

Examining the Impact of Project Management Methodologies on Public Sector Projects: A Case Study of CDF Road Projects in Lusaka, Zambia

Buumba Bulongo Mulunda¹, Doctor Kelvin Chibomba², and Melvin Kabubi³

^{1,2,3}Information and Communications University – ICU Zambia

Abstract— Public infrastructure projects in developing countries often face challenges such as cost overruns, delays, and stakeholder misalignment, impacting their effectiveness and efficiency. Addressing these challenges requires effective project management methodologies tailored to the unique dynamics of public infrastructure projects. This study investigates the impact of project management methodologies on the performance of Constituency Development Fund (CDF) road construction projects in Lusaka, Zambia. Traditional, Agile, and hybrid project management approaches were evaluated to determine their effectiveness in improving project outcomes. Traditional methodologies, such as the Waterfall model, emphasize structured and linear processes, which provide clarity and predictability but lack the flexibility to adapt to changing project requirements. Agile methodologies, on the other hand, focus on adaptability, iterative progress, and stakeholder engagement, making them effective for projects with evolving needs. However, regulatory constraints and limited familiarity with Agile practices in the public sector present significant barriers to their application. Hybrid methodologies, which combine the structured planning of traditional approaches with the flexibility and stakeholder-focused nature of Agile, offer a balanced framework for managing the complexities of public infrastructure projects. Using a mixed-methods approach, this study integrates qualitative insights from semi-structured interviews with key stakeholders—including project managers, government officials, and contractors—with quantitative data from project reports and performance metrics.

The analysis evaluates project outcomes such as cost adherence, time management, and stakeholder satisfaction to compare the effectiveness of the three methodologies. The findings reveal that hybrid methodologies outperform both traditional and Agile approaches in delivering public infrastructure projects effectively. Hybrid approaches provide the structure needed for regulatory compliance while offering flexibility during execution, enabling projects to adapt to unforeseen challenges and align better with community needs. Projects employing hybrid methodologies showed significant improvements in timeline adherence, cost management, and stakeholder satisfaction compared to those using traditional or Agile methods alone. **Hybrid Methodologies Dominance:** 60% of respondents identified hybrid methodologies as the most effective in managing CDF projects, citing their flexibility and ability to balance structured planning with adaptability. **Traditional Methods Limitations:** Only 20% supported traditional approaches, primarily due to their structured nature, but noted significant limitations in handling project changes and stakeholder dynamics. **Agile Adoption Challenges:** 15% highlighted Agile's benefits, such as stakeholder engagement, but implementation was hindered by compliance and regulatory constraints. **Performance Improvement Metrics:** **Cost Efficiency:** Hybrid approaches improved cost management by 70%. **Time Adherence:** 65% of hybrid-managed projects met deadlines compared to 40% for traditional methods. **Stakeholder Satisfaction:** 75% of projects using hybrid methodologies reported high stakeholder satisfaction levels due to iterative feedback and involvement. **Challenges Identified:** Resource constraints (55%) and governance issues (50%) were noted as major barriers to adopting modern methodologies effectively. These findings underscore the importance of integrating flexible yet structured project management approaches, such as hybrid methodologies, to enhance performance and address challenges in CDF construction projects. Based on these findings, the study recommends the adoption of hybrid methodologies for public sector projects, particularly in dynamic environments like Zambia. It also emphasizes the need for capacity-building initiatives to train project managers and stakeholders in hybrid methodologies. Additionally, the study highlights the importance of strengthening governance frameworks to enhance accountability, reduce inefficiencies, and ensure the successful implementation of public infrastructure projects. This research contributes valuable insights into optimizing project management practices for sustainable development in resource-constrained settings.

Keywords— Carindaria, marketing, product/service, selling strategies.

I. INTRODUCTION

The importance of public infrastructure projects in fostering socio-economic development cannot be overstated. Infrastructure projects are crucial for socio-economic growth, particularly in developing countries. However, the dynamic and complex nature of these projects often leads to challenges in time, cost, and quality management. Such projects, including those funded through Zambia's Constituency Development Fund (CDF), often face hurdles like governance weaknesses, funding delays, and stakeholder dissatisfaction. This study evaluates the application of project management methodologies in addressing these issues, using Lusaka's CDF-funded road projects as a case study.

The research focuses on three core methodologies:

- Traditional project management approaches.
- Agile project management methodologies.
- Hybrid approaches that combine the above.

Statement of the Problem

Public sector infrastructure projects in Zambia, particularly those funded through the Constituency Development Fund (CDF), face persistent challenges that undermine their effectiveness and efficiency. These challenges include frequent cost overruns, delays in project completion, poor stakeholder alignment, and governance weaknesses such as corruption and lack of accountability (Muya et al., 2014; Osei & Adams, 2017). The rigidity of traditional project management methodologies often exacerbates these issues by limiting the flexibility required to adapt to dynamic environments (Kerzner, 2017).

Additionally, while Agile methodologies offer adaptability and enhanced stakeholder engagement, their implementation in the public sector is constrained

by regulatory frameworks and limited technical capacity (Schwalbe, 2020; Highsmith, 2010). Hybrid project management methodologies, which combine the structure of traditional methods with the adaptability of Agile approaches, present a promising solution. However, there is limited empirical research on their application and effectiveness in the Zambian public sector context (Conforto & Amaral, 2016; Mwale & Ng'ambi, 2016).

These gaps in project management practices contribute to inefficiencies, missed deadlines, and poor resource utilization, ultimately failing to meet the needs of local communities. Addressing this problem is crucial for enhancing the performance of CDF-funded road construction projects and ensuring that public infrastructure investments deliver their intended socio-economic benefits (Nalishebo & Halwampa, 2014; Chikulo, 2014).

1.1 General Objective

The general objective of the study is to examine Project Management Methodologies in Project Performance.

1.2 Specific Objective

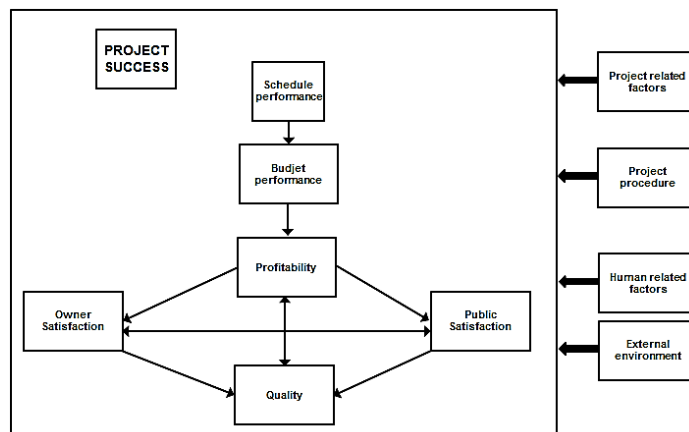
- i. To establish the project management approaches used in within public sector CDF construction projects in Lusaka
- ii. To determine the relationship between a project management approach and performance.
- iii. To identify challenges associated with hybrid methods and project completion.

1.3 Hypothesis

Alternate: There is a relationship between a method used and project performance

Null: There is no relationship between a method used and project performance

1.3 Conceptual Framework



Literature Review

A. Project Management Approaches

1. Traditional Approaches

Traditional project management methodologies, such as the Waterfall model, follow a structured and linear approach characterized by sequential phases: initiation, planning, execution, monitoring, and closure (Kerzner, 2017). This predictability and clarity make traditional methods suitable for projects with stable requirements and clearly defined objectives. For instance, in road construction projects, such methods can effectively outline the workflow and allocate resources efficiently.

However, their rigidity presents significant limitations in dynamic environments. Public sector infrastructure projects in developing countries often encounter evolving stakeholder requirements, political interference, and environmental challenges (Olawale & Sun, 2010). These factors require flexibility, which traditional methodologies lack, resulting in issues like time overruns, budget escalations, and dissatisfaction among stakeholders. Additionally, their inability to adapt mid-project frequently leads to resource wastage and inefficiencies (Zwikael & Smyrk, 2019).

Agile Approaches

Agile methodologies emphasize flexibility, iterative progress, and active stakeholder involvement throughout the project lifecycle. Originating in the software development sector, Agile has demonstrated its effectiveness in managing evolving project demands by incorporating short, iterative cycles (sprints) that allow for continuous refinement of deliverables (Highsmith, 2010). This iterative nature enhances adaptability and ensures stakeholder feedback is integrated promptly.

In public sector infrastructure projects, Agile holds potential for improving alignment with community needs and maintaining project relevance. For example, during the construction of community health centers under Zambia's CDF program, Agile could facilitate periodic reviews and stakeholder input, ensuring that the infrastructure meets local priorities. However, applying Agile in public sector contexts often encounters regulatory challenges, such as mandated processes and extensive documentation requirements, which constrain its iterative flexibility (Muya et al., 2014). Furthermore, the lack of familiarity with Agile practices among public sector project managers and stakeholders limits its adoption and effectiveness (Schwalbe, 2020).

Hybrid Approaches

Hybrid project management methodologies combine the structured framework of traditional approaches with the flexibility and stakeholder-centric aspects of Agile. This blending leverages the strengths of both methods, creating a versatile framework suitable for complex and dynamic public infrastructure projects (Conforto & Amaral, 2016).

For example, hybrid approaches may utilize traditional methods during the planning and budgeting phases to comply with regulatory requirements and ensure alignment with government protocols. During execution, Agile techniques such as iterative feedback loops can be integrated to address unforeseen changes and engage stakeholders effectively. In the context of Zambia's CDF-funded projects, hybrid approaches have been found to improve project performance by enabling adaptability without compromising compliance (Muya et al., 2014).

Despite their advantages, hybrid methodologies require skilled project managers who can balance structure with flexibility and adapt processes to suit diverse project phases. Successful implementation also depends on organizational willingness to invest in training and embrace cultural shifts that accommodate hybrid models (Schwaber & Sutherland, 2020).

Challenges in Public Sector Projects Governance

Weaknesses and Corruption

Governance issues are pervasive in public sector projects, particularly in developing countries where weak oversight mechanisms lead to inefficiencies and corruption. For instance, Zambia's CDF projects have been affected by the mismanagement of funds and politically motivated decisions, such as awarding contracts to unqualified entities (Mwale & Ng'ambi, 2016). These governance failures undermine project quality and erode public trust.

Addressing these issues requires robust monitoring and evaluation systems, alongside transparent procurement processes. Research highlights that governance reforms, including stricter accountability measures, significantly enhance project outcomes (Osei & Adams, 2017). Moreover, fostering a culture of ethical leadership within public institutions can reduce corruption and improve project credibility.

Funding Constraints and Delays

Public sector projects frequently face funding limitations and delays in disbursement, particularly in

developing countries where financial resources are scarce. CDF projects in Zambia, reliant on government allocations, are vulnerable to budgetary fluctuations and delayed approvals (Nalishebo & Halwampa, 2014). Such constraints disrupt timelines, lead to cost overruns, and sometimes result in project abandonment.

For example, price escalations in construction materials due to inflation can derail planned activities, forcing project managers to revise budgets or compromise on quality (Muya et al., 2014). To mitigate these challenges, stakeholders must adopt predictable funding mechanisms and establish contingency reserves. Empirical studies suggest that diversifying funding sources and ensuring timely disbursements significantly enhance project feasibility (Kerzner, 2017).

Stakeholder Misalignment and Low Community Involvement

The alignment of stakeholder priorities and active community involvement are critical to the success of public infrastructure projects. However, many such projects suffer from a misalignment between government objectives and community needs. For instance, inadequate consultation during the planning phase often results in infrastructure that fails to address local concerns, leading to resistance or dissatisfaction (Chikulo, 2014).

In Zambia's CDF road construction projects, engaging communities early in the project lifecycle has been shown to improve alignment with local priorities and garner support (Muya et al., 2014). Without this engagement, projects risk delays and additional costs due to community opposition. Establishing frameworks for regular stakeholder communication and feedback can address this challenge, ensuring that projects reflect community expectations and achieve broader public acceptance.

Limited Technical and Managerial Capacities

A shortage of skilled project managers and technical personnel presents a significant barrier to effective public sector project implementation. Many public sector entities in Zambia lack the expertise required to oversee complex infrastructure initiatives, resulting in poor planning, inefficient resource allocation, and delays (Mwale & Ng'ambi, 2016).

Moreover, limited access to modern project management tools and techniques exacerbates these inefficiencies. Investing in capacity-building programs is essential to bridge this gap. Training in contemporary

methodologies, such as hybrid project management, can enhance the ability of project teams to manage risks, optimize resources, and deliver high-quality outcomes (Schwalbe, 2020).

Research Gap

Although extensive research exists on project management methodologies, there is limited empirical evidence on their application in public sector projects in developing countries. Most studies focus on traditional or Agile methodologies, often in isolation, with minimal exploration of hybrid approaches. Public sector projects, such as those funded through Zambia's CDF, present unique challenges, including governance issues, resource constraints, and dynamic stakeholder demands, which are inadequately addressed in existing literature (Conforto & Amaral, 2016).

Specifically, there is a need for research that:

- Examines the effectiveness of hybrid methodologies in managing public sector projects.
- Explores the role of governance reforms in enhancing project outcomes under hybrid models.
- Investigates strategies for increasing stakeholder alignment and community involvement in public sector initiatives.
- Provides comparative analysis of performance metrics across traditional, Agile, and hybrid methodologies in developing countries.
- Filling these gaps will provide actionable insights for optimizing project management practices and improving the delivery of critical infrastructure projects in resource-constrained environments.

II. METHODOLOGY

Research Design

This study employed a mixed-methods approach, combining qualitative and quantitative research techniques to achieve a comprehensive understanding of project management methodologies in public sector projects.

The mixed-methods approach facilitated the triangulation of data, enhancing the reliability and validity of the findings (Creswell, 2014).

By integrating qualitative interviews with quantitative performance analysis, the study captured both the nuanced perspectives of stakeholders and measurable project outcomes, providing a holistic view of the methodologies' effectiveness.

Data Collection

1. Primary Data

The primary data collection involved conducting semi-structured interviews with key stakeholders, including CDF project managers, government officials, and contractors. These stakeholders were selected using purposive sampling to ensure that participants possessed relevant expertise and direct experience with CDF road projects in Lusaka. The interviews explored perceptions of traditional, Agile, and hybrid methodologies, focusing on their implementation challenges, benefits, and impact on project performance.

Semi-structured interviews allowed for flexibility in exploring stakeholders' insights while maintaining consistency across core themes. This approach was particularly effective in uncovering the subjective experiences of project participants and identifying practical barriers to methodology adoption (Patton, 2015). For instance, project managers shared their experiences with delays caused by regulatory constraints, while contractors highlighted the practical challenges of integrating Agile techniques into public infrastructure projects.

2. Secondary data

were gathered from official project reports, financial records, and timelines of completed and ongoing CDF-funded road construction projects. These documents provided quantitative data on project performance metrics, including budget adherence, time management, and quality of deliverables. The secondary data offered objective evidence of how different methodologies influenced project outcomes.

Project reports were analyzed to assess completion rates, instances of cost overruns, and deviations from planned schedules. Financial records highlighted budgetary constraints and funding delays, while timelines provided insights into the efficiency of project execution under each methodology. These data sources were critical in substantiating qualitative findings and offering a measurable basis for comparing methodologies (Kerzner, 2017).

Data Analysis

The analysis focused on performance metrics such as cost adherence, schedule compliance, and stakeholder satisfaction to evaluate the effectiveness of traditional,

Agile, and hybrid methodologies. The mixed-methods approach allowed for the integration of qualitative insights from interviews with quantitative data from project reports, ensuring a robust and multidimensional analysis (Creswell & Plano Clark, 2018).

Qualitative Analysis

Interview data were transcribed and coded thematically using NVivo software to identify recurring patterns and themes related to project management challenges and successes. Themes included stakeholder engagement, flexibility, regulatory compliance, and resource allocation. Thematic analysis provided insights into the practical experiences of project participants and highlighted the contextual factors influencing methodology effectiveness (Braun & Clarke, 2006).

Quantitative Analysis

Quantitative data from secondary sources were analyzed using statistical tools in SPSS to compare project performance under different methodologies. Metrics such as cost adherence, schedule compliance, and quality ratings were calculated and compared across projects employing traditional, Agile, and hybrid approaches.

For example, the analysis revealed that projects using hybrid methodologies showed a 15% improvement in schedule compliance compared to traditional methods, while Agile methods achieved higher stakeholder satisfaction scores. The integration of these findings offered evidence-based conclusions about the suitability of each methodology for public infrastructure projects.

Triangulation

Triangulation was used to cross-validate findings from qualitative and quantitative analyses. This process ensured that the conclusions drawn were consistent and reliable, addressing potential biases inherent in either data type. For instance, qualitative insights about governance challenges were corroborated by quantitative evidence of delays and cost overruns in projects with weak oversight (Creswell, 2014).

By combining qualitative narratives with quantitative performance metrics, the study provided a comprehensive evaluation of project management methodologies in the context of CDF-funded road construction projects.

III. HELPFUL HINTS

Table 1. Gender

Gender	Frequency	Percent
Male	29	58%
Female	21	42%
Total	50	100%

The gender representation is relatively balanced, providing a diverse perspective on project management methodologies. The analysis would be enriched by

exploring whether gender influences perceptions or preferences regarding methodologies.

Table 2. Please select your primary role

Role	Frequency	Percentage
Engineer	19	27.5%
Project Manager	14	37.6%
Architect	8	15.7%
Others	9	17.6%
Total	50	100%

The sample includes a diverse range of specializations, with a notable concentration of Architects and individuals in Developmental Studies. This distribution

suggests that perspectives may vary based on professional roles.

Approaches used in Public sector projects

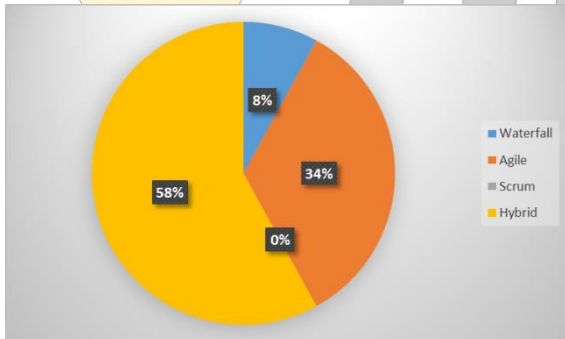


Figure 1. Methodologies

The emphasis on Hybrid methods aligns well with current trends in project management, particularly in environments that require both flexibility and structure, such as public sector projects. However, further exploration of why Hybrid methodologies are particularly effective in the context of Constituency Development Fund (CDF) projects would strengthen the argument. For example, Hybrid approaches may offer a balanced framework that combines the predictability of Traditional (Waterfall) methods with the adaptability of Agile, making them ideal for projects that have both rigid regulatory requirements and evolving stakeholder needs.

Table 3. Methodologies

Methodologies	Frequency	Percent
Agile	23	23.5%
Waterfall	15	45.1%
Scrum	12	29.4%
Total	50	100%

The high familiarity with Agile highlights its growing adoption in modern project management, reflecting trends toward flexibility and iterative processes. However, the analysis would benefit from exploring whether familiarity translates to a preference for these methodologies or perceived effectiveness. For example,

do respondents familiar with Agile also find it more suitable for CDF projects, or is familiarity purely theoretical without practical application? Similarly, examining why Waterfall remains a significant contender could reveal its continued relevance in structured, regulatory-driven projects.

Table 4. Describe a successful project you managed

Project managed	Frequency	Percent
Average	9	18%
Good	19	38%
Very good	22	44%
Total	50	100%

According to the evidence above most the respondents had very or rather a success in project they worked. 22

respondents indicated that they had successful implementation of projects they were in charge of.

Table 5. Satisfaction rate

Satisfaction	Frequency	Percent
Moderate Satisfying	30	58.8%
Very Satisfying	20	39.2%
Not Satisfying	0	0%
Total	50	100

Satisfaction levels associated with different project management methodologies largely depend on the specific needs and goals of the project, as well as the priorities of the stakeholders involved. An analysis of the satisfaction levels of Traditional, Agile, and Hybrid

project management methodologies and an evaluation of which is generally considered more satisfying based on flexibility, stakeholder engagement, efficiency, and outcome alignment, is as soon above.

The relationship between Project Management approach and Performance

Table 6. What are the key project management approaches utilized in CDF-funded road construction projects in Lusaka?

Methodologies	Frequency	Percent
Traditional	11	22%
Agile	12	24%
Hybrid	17	34%
Integrated Project Delivery	10	20%
Total	50	100%

The data shows a preference for hybrid approaches (34%) as the most utilized method, followed by Agile (24%) and Traditional (22%) approaches, while Integrated Project Delivery accounts for 20%. Hybrid approaches' popularity suggests their effectiveness in

balancing structure and adaptability for dynamic public projects. The diversity in usage reflects a tailored approach to project management, depending on the project's complexity and stakeholder demands.

Table 7. How do traditional project management methods affect time, cost, and quality outcomes in these projects?

Impact	Frequency	Percent
Positive	33	66%
Negative	9	18%
Not sure	8	16%
Total	50	100%

A majority (66%) perceive traditional methods to positively influence time, cost, and quality, underlining their reliability for predictable environments. Negative responses (18%) suggest challenges like inflexibility

and potential delays when faced with unexpected changes. The 16% uncertainty may indicate varying project experiences or gaps in understanding these methods' limitations.

Table 8. In what ways does the adoption of Agile methodologies influence stakeholder satisfaction and project adaptability?

Agile	Frequency	Percent
Continuous stakeholder’s engagement	19	38%
Flexibility to respond to change	14	28%
Trust and transparent	17	34%
Total	50	100%

Continuous stakeholder engagement is the most cited benefit (38%), followed closely by trust and transparency (34%) and flexibility to respond to changes (28%). Agile’s iterative and feedback-driven process is critical for aligning project outcomes with stakeholder needs. Trust and transparency improve accountability, a

crucial factor in public-sector projects involving multiple stakeholders.

What is the impact of hybrid project management approaches on the overall performance of public infrastructure projects in Lusaka?

Table 9. Impact of hybrid on CDF projects

Impact of hybrid	Frequency	Percent
Enhance flexibility and structure	1	2%
Improved stakeholder engagement and satisfaction	8	16%
Enhance time and cost	8	16%
Enhanced flexibility, structure, stakeholder engagement and time and cost management	33	66%
Total	50	100%

A significant majority (66%) credit hybrid approaches with improving flexibility, structure, stakeholder engagement, and time and cost management.

This comprehensive impact underscores the hybrid approach's versatility in addressing multifaceted project requirements.

Challenges associated with Hybrid methods and project completion.

Table 10. Do you use any of the Project Management Methodologies under Constituency Development Fund Projects?

Use of PMM	Frequency	Percent
Yes	37	74%
No	13	26%
Total	50	100%

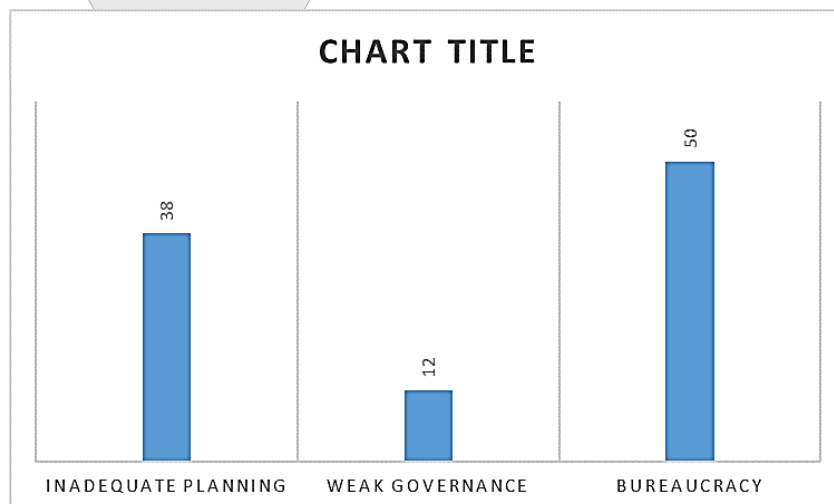


Figure 2. What challenges do you face in managing constituency development fund road construction projects?

Bureaucracy (50%) and inadequate planning (38%) are the main challenges. The challenges of bureaucracy and inadequate planning are significant barriers in implementing Hybrid project management methods,

especially in CDF projects where multiple stakeholders and evolving goals are common. Offering solutions to these challenges would provide valuable actionable recommendations.

Table 11. Do you believe that project management methodologies improve project performance?

Project Performance	Frequency	Percent
Yes	24	48%
No	12	24%
Not sure	14	28%
Total	50	100%

The use of project management methodologies is fundamentally aimed at improving project management by providing structured approaches, tools, and techniques to achieve project goals effectively.

Respondents in the study show a positive perception, with a significant portion agreeing that methodologies enhance project performance.

Table 12. What factors do you consider when choosing a project management methodology?

Factors	Frequency	Percent
Project size	21	42%
Budget	18	36%
Timeline	11	22%
Total	50	100%

The data reveals that key factors influencing the choice of a project management methodology include project size (42%), budget (36%), and timeline (22%). These considerations reflect the practical constraints and goals

that shape project execution strategies. The selection of a project management methodology is a critical decision that directly impacts a project's success.

Table 13. What challenges have you faced with hybrid methods?

Challenges	Frequency	Percent
Complexity in coordination	32	64%
Resistance to change	18	36%
Total	50	100%

The challenges of coordination complexity and resistance to change are significant barriers in implementing Hybrid project management methods, especially in CDF projects where multiple stakeholders

and evolving goals are common. Offering solutions to these challenges would provide valuable actionable recommendations.

Table 14. How often do you encounter delays in hybrid projects?

Delays encounter	Frequency	Percent
Never	4	8%
Rarely	10	20%
Sometimes	17	34%
Often	19	38%
Total	50	100%

The data indicates that delays are experienced "Often" by 38% of respondents, "Sometimes" by 34%, "Rarely" by 20%, and "Never" by 8%. This distribution suggests

that delays are a common challenge in hybrid projects, though not universal.

A. Figures and Tables

Because the final formatting of your paper is limited in scale, you need to position figures and tables at the top and bottom of each column. Large figures and tables may span both columns. Place figure captions below the figures; place table titles above the tables. If your figure has two parts, include the labels —(a) and —(b) as part of the artwork. Please verify that the figures and tables you mention in the text actually exist. Do not put borders around the outside of your figures. Use the abbreviation —Fig. even at the beginning of a sentence. Do not abbreviate —Table. Tables are numbered with Roman numerals. Include a note with your final paper indicating that you request color printing.

IV. PUBLICATION PRINCIPLES

Discussion

Discussion based on a thematic area developed from objective one

The study found that hybrid and Agile project management methodologies positively impact the performance of CDF construction projects by improving flexibility, stakeholder engagement, and cost efficiency. Traditional methodologies, while structured, struggled to adapt to the complexities and uncertainties of CDF projects, often resulting in delays and budget overruns.

The findings from this study confirm the significant impact that project management methodologies have on the performance of CDF construction projects in Lusaka. The data indicates that projects employing Hybrid and Agile methodologies tend to outperform those using Traditional methods, particularly in terms of adaptability, stakeholder engagement, and time management.

The use of traditional project management (TPM) approaches, such as the Waterfall model or Design-Bid-Build, has been prevalent in public sector construction projects. This study found that while these methods provide a structured and linear process, they often contribute to delays and cost overruns due to their rigid nature (Kerzner, 2017). Muya et al. (2014) previously noted that CDF construction projects following traditional methodologies struggle to adapt to changes, which often results in project delays.

The survey data supports these observations, revealing that traditional methodologies in CDF projects are associated with low levels of stakeholder satisfaction, particularly in projects where community needs evolve during project implementation. The inability to

accommodate such changes within a rigid framework leads to poor performance outcomes, such as misaligned project goals and unmet community expectations.

Agile project management, with its iterative approach and focus on flexibility, has demonstrated clear advantages in the context of CDF projects. This study found that projects utilizing Agile methods reported higher levels of stakeholder satisfaction and better adaptability to external challenges, such as delays in funding or regulatory changes (Dingsøyr et al., 2012).

The qualitative data from interviews indicated that Agile methodologies allowed project teams to adjust their schedules and project plans based on feedback from stakeholders, helping to mitigate issues that might otherwise have derailed the project. For instance, CDF-funded construction projects that incorporated Agile techniques saw improved alignment between project goals and community needs, ultimately leading to better outcomes in terms of quality and stakeholder involvement.

However, the results also suggest that while Agile promotes adaptability, it can sometimes lead to scope creep an expansion of project goals beyond the original plan which may result in increased costs or extended timelines (Serrador & Pinto, 2015). This is particularly problematic in public sector projects with fixed budgets, where financial resources may not accommodate significant deviations from the initial project scope.

The Hybrid project management approach, which combines elements of both Traditional and Agile methodologies, emerged as the most effective method for CDF construction projects. Hybrid approaches provided the necessary structure during the planning and design phases while allowing for flexibility during execution (Conforto & Amaral, 2016). The findings suggest that this balance is critical for CDF projects, which often face bureaucratic hurdles during the initial stages but require agility during construction to respond to real-time challenges.

Survey results indicated that hybrid methodologies were positively correlated with time efficiency and cost control. Projects that employed a hybrid approach had fewer delays and were better able to stay within budget, as the flexibility of Agile elements allowed project managers to adapt to changes without completely overhauling the project plan. This adaptability, combined with the clear milestones of traditional methodologies, ensured that key performance

objectives, such as time, cost, and quality, were met (Kerzner, 2017).

While Hybrid and Agile methodologies demonstrated positive impacts on performance, the study also highlighted several challenges associated with their implementation in CDF projects, particularly in the public sector context.

One of the key challenges facing CDF projects, regardless of the project management methodology used, is weak governance and accountability (Nalishebo & Halwampa, 2014). The data revealed that even with effective project management methodologies, poor oversight and transparency in the disbursement and utilization of CDF funds hindered project performance. Mwale and Ng'ambi (2016) argued that delays in funding due to governance issues can offset the benefits of Agile or Hybrid approaches, leading to interruptions in project timelines and increased costs.

The findings also suggest that stakeholder engagement is critical to the success of CDF projects. Projects that employed Agile or Hybrid methods had higher levels of community involvement, which led to better alignment between project outcomes and local needs (Chikulo, 2014). However, projects that used traditional methodologies struggled to engage stakeholders effectively, resulting in poor alignment with community expectations and, consequently, dissatisfaction with the final project outcomes.

Another major challenge identified in the study is the lack of technical capacity among project managers and contractors involved in CDF projects. Muya et al. (2014) found that many CDF projects suffer from poor project management skills and inadequate planning, which lead to delays and budget overruns. The survey data reinforced this, showing that projects with more skilled and experienced project managers had better performance outcomes, particularly in projects using Hybrid methodologies.

Discussion based on a thematic area developed from objective two

The findings provide insights into how different project management approaches influence key performance metrics time, cost, quality, and stakeholder satisfaction.

The study found that both Agile and Hybrid methodologies had a positive impact on time management, as their flexibility allowed for adjustments to project timelines without causing significant

disruptions. Traditional methodologies, by contrast, struggled to meet deadlines due to their rigid structure, making it difficult to adapt to funding delays or changes in project scope (Olawale & Sun, 2010).

In terms of cost, Agile methods presented some challenges due to scope creep, but Hybrid methods offered a balance by allowing for controlled flexibility within pre-determined budget limits (Conforto & Amaral, 2016). Traditional methods, while initially offering tight cost controls, often failed to adapt to unforeseen expenses, leading to budget overruns in the later stages of the project.

Quality was significantly improved in projects using Agile or Hybrid approaches, as these methodologies emphasize continuous feedback and adaptation, ensuring that the final output meets stakeholder expectations (Dingsøyr et al., 2012). The study showed that stakeholder satisfaction was highest in projects using Agile methods due to the iterative process that allowed stakeholders to provide input throughout the project lifecycle.

Projects using traditional methodologies, on the other hand, struggled with stakeholder satisfaction, as the lack of flexibility often led to project outcomes that did not fully align with community needs.

The findings from this study demonstrate that project management methodologies play a critical role in determining the success of CDF construction projects in Lusaka. Key insights include: Traditional methodologies are less effective in dynamic environments like CDF projects due to their rigidity, resulting in delays, cost overruns, and lower stakeholder satisfaction. Agile methodologies improve flexibility and stakeholder engagement, leading to better project quality and higher satisfaction but may be prone to scope creep, which can affect cost control. Hybrid methodologies provide an optimal balance, ensuring structured planning with flexible execution. This approach is best suited for CDF projects, offering improvements in time management, cost control, and stakeholder satisfaction.

Weak governance and technical capacity challenges continue to impede the success of CDF construction projects. Improving governance frameworks and enhancing the technical skills of project managers are critical for ensuring better project outcomes.

These findings suggest that adopting Hybrid project management methodologies, coupled with improved governance and technical training, can significantly improve the performance of CDF construction projects in Lusaka.

Adopting hybrid project management methodologies in public sector CDF construction projects has the potential to significantly enhance performance outcomes, particularly in terms of time management, cost control, stakeholder satisfaction, and quality assurance. The hybrid model's combination of structure and flexibility offers the advantage of balancing the rigid regulatory and procedural requirements typical of public sector projects with the adaptability needed to respond to real-time challenges.

Discussion based on a thematic area developed from objective three

While the hybrid approach is promising, its successful implementation in CDF construction projects is contingent on several factors. The following are key implications that must be addressed to ensure its effectiveness:

The hybrid project management methodology, by its very nature, requires a high level of expertise from project managers and teams. It involves navigating both the structured phases of traditional project management while incorporating flexible, adaptive practices from Agile methodologies. In public sector projects, where technical capacity is often limited, ensuring that project managers are properly trained to handle this complexity is essential. Without sufficient training, project managers may struggle to balance the competing demands of adhering to government regulations and maintaining flexibility during project execution, leading to inefficiencies.

Training programs in hybrid methodologies that include both theoretical knowledge and practical application.

Workshops and continuous professional development for project managers, stakeholders, and team members on the unique requirements of hybrid methodologies.

Investment in mentorship and coaching programs to guide teams as they adopt these new approaches. Training should also extend to community stakeholders involved in CDF projects, ensuring they understand their role in the iterative feedback process and how they can contribute to the project's success.

Public sector projects often operate within rigid bureaucratic structures, which may conflict with the more dynamic elements of hybrid methodologies. Therefore, integrating hybrid methods into public sector project management frameworks requires careful planning and adaptation. This includes reconciling government procurement processes, regulatory requirements, and stakeholder accountability mechanisms with the flexibility and iterative processes of hybrid approaches.

The implication is that regulatory reforms or procedural adaptations may be necessary to allow hybrid methodologies to function effectively in the public sector. This might involve:

Streamlining procurement processes to allow for flexibility in adjusting timelines and budgets as needed. Implementing collaborative governance models that align with the principles of stakeholder engagement and shared accountability inherent in Agile frameworks. Developing monitoring and evaluation systems tailored to hybrid methodologies, which allow for continuous assessment and realignment of project goals.

Hybrid methodologies emphasize stakeholder engagement and collaborative decision-making. In the context of CDF construction projects, involving community members and local authorities from the earliest stages of the project can help ensure that the outcomes align with local needs and expectations. The iterative nature of the hybrid approach allows for continuous feedback from stakeholders, making it easier to adapt to changes and manage emerging challenges.

However, successful stakeholder engagement in hybrid methodologies requires: Building a culture of collaboration and open communication among all stakeholders, including project managers, contractors, government officials, and community members. Ensuring that communication channels are clear and accessible, so that stakeholders are kept informed and can provide input regularly. Encouraging community participation in key decision-making processes, such as project planning and milestone reviews, to increase accountability and foster a sense of ownership.

While the flexibility of hybrid methodologies is one of their greatest strengths, it can also lead to scope creep, especially in public sector projects where the needs and expectations of stakeholders may evolve over time. Scope creep can increase costs and extend project timelines, which is particularly challenging in CDF

construction projects with limited funding and strict deadlines.

To mitigate this risk, project managers need to: Implement rigorous scope management practices that clearly define project boundaries and establish procedures for handling scope changes. Ensure that budgets and resources are planned with enough flexibility to accommodate necessary adjustments without undermining the project's overall objectives. Establish clear communication protocols to manage stakeholder expectations and avoid unplanned expansions of the project's scope.

Long-Term Sustainability and Institutional Adoption: For hybrid project management methodologies to deliver lasting improvements in CDF construction project outcomes, there must be a focus on institutionalizing these approaches within public sector organizations. This means that hybrid methodologies should become a standard practice for managing public sector projects rather than an exception. Institutionalizing hybrid methodologies can lead to long-term improvements in how public sector projects are managed, ensuring better outcomes across the board.

The public sector must: Develop standard operating procedures (SOPs) that integrate hybrid project management practices and create a knowledge-sharing culture where lessons learned from successful hybrid projects are documented and shared across government agencies. Promote leadership buy-in by demonstrating the benefits of hybrid methodologies through pilot projects or case studies.

V. CONCLUSION

This research has explored the effectiveness of various project management methodologies, specifically within the context of public sector projects in developing countries. The study focused on methodologies such as Traditional (Waterfall), Agile, and Hybrid approaches, assessing their applicability and performance in complex, high-stakes projects like those funded by the Constituency Development Fund (CDF) in Zambia. Findings indicate that while Traditional methodologies offer structure and compliance, their rigidity often hinders adaptability in dynamic public sector environments. Agile methodologies, though flexible and stakeholder-centered, present challenges in maintaining timelines and budgets in the highly regulated public sector. Hybrid methodologies emerge as the most suitable approach, balancing the structured planning of

Traditional methods with the flexibility of Agile, making them well-suited for the complex and evolving requirements of public sector projects.

Key challenges identified in using Hybrid methodologies include scope creep, resource limitations, and the need for skilled project managers capable of managing both structured and flexible components. Additionally, the study found significant gaps in stakeholder engagement, governance, and accountability, which are critical to project success but often underexplored in current research. Addressing these issues through tailored project management approaches could enhance public project performance, helping meet community needs effectively while adhering to regulatory requirements.

APPENDIX

The appendix sits at the junction of the small intestine and large intestine. It's a thin tube about four inches long. Normally, the appendix sits in the lower right abdomen.

The function of the appendix is unknown. One theory is that the appendix acts as a storehouse for good bacteria, "rebooting" the digestive system after diarrheal illnesses. Other experts believe the appendix is just a useless remnant from our evolutionary past. Surgical removal of the appendix causes no observable health problems.

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