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Financial Monitoring and Financial Overruns: A Case of the Kigali Infrastructure Project (KIP) in Nyarugenge District, Rwanda

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Abstract

Financial overruns threaten the timely and efficient delivery of urban infrastructure, yet the relative contribution of different monitoring practices remains insufficiently documented in specific Rwandan projects. This study examined the associations of budget monitoring, cash-flow monitoring and cost-control monitoring with perceived financial-overrun control in the Kigali Infrastructure Project, Nyarugenge District. A descriptive mixed-methods design was used. Of 214 questionnaires administered, 204 were returned (95.3%); three project managers also participated in key-informant interviews. Questionnaire data were analysed using descriptive statistics, Pearson correlations and multiple regression in SPSS version 23, while interviews were analysed thematically and yielded four themes that broadly echoed the survey results. The regression model accounted for 77.3% of variation in the study's financial-overrun outcome ($R^2 = .773$; $F(3, 200) = 226.725$, $p < .001$). Budget monitoring ($\beta = .626$, $p < .001$) and cost-control monitoring ($\beta = .379$, $p < .001$) were significant positive predictors; cash-flow monitoring was not ($\beta = .012$, $p = .850$) after adjustment for the other predictors. The findings identify budget oversight and expenditure control as the strongest correlates of respondents' reported success in containing overruns. Project managers should strengthen variance review, corrective-action tracking and cost-control procedures while investigating operational barriers to cash-flow effectiveness. Because the evidence is cross-sectional and based principally on stakeholder reports, it cannot establish causation or independently verify actual changes in project costs.

Keywords: *Budget Monitoring, Cash-Flow Monitoring, Cost Control, Financial Overruns, Infrastructure Projects*

1.0 Introduction

Financial monitoring is central to infrastructure project governance because it enables managers to compare planned resources with actual financial commitments, identify emerging deviations, and respond before cost pressures intensify. Infrastructure projects are especially exposed to financial overruns when procurement prices change, implementation schedules shift, or disbursements are delayed. Budget monitoring, cash-flow monitoring, and cost-control monitoring address related but distinct financial risks: the first examines adherence to approved allocations, the second assesses the timing and sufficiency of funds, and the third scrutinises expenditure and corrective action (Kerzner, 2017).

Internationally, project financial oversight increasingly combines periodic budget reviews, expenditure reporting, and forward-looking financial forecasts. Earned value management, for example, links planned work and expenditure to actual project progress, providing an analytical basis for detecting emerging cost deviations (Fleming & Koppelman, 2010). Such monitoring can strengthen accountability between those financing infrastructure and those responsible for its implementation, consistent with the oversight concerns emphasised by agency theory (Eisenhardt, 1989). However, the usefulness of financial information depends on whether project managers act promptly on identified variances.

Across African and East African infrastructure settings, the practical effectiveness of financial monitoring may be constrained by delayed funding, fragmented reporting, and limited capacity to translate financial records into corrective decisions. These challenges underscore the need to distinguish monitoring the approved budget from tracking liquidity and enforcing expenditure controls. A project may report regular budget reviews yet still face payment bottlenecks, while strong expenditure authorisation may not fully compensate for late cash inflows. The contribution of each practice therefore warrants separate empirical examination rather than treating financial monitoring as a single activity.

In Rwanda, public infrastructure development operates within an institutional environment that emphasises financial accountability, budget execution, and procurement oversight. The Kigali Infrastructure Project (KIP), examined in this study in connection with urban infrastructure upgrading in Nyarugenge District, provides a relevant setting because works involving roads, drainage, walkways, and related facilities require coordinated budgeting, timely payments, and ongoing expenditure scrutiny. Financial monitoring is particularly important where construction activities and contractual obligations create risks of differences between planned and actual costs.

Although financial monitoring is widely recognised as important, evidence on the distinct associations of budget monitoring, cash-flow monitoring, and cost-control monitoring with financial overruns remains limited for the KIP context. Accordingly, this study examined these three associations among project stakeholders in Nyarugenge District. The outcome was measured through respondents' perceptions of how effectively financial overruns were controlled, rather

than independently audited monetary overrun amounts; the findings therefore concern reported overrun control and should not be interpreted as proof of causal reductions in actual project costs.

1.1 Statement of the Problem

Financial overruns remain a major challenge in infrastructure project implementation, contributing to increased expenditures, project delays, and inefficient resource utilisation. Despite the adoption of financial monitoring systems in Rwanda, infrastructure projects such as the Kigali Infrastructure Project (KIP) in Nyarugenge District continue to face financial management challenges associated with budget deviations, cash-flow constraints, and inadequate expenditure control (Bwanakweli, 2022; Nkubito, 2021). These challenges raise concerns about the effectiveness of financial monitoring practices in managing project costs.

Although previous studies have examined financial monitoring in infrastructure development, limited empirical evidence exists regarding the distinct associations of budget monitoring, cash-flow monitoring, and cost-control monitoring with financial overruns in Rwanda's urban infrastructure projects (Nyirinkindi, 2020). This study therefore examined these associations in the Kigali Infrastructure Project, Nyarugenge District, Rwanda, to provide evidence for strengthening financial oversight and improving financial-overrun management.

1.2 Research Objectives

The specific objectives of the study were:

i. To examine the association between budget monitoring and financial overruns in the Kigali Infrastructure Project, Nyarugenge District, Rwanda.
ii. To assess the association between cash-flow monitoring and financial overruns in the Kigali Infrastructure Project, Nyarugenge District, Rwanda.
iii. To determine the association between cost-control monitoring and financial overruns in the Kigali Infrastructure Project, Nyarugenge District, Rwanda.

1.3 Research Hypotheses

H_{01}: Budget monitoring has no statistically significant association with financial overruns in the Kigali Infrastructure Project.

H_{02}: Cash-flow monitoring has no statistically significant association with financial overruns in the Kigali Infrastructure Project.

H_{03}: Cost-control monitoring has no statistically significant association with financial overruns in the Kigali Infrastructure Project.

2.0 Literature Review

2.1 Theoretical Framework

The study draws on project risk management, agency theory and contingency theory. Risk management frames budget and cost monitoring as early-warning and response processes. Agency

theory highlights the value of financial reporting and oversight when implementers manage resources on behalf of funders or public authorities (Eisenhardt, 1989). Contingency theory, which originated in Fiedler's (1964) argument that effectiveness depends on the fit between a leader and the situation, suggests that the effectiveness of any monitoring arrangement likewise depends on the organisational and operating context (Donaldson, 2001). Together, these perspectives motivate comparison of the three practices without implying that the cross-sectional survey directly tests each theory.

2.2 Financial Monitoring Practices

Budget monitoring compares actual spending with approved allocations and uses periodic variance reviews to flag deviations requiring managerial intervention (Kerzner, 2017). Earned value management is often integrated into budget monitoring to compare the planned value of work with the actual cost incurred, giving an early warning of cost deviations (Fleming & Koppelman, 2010). In principle, timely detection can improve accountability and reduce the likelihood that small discrepancies become entrenched. Cash-flow monitoring instead focuses on the timing of inflows and outflows, payment commitments and liquidity forecasts. Even a project that closely tracks its budget may encounter delays if payments or disbursements are mistimed. Cost-control monitoring concerns expenditure authorisation, baseline adherence, procurement-cost scrutiny and corrective action once variances emerge. These functions overlap, but each may contribute differently when entered simultaneously in a statistical model.

2.3 Research Gap

Existing literature connects expenditure oversight, cash-flow forecasting and project-cost discipline to infrastructure performance. The specific empirical gap addressed here is whether the three dimensions retain independent associations with the outcome when considered together among stakeholders in KIP. This is especially relevant where budget monitoring and cash-flow monitoring are strongly correlated, potentially changing their individual regression estimates.

3.0 Methodology

The study adopted a descriptive mixed-methods design combining structured questionnaires and key-informant interviews in the Kigali Infrastructure Project (KIP), Nyarugenge District, Rwanda, covering project implementation between 2018 and 2024. The target population comprised 477 stakeholders, including government officials, project managers, engineers, contractors, procurement officers and community representatives, from whom a sample of 217 (214 questionnaire respondents and three interviewees) was selected using stratified random and purposive sampling; 204 of the 214 questionnaires distributed were completed, and three project managers participated in key-informant interviews. Budget monitoring, cash-flow monitoring, cost-control monitoring and financial overruns were each measured using five items (20 items in total), all rated on the same five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), and the instrument was reliable, with Cronbach's alpha coefficients of .812, .784, .838 and .806, respectively (overall $\alpha = .810$). Because the financial-overrun items

were positively worded, higher scores indicate more favourable perceived control of financial overruns. Quantitative data were analysed in SPSS version 23 using descriptive statistics, Pearson correlation and multiple linear regression, while interview data were analysed thematically. The three project managers were purposively selected for their experience in project financial monitoring. With their informed consent, they took part in recorded, in-person, semi-structured interviews guided by seven open-ended questions on budget-variance tracking, cash-flow management, disbursement delays, cost-control implementation and possible improvements. Transcripts were coded inductively, with open coding followed by focused coding that grouped related codes into broader themes.

4.0 Findings and Discussion

This section presents the findings of the study and discusses them in relation to the literature. It first reports the descriptive statistics for budget monitoring, cash-flow monitoring, cost-control monitoring and financial overruns, followed by the Pearson correlation and multiple regression analyses used to test the study hypotheses, and then summarises the themes that emerged from the key-informant interviews.

4.1 Descriptive Statistics

Respondents rated their agreement with statements on each financial monitoring practice and on financial overruns using a five-point Likert scale. The means and standard deviations are presented in Table 1.

Table 1: Descriptive Statistics

Statements	M	SD
Budget Monitoring	**4.17**	**0.76**
Project budgets are prepared before project implementation begins	4.18	0.73
Budget implementation is regularly monitored throughout the project lifecycle	4.15	0.77
Budget variances are identified and addressed promptly during project implementation	4.09	0.82
Periodic budget reviews are conducted to improve financial performance	4.14	0.76
Effective budget monitoring has contributed to minimising financial overruns in the project	4.27	0.70
Cash-Flow Monitoring	**4.15**	**0.77**
Cash-flow plans are prepared before project implementation begins	4.11	0.79
Project funds are disbursed on time to support project activities	4.06	0.84
Cash inflows and outflows are continuously monitored throughout project implementation	4.18	0.73
Regular cash-flow reports are prepared and reviewed by project management	4.13	0.76
Effective cash-flow monitoring has contributed to reducing financial overruns in the project	4.25	0.71
Cost-Control Monitoring	**4.20**	**0.74**
Project expenditures are continuously monitored throughout project implementation	4.19	0.74
Cost-control measures are effectively implemented to prevent unnecessary expenditures	4.22	0.71
Cost variances are identified and corrected promptly during project implementation	4.11	0.80
Project expenditures are maintained within the approved budget limits	4.16	0.76
Effective cost-control monitoring has contributed to reducing financial overruns in the project	4.31	0.68
Financial Overruns	**4.19**	**0.73**
Project expenditures have generally remained within the approved budget	4.08	0.81
The project has effectively minimised unnecessary cost escalations	4.14	0.77
Financial resources have been efficiently utilised throughout project implementation	4.19	0.73
Financial monitoring has improved the project's ability to control financial overruns	4.26	0.69
Effective financial management has contributed to completing project activities within the approved financial limits	4.29	0.67

As shown in Table 1, respondents strongly agreed that financial monitoring practices were applied in the project. Cost-control monitoring recorded the highest grand mean (M = 4.20, SD = 0.74), followed by budget monitoring (M = 4.17, SD = 0.76) and cash-flow monitoring (M = 4.15, SD = 0.77), while financial overruns recorded a grand mean of 4.19 (SD = 0.73). The highest-rated items were that effective cost-control monitoring had contributed to reducing financial overruns (M = 4.31) and that effective financial management had contributed to completing project activities within the approved financial limits (M = 4.29), whereas the lowest-rated items concerned the timely disbursement of project funds (M = 4.06) and expenditures remaining within the approved budget (M = 4.08). These results indicate that financial monitoring was perceived as well established in KIP, although the timeliness of disbursements and adherence to the approved budget received comparatively lower ratings.

4.2 Correlation Analysis

Pearson correlation analysis was conducted to examine the strength and direction of the relationships between the financial monitoring practices and financial overruns. The results are presented in Table 2.

Table 2: Correlation between Financial Monitoring Practices and Financial Overruns

	BM	**CFM**	**CCM**	**FO**
Budget Monitoring	1			
Cash-Flow Monitoring	.846**	1		
Cost-Control Monitoring	.462**	.493**	1	
Financial Overruns	.812**	.729**	.674**	1
Sig. (2-tailed)	.000	.000	.000	
N	204	204	204	204

***. Correlation is significant at the 0.01 level (2-tailed). BM = Budget Monitoring; CFM = Cash-Flow Monitoring; CCM = Cost-Control Monitoring; FO = Financial Overruns.*

As presented in Table 2, financial overruns had strong, positive and statistically significant correlations with budget monitoring ($r = .812$, $p < .001$) and cash-flow monitoring ($r = .729$, $p < .001$), and a moderate positive correlation with cost-control monitoring ($r = .674$, $p < .001$). Budget monitoring and cash-flow monitoring were also strongly intercorrelated ($r = .846$, $p < .001$), indicating substantial shared variance between the two practices. These results suggest that stronger financial monitoring is associated with more favourable control of financial overruns, consistent with the view that variance review and expenditure oversight provide early warning of cost deviations (Kerzner, 2017).

4.3 Regression Analysis

Multiple linear regression analysis was conducted to determine the combined and individual influence of budget monitoring, cash-flow monitoring and cost-control monitoring on financial overruns and to test the study hypotheses. The model summary, analysis of variance and regression coefficients are presented in Table 3.

Table 3: Regression Results for Financial Monitoring Practices and Financial Overruns

Model	**R**	**R Square**	**Adjusted R Square**		**Std. Error of the Estimate**	
1	.879	.773	.769		.22589	
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	34.707	3	11.569	226.725	.000
	Residual	10.205	200	.051		
	Total	44.912	203			
Model		**B**	**Std. Error**	**Beta (β)**	**t**	**Sig.**
1	(Constant)	-.705	.175		-4.019	.000
	Budget Monitoring	.564	.057	.626	9.873	.000
	Cash-Flow Monitoring	.010	.055	.012	.190	.850
	Cost-Control Monitoring	.508	.052	.379	9.734	.000

Note: Dependent Variable: Financial Overruns. Predictors: (Constant), Budget Monitoring, Cash-Flow Monitoring, Cost-Control Monitoring.

Table 3 indicates that the three financial monitoring practices had a strong linear relationship with financial overruns ($R = .879$) and jointly explained 77.3% of the variation in financial overruns ($R^2 = .773$, adjusted $R^2 = .769$). The model was statistically significant, $F(3, 200) = 226.725$, $p < .001$. Budget monitoring was the strongest predictor ($\beta = .626$, $t = 9.873$, $p < .001$), followed by cost-control monitoring ($\beta = .379$, $t = 9.734$, $p < .001$); hence, H01 and H03 were rejected. Cash-flow monitoring was not a significant predictor after controlling for the other practices ($\beta = .012$, $t = 0.190$, $p = .850$); hence, H02 was not rejected. The fitted model was $FO = -0.705 + 0.564BM + 0.010CFM + 0.508CCM$. The non-significance of cash-flow monitoring despite its strong bivariate correlation is likely to reflect its high overlap with budget monitoring ($r = .846$). These findings are consistent with agency theory, which emphasises financial reporting and oversight when resources are managed on behalf of funders (Eisenhardt, 1989), and with the view that budget variance review and corrective action are central to project cost control (Kerzner, 2017).

4.4 Key-Informant Interview Findings

The interviews with the three project managers were analysed thematically to contextualise the survey results. Four themes were identified. Because only three informants were interviewed, the themes below describe views held by most of them and are illustrative rather than generalizable.

Theme 1: Early budget monitoring with variance-triggered corrective action. Most informants reported that budgets are prepared before implementation and compared with approved allocations throughout the project through periodic financial reviews and budget-performance meetings. When variances are identified, management responds with expenditure adjustments, cost prioritisation or, where necessary, budget revisions, which informants said allowed financial risks to be addressed before they escalated into overruns.

Theme 2: Cash-flow planning and timely disbursement. Informants explained that cash-flow plans are prepared at the start of the project and updated as requirements change. Tracking inflows and outflows helps management anticipate funding gaps, and regular reporting and reconciliation of accounts was said to support transparency. Timely disbursement was linked to fewer implementation delays, while delayed payments and cash shortages were identified as financial risks.

Theme 3: Expenditure approval and cost control. Cost control was described as built into the project's financial management system across all phases. Actual expenditure is regularly compared with approved budgets, and strict approval procedures, expenditure tracking and the prioritisation of essential spending were said to have prevented unnecessary costs and improved decision-making.

Theme 4: Integrated monitoring, accountability and transparency. Informants emphasised that the three practices work together: combining them was said to support earlier identification of financial problems, more efficient allocation of resources, stronger internal controls and greater accountability for project funds.

These accounts are consistent with the questionnaire results, in which all three practices were rated highly (Table 1), and the emphasis on variance detection and corrective action parallels the strong regression estimates for budget monitoring and cost-control monitoring (Table 3). However, informants spoke favourably of all three practices, including cash-flow monitoring, so the interviews do not explain why cash-flow monitoring was not a significant predictor; its overlap with budget monitoring ($r = .846$) remains the more plausible statistical explanation. The interview evidence is also limited by the small number of purposively selected informants and by the fact that their accounts were not independently verified against project financial records.

5.0 Conclusion

The study examined the relationship between financial monitoring practices and financial overruns in the Kigali Infrastructure Project (KIP) in Nyarugenge District, Rwanda, focusing on budget monitoring, cash flow monitoring, and cost control monitoring. The findings revealed that budget

monitoring ($\beta = 0.626$, $p < 0.001$) and cost control monitoring ($\beta = 0.379$, $p < 0.001$) were positive and statistically significant predictors of the reported control of financial overruns. However, cash flow monitoring ($\beta = 0.012$, $p = 0.850$) demonstrated no statistically significant relationship. The regression model explained 77.3% of the variation in the dependent variable ($R^2 = 0.773$). The study concludes that effective budget monitoring and cost control monitoring are particularly important for strengthening financial discipline and managing financial overrun risks in public infrastructure projects. Interviews with three project managers pointed in the same direction, emphasising early variance detection and corrective action, although these accounts cannot be generalised. Nevertheless, the findings establish statistical associations rather than causal effects.

6.0 Recommendations

Based on the study findings, the following recommendations are proposed to strengthen financial monitoring practices and minimise the risk of financial overruns in public infrastructure projects:

i. Strengthening budget monitoring: The management of the Kigali Infrastructure Project (KIP) should enhance budget monitoring through regular expenditure reviews, systematic budget variance analysis, and timely implementation of corrective measures to improve financial accountability and expenditure control.
ii. Improving cost control mechanisms: Project managers should strengthen cost control practices by establishing clear expenditure limits, conducting periodic financial audits, monitoring procurement costs, and ensuring that project expenditures remain aligned with approved budgets.
iii. Enhancing cash flow monitoring: Although cash flow monitoring was not a statistically significant predictor in the regression model, project management should continue improving cash flow forecasting, payment scheduling, and timely disbursement of funds to maintain financial stability and support uninterrupted project implementation.
iv. Promoting integrated financial monitoring systems: The Ministry of Infrastructure (MININFRA), the Ministry of Finance and Economic Planning (MINECOFIN), and relevant project stakeholders should encourage the adoption of integrated digital financial monitoring systems to facilitate timely financial reporting, expenditure tracking, and evidence-based decision-making.
v. Strengthening institutional capacity and accountability: Relevant government institutions and project management teams should provide continuous professional development in financial planning, budget monitoring, and cost management while reinforcing transparency, internal controls, and accountability throughout the project implementation cycle.

This study has several limitations. First, the design is cross-sectional and the data are mainly stakeholders' perceptions, so the findings show associations rather than causal effects and do not verify actual cost performance. Second, some questionnaire items ask respondents to judge whether a practice has reduced overruns, which may inflate the associations with the outcome measure. Third, the study covers a single project, the Kigali Infrastructure Project in Nyarugenge

District, and the interviews involved only three purposively selected project managers, so the results cannot be generalised to other projects or districts. Fourth, budget monitoring and cash-flow monitoring were strongly correlated (r = .846), which limits confidence in the estimate for cash-flow monitoring.

Future research should compare perceptual measures with objective cost data, such as budgeted against actual expenditure; use longitudinal designs to test whether changes in monitoring precede changes in cost performance; and extend the analysis to several projects and districts. Studies should also address the overlap between monitoring practices, for example through collinearity diagnostics or structural equation modelling, and include a larger and more varied set of interviewees such as contractors, finance officers and funders.

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