and structural errors, and lowering costs.

2.5 Establishment of Research Gaps
Insufficient Adoption of Modern Cost Control Technologies: There is a clear gap in the exploration and application of digital tools such as Building Information Modeling (BIM), cost estimation software, and artificial intelligence in construction cost management. Most studies still focus on traditional, manual, and subjective techniques, neglecting the potential of technology to improve accuracy, efficiency, and predictability.

Limited Integration of Risk and Cost Management Frameworks: While some literature touches on risk factors contributing to cost overruns, there is a lack of comprehensive frameworks that integrate risk management with cost control. This disconnect fails to address the dynamic interplay between risks and financial outcomes in construction projects.

Absence of Longitudinal and Comparative Studies: The current literature is largely cross-sectional and localized, offering limited insight into long-term trends or cross-country comparisons. A gap exists in studies that track cost overrun patterns over time or compare management practices across different regions or project types.

Underrepresentation of Stakeholder Perspectives: There is limited engagement with diverse stakeholder groups (e.g., contractors, government regulators, financiers) in the literature. Most studies rely on project managers or engineers, overlooking how broader stakeholder involvement could influence cost control effectiveness.

Inadequate Focus on Capacity Building and Training Needs: There is a noticeable absence of analysis regarding the skills gap among construction professionals in adopting modern cost management practices. Research seldom explores how training and capacity-building initiatives could enhance the adoption of innovative cost control tools.

3. Research Design
The investigation adopted a cross-sectional study design, utilizing a quantitative approach to gather primary data. This design enables the collection of data at a single point in time, providing a snapshot of the variables under investigation. It is particularly useful for identifying patterns, relationships, and prevalence within a defined population (Lohr, 2021) [10].

3.1 Target population
By definition, a population is defined as a collection of objects, events, or individuals sharing common characteristics that the researcher is interested in studying (Casteel, 2021). The target population for this study consisted of 100 Consultants comprising project managers, architects, engineers responsible for road construction in Chawama Constituency.

3.2 Sample size
To determine the sample size from our given population of Seventy thousand, one hundred and eighty-one thousand (70,181), a Yamane's formula was used that states as follows;

$$n = \frac{N}{1 + N(e)^2}$$

Where:
   N = population of Study (70, 181)
   n = sample of study
   (e) = level of significance
Note (e) = 0.1 (90% confidence level)

$$n = \frac{70,181}{1 + 70,18(0.01)^2}$$

$$n = \frac{70181}{702.81}$$

$$n = 99.86$$

The number of respondents was rounded-up, thereby making the total sample size of 100 respondents.
Therefore, the study consisted of 100 construction company workers.

3.3 Sampling
The study utilized a convenience sampling approach, which involves selecting participants who are readily accessible and willing to take part in the research. This method was chosen due to its practicality, cost-effectiveness, and efficiency in data collection, especially when time and resources are limited (Golzer, 2022).

3.4 Data Collection Methods
The primary research tool for this study was a structured questionnaire comprising closed-ended questions. Data was collected through structured surveys and interviews using standardized questionnaires to ensure consistency, reliability, and ease of analysis. This method was selected because closed-ended questions enable the collection of quantifiable data, facilitate comparisons across respondents, and minimize the risk of interviewer bias (Baburajan, 2022).

3.5 Data Analysis
Data entry and statistical analysis was done using the Statistical Package for the Social Sciences (SPSS) version 26 and STATA. For inferential statistics, Chi-square analysis was employed to establish associations between variables (Lugo-Armenta, 2021).

3.6 Triangulation

The study employed triangulation as a research strategy to enhance the validity and reliability of the findings. Triangulation involved the use of multiple data sources, data collection methods, and/or researchers' perspectives to corroborate and cross-verify research results. In this study, triangulation was achieved by obtaining quantitative data collected through surveys. This approach helped mitigate potential biases and provided a more comprehensive and accurate understanding of the research phenomenon, increasing the overall robustness of the study's conclusions.

4. Findings and Results

4.1 Presentation of results on background characteristics of the respondents

The age of the 100 respondents shows a distribution skewed towards experienced professionals. The average age is approximately 42.4 years, with a standard deviation of 10.2 years, indicating a moderate spread around the mean. The youngest respondent is 24 years old, while the oldest is 63.

Table 4.1.1: Age Distribution of Respondents

Descriptive Statistic	Value
Mean Age	42.4
Median Age	41.5
Mode Age	45
Minimum Age	24
Maximum Age	63
Standard Deviation	10.2

The majority of respondents in this survey were male, representing 78% of the sample. Female respondents accounted for the remaining 22%. This gender distribution is often typical in the construction and project management sectors.
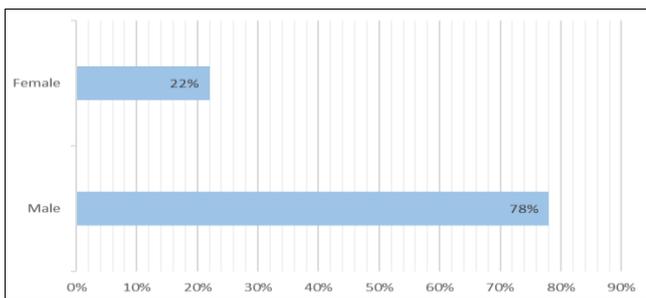
Fig 4.1.2: Gender Distribution of Respondents

The respondent pool is highly educated, with 70% holding a Bachelor's degree or higher. The most common qualification was a Bachelor's Degree (40%), followed closely by a Master's Degree (26%). This high level of education is expected for professionals involved in technical cost management roles.
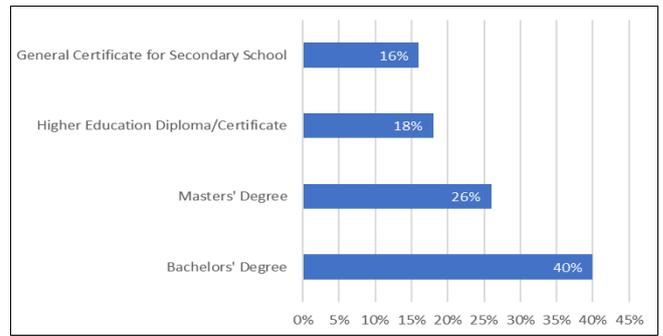

Fig 4.1.4: Educational Qualification of Respondents

4.2 Identifying and Categorizing Cost Management Techniques

Budgeting is most commonly reviewed on a monthly basis (52% of projects). A significant portion (34%) also reviews it quarterly. Only 4% of projects limit budget reviews to initiation and closure, indicating a strong culture of ongoing financial oversight.
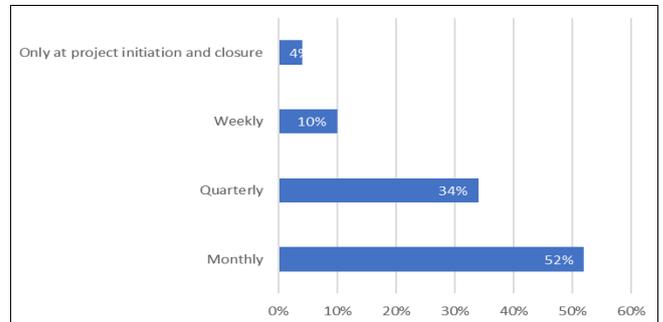

Fig 4.2.1: Frequency of Budget Reviews

MS Excel remains the dominant tool for cost management, used by 94% of respondents. Manual records are still surprisingly prevalent at 42%, while dedicated software like Primavera and CostX have lower adoption rates.

Table 4.2.3: Most Commonly Used Cost Management Tools

		Responses		Percent of Cases
		N	Percent	
Most commonly used tool	MS Excel	47	18.5%	94.0%
	Manual records	21	25.4%	42.0%
	Primavera	15	7.6%	30.0%
	CostX	8	25.4%	16.0%
Total		91	100.0%	182.0%

a. Dichotomy group tabulated at value 1

Perceptions on the availability of skilled personnel are polarized. A combined 44% find it Adequate or Very Adequate, but an almost equal combined 42% find it Inadequate or Very Inadequate, pointing to a critical skills gap in the industry.
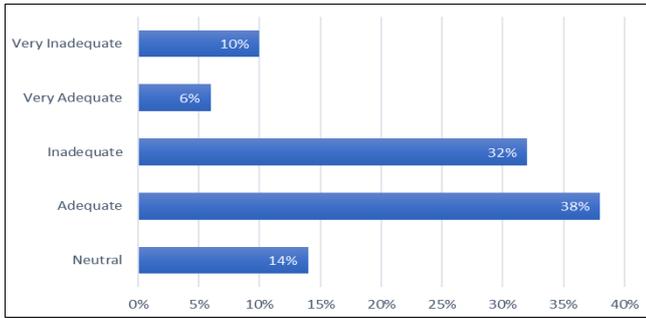
Fig 4.2.3: Availability of Skilled Personnel for Cost Management

4.3 Effectiveness of Cost Management Strategies

Approximately 40% of CDF road projects finish within 51–75% of the approved budget range, indicating partial success in cost management. Very few (10%) stay fully within budget, often due to fluctuating material costs and late funding releases. This trend suggests moderate cost discipline but highlights inefficiencies in project cost forecasting and control.
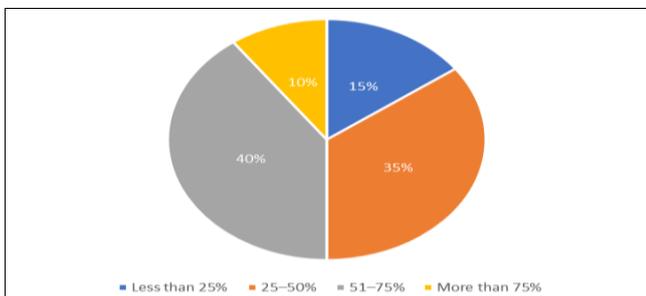

Fig 4.3.2: Budget Performance of CDF Road Projects

Monthly reporting was rated most effective (60%) in supporting management decisions. It provides a balance between responsiveness and data completeness, enabling project teams to monitor cost variances and take timely action. Weekly reporting is uncommon due to limited administrative capacity, while quarterly or ad hoc reporting leads to delayed corrective measures.
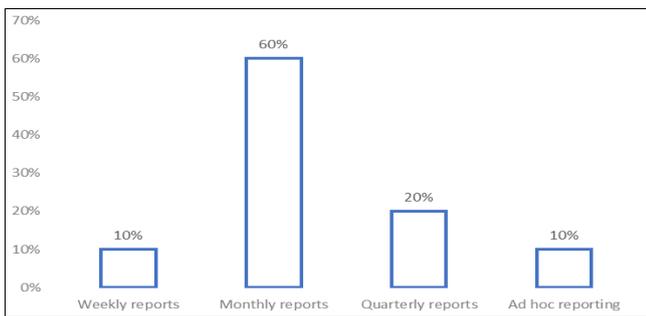
Fig 4.3.3: Effectiveness of Reporting Frequency in Cost Management

Design changes (35%) and market price fluctuations (30%) are the two dominant causes of forecast inaccuracy. Frequent revisions to road designs and fluctuating input prices (e.g., fuel and materials) make initial estimates unreliable. Data availability and staff competence also matter but play secondary roles in this context.
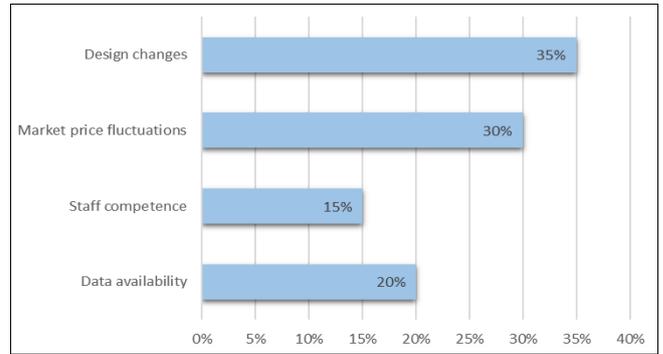

Fig 4.3.5: Causes of Forecast Inaccuracy

External audits (40%) are perceived as the most transparent financial review mechanism. They promote accountability and detect fund mismanagement. However, community oversight remains low, suggesting limited public participation in monitoring project expenditures.
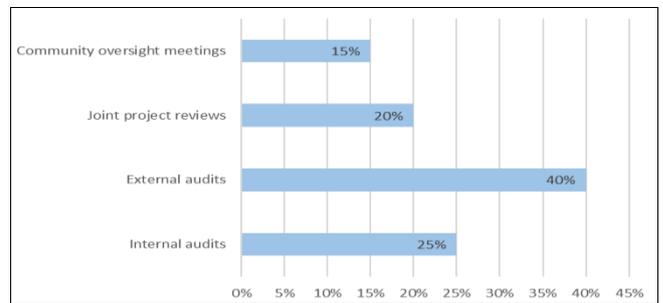

Fig 4.3.8: Transparency and Oversight Mechanisms

Cost overruns are often addressed through reallocation of funds or supplementary budget requests, both at 30%. These responses are reactive rather than preventive, indicating weak early-stage risk control. Contractor penalties are rarely used due to administrative and political sensitivities.
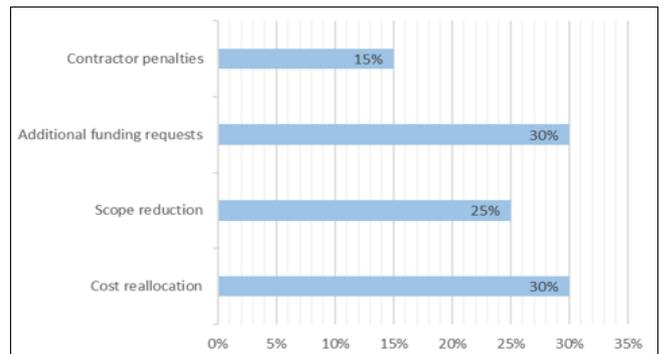

Fig 4.3.9: Approaches to Managing Cost Overruns

4.4 Analyzing the Relationship Between Cost Management and Project Management

Resource allocation (35%) was viewed as the strongest influence on project costs. Delays or shortages in materials and equipment directly inflate expenses. Effective scheduling and risk management also play complementary roles in minimizing waste and downtime.
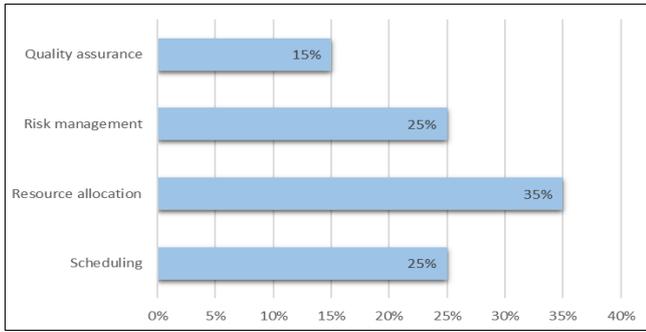
Fig 4.4.1: Influence of Resource Allocation on Project Costs

Site meetings (35%) and digital dashboards (30%) facilitate effective coordination between Engineers, Contractors, and Finance Officers. Projects with structured digital communication report fewer cost discrepancies.
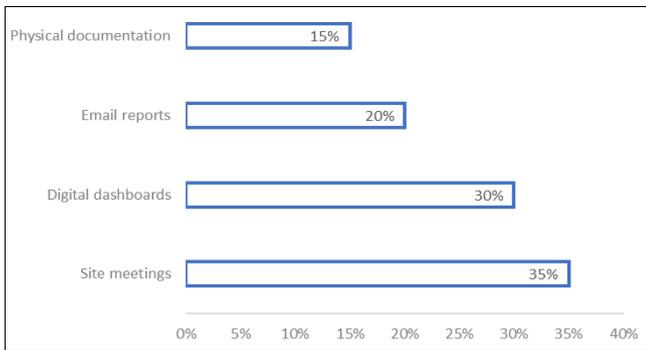

Fig 4.4.3: Coordination Mechanisms in Cost Management

Integrated project management (45%) offers the best alignment of cost and performance, allowing collaboration among all project actors. Hierarchical structures often slow down decision-making and increase costs.
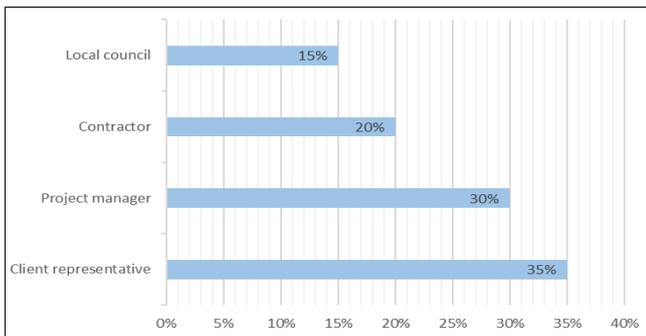

Fig 4.4.8: Key Decision-Makers in Cost Management

4.5 Investigating Limitations and Challenges of Cost Management

Delayed disbursements were cited by 30% of respondents as the most serious limitation to cost control. Funding for CDF projects often arrives later than planned due to bureaucratic processes or cash flow constraints within.
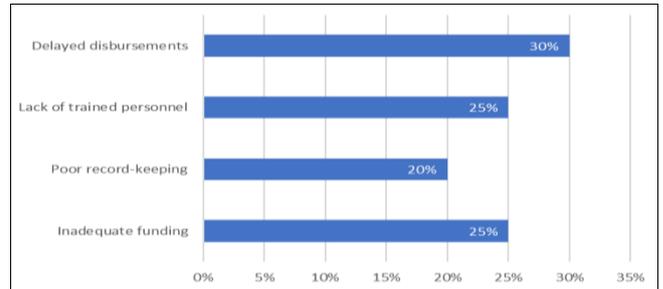

Fig 4.5.1: Financial Limitations Affecting Cost Control

Price inflation was the dominant cause of budget deviations, identified by 35% of respondents. Rising prices of key construction inputs such as fuel, cement, and bitumen directly inflate project costs, especially in long-duration road works. Design changes (30%) were also a key source of deviation, often resulting from poor feasibility studies or political adjustments to project scope after approval. Procurement delays (20%) further contribute to overruns because they extend project start dates, leading to exposure to new price conditions. Contractor inefficiency (15%) is a minor but persistent factor, usually linked to small-scale firms with inadequate financial capacity to manage price volatility.
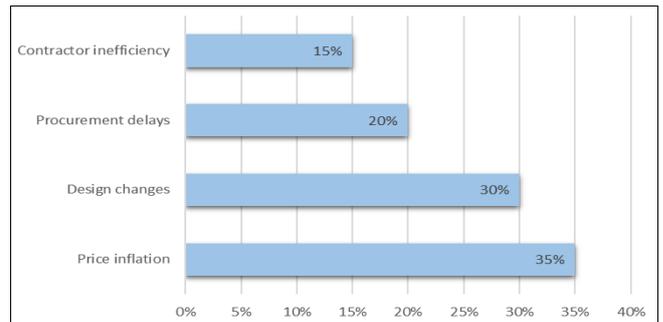

Fig 4.5.2: Causes of Budget Deviations

Delayed reporting (30%) is the most significant administrative issue affecting cost accuracy. Many CDF project offices rely on manual data transmission between field engineers, district offices, and the Ministry of Local Government, causing time lags and inconsistencies in expenditure updates. Weak documentation (25%) and poor data integration (25%) indicate that records are often incomplete or fragmented, making it difficult to track cumulative project costs. Lack of supervision (20%) contributes to these problems, as project accountants and auditors are often overextended, covering several projects simultaneously without robust monitoring systems.
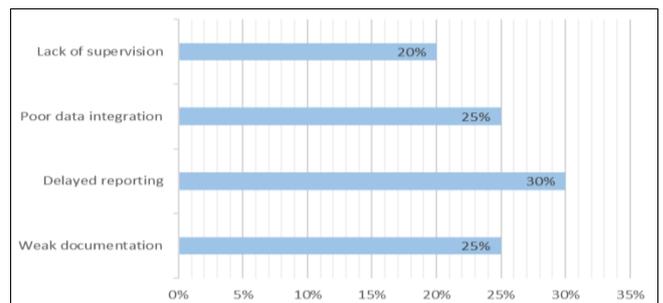

Fig 4.5.3: Administrative Barriers to Accurate Cost Monitoring

Lack of accountability (35%) emerged as the major institutional barrier. Respondents noted that cost overruns or mismanagement cases often go unpunished, creating limited motivation for compliance. Weak enforcement of cost management guidelines (25%) also reduces institutional discipline, as internal audit recommendations are rarely acted upon. Overlapping responsibilities between local councils, contractors, and constituency offices (20%) create confusion over who is responsible for monitoring and authorizing expenditures. Inconsistent oversight (20%) by higher authorities leads to irregular audits and delays in detecting misuse of funds, which weakens transparency in CDF project delivery.
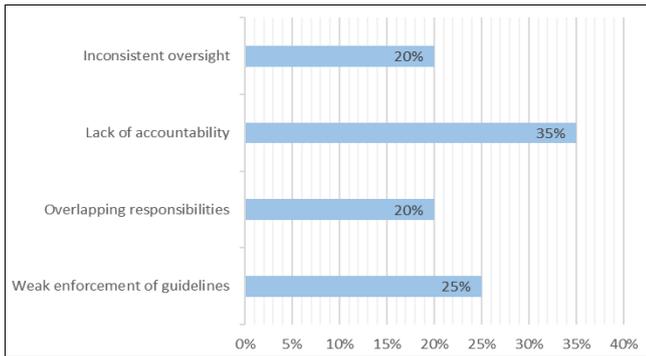

Fig 4.4.5: Institutional Barriers to Cost Management

Both inaccurate cost estimates and political interference were cited equally (30%) as the main procurement challenges. Inaccurate estimates often stem from limited market surveys and outdated bill-of-quantities templates. This leads to tender awards that are not financially realistic, resulting in cost variations during implementation. Political interference, common in CDF projects, disrupts the procurement process by introducing unplanned project scope adjustments or influencing contractor selection. Lengthy tender processes (25%) delay project commencement and increase costs through inflationary effects, while unqualified bidders (15%) contribute to inefficiencies and poor cost control once contracts are awarded.
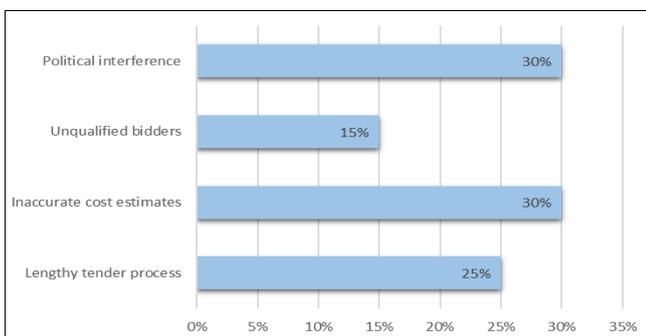

Fig 4.5.6: Procurement Challenges

Economic inflation (40%) has the strongest impact on cost variation. Rising prices of essential construction inputs, particularly fuel and bitumen, directly affect project costs. Inflation also influences contractor pricing strategies and

increases requests for variation orders. Supply chain delays (25%) often linked to import disruptions or fuel shortages compound this effect by extending project timelines. Exchange rate fluctuations (15%) are less significant but still relevant when imported materials are used. The results suggest that external macroeconomic instability is a major uncontrollable factor in CDF project cost performance.
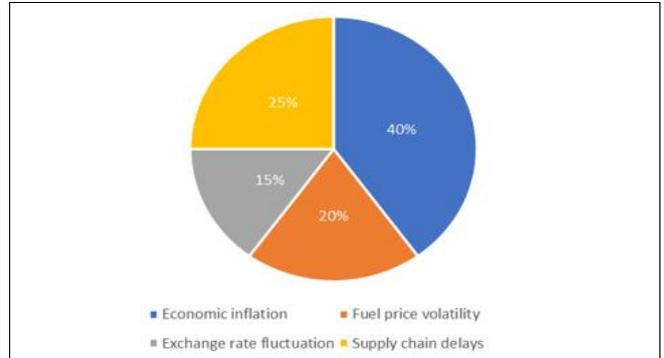

Fig 4.5.8: External Economic Factors

Late payments (35%) and misallocation of funds (30%) are the two most frequent financial issues. Delays in releasing payments to Contractors strain cash flow and cause work stoppages or claims for compensation. Misallocation of funds occurs when budgets meant for road projects are redirected to other constituency priorities, undermining project continuity. Inadequate audits (20%) and reliance on manual accounting (15%) weaken transparency, making it difficult to detect errors or misuse promptly. Strengthening digital financial management systems and regular audits could address these weaknesses.
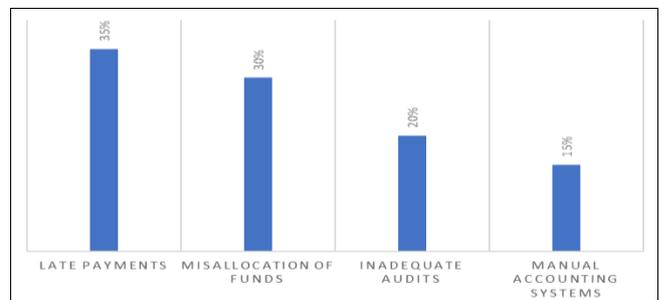
Fig 4.5.9: Financial Management Issues

Technology adoption (35%) is the least effectively implemented strategy for addressing cost management challenges. Many CDF projects continue to rely on manual accounting and paper-based systems due to limited technical capacity and budget constraints. Training and capacity building (25%) are also insufficient, as many officers lack formal training in project financial management tools. Policy reform (20%) has been slow, with existing CDF regulations providing limited guidance on modern cost control mechanisms. Performance-based contracting (20%) remains underutilized, although it could significantly improve cost accountability by linking contractor payments to measurable performance indicators.

Fig 4.5.10: Strategies for Addressing Cost Management Challenges
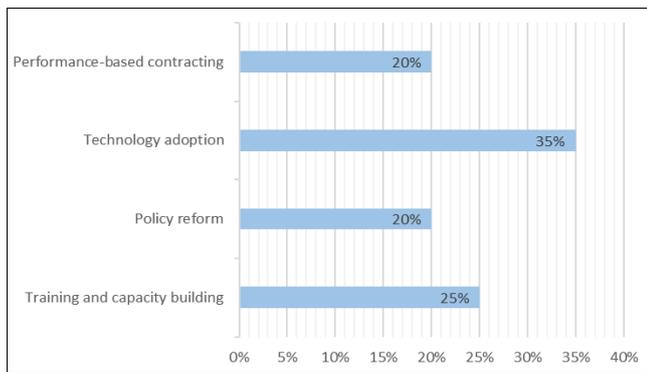
4.6 Discussion of Study Results

Objective I: Identification and Categorization of Cost Management Techniques

The findings revealed that budgeting and cost control are the most widely practiced techniques, each reported by nearly all respondents. This observation is consistent with studies by Tembo (2024) and Gitonga (2022), who found that most public construction projects in Zambia and Kenya depend heavily on these two methods to ensure financial discipline and to track expenditures throughout implementation.

The findings also revealed limited application of more advanced cost management techniques such as Earned Value Management (EVM). Only about 58 percent of respondents reported using EVM, suggesting that most project teams do not employ integrated cost and schedule performance measurement systems. This finding suggests that even though EVM could enhance financial transparency and performance tracking, the local project environment may not yet support its systematic adoption.

The majority of respondents indicated that Microsoft Excel is the primary tool for cost management, used by 94 percent of project teams. While Excel is accessible and flexible, its overuse exposes projects to human error, poor version control, and difficulties in data consolidation. Fashina (2021) cautioned that spreadsheet-based management lacks the automation and analytical capability required for large-scale construction projects. The study further showed that manual records remain common, with 42 percent of respondents reporting their use, while only 30 percent and 16 percent use Primavera and CostX respectively.

The findings highlight a recurring pattern of dependence on traditional and manually oriented cost management methods. This pattern reflects broader institutional and technical limitations within the CDF project structure.

Objective II: Effectiveness of Cost Management Strategies

The study found that 40 percent of respondents indicated that cost control methods are rarely reviewed. This finding is consistent with Tolzmann (2024), who observed that many public infrastructure projects lack structured evaluation of cost management techniques, which limits institutional learning and adaptation. Wadhwa (2024) emphasized that continuous improvement is a defining feature of effective cost management systems. The absence of periodic review in CDF projects explains why outdated methods persist, particularly manual cost tracking and spreadsheet-based monitoring. Over time, this leads to inefficiencies in financial reporting and weak alignment between cost management practices and project goals.

Design changes and market price fluctuations emerged as the two main causes of forecast inaccuracy, accounting for 35 and 30 percent respectively. This observation aligns with Chhelo (2020) and Rashid (2020), who identified design variation and inflation as leading sources of cost deviation in road construction projects.

Regarding tools used for cost tracking, the study found that half of respondents rely on Excel-based systems, while enterprise resource planning (ERP) tools are rarely used. This supports Susiku (2020) [21], who found that many local government projects in Zambia depend on manual record-keeping due to high software costs and limited technical expertise. Although Excel offers accessibility, it lacks automation and real-time analytical capability. As a result, project data are often fragmented, delaying managerial responses to emerging cost deviations. structures (CBS) enhance transparency and coordination across project stages. The underuse of such systems in CDF projects highlights a significant digital gap that weakens cost management effectiveness.

When cost overruns occur, the most common responses include re-allocation of funds and supplementary budget requests, both at 30 percent. This confirms that financial control in CDF projects is largely reactive. Rashid (2020) observed that reactive cost management, though necessary, does not address the underlying causes of overruns, such as weak planning and inadequate risk analysis.

Taken together, the findings demonstrate that CDF road projects in Chawama apply a mix of traditional and modern cost management strategies with moderate effectiveness in achieving project goals. Techniques such as forecasting, auditing, and regular reporting promote financial accountability but are constrained by limited use of technology, weak review systems, and reactive responses to cost challenges.

The Relationship Between Cost Management and Project Management Practices

Resource allocation has a direct impact on project cost performance. About 35% of respondents identified resource allocation as the strongest factor influencing costs, as shortages or delays in materials and equipment often result in inflated expenditures. This is consistent with the conclusions of Rush (2023) and Akpe (2024), who emphasized that the coordination of resources, schedules, and budgets determines whether a project remains within its financial limits. The results demonstrate that poor resource allocation leads to time overruns, idle labor, and rework costs, all of which increase total expenditure.

At the planning stage of road projects, Cost Management and Project Management converge in developing detailed project budgets, schedules, and resource plans. Both functions rely on accurate data from the Bill of Quantities and the Work Breakdown Structure (WBS) to estimate and allocate resources effectively. The study revealed that most teams use simple budget templates (40%) to link cost data to planning activities.

The monitoring and control phase represents the strongest intersection between cost management and project management. During this stage, Project Managers track physical progress against planned schedules, while Cost Managers monitor actual expenditures against budgeted amounts. The study found that site meetings (35%) and digital dashboards (30%) are the most effective coordination mechanisms among engineers, contractors, and finance officers. Projects that used these tools recorded fewer cost

discrepancies and delays, showing that communication and data transparency are critical enablers of cost efficiency. This finding is supported by Abbas (2024), who observed that digital dashboards facilitate real-time cost tracking and improve decision-making accuracy.

Key Limitations and Challenges in Cost Management Application

The most frequently reported limitation was delayed disbursement of project funds, cited by 30% of respondents as the most serious barrier to cost control. This aligns with Alkhawaja (2023) and Datta (2023), who argue that financing delays are among the most common disruptions in public construction programs, particularly those dependent on government releases or donor funding. In CDF projects, cash flow interruptions cause a chain reaction of inefficiencies: contractors suspend work, idle equipment accumulates additional costs, and materials procured on credit increase in price due to inflation or delayed payments. Inflation emerged as a closely linked challenge, identified by 35% of respondents as the dominant cause of cost deviations. The literature supports this finding, emphasizing the impact of rising prices of construction inputs such as fuel, steel, and bitumen on cost management (Kirira, 2020; Karaca, 2020). Inflationary pressures in Zambia's construction sector have been compounded by fluctuating exchange rates and dependency on imported materials, leading to price variations that are difficult to predict during the budgeting stage.

The study also found that design changes and scope adjustments, cited by 30% of respondents, significantly contribute to budget overruns. This finding reinforces the observations of Moshood (2024) and Kisyang'a (2024), who noted that scope creep remains one of the leading sources of cost escalation in public infrastructure. In CDF projects, design alterations are often politically motivated or arise from inadequate feasibility studies that fail to account for site conditions, community demands, or utility relocations. Once implementation begins, new requirements such as drainage systems, pedestrian walkways, or additional access roads are introduced without proportional budget adjustments.

External economic factors also emerged as major contributors to cost variation. Economic inflation, identified by 40% of respondents, and supply chain delays, noted by 25%, illustrate how global and national market dynamics affect local infrastructure delivery. These findings support the work of Senic (2025), who observed that material price volatility and logistics disruptions have become increasingly unpredictable due to global market interdependence. Exchange rate fluctuations, though less prominent at 15%, still pose risks for projects reliant on imported materials.

From a technical standpoint, manual data entry and outdated software were identified as the most pressing challenges. The study found that 35% of respondents viewed manual data entry errors as the main technical barrier to accurate cost monitoring. This finding is consistent with Matikiti (2024) [11] and Nguyen (2024), who emphasize that reliance on traditional record-keeping undermines cost accuracy and hinders the use of analytical tools necessary for modern project management. Limited internet connectivity, particularly in field offices, further restricts the use of centralized digital platforms for cost tracking.

Comparing the study findings with literature indicates that while the nature of Cost Management challenges in road

projects is widely documented, The interdependencies make Cost Management in CDF road projects particularly vulnerable to both internal inefficiencies and external shocks for example, delayed disbursements trigger inflationary effects and contractor claims, while weak supervision and manual reporting prevent early detection of cost deviations. Similarly, inadequate training limits the adoption of digital systems that could improve transparency, and political interference undermines professional cost estimation and procurement integrity.

5. Conclusion and Recommendation
5.1 Conclusion
The study concludes that cost management in CDF-funded road construction projects within Chawama Constituency is characterized by strong reliance on traditional techniques such as budgeting, cost control, and historical data-based estimation, supported mainly by manual and Excel-based tools. The results show that most projects maintain moderate budget adherence, though cost overruns often stem from delayed disbursements, price inflation, design changes, and administrative inefficiencies. Cost control is most active during implementation and monitoring stages, suggesting a reactive rather than preventive approach. Resource allocation, integrated project management, and regular audits contribute positively to cost performance, but institutional weaknesses such as inadequate skills, weak accountability, and political interference continue to hinder efficiency. The findings highlight the need for digital transformation, continuous capacity building, stricter oversight, and adoption of data-driven cost management practices to enhance financial discipline and value delivery in future CDF road projects.

5.2 Recommendation
The study recommends prioritizing the adoption of modern digital tools for cost management in CDF-funded road projects.

Continuous capacity building for project personnel is essential to enhance the technical and analytical competencies of those managing project finances. Many officers currently lack formal training in advanced cost management methods, limiting the effectiveness of control measures. methods in their operational environment. Improved staff competency will result in better forecasting, reporting, and decision-making, leading to more efficient use of funds.

The study also recommends strengthening cost forecasting and budgeting processes by integrating market trend analysis and inflation-adjusted models. Current practices often rely on static budgets that fail to reflect changing material prices or macroeconomic conditions, which leads to frequent cost overruns. Incorporating dynamic forecasting models based on updated market data and economic indicators will help create more realistic budgets. This approach will allow project teams to anticipate price changes in fuel, cement, and bitumen, which are key cost drivers in road projects. Using these projections, budget contingencies can be more accurately set to cushion against inflation and currency fluctuations.

Timely disbursement of project funds is another key area for improvement. Delayed payments to contractors have been shown to disrupt cash flow, prolong project duration, and increase total costs. The Ministry of Local Government and

Rural Development should establish predictable disbursement schedules aligned with project milestones.

Finally, the creation of a centralized cost data repository is recommended to support institutional learning and informed decision-making. Many cost management challenges arise from fragmented data storage and weak documentation practices. A centralized digital database that captures historical cost information, performance metrics, and lessons from completed projects would enable benchmarking and trend analysis. Such a system would allow future projects to draw insights from past performance, improving estimation accuracy and risk management. This repository could be managed by the Ministry of Local Government in collaboration with district councils to ensure consistency and data integrity. Access to reliable cost data would enhance transparency, facilitate research, and strengthen evidence-based policy formulation across the CDF program.

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