Cash-Flow Monitoring and Evaluation as a Predictor of Public Infrastructure Project Performance: Evidence From UNRA, Uganda

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ABSTRACT

Public infrastructure projects rarely proceed exactly according to their original financial and implementation assumptions. Prices change, work schedules shift, quantities are revised, payment obligations accumulate and funding priorities may be adjusted. Under such conditions, the effectiveness of monitoring and evaluation (M&E) becomes central to project control because it provides the information required to identify deviations, explain their causes and initiate corrective action. This article examined the relationship between cash-flow monitoring and evaluation and the implementation of public infrastructure projects at the Uganda National Roads Authority (UNRA). The article was derived from a convergent mixed-methods study involving 78 questionnaire respondents, 10 key informants and documentary evidence from ten substantially completed road-infrastructure projects. Quantitative evidence was analysed using descriptive statistics, Pearson's correlation and simple linear regression, while qualitative and documentary evidence were examined thematically. The findings showed persistent concerns regarding audit follow-up, updating of budgets and cost estimates, feedback mechanisms, financial tracking and adaptation of financial policies. Respondents strongly supported regular audits, phased technical reviews, systematic tracking of audit recommendations and continuous revision of budgets and policies. Cash-flow M&E had a strong, positive and statistically significant relationship with public infrastructure-project implementation ($r = .740$, $p < .01$). Regression analysis further established that cash-flow M&E significantly predicted project implementation ($\beta = .740$, $p < .001$) and explained 54.7% of the observed variation in implementation outcomes ($R^2 = .547$; adjusted $R^2 = .538$; $F = 60.437$). Among the three cash-flow-management dimensions examined in the parent study, M&E made the largest single explanatory contribution. The study concludes that cash-flow M&E is not merely a reporting or compliance function; it is an adaptive management capability through which financial variance is detected, accountability is strengthened and evidence is translated into corrective decisions. The article recommends risk-based audits, routine budget-versus-actual reviews, electronic tracking of audit recommendations and stronger integration of financial and physical-progress monitoring.

Keywords: Cash-Flow Monitoring and Evaluation; Infrastructure Performance; Financial Accountability; Auditing; Project Monitoring; Financial Tracking; UNRA; Uganda

INTRODUCTION

The financial realities of public road construction rarely match the neat assumptions of an approved work plan. Construction prices change, physical quantities are revised, work schedules shift, certificates may be delayed and financing priorities can change during implementation. The practical management question is therefore not whether deviations from original plans will occur, but whether those deviations will be detected early enough, interpreted correctly and addressed before they become entrenched project problems.

The practical value of monitoring and evaluation lies in bringing financial decisions into conversation with what is actually happening on site. Monitoring generates continuous information on activities, expenditure, outputs and emerging variances, while evaluation provides a more systematic assessment of whether interventions remain relevant, efficient, effective and capable of producing the intended results (Goergens & Kusek, 2009; Lamhauge et al., 2012). Within public infrastructure, these functions become particularly important because financial performance and physical implementation are inseparable. Expenditure can only be interpreted meaningfully when it is considered alongside work completed, quality achieved, contractual obligations and implementation time.

Cash-flow M&E should consequently be understood as a management process, rather than an exercise in producing financial returns. It involves tracking approved cash plans against actual releases, commitments and payments; reviewing whether expenditure corresponds with physical progress; identifying emerging financial risks; following up audit findings; updating cost estimates and forecasts; and ensuring that corrective decisions are implemented. When these processes function effectively, managers are able to detect problems while there is still time to act. When monitoring is weak or delayed, cost escalation, payment backlogs, inaccurate forecasts and unauthorised or poorly justified reallocations may persist until the opportunity for timely correction has passed.

This distinction is particularly important in large public-road projects. Such projects normally involve multi-year budgets, complex procurement arrangements, large contractual commitments, compensation obligations and changing implementation conditions. A project may therefore appear financially compliant at one reporting point while accumulating risks that only become visible after significant time and cost consequences have already occurred. For this reason, effective oversight should be continuous and should connect financial evidence to physical performance rather than relying primarily on end-of-project audit.

Uganda's road-infrastructure sector has historically attracted substantial public investment and correspondingly high expectations regarding accountability, value for money and timely delivery. Sector studies and institutional reports have nevertheless documented recurring concerns relating to budget performance, project delay, cost escalation and expenditure governance (Ggoobi et al., 2020; Uganda National Roads Authority [UNRA], 2021/2022, 2022). These conditions make cash-flow M&E relevant not only to financial accountability but also to implementation performance.

The wider project-management literature similarly emphasises that monitoring systems generate value only when information is actually used in decision-making. Goergens and Kusek (2009) argue that results-based M&E requires institutional capacity to collect, interpret and use performance information, while Lamhauge et al. (2012) emphasise the importance of indicators, learning and adaptation where implementation conditions change. In road projects, Njeru and Kirui (2022) likewise report that M&E practices are associated with project performance, reinforcing the importance of structured monitoring throughout implementation.

Against this background, this article examines cash-flow M&E as an adaptive-control capability within public infrastructure management. The study sought to determine whether cash-flow M&E significantly predicts public infrastructure-project implementation at UNRA and to identify the institutional practices required to convert monitoring evidence into timely corrective action. The article therefore shifts attention from the production of monitoring reports to the more important question of whether monitoring evidence changes managerial behaviour and improves project delivery.

LITERATURE REVIEW AND CONCEPTUAL ORIENTATION

Monitoring and evaluation is fundamentally a results-oriented management function. Monitoring is continuous and focuses on whether implementation is proceeding according to agreed plans, targets and resource assumptions. Evaluation is more periodic and analytical, examining the significance of observed performance, the reasons for success or failure and the implications for future decisions (Goergens & Kusek, 2009). In practice, the two functions are closely related because monitoring provides much of the evidence that later evaluation interprets.

In financial management, monitoring involves comparing approved budgets and cash-flow forecasts with actual releases, commitments, expenditure and payments. It also includes reviewing compliance, verifying accountability, assessing budget absorption, tracking outstanding obligations and updating forecasts when assumptions change. Evaluation moves beyond the identification of variance to ask whether financial controls, resource-allocation decisions and cash-management practices are contributing to efficient and effective project delivery.

A strong M&E system therefore requires more than information collection. Its value depends on the quality of the information generated, the capacity of personnel to interpret it, the speed with which findings reach decision-makers and the extent to which recommendations are implemented. Goergens and Kusek (2009) emphasise that M&E systems are effective when they support management and learning rather than when they exist only as reporting structures. This point is particularly relevant in public institutions where reports may be produced regularly but corrective actions remain weakly tracked.

The adaptive character of M&E is also important. Lamhauge et al. (2012) note that monitoring systems are especially valuable where implementation conditions and baselines change over time because evidence allows assumptions and responses to be revised. Although their analysis focuses on development and adaptation interventions, the underlying principle applies directly to infrastructure: monitoring becomes useful when evidence triggers adjustment to plans, budgets, indicators or implementation strategies.

2.1 Financial Tracking and Budget-versus-Actual Review

Financial tracking provides the most immediate connection between cash-flow plans and actual project behaviour. A budget establishes an authorised financial envelope, but implementation generates commitments and payments at different points in time. Regular comparison between planned and actual cash flows therefore enables managers to determine whether expenditure is moving in line with implementation expectations.

Budget-versus-actual review is important for at least three reasons. First, it identifies emerging underspending or overspending. Second, it allows managers to distinguish between financial variance caused by genuine efficiency and variance resulting from delayed implementation. Third, it improves the accuracy of future forecasts because actual expenditure patterns provide evidence for revising assumptions. Without this feedback process, forecasts may remain static even when project conditions have materially changed.

2.2 Auditing as a Monitoring Mechanism

Auditing is a central accountability mechanism within public financial management. However, its value to project implementation depends heavily on timing. End-of-project audits can identify irregularities and document lessons, but they may occur too late to prevent cost escalation or implementation failure. Periodic, risk-based and technically informed audits are therefore more useful where the objective is both accountability and corrective management.

Risk-based auditing allocates monitoring attention according to project value, complexity, financial exposure and emerging warning signs. This is particularly appropriate for infrastructure portfolios because projects differ substantially in scale and risk. High-value or high-risk projects may require more frequent review, surprise audits or external independent assessment, while routine projects may be adequately controlled through standard internal processes.

2.3 Integrating Financial and Physical Monitoring

Financial performance cannot be interpreted in isolation from physical progress. High expenditure may indicate strong implementation, but it may also reflect front-loaded payments, cost escalation or weak value for money. Similarly, low expenditure may reflect efficiency, but it may also indicate procurement delay, unresolved land issues, slow certification or stalled construction.

Effective cash-flow M&E therefore requires integrated review of financial and technical information. Expenditure should be assessed alongside quantities delivered, milestones achieved, work quality, contract status and implementation time. This principle is consistent with contemporary project-performance thinking, which treats successful delivery as multidimensional rather than reducing it to a single financial measure (Ika & Pinto, 2022).

Collaborative monitoring further strengthens this integration by bringing together finance, engineering, procurement, safeguards, contract management and other relevant perspectives. Musyimi and Ondara (2022) emphasise the value of collaborative M&E practices in project performance, while Njeru and Kirui (2022) similarly associate structured M&E practices with road-project performance. These studies reinforce the argument that monitoring is strongest when it is multidisciplinary and linked directly to implementation decisions.

2.4 Audit Follow-Up and Corrective Action

One of the most persistent weaknesses in public-sector monitoring systems is the gap between identifying a problem and ensuring that it is corrected. A recommendation that is not assigned to a responsible officer, given a deadline and tracked to completion may have little practical effect. This produces what may be described as an evidence-to-action gap.

Audit follow-up is therefore a critical part of cash-flow M&E. A strong system should record each recommendation, identify the responsible unit, specify the required action, establish a deadline and verify completion. Where actions remain unresolved, they should be escalated through management structures. In this way, M&E becomes a closed feedback loop rather than a one-directional reporting process.

2.5 Budget and Cost-Estimate Updating

Infrastructure budgets and cost estimates are prepared using assumptions that may change during implementation. Prices may rise, quantities may change, scope may be modified and construction schedules may be extended. Regular updating is therefore necessary if financial information is to remain useful for decision-making.

Failure to update budgets and forecasts can create a misleading impression of project performance. Managers may continue comparing actual expenditure against obsolete assumptions, resulting in poor financial decisions and weak forecasting. Continuous revision does not imply uncontrolled budget changes; rather, it requires transparent documentation, approval and justification of material adjustments.

2.6 Policy Learning and Adaptation

Monitoring evidence should not only influence individual projects; it should also inform institutional policy. Repeated findings across projects may indicate weaknesses in cost estimation, procurement rules, cash-release procedures, contract management or audit practice. When such patterns are ignored, organisations risk reproducing the same problems across successive investments.

Policy learning therefore represents the longer-term value of M&E. Lessons from completed and ongoing projects should inform the revision of standard procedures, financial controls, cost-estimation methods and project-selection criteria. In this sense, M&E contributes both to immediate corrective action and to institutional learning.

2.7 Conceptual Orientation and Hypothesis

This article conceptualises cash-flow M&E as an adaptive-control capability. The process begins with approved financial and implementation plans, continues through routine tracking of releases, commitments, payments and physical progress, and produces information on variance. That evidence is then interpreted through review and audit, after which corrective actions, forecast revisions and policy adjustments are expected to follow.

The conceptual logic may therefore be expressed as: approved cash and implementation plans → monitoring of financial and physical performance → identification and explanation of variance → corrective action and learning → improved project implementation.

The study accordingly tested the following hypothesis:

H1: Cash-flow monitoring and evaluation has a statistically significant positive relationship with the implementation of public infrastructure projects.

METHODOLOGY

The article was developed from a parent study examining cash-flow management and the implementation of public infrastructure projects at UNRA. A convergent mixed-methods design was adopted, enabling quantitative and qualitative evidence to be collected during the same broad phase of the research and subsequently integrated during interpretation. Creswell and Creswell (2018) explain that convergent designs are useful where numerical relationships require contextual explanation, while Zohrabi (2013) similarly emphasises the value of combining qualitative and quantitative approaches where complex organisational phenomena cannot be adequately understood through a single method.

The study focused on ten substantially completed UNRA road-infrastructure projects. The population consisted of stakeholders directly involved in cash-flow management and infrastructure implementation, including project engineers, station engineers, section managers, procurement officers, accountants, project managers, supervisors, technical personnel, directors and community representatives. This multidisciplinary population was appropriate because effective M&E requires information from financial, technical, procurement, contractual and stakeholder perspectives.

The quantitative component targeted 92 respondents and obtained 78 usable questionnaires, representing an 85% response rate. Ten key informants were additionally interviewed, producing an overall participation rate of approximately 86.3%. The relatively high participation level provided a strong basis for analysing stakeholder perceptions within the selected institutional setting, although findings should be generalised cautiously beyond UNRA.

Data were collected through structured questionnaires, semi-structured interviews, observation and documentary review. Quantitative responses were measured using a six-point agreement scale. The qualitative component explored stakeholder experience of auditing, feedback, budget updating, policy review, tracking of recommendations and integration of financial and technical monitoring. Documentary evidence provided additional context concerning project performance and financial-management practices.

Quantitative analysis involved descriptive statistics, Pearson's correlation coefficient and simple linear regression. Correlation analysis established the strength and direction of association between cash-flow M&E and infrastructure-project implementation, while regression analysis estimated the predictive contribution of M&E. Qualitative and documentary evidence were organised thematically and used to interpret the statistical findings.

The dependent variable, implementation of public infrastructure projects, was interpreted through project time, cost, quality, safety and overall execution. Ethical safeguards included informed consent, confidentiality, voluntary participation and restricted use of the data for academic purposes.

RESULTS

4.1 Qualitative and Descriptive Findings

The qualitative and descriptive evidence portrayed a strong demand for more regular, risk-focused and action-oriented monitoring of infrastructure financing. Stakeholders proposed quarterly audits, surprise audits,

independent external review and stronger internal audit arrangements as mechanisms for detecting non-compliance and financial risk before problems became entrenched.

Respondents also emphasised that technical audits should be phased across implementation rather than concentrated at project completion. This recommendation reflects recognition that expenditure is only meaningful when interpreted alongside the quantity and quality of work actually delivered. Phased technical review would therefore allow managers to identify situations where expenditure and physical progress diverge while corrective action is still possible.

Regular updating of budgets and cost estimates emerged as another major theme. Ninety-three percent of the qualitative respondents supported routine budget updates, while all respondents emphasised the need for continuous review and adaptation of relevant policies. These findings suggest that stakeholders viewed static financial plans as inadequate for projects implemented under changing prices, scopes, schedules and funding conditions.

A particularly important theme concerned the gap between audit findings and management action. Participants observed that the production of audit reports does not automatically result in improvement and therefore recommended a formal system for tracking recommendations, assigning responsible officers, setting deadlines and recording completion status. This reflects a broader understanding of M&E as a feedback and accountability process rather than a reporting exercise.

4.2 Inferential Findings

Cash-flow M&E had a strong positive relationship with public infrastructure-project implementation. Pearson's correlation coefficient was $r = .740$, indicating that stronger M&E practices were associated with stronger implementation performance within the study sample. The relationship was statistically significant at $p < .001$.

Table 1 Association between Cash-Flow M&E and Infrastructure Project Implementation

Measure	Reported value
Pearson correlation (r)	.740
Statistical significance	$p < .01$

Regression analysis further confirmed a strong predictive effect. The unstandardised coefficient was $B = .848$ and the standardised beta coefficient was $\beta = .740$. The model produced an R^2 of .547 and an adjusted R^2 of .538, while the F statistic was 60.437. These results indicate that cash-flow M&E explained approximately 54.7% of the observed variation in infrastructure-project implementation.

Table 2 Simple Regression Model for Cash-Flow M&E

Measure	Reported value
Unstandardized coefficient (B)	.848
Standardized coefficient (β)	.740
R^2	.547
Adjusted R^2	.538
F statistic	60.437
Model significance	$p < .001$

From a managerial perspective, this is a substantial explanatory contribution for a single cash-flow-management dimension. It suggests that monitoring, feedback, audit, accountability and adaptive review are closely associated with project delivery. However, the remaining 45.3% of variation reflects other influences not included in the

simple regression model, including technical complexity, procurement performance, contractor capability, land acquisition, institutional capacity and wider fiscal or contextual conditions.

Because the study was cross-sectional, the regression results should be interpreted as strong evidence of association and prediction rather than definitive proof of causality. Nevertheless, among the three cash-flow-management dimensions examined in the parent study, M&E made the largest single explanatory contribution to project implementation.

The statistical association between cash-flow monitoring and infrastructure delivery warrants a managerial rather than merely numerical interpretation. A correlation of .740 indicates that stronger reported monitoring practices tended to accompany stronger implementation outcomes; it does not establish that monitoring alone caused those outcomes. In the context of public road works, monitoring has practical value when expenditure reports are reconciled with certified physical progress, commitments, contract variations and payment schedules. This reading is consistent with the results-oriented and public-finance perspectives developed by Kusek and Rist (2004), Creswell and Creswell (2018), Lamhauge et al. (2012), the World Bank (2020), and the Uganda National Roads Authority (2021/22). The evidence therefore supports treating financial monitoring as a decision process rather than a retrospective reporting exercise.

The model's R^2 of .547 suggests substantial explanatory relevance, but it also leaves 45.3% of outcome variation outside this single-predictor specification. Procurement delays, land acquisition, contractor capacity, weather, funding-release timing and governance conditions may also influence delivery. The finding should not be interpreted as proof that more audits automatically produce better roads. The more defensible implication is that audits become useful when recommendations are assigned to responsible officers, tracked to closure and linked to timely corrective decisions. This distinction between evidence generation and evidence use is emphasized across Kusek and Rist (2004), Creswell and Creswell (2018), Lamhauge et al. (2012), the World Bank (2020), and the Uganda National Roads Authority (2021/22).

A practical monitoring cycle would begin with a credible baseline cash-flow forecast, compare actual releases and expenditures against that forecast at defined intervals, identify the causes of material variance and record management decisions. Financial and engineering teams should jointly examine whether payments match verifiable work completed. Where deviations recur, the institution should revise forecasts and strengthen control points rather than simply repeating the same report. Such a cycle would connect financial stewardship with operational learning, an approach broadly aligned with Kusek and Rist (2004), Creswell and Creswell (2018), Lamhauge et al. (2012), the World Bank (2020), and the Uganda National Roads Authority (2021/22).

DISCUSSION

The findings establish cash-flow M&E as a major component of public infrastructure-project performance. The strong correlation and substantial R^2 demonstrate that monitoring is not a peripheral compliance activity. Rather, it functions as an operational control mechanism through which managers identify financial risk, assess whether expenditure is consistent with implementation, and initiate corrective action.

The explanatory power of 54.7% is particularly important. It indicates that the quality of monitoring, feedback and follow-up is closely associated with differences in project implementation. Although the result does not establish that M&E alone causes better performance, it strongly supports the proposition that projects are more likely to remain under control when managers have timely evidence about financial and physical performance.

The qualitative findings help explain this statistical relationship. Regular audits, budget updates and policy reviews create feedback that enables management to respond before financial weaknesses become entrenched. Conversely, an audit conducted only after project completion may document failure but cannot prevent the costs already incurred. This distinction shifts the purpose of auditing from retrospective fault-finding toward preventive and corrective management.

The emphasis on phased technical audit further demonstrates why financial and physical monitoring should be integrated. Expenditure cannot be meaningfully assessed without evidence of physical progress, work quality and contractual performance. A project may record high budget absorption while delivering less work than expected, or low absorption may result from legitimate constraints such as delayed access or procurement. Financial indicators therefore require technical interpretation.

This finding is consistent with the broader literature on results-based M&E. Goergens and Kusek (2009) argue that monitoring information creates value when it is used for management and learning rather than produced simply to satisfy reporting requirements. Lamhauge et al. (2012) similarly emphasise the adaptive value of monitoring where conditions and assumptions change. In the road-project context, Njeru and Kirui (2022) also associate M&E practices with performance, supporting the view that continuous performance information can strengthen delivery.

The study also identifies audit follow-up as a critical point of weakness. Monitoring that stops at the production of findings remains incomplete. A functioning M&E system must connect each significant finding to responsibility, a deadline, corrective action and subsequent verification. The proposed electronic tracking of audit recommendations is therefore not merely an administrative convenience; it closes the accountability loop between evidence and management response.

Risk-based auditing emerged as another important practical implication. Infrastructure portfolios contain projects with different values, complexity, funding arrangements and levels of exposure. Allocating equal oversight resources to all projects may therefore be inefficient. Risk-based monitoring directs attention toward high-value projects, recurrent problem areas, unusual financial patterns and emerging indicators of implementation failure. This approach can improve both the relevance and timeliness of oversight.

The strong support for routine budget and cost-estimate updates also reflects the dynamic character of infrastructure delivery. Static forecasts gradually lose decision value when prices, schedules, quantities and scope change. Updating financial assumptions allows managers to maintain a realistic picture of future requirements and provides a stronger basis for cash-release decisions and performance assessment. Importantly, such updates should remain subject to documented justification and approval so that adaptation does not become a route for uncontrolled cost escalation.

The finding that all qualitative respondents supported regular policy review also has broader institutional significance. Monitoring evidence should not be confined to individual projects. Repeated weaknesses across projects may reveal problems in procurement procedures, financial controls, cost-estimation methods or cash-management rules. Policy adaptation therefore allows organisations to convert project-level evidence into institutional learning.

Overall, the study supports a distinction between monitoring as reporting and monitoring as management. Reporting-oriented M&E asks whether information has been collected and submitted. Management-oriented M&E asks what the evidence means, who must respond, when corrective action is required and whether the response was effective. The latter orientation is more consistent with the strong relationship observed between cash-flow M&E and infrastructure-project implementation.

CONCLUSION

The study examined the relationship between cash-flow monitoring and evaluation and the implementation of public infrastructure projects at UNRA. The findings demonstrate a strong and statistically significant positive relationship between the two variables. With $r = .740$ and $R^2 = .547$, cash-flow M&E emerged as the strongest single predictor among the cash-flow-management dimensions examined in the parent study.

The evidence shows that effective M&E extends beyond audit compliance or routine preparation of reports. Its principal value lies in detecting financial and implementation variance early, interpreting the significance of those deviations and ensuring that corrective action follows. Regular financial tracking, budget-versus-actual

comparison, phased technical review, audit follow-up and policy adaptation therefore constitute core elements of project-control capability.

The study also demonstrates that financial monitoring should not be separated from physical performance. Expenditure becomes meaningful only when assessed alongside work completed, quality achieved, contractual obligations and implementation time. Similarly, audit findings create limited value when they are not assigned, tracked and resolved.

The central conclusion is therefore that cash-flow M&E should be institutionalised as a continuous feedback system connecting evidence, responsibility, corrective action and learning. When monitoring information is timely, integrated and acted upon, it strengthens accountability and supports more adaptive and efficient infrastructure delivery.

RECOMMENDATIONS

First, major infrastructure projects should be subjected to quarterly risk-based financial and technical audits, with greater monitoring intensity applied to high-value, high-risk or persistently underperforming projects.

Second, UNRA and comparable public institutions should establish an electronic audit-recommendation tracking system showing each finding, responsible officer, agreed action, deadline, implementation status and evidence of closure. Unresolved high-risk recommendations should be escalated automatically to senior management.

Third, project-review processes should require routine comparison of approved cash plans with actual releases, commitments, payments and physical progress. Significant variances should be explained and linked to specific management actions rather than simply reported.

Fourth, project budgets, cash-flow forecasts and cost estimates should be revised when material implementation changes occur. All revisions should be supported by documented evidence, approval and a clear explanation of their implications for project cost and completion.

Fifth, the capacity and operational independence of internal audit should be strengthened, while independent external technical or financial review should be used selectively for high-value or high-risk projects.

Sixth, multidisciplinary project-review meetings should integrate finance, engineering, procurement, safeguards and contract-management evidence. This would reduce fragmented interpretation and improve the quality of corrective decisions.

Seventh, lessons from completed projects should be systematically documented and used to revise financial policies, standard documents, cost-estimation procedures and future project-design assumptions.

IMPLICATIONS OF THE STUDY

8.1 Managerial Implications

Senior managers should evaluate M&E according to the quality of corrective action rather than the volume of reports produced. Project-performance reviews should therefore include unresolved financial recommendations, overdue corrective actions and evidence showing whether previously identified weaknesses have been addressed.

8.2 Governance Implications

Transparent tracking of releases, commitments, payments, audit issues and management responses can strengthen accountability and reduce opportunities for arbitrary financial decisions. Making the status of significant audit recommendations visible to authorised oversight structures can also improve institutional responsibility.

8.3 M&E Practice Implications

Financial monitoring should be integrated with technical progress, work quality, procurement status and contractual information. This reduces the risk of interpreting expenditure in isolation and produces a more accurate assessment of whether public resources are translating into physical outputs.

8.4 Policy Implications

Monitoring evidence should feed directly into the revision of cash-management rules, cost-estimation procedures, audit approaches and project-selection criteria. Recurrent findings across projects should be treated as potential institutional weaknesses requiring policy response rather than as isolated project problems.

8.5 Research Implications

Future research should test whether stronger M&E systems reduce cost overruns, payment delays and implementation time using longitudinal project-level administrative data. Studies could compare the timing of audit findings, closure rates for recommendations and subsequent changes in financial and physical performance. Comparative research across roads, energy, water and health infrastructure would also help determine whether the relationship observed in this study is sector-specific or more broadly applicable.

STUDY LIMITATIONS

The study has several limitations. First, cash-flow M&E competence and practice were measured substantially through stakeholder perceptions, and the study did not independently audit every project transaction. Perception data provide important organisational insight, but they may differ from findings based entirely on audited administrative records.

Second, the research was cross-sectional. The statistical relationships therefore establish association and prediction rather than definitive causality. Longitudinal evidence would be necessary to determine whether improvements in M&E are followed by measurable reductions in cost overruns, delays or payment backlogs.

Third, the study focused on one institution and ten substantially completed road-infrastructure projects. The findings should therefore be generalised cautiously to other agencies and infrastructure sectors.

Despite these limitations, the convergence of quantitative, qualitative and documentary evidence strengthens confidence in the central conclusion that cash-flow M&E is closely associated with public infrastructure-project implementation.

CONTRIBUTION OF THE STUDY

This study makes four principal contributions. First, it positions cash-flow M&E as an adaptive-control capability rather than a narrow compliance activity. Second, it provides empirical evidence that cash-flow M&E is strongly associated with public infrastructure-project implementation and, within the parent study, makes the largest single explanatory contribution among the cash-flow-management dimensions examined.

Third, the study clarifies the mechanism through which M&E contributes to project performance: financial and physical data are tracked, variance is detected, findings are interpreted, corrective actions are assigned and subsequent performance is reviewed. This feedback loop explains why monitoring quality can affect implementation outcomes.

Finally, the study highlights the importance of audit follow-up and institutional learning. Monitoring evidence has limited value when recommendations are not implemented, while recurring findings across projects should inform future policy, cost estimation and project design. The article therefore contributes to the broader understanding of infrastructure management by demonstrating that the usefulness of M&E depends less on the production of information than on the organisation's capacity to convert evidence into timely action.

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