



# Effect of Financial Resource Management Practices on Road Construction Project Performance in Rwanda: A Case Study of the Kicukiro-Kagarama-Muyange Road Project

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**Abstract:** This study examined the effect of budgeting practices on the successful completion of road construction projects in Rwanda, with specific reference to the Kicukiro–Kagarama–Muyange Road Project. The study adopted a quantitative approach using an explanatory and cross-sectional research design. The target population comprised 90 respondents, and a census approach was used. Data were collected through structured questionnaires and documentary review and analyzed using SPSS. Descriptive statistics, Pearson correlation, and simple linear regression were used for data analysis. The findings revealed that budgeting practices were positively associated with successful completion of road construction projects. Pearson correlation established a strong positive relationship between budgeting practices and successful completion of road construction projects ( $r = 0.779$ ,  $p = 0.000$ ). Regression analysis showed that budgeting practices significantly predicted successful completion of road construction projects, explaining 60.7% of the variation in project performance ( $R^2 = 0.607$ ,  $F = 135.828$ ,  $p = 0.000$ ). The regression coefficient further indicated a positive and significant effect of budgeting practices on successful project completion ( $\beta = 0.779$ ,  $p = 0.000$ ). The study concluded that effective budgeting practices, including comprehensive budget preparation, periodic budget review, management approval, contingency provisions, and clear communication of budget information, contribute to successful road construction project completion. The study recommends strengthening budget preparation, regular budget reviews, communication of budget information, and contingency planning to improve project performance.

**Keywords:** Budgeting Practices; Road Construction Projects; Project Performance; Successful Completion; Rwanda

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## 1. Introduction

The construction sector is a key driver of global economic growth, infrastructure expansion, and societal transformation. Despite their strategic importance,

construction projects, particularly large-scale infrastructure projects like road development, continue to face cost overruns, timetable delays, and performance inefficiencies. Cost overruns in infrastructure projects frequently exceed 30-40%, even in relatively well-

managed environments, indicating that such inefficiencies are systemic features of project delivery (Flyvbjerg, Bruzelius, & Rothengatter, 2003; World Bank, 2020). This recurrent underperformance raises serious issues about the efficacy of financial resource management methods, which are supposed to ensure that project budgets, schedules, and expected outputs are all in sync (PMI, 2021).

At the theoretical level, classic project management frameworks presume that effective financial planning, budgeting, and cost control methods will reduce inefficiencies and improve project success. However, empirical and behavioral research are progressively challenging this notion. According to scholars, optimism bias and deliberate misrepresentation cause project actors to consistently underestimate costs and overstate benefits, weakening the credibility of financial planning processes (Flyvbjerg, 2014). This sparks a critical debate in the literature about whether financial inefficiencies in construction projects are primarily the result of technical limitations in financial management systems or deeper behavioural and institutional failures in incentives, governance, and accountability. While this argument is well-established, there is little empirical information on how these theoretical reasons translate into actual financial management practices at the project implementation level, especially in developing countries (Love et al., 2019).

Project performance is predicted to be more efficient in advanced economies with well-developed institutional frameworks, regulatory systems, and financial controls. This anticipation is somewhat justified because stronger financial governance procedures have been linked to better project outcomes (OECD, 2021). Nonetheless, a growing body of evidence suggests that even in these circumstances, infrastructure projects continue to face large cost increases and budget changes during implementation (Natural Audit Office (NAO), 2022). This implies that the sheer presence of advanced financial management systems does not imply efficiency. Rather, the effectiveness of these systems is determined by their enforcement, adaptation to project complexity, and connection with larger project management processes. As a result, financial resource management must be viewed as both a technological function and an institutional and behavioral process.

The issues are much more severe in developing nations, where institutional capacity restrictions, weak financial control systems, and economic volatility increase project inefficiencies. Poor cost estimation, delayed cash disbursement, and inadequate financial planning are all important factors to project delays and budget overruns, according to empirical studies (Ofori, 2015; KPMG, 2020). These problems, however, are more than just operational shortcomings; they represent deeper structural concerns such as fragmented financial management, lack of budgetary discipline enforcement, and a lack of synergy

between financial planning and project execution. This reinforces the argument that financial resource management practices are central, rather than peripheral, to project performance, as they have a direct impact on project resource allocation, utilization, and monitoring.

At the continental level, Africa provides an especially important framework for investigating these issues. Infrastructure development is a high priority across the continent, but project performance continues to be hampered by persistent inefficiencies. Evidence from several African nations shows that a considerable proportion of construction projects incur cost and time overruns, which frequently exceed acceptable limits (AfDB, 2021; Moyo & Chigara, 2022). While negative outcomes are typically attributed to resource restrictions, a rising body of literature challenges this view by finding that even well-funded initiatives perform poorly due to inadequate financial management techniques (Ika, Diallo, & Thuillier, 2012). This moves the analytical focus from resource availability to resource management, implying that inefficiencies stem less from a lack of financial resources and more from how those resources are planned, allocated, and controlled inside project environments.

Rapid urbanization and growing infrastructure investment in East Africa have heightened the need for effective project delivery. However, the performance of regional construction projects remains reflective of larger continental difficulties. Empirical research from Kenya, Uganda, and Tanzania demonstrates that inadequate financial planning, weak cost control practices, and ineffective financial monitoring systems continue to have an impact on project outcomes (Ngugi & Mugo, 2020; Seboru, 2015). These findings highlight a fundamental gap between existing financial management theories and their practical use. Despite the availability of well-developed financial management tools, their implementation is variable, frequently hampered by institutional problems and low technical capabilities.

Rwanda has made great progress in infrastructure development as part of its broader economic transformation program. Road construction projects, in particular, are critical for enhancing connectivity, enabling trade, and promoting urban growth (Government of Rwanda, 2022). Despite these efforts, project implementation issues remain, notably in terms of cost management and timely completion. Existing research shows that construction projects in Rwanda commonly encounter budget deviations, delays, and performance inefficiencies, which are frequently linked to flaws in financial planning, cost control, and resource allocation (Habimana, 2019; Uwizeyimana, 2021). Notably, the majority of these studies see financial management as a subset of broader project management methods, failing to

isolate and objectively analyze its independent contribution to project performance.

The Kicukiro Centre-Kagarama-Muyange road project, which was implemented by NPD Ltd., provides a useful empirical background for investigating these difficulties. As an urban road building project in a fast developing neighborhood, it exemplifies the complexity, stakeholder diversity, and financial needs associated with infrastructure projects in Kigali. More importantly, the project provides an opportunity to go beyond broad analysis and study how financial resource management approaches work in a real-world implementation context. Its selection is thus justified not just by its practical importance, but also by its ability to offer context-specific insights that can inform both policy and practice.

Against this backdrop, this study aims to critically assess the impact of financial resource management procedures on the successful completion of road building projects in Rwanda. The study intends to bridge the gap between theory and reality by identifying essential financial management strategies and experimentally measuring their impact on project completion (as defined by time, cost, and quality). As a result, it adds to a more nuanced knowledge of how financial resources can be efficiently managed to improve project performance, giving actionable insights for policymakers, practitioners, and academics in construction and project management.

## 1.1 Statement of the problem

Rwanda's socioeconomic development relies heavily on road infrastructure, which supports trade, mobility, urbanisation, and regional integration. Consequently, substantial financial resources have been invested in road construction projects to improve transport networks and support national development goals. Despite these investments, road construction projects continue to experience performance challenges, including delays in completion, cost increases, and difficulties in achieving planned project objectives. Such challenges reduce the effectiveness of infrastructure investments and may limit the expected economic and social benefits of road development projects. Evidence from assessments of Rwandan infrastructure projects indicates that project implementation remains challenging, particularly in relation to budget execution and the timely availability of financial resources (NAO, 2022). These challenges highlight the importance of effective budgeting practices in ensuring that financial resources are adequately planned and allocated to support project activities. Since road construction projects require substantial financial resources, weaknesses in budget preparation, budget review, approval, contingency planning, and communication of budget information may negatively affect project implementation and completion.

Although budgeting is widely recognised as an important component of effective project management, limited empirical evidence in Rwanda has specifically examined the effect of budgeting practices on the performance of road construction projects. Previous studies have generally examined financial resource management or project management from a broader perspective, without sufficiently isolating budgeting practices as an independent factor influencing project performance. Consequently, there is limited empirical evidence on how comprehensive budget preparation, periodic budget review, management approval, contingency provisions, and communication of budget information influence the successful completion of road construction projects in Rwanda. This knowledge gap is particularly relevant to the Kicukiro–Kagarama–Muyange Road Project, an urban road infrastructure project requiring substantial financial resources and effective coordination among different project stakeholders. Without clear empirical evidence on the contribution of budgeting practices to project performance, project managers and other stakeholders may face difficulties in identifying appropriate measures for strengthening financial planning and improving project completion. Therefore, this study seeks to determine the effect of budgeting practices on the successful completion of road construction projects in Rwanda, using the Kicukiro–Kagarama–Muyange Road Project as a case study.

This study was guided by the following research objective:

To determine the effect of budgeting practices on the successful completion of road construction projects. This study was guided by the following objective.

## 2. Literature Review

This section provides an analytical explication of the core concepts underlying the investigation, assuring conceptual precision and consistency in interpretation. Rather than presenting definitions separately, the discussion combines theoretical meaning with practical application, connecting each concept to how it will be measured in the study. This approach is critical for laying a solid foundation for empirical analysis, especially considering the usage of regression tools to investigate correlations between variables.

### 2.1.1 Financial Resource Management Practices

Financial resource management procedures are the systematic methods for planning, allocating, utilizing, and monitoring financial resources within a project setting in

order to accomplish desired outcomes. In the context of building projects, these techniques are critical for ensuring that financial inputs are properly transformed into outputs within time, cost, and quality restrictions. According to established project management frameworks, efficient financial management goes beyond initial planning to encompass ongoing cost control, cash flow coordination, and rigorous financial monitoring throughout the project lifecycle (PMI, 2021; Kerzner, 2017).

Analytically, financial resource management is a dynamic and integrative function that connects planning and execution. Weaknesses in this role frequently appear as cost overruns, delays, and inefficiencies, indicating that financial mismanagement is a systematic issue influencing project performance (Flyvbjerg, 2014). This study conceptualises financial resource management methods in four interrelated dimensions: budgeting procedures, cost control practices, cash flow management, and financial monitoring and reporting.

### **2.1.2 Budgeting Practices**

Budgeting techniques are the activities involved in estimating, assigning, and managing the financial resources needed for project delivery. The budget is a financial roadmap that guides resource allocation and decision-making throughout the construction project's lifecycle. Effective budgeting is distinguished by the accuracy of initial cost estimates, the ability to stick to specified budgets, and the efficiency with which resources are allocated across project activities (Horngren et al., 2018).

However, budgeting in large infrastructure projects is frequently fraught with uncertainty, and cost estimation errors have long been known as a key driver of cost overruns. This emphasises the need of not just creating realistic budgets, but also keeping them relevant and enforceable during implementation (Flyvbjerg, 2014). This study defines budgeting procedures in terms of budget preparation accuracy, adherence to approved budgets, and the effectiveness of financial resource distribution across project components.

### **2.1.3 Successful Completion of Road Construction Projects**

The extent to which a road construction project achieves its planned objectives while adhering to time, cost, and quality restrictions is referred to as successful completion. This definition is based on the well-recognized "triple constraint" paradigm, which measures project success in terms of schedule adherence, budget compliance, and meeting defined quality requirements (PMI, 2021). However, contemporary approaches emphasize that project

success is multidimensional, taking into account both efficiency and effectiveness in project execution (Atkinson, 1999).

In practice, a failure in any of these areas degrades total project performance. Delays raise expenses and disrupt expected outcomes, cost overruns tax financial resources, and poor quality diminishes the long-term value of infrastructure investments. In this study, successful project completion is measured by three key indicators: time performance (adherence to the project schedule), cost performance (variance from the planned budget), and quality performance (compliance with established engineering standards).

## **2.2 Theoretical Review**

The theoretical framework provides the foundation for explaining the relationship between financial resource management practices and road construction project performance. It helps to explain why effective planning, allocation, monitoring, and control of financial resources are expected to contribute to successful project implementation. This study is guided by project management theory, which is relevant because financial management is an important part of planning and controlling project activities.

Project Management Theory emphasizes the systematic planning, organization, allocation, monitoring, and control of project resources to achieve project objectives. According to the Project Management Institute (PMI, 2021), effective project management involves coordinated project planning, execution, measurement, and control to support the delivery of intended outcomes. In road construction projects, this means that financial resources need to be properly planned and allocated to project activities, while expenditure and financial performance should be continuously monitored and controlled.

The theory is particularly relevant to the present study because it provides a basis for examining budgeting practices, cost control practices, cash flow management, and financial monitoring and reporting as determinants of project performance. Effective budgeting provides a financial plan for project activities, cost control helps identify and address expenditure deviations, cash flow management ensures the availability of funds when required, and financial monitoring and reporting support informed decision-making and accountability. Recent evidence from Rwanda also supports the relevance of effective financial resource management to project performance (Aradukunda & Sikubwabo, 2024). Therefore, Project Management Theory suggests that effective financial resource management can contribute to

achieving road construction project objectives within the required time, cost, and quality standards.

## 2.3 Empirical Review

This section examines empirical research on the relationship between budgeting practices and project success in global, developing-country, African, and Rwandan contexts. Previous studies generally indicate that accurate cost estimation, realistic budget preparation, budget adherence, and regular budget updating are important for controlling project costs and improving project outcomes. At the global level, Flyvbjerg (2014) found that differences between estimated and actual project costs are frequently associated with weaknesses in initial cost estimation and budgeting. The evidence suggests that systematic budget preparation can reduce the likelihood and magnitude of cost overruns. However, much of the global evidence is drawn from countries with relatively developed financial management systems and strong institutional controls, which may limit its direct applicability to road construction projects in developing countries.

In developing countries, empirical studies similarly identify budgeting practices as important determinants of construction project performance, although methodological approaches and contextual conditions differ considerably. Studies in Asia and the Middle East indicate that inaccurate cost estimation, unrealistic budgets, and inadequate budget updates can contribute to cost escalation and project delays (Mat Marsono & Khalid, 2018). However, many of these studies rely heavily on survey responses, descriptive statistics, and relatively small samples, making it difficult to establish the independent effect of budgeting practices on project performance. In addition, much of the literature examines construction firms or construction projects generally rather than focusing specifically on road infrastructure projects. This creates a contextual gap because road construction projects often involve large budgets, long implementation periods, multiple stakeholders, and changing material and operational costs.

At the African level, studies conducted in countries such as Nigeria, Ghana, and South Africa show that budget preparation accuracy, adherence to approved budgets, and effective allocation of financial resources are associated with better construction project performance (Aigbavboa & Thwala, 2017). These studies provide useful evidence about financial management challenges within the African construction environment. However, many African studies examine budgeting together with other financial or project management practices, making it difficult to determine the specific contribution of budgeting practices to project

success. In Rwanda, available empirical studies have identified budgeting challenges as factors associated with cost overruns and delays in infrastructure projects (Habimana, 2019; Uwizeyimana, 2021). Nevertheless, Rwanda-specific research remains limited, and much of it uses descriptive or case-study approaches rather than rigorous quantitative techniques capable of determining the statistical effect of budgeting practices on project performance.

Overall, the reviewed literature demonstrates the importance of budgeting practices in supporting project success, but several gaps remain. Global studies provide strong evidence but are largely based on institutional environments that differ from Rwanda. Developing-country studies are more contextually relevant but often depend on perceptual survey data and have methodological limitations. African studies provide useful regional evidence but frequently combine budgeting with other project management practices, reducing conceptual clarity. In Rwanda, empirical evidence on budgeting practices in road construction projects remains particularly limited, especially studies that quantitatively examine budgeting practices as an independent variable and project performance in terms of time, cost, and quality as the dependent variable. The current study therefore seeks to address this contextual and methodological gap by examining the effect of budgeting practices on the performance of the Kicukiro–Kagarama–Muyange Road Project in Rwanda

## 3. Methodology

The study adopted a quantitative approach using an explanatory and cross-sectional research design. The quantitative approach was appropriate because the study focused on measuring budgeting practices and determining their effect on road construction project performance. The explanatory design was used because the study sought to establish whether budgeting practices significantly influence project performance without manipulating the study variables. The cross-sectional design enabled the researcher to collect data from respondents at a specific point in time within the Kicukiro Centre–Kagarama–Muyange Road Project implemented by NPD Ltd.

The target population consisted of 90 respondents directly involved in the Kicukiro Centre–Kagarama–Muyange Road Project. The respondents included 3 project managers, 25 site engineers, 30 site supervisors, 10 quantity surveyors, 10 finance/accounts personnel, and 12 client/project representatives. These categories were selected because they were directly involved in project planning, budgeting, implementation, supervision, and monitoring and could therefore provide relevant information concerning budgeting practices and project

performance. Since the population was relatively small and accessible, the study adopted a census approach, whereby all 90 respondents were included in the study.

The study collected primary data and documentary evidence. Primary data were obtained through a structured questionnaire administered to the 90 selected respondents. The questionnaire collected quantitative information on budgeting practices and road construction project performance. Documentary review was also used to supplement the questionnaire data through examination of relevant project records, including approved budgets, progress reports, financial records, and other documents related to project implementation. The use of documentary evidence helped to provide additional information concerning the application of budgeting practices and the performance of the road construction project.

The principal research instrument was a structured questionnaire. The questionnaire contained closed-ended statements measured using a five-point Likert scale, ranging from strong disagreement to strong agreement. The budgeting practices items focused on the comprehensiveness of project budgets, accuracy of budget preparation, monitoring of expenditures against the approved budget, adherence to budget allocations, and participation of relevant stakeholders in budget preparation. Project performance, which was the dependent variable, was measured in terms of time, cost, and quality. Respondents were therefore asked to assess the extent to which project activities were completed according to schedule, within the planned budget, and in accordance with the required construction quality standards.

Before the main data collection exercise, the research instrument was subjected to validity and reliability assessment. Content validity was assessed by reviewing the questionnaire items against relevant literature, the conceptual framework, and the study objective. Academic supervisors and construction project professionals reviewed the instrument to establish its clarity, relevance, and completeness. A pilot study was conducted in a similar road construction project in Kigali City that was not part of the main study. Reliability was assessed using Cronbach's Alpha, with a value of 0.70 or above considered acceptable. For the budgeting practices construct, the pilot study produced a Cronbach's Alpha coefficient of 0.865 across five items, indicating good internal consistency and confirming that the items were suitable for measuring budgeting practices.

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Quantitative data were summarized using descriptive statistics, including frequencies, percentages, means, and standard deviations.

Inferential statistics were used to determine the relationship and effect of budgeting practices on project performance. Specifically, Pearson correlation analysis was used to establish the strength and direction of the relationship between budgeting practices and project performance, while simple linear regression analysis was used to determine the effect of budgeting practices on project performance. The analysis generated the correlation coefficient, regression coefficient, significance level, and R-squared value to establish the strength, direction, statistical significance, and explanatory power of budgeting practices.

Since the study focused on one independent variable, the analytical model was expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where:

Y = Road Construction Project Performance

$\beta_0$  = Constant term

$\beta_1$  = Regression coefficient

$X_1$  = Budgeting Practices

$\varepsilon$  = Error term

The regression model was used to determine whether changes in budgeting practices significantly predict changes in road construction project performance. A positive and statistically significant regression coefficient would indicate that effective budgeting practices are associated with improved project performance, while a non-significant coefficient would indicate that budgeting practices do not have a statistically significant effect on project performance.

Finally, the study observed ethical considerations throughout the research process. Formal permission was obtained from NPD Ltd. before data collection, and respondents were informed about the purpose of the study and the voluntary nature of their participation. Informed consent was obtained from participants, while confidentiality and anonymity were maintained throughout the research process. Questionnaire responses were coded to protect respondents' identities, and collected information was securely stored and used strictly for academic purposes. Respondents were also informed of their right to decline participation or withdraw from the study at any stage.

## 4. Results and Discussion

This section presents the findings and discussion of the study on the effect of budgeting practices on road construction project performance in Rwanda, with specific

reference to the Kicukiro Centre–Kagarama–Muyange Road Project implemented by NPD Ltd.

4.1 Findings

This study presents the findings obtained from the questionnaires and documentary review and discusses them in relation to the study objective and existing empirical literature. The chapter covers the response rate, respondents’ characteristics, descriptive findings, correlation and regression analysis, and the findings concerning the effect of budgeting practices (X<sub>1</sub>) on road construction project performance (Y).

4.1.1 Response rate

The study targeted 90 respondents, and all 90 questionnaires distributed to the targeted respondents were successfully completed and returned, representing a 100% response rate. This indicates full participation of the

selected respondents and provides complete data for the study. The high response rate was facilitated by effective questionnaire administration and follow-up with respondents. Therefore, the collected data were considered adequate and suitable for subsequent statistical analysis and interpretation.

4.1.2 Descriptive Statistics for Budgeting Practices

Table 1 presents the descriptive statistics for budgeting practices (X<sub>1</sub>), showing respondents’ assessments of different budgeting-related statements in the Kicukiro–Kagarama–Muyange Road Project. The table summarizes the number of observations, minimum and maximum responses, mean scores, and standard deviations for each budgeting practice indicator, together with the overall composite mean. These statistics provide an overview of respondents’ perceptions regarding the implementation of budgeting practices in the study context.

Table 1: Respondents’ Perceptions of Budgeting Practices

| Statements                                                                             | N  | Mean        | Std.  |
|----------------------------------------------------------------------------------------|----|-------------|-------|
| Project budgets are prepared comprehensively before project commencement.              | 90 | 3.81        | 0.763 |
| Budgets are reviewed periodically and adjusted based on project needs.                 | 90 | 3.9         | 0.704 |
| Project budgets are approved by relevant management authorities before implementation. | 90 | 3.84        | 0.669 |
| Budget allocations include provisions for contingencies and unforeseen costs.          | 90 | 3.79        | 0.645 |
| Budget information is clearly communicated to project stakeholders.                    | 90 | 3.89        | 0.589 |
| <b>Composite Mean</b>                                                                  |    | <b>3.85</b> |       |

Source: Field data, 2026

Table 2 presents respondents’ perceptions of budgeting practices in the Kicukiro–Kagarama–Muyange Road Project. The descriptive statistics indicate that respondents generally agreed that budgeting practices were effectively implemented in the project. The composite mean of 3.85 indicates a favorable overall perception of budgeting practices among the respondents. Among the individual indicators, the statement that budgets are reviewed periodically and adjusted based on project needs recorded the highest mean score, followed by the statement that budget information is clearly communicated to project stakeholders. Project budgets being approved by relevant management authorities before implementation also received a relatively high rating, while comprehensive preparation of project budgets before commencement was similarly positively perceived. The lowest mean was recorded for budget allocations including provisions for contingencies and unforeseen costs. Nevertheless, this rating remained above the neutral value, indicating general agreement with the statement. The relatively low standard deviations indicate reasonable consistency in respondents’ perceptions of budgeting practices.

The findings are consistent with Project Management Theory, which emphasizes effective planning and control of project resources as important elements of successful project implementation. In this context, comprehensive budget preparation, periodic budget review, management approval, contingency planning, and clear communication of budget information provide a basis for allocating and controlling financial resources throughout the project lifecycle. The generally favorable responses therefore suggest that the application of budgeting practices provided a structured financial basis for project implementation and contributed to effective management of project resources.

From an economic perspective, effective budgeting promotes the efficient allocation of limited financial resources and strengthens financial discipline during project implementation. Periodic budget reviews enable project managers to respond to changing project requirements, while management approval strengthens accountability in the allocation and use of project funds. Comprehensive budget preparation and provisions for

contingencies can also help reduce the likelihood of financial shortages and unexpected cost pressures. However, the comparatively lower perception of contingency provisions suggests that there is still room for strengthening financial preparedness for unforeseen costs that may arise during project implementation.

The findings are consistent with previous empirical studies that have emphasized the importance of realistic budgeting, regular budget review, and effective budget control in supporting successful project implementation (Jiang & Chi, 2024; Kuntadi & Livrianti, 2022). The present findings therefore reinforce existing empirical evidence while providing context-specific evidence from a road construction project in Rwanda. The favorable overall perception indicates that appropriate budgeting mechanisms were generally in place within the project.

These findings are plausible within the Kicukiro–Kagarama–Muyange Road Project, where effective budgeting is important for coordinating procurement activities, contractor payments, labor costs, and material acquisition throughout project implementation. Given the dynamic nature of urban road construction and the possibility of fluctuations in construction input prices, periodic budget reviews and clear communication among stakeholders are important for maintaining financial

stability. Nevertheless, the comparatively lower perception of contingency provisions indicates the need for greater attention to financial preparedness for unforeseen events that may affect project costs.

The findings suggest that project owners, project managers, and contractors should strengthen budgeting practices by ensuring comprehensive budget preparation before project commencement, conducting regular budget reviews, maintaining clear communication of budget information, and improving provisions for unforeseen project costs. Strengthening these practices can improve financial planning, enhance accountability, minimize budget deviations, and increase the likelihood of completing road construction projects within the planned time, cost, and quality requirements.

#### 4.1.3 Correlation Analysis

Correlation analysis was conducted using Pearson’s Product Moment Correlation Coefficient (r) to determine the strength and direction of the relationship between the Scrum framework and humanitarian project performance at Mahama Refugee Camp. The correlation coefficient ranges from −1 to +1, while the p-value was used to determine statistical significance at the 5% level ( $p < 0.05$ ). The results of the correlation analysis are presented in Table 3

**Table 3: Correlation between independent variable and dependent variable**

|                                                     |                 | Budgeting Practices | Successful Completion of Road Construction Projects |
|-----------------------------------------------------|-----------------|---------------------|-----------------------------------------------------|
| Budgeting Practices                                 | Pearson         | 1                   |                                                     |
|                                                     | Correlation     |                     |                                                     |
|                                                     | Sig. (2-tailed) |                     |                                                     |
| Successful Completion of Road Construction Projects | N               | 90                  |                                                     |
|                                                     | Pearson         | .779**              | 1                                                   |
|                                                     | Correlation     |                     |                                                     |
|                                                     | Sig. (2-tailed) | .000                |                                                     |
|                                                     | N               | 90                  | 90                                                  |

**Source:** Field data, 2026

The Pearson correlation results in Table 3 indicate a strong, positive, and statistically significant relationship between budgeting practices and successful completion of road construction projects ( $r = 0.779$ ,  $p < 0.001$ ,  $N = 90$ ). This means that better budgeting practices are associated with higher levels of successful completion of road construction projects. In particular, comprehensive budget preparation, periodic budget reviews, management approval, provision for contingencies, and clear communication of budget information are associated with improved project outcomes. Therefore, the finding suggests that strengthening budgeting practices ( $X_1$ ) may contribute to improved road construction project performance.

#### 4.1.4 Regression analysis

Simple linear Regression analysis was conducted to determine the effect of budgeting practices ( $X_1$ ) on the successful completion of road construction projects ( $Y$ ). Since the study focused on one independent variable, simple linear regression analysis was appropriate. The analysis determined the extent to which variations in budgeting practices explain variations in successful completion of road construction projects.

**Table 4. Model summary**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .779 <sup>a</sup> | .607     | .602              | .42557                     |

a. Predictor: (Constant), Budgeting Practices

The results in Table 4 indicate that the correlation coefficient ( $R = 0.779$ ) shows a strong positive relationship between budgeting practices and successful completion of road construction projects. The coefficient of determination ( $R^2 = 0.607$ ) indicates that 60.7% of the variation in successful completion of road construction projects is explained by budgeting practices, while the adjusted  $R^2$  of 0.602 indicates that approximately 60.2% of the variation remains explained after adjusting for the

predictor. The Std. Error of the Estimate of 0.42557 indicates the average difference between the observed and predicted values of successful completion of road construction projects. The findings imply that budgeting practices make a substantial contribution to successful completion of road construction projects, while the remaining 39.3% of the variation is explained by other factors not included in the model.

**Table 5. ANOVA Results**

| Model |            | Sum of Squares | df | Mean Square | F       | Sig.              |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1     | Regression | 31.842         | 1  | 31.842      | 135.828 | .000 <sup>b</sup> |
|       | Residual   | 20.609         | 88 | .234        |         |                   |
|       | Total      | 52.451         | 89 |             |         |                   |

a. Dependent Variable: Successful Completion of Road Construction Projects (Y)

b. Predictors: (Constant), Budgeting Practices (X1)

The results in Table 5 show that the regression model was statistically significant, with an F-value of 135.828 and a significance value of 0.000, which is below the 0.05 level of significance. This indicates that budgeting practices ( $X_1$ ) significantly predict successful completion of road construction projects (Y). The finding implies that effective budgeting practices, including comprehensive

budget preparation, periodic budget review, management approval, contingency provision, and clear communication of budget information, contribute significantly to improving road construction project performance. Therefore, the null hypothesis stating that budgeting practices have no significant effect on successful completion of road construction projects is rejected.

**Table 6. Regression Coefficients**

| Model |                     | Unstandardized Coefficients |            | Standardized Coefficients | t      |
|-------|---------------------|-----------------------------|------------|---------------------------|--------|
|       |                     | B                           | Std. Error | Beta                      |        |
| 1     | (Constant)          | 0.943                       | 0.211      | —                         | 4.474  |
|       | Budgeting Practices | 0.662                       | 0.057      | 0.779                     | 11.655 |

a. Dependent Variable: Successful Completion of Road Construction Projects

The results in Table 6 show that budgeting practices have a positive and statistically significant effect on the successful completion of road construction projects ( $B = 0.662$ ,  $\beta = 0.779$ ,  $t = 11.655$ ,  $p = 0.000$ ). The positive regression coefficient indicates that an improvement in budgeting practices is associated with an improvement in the successful completion of road construction projects. The standardized beta coefficient of 0.779 indicates a strong positive contribution of budgeting practices to successful project completion. The statistically significant result indicates that budgeting practices are an important predictor of successful completion of road construction projects. This finding implies that effective budgeting

practices, including comprehensive budget preparation, periodic budget review, management approval, contingency provisions, and clear communication of budget information, can enhance the successful completion of road construction projects. Therefore, strengthening budgeting practices is important for improving the successful completion of the Kicukiro–Kagarama–Muyange Road Project in Rwanda.

## 4.2 Discussion of Findings

The objective of this study was to determine the effect of budgeting practices on the successful completion of road

construction projects in Rwanda, with specific reference to the Kicukiro–Kagarama–Muyange Road Project. The findings revealed that budgeting practices contribute positively to successful road construction project performance through comprehensive budget preparation, periodic budget review, management approval, contingency planning, and clear communication of budget information. The findings showed that effective budgeting enables project teams to plan financial requirements, allocate resources to project activities, monitor financial needs, and adjust budgets when project requirements change. This is particularly important in road construction projects because implementation involves substantial financial resources, multiple activities, and different stakeholders. However, unforeseen financial requirements may still affect the consistency of project implementation, suggesting that effective budgeting supports financial planning but does not completely eliminate financial challenges.

The findings further showed that budgeting practices improve financial coordination, accountability, and resource allocation among project stakeholders. Comprehensive budget preparation provides project teams with a clear financial plan, while regular budget reviews enable them to respond to changes in project requirements. Management approval strengthens accountability in the use of project funds, while contingency provisions help project teams prepare for unforeseen costs. Clear communication of budget information also promotes coordination among project stakeholders and supports informed decision-making. These findings demonstrate that budgeting provides a structured approach to managing financial resources while allowing project teams to respond to changing financial requirements during road construction project implementation.

The correlation and regression findings demonstrated that budgeting practices have a positive and statistically significant influence on the successful completion of road construction projects. The findings imply that effective application of comprehensive budget preparation, periodic budget review, management approval, contingency planning, and clear communication contributes to improved road construction project outcomes. Effective budgeting enables project teams to organize financial resources according to project priorities, identify potential financial challenges, and make appropriate adjustments during implementation. The findings therefore suggest that strengthening budgeting practices can enhance the likelihood of successful road construction project completion.

The findings are consistent with Flyvbjerg (2014), who found that weaknesses in cost estimation and budgeting can contribute to differences between estimated and actual

project costs. They also agree with Mat Marsono and Khalid (2018), who reported that inaccurate cost estimation, unrealistic budgets, and inadequate budget updates can contribute to cost escalation and project delays. Similarly, Aigbavboa and Thwala (2017) found that effective budget preparation, adherence to approved budgets, and appropriate allocation of financial resources are associated with improved construction project performance. These studies support the present findings that effective budgeting enables project teams to plan activities effectively, manage financial resources, and respond to challenges that may affect project implementation.

The findings further agree with Habimana (2019) and Uwizeyimana (2021), who identified financial planning and budgeting challenges as factors associated with cost overruns and delays in infrastructure projects in Rwanda. Overall, the consistency between the present findings and previous studies indicates that budgeting practices are important for road construction projects. Therefore, effective application of budgeting practices can contribute to improved financial planning, resource allocation, accountability, and overall performance of road construction projects in Rwanda, particularly the Kicukiro–Kagarama–Muyange Road Project.

## **5. Conclusion and Recommendations**

### **5.1 Conclusion**

The study concluded that budgeting practices have a positive and significant effect on the successful completion of road construction projects in Rwanda, particularly the Kicukiro–Kagarama–Muyange Road Project. Effective budgeting practices, including comprehensive budget preparation, periodic budget review, management approval, contingency provisions, and clear communication of budget information, provide a clear financial framework for planning, allocating, and managing project resources. These practices enable project stakeholders to plan financial requirements, allocate resources appropriately, respond to changing project needs, and strengthen accountability in the use of project funds. Therefore, strengthening budgeting practices can improve the likelihood of completing road construction projects according to the planned time, cost, and quality requirements.

### **5.2 Recommendations**

Based on the study findings on the effect of budgeting practices on the successful completion of road construction projects in Rwanda, particularly the Kicukiro–Kagarama–Muyange Road Project, the following three main recommendations are made:

1. Project managers should strengthen the preparation of comprehensive project budgets before project commencement by ensuring that all major project activities, materials, labour requirements, and expected expenditures are carefully estimated and included in the approved budget. This will provide a clear financial plan for project implementation and improve the allocation and management of financial resources.
2. Project managers and relevant management authorities should maintain regular budget reviews and clear communication of budget information throughout project implementation. Budget reviews should be conducted periodically to identify changes in project financial requirements, while updated budget information should be communicated promptly to relevant stakeholders. This will strengthen coordination, accountability, and timely financial decision-making during project implementation.
3. Project managers should strengthen provisions for contingencies and unforeseen project costs, as this was the comparatively weaker aspect of budgeting practices identified by the study. Adequate contingency provisions should be incorporated into project budgets and reviewed regularly to ensure that they remain appropriate to potential financial risks. This will improve financial preparedness and help the project respond to unexpected costs without significantly disrupting project implementation or compromising the planned time, cost, and quality requirements

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