Cash-Flow Implementation and the Delivery of Public Infrastructure Projects: Evidence from the Uganda National Roads Authority, Uganda

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ABSTRACT

Public infrastructure delivery depends not merely on the approval of budgets but on the effectiveness with which approved financial resources are translated into actual, timely and accountable expenditure. A project may have an approved budget, signed contract and technically feasible work programme yet remain operationally constrained when fund releases, procurement commitments, payment certificates and contractor payments are delayed or inconsistently executed. This article examined the relationship between cash-flow implementation and the delivery of public infrastructure projects at the Uganda National Roads Authority (UNRA).

The study was derived from a convergent mixed-methods investigation involving 78 questionnaire respondents, 10 key informants and documentary evidence from ten substantially completed road-infrastructure projects. Quantitative data were analysed using descriptive statistics, Pearson's correlation and simple linear regression, while qualitative and documentary evidence were thematically interpreted to explain the observed statistical relationships.

The findings revealed that respondents generally recognised the existence of formal policies governing fund release and expenditure approval. However, concerns emerged regarding procurement transparency, predictability of funding, merit-based allocation, timely approval of financial obligations and prompt payment of contractors, suppliers and service providers. Documentary evidence further demonstrated considerable time extensions and cost escalation associated with delayed disbursement, delayed approval of interim payment certificates, land-acquisition constraints, reallocation of project funds, scope changes and interest on overdue payments. Cash-flow implementation had a positive and statistically significant relationship with public infrastructure-project implementation ($r = .536$, $p < .01$). Regression analysis further demonstrated that cash-flow implementation significantly predicted infrastructure-project implementation ($\beta = .536$, $p < .001$), accounting for 28.7% of the observed variance in project-performance outcomes ($R^2 = .287$).

The study concludes that public infrastructure performance depends substantially on the effectiveness of financial execution rather than budget approval alone. Timely fund release, credible commitment control, transparent procurement, efficient payment-certification systems, protection of approved project resources and predictable contractor payments are therefore essential for reducing avoidable project delays, financing costs and implementation disruption. The article recommends stronger integration of financial and physical-progress monitoring, electronic tracking of payment processes, improved accountability for payment delays and greater alignment between public-sector cash releases and contractual implementation requirements.

Keywords: cash-flow implementation; public infrastructure; project delivery; fund disbursement; contractor payment; public financial management; UNRA; Uganda

INTRODUCTION

Public infrastructure represents one of the most important instruments through which governments pursue economic transformation, territorial connectivity and improved access to essential public services. Roads, bridges, energy systems, water networks and related public investments influence market access, mobility, productivity, employment and long-term national competitiveness. Their effectiveness, however, depends not merely on whether government approves projects and allocates budgets, but on whether those financial commitments are translated into timely implementation.

This distinction between **budget approval and financial execution** is fundamental to understanding public infrastructure performance.

A budget gives an institution authority to spend. A cash-flow plan forecasts when expenditure is expected to occur. Cash-flow implementation, however, concerns whether the approved and planned financial resources are actually released, committed, processed and paid when implementation activities require them.

Public infrastructure is therefore delivered through financial action rather than appropriation alone.

A road project may possess a valid contract, approved budget and detailed work programme but still experience serious implementation challenges when expected funds are not released according to schedule. Similarly, contractors may complete certified works yet encounter liquidity constraints when interim payment certificates are delayed or approved payments remain outstanding.

Such circumstances create a transmission failure between financial approval and physical implementation.

In Uganda, public infrastructure financing operates within a wider public financial-management system involving annual appropriations, expenditure limits, warrants, commitments, procurement procedures, certification and payment processes. These institutional controls are necessary for accountability and fiscal discipline. Nevertheless, infrastructure contracts frequently generate monthly or milestone-based obligations that may not correspond perfectly with public-sector cash-release cycles.

The resulting mismatch can create significant implementation pressures.

When contractor payments are delayed, firms may be compelled to rely on commercial borrowing, reduce workforce deployment, slow procurement of materials, postpone equipment mobilisation or reschedule activities. Consequently, what begins as a financial delay may progressively become a technical, contractual and performance problem.

Nawaf (2022) demonstrates that variations in construction-project cash flow can affect project performance because implementation depends upon a continuous ability to finance labour, materials, plant and other operational requirements. Chadee et al. (2023) similarly show that delayed payments can adversely affect contractors' cash flows by increasing debt and disrupting payments to subcontractors and suppliers.

Cash-flow implementation should therefore be conceptualised as a project-delivery capability.

It concerns the ability of the implementing institution to convert approved financial plans into authorised, predictable and accountable expenditure in a manner that sustains project activities.

The concept extends beyond the physical act of making payment.

It incorporates the release of funds, allocation decisions, commitment control, procurement processes, approval of certificates, management of financial reallocations and eventual settlement of legitimate contractual obligations.

Weakness at any stage may affect the entire project-financing chain.

The Ugandan roads sector provides an important context for investigating these dynamics. Road infrastructure has historically constituted a major component of national public investment. Its implementation typically involves substantial long-term commitments to contractors, consultants, suppliers and affected communities.

Previous Uganda-specific studies have identified delayed payments, weak expenditure governance, procurement constraints and inconsistencies between budgets and implementation requirements as factors affecting road-project performance (Ggoobi et al., 2020; Muzaale & Auriacombe, 2018).

Muzaale and Auriacombe (2018), for example, identified delayed payment to contractors as an important challenge affecting road-project completion. Their analysis associated late payment with reduced productivity, increased time-related costs, resequencing of work and extension of project duration. These challenges suggest that a formal policy framework alone is insufficient.

The effectiveness of infrastructure financing ultimately depends on the quality of implementation. Public financial-management reforms increasingly recognise this distinction. The International Monetary Fund's Public Investment Management Assessment for Uganda identified significant progress in the institutional design of public investment management but also emphasised the need to improve predictability of budget releases, management of multi-year commitments, portfolio monitoring and the integration of relevant information systems (International Monetary Fund [IMF], 2022).

This creates an important analytical distinction between **planning quality and execution quality**.

A cash-flow plan may correctly identify expected project requirements. However, the intended benefits of that plan will not materialise when actual fund releases, procurement approvals or payments are delayed.

Similarly, strong financial controls may protect public resources against misuse but become counterproductive when administrative processes are excessively slow or poorly coordinated with contractual obligations.

Public infrastructure financial management therefore requires both control and execution.

This article examines cash-flow implementation as a separate determinant of infrastructure-project performance.

Specifically, the study sought to:

1. examine the effectiveness of cash-flow implementation practices within selected UNRA infrastructure projects;

2. determine the relationship between cash-flow implementation and public infrastructure-project implementation;

3. assess the predictive contribution of cash-flow implementation to project performance; and

4. identify managerial, institutional and policy implications arising from weaknesses in financial execution.

The article contributes to existing knowledge by shifting analytical attention from the availability of approved budgets to the organisational mechanisms through which those budgets become actual project expenditure.

LITERATURE REVIEW AND CONCEPTUAL ORIENTATION

2.1 Conceptualising Cash-Flow Implementation

Cash-flow implementation refers to the operational execution of approved financial plans through the release, allocation, commitment, control and payment of financial resources. Whereas cash-flow planning addresses the question of what financial resources will be required and when they will be needed, cash-flow implementation focuses on whether those planned resources actually reach project activities at the required time. The distinction is important because planning represents financial intention, while implementation represents the conversion of that intention into actual expenditure.

An infrastructure institution may therefore prepare technically sound annual and project-level cash-flow plans yet still experience poor project performance when the financial-execution system fails to deliver funds according to those plans. Cash-flow implementation consequently encompasses a chain of interconnected processes, including the release of approved resources, allocation of funds to authorised activities, commitment of resources against legitimate obligations, procurement and contractual processing, preparation and approval of interim payment certificates, verification of claims, payment of contractors and suppliers, management of financial adjustments and reallocations, and reconciliation of actual expenditure with planned physical progress. Each stage represents a potential point of delay, meaning that the effectiveness of cash-flow implementation depends not simply on the existence of financial regulations but on the efficiency of the complete expenditure chain.

2.2 Financial Execution and Public Infrastructure Delivery

Infrastructure projects are particularly sensitive to cash-flow disruptions because implementation continuously generates expenditure obligations. Contractors normally incur substantial costs before receiving payment for completed works, including expenditure on labour, construction materials, equipment, fuel, subcontractors and other operational requirements. Consequently, when public institutions delay payments, liquidity pressure is effectively transferred from the implementing agency to the contractor.

Such transfer does not eliminate the underlying financial problem. Instead, it may reappear through reduced mobilisation, increased borrowing, delayed payments to suppliers and subcontractors, and slower implementation. Nawaf (2022) argues that variation in construction-project cash flow negatively affects project performance because cash availability directly influences the contractor's ability to maintain construction operations. Similarly, Chadee et al. (2023) demonstrate that delayed approved payments can increase contractor indebtedness and disrupt payments to suppliers and subcontractors. Nguyen et al. (2024) further found that payment delays can weaken subcontractor business performance, particularly where administrative complexity, contractual problems and weak adherence to agreed payment arrangements are present.

Taken together, this evidence suggests that payment predictability constitutes an important component of project-production capacity. The contractor's ability to maintain construction output partly depends on the reliability of the employer's payment system. Cash-flow implementation therefore has implications well beyond the finance department because it can influence project schedules, productivity, supplier relationships, contractual claims and overall implementation performance.

2.3 Public Financial Management and Expenditure Control

Government financial-management systems are designed to protect public resources through expenditure authorisation, commitment control, procurement regulation and accountability mechanisms. These controls are indispensable because weak oversight may expose infrastructure financing to unauthorised commitments, fraud, waste and unnecessary cost escalation. However, financial controls must also function efficiently enough to support legitimate project implementation.

The central challenge is therefore not whether expenditure should be controlled, but how such control can be exercised without creating avoidable delays. Tripathi and Gardner (2016) emphasise that effective cash management requires credible forecasting, expenditure discipline and stronger coordination between cash availability and government obligations. Within infrastructure projects, this implies that control systems should achieve two objectives simultaneously: safeguarding public resources and maintaining sufficient predictability to enable contracted activities to continue.

This concern is also reflected in Uganda's public investment-management context. The International Monetary Fund (2022) identified predictable budget releases and stronger management of multi-year commitments as important requirements for improving the effectiveness of Uganda's public investment system. Effective cash-flow implementation must therefore balance **fiscal discipline with operational continuity**. Weak controls expose projects to financial mismanagement, while excessively slow controls may expose otherwise viable projects to unnecessary implementation disruption.

2.4 Fund Release and Financial Predictability

Fund release represents one of the earliest operational stages in cash-flow implementation because project obligations cannot be honoured when approved resources remain unavailable. However, the issue extends beyond the amount released to include the predictability and timing of such releases. Contractors and project managers make implementation decisions on the basis of expectations regarding future resource availability, and repeated delays or substantial shortfalls may cause physical schedules to become disconnected from financial reality.

Predictable releases reduce this uncertainty and improve coordination between financial and physical implementation. Conversely, unpredictable releases may force repeated revisions to work programmes, procurement plans and contractor payment arrangements. The problem becomes particularly important in multi-year infrastructure projects because annual government budget cycles do not always correspond closely with long-term contractual obligations. Effective management of multi-year commitments is therefore essential if financial execution is to support uninterrupted infrastructure implementation.

2.5 Commitment Control

Commitment control refers to mechanisms intended to prevent public institutions from entering into financial obligations that exceed available or realistically anticipated resources. Although commitment control is fundamentally an instrument of fiscal discipline, it is also directly related to infrastructure-project performance.

Where contracts or payment obligations are approved without credible financing, unfunded commitments may accumulate and increase the likelihood of subsequent payment delays. Commitment controls should therefore operate prospectively rather than functioning merely as mechanisms for recording liabilities after they have already arisen. In infrastructure projects, this requires commitment decisions to be directly connected to cash-flow forecasts, work programmes and expected contractual payment schedules. Such integration enables public institutions to distinguish between obligations that can realistically be financed and commitments that may subsequently become arrears.

2.6 Procurement Transparency and Financial Execution

Procurement forms another important interface between project implementation and financial management because procurement decisions create future expenditure obligations. Weak procurement planning may therefore result in commitments that are poorly synchronised with available cash, thereby exposing projects to subsequent implementation delays.

Transparency is equally important. Decisions concerning which activities receive resources, which contractors are paid first and which obligations are deferred can materially influence project performance. Where stakeholders perceive such decisions as arbitrary or insufficiently transparent, confidence in the financial-

management system may decline. Clear and auditable criteria for expenditure prioritisation and payment processing therefore strengthen not only financial integrity but also institutional legitimacy and predictability.

2.7 Interim Payment Certification

Interim payment certificates constitute a critical bridge between physical project progress and financial expenditure. In construction contracts, payments are commonly made only after technical verification confirms that specified work has been satisfactorily completed. Certification therefore protects public resources by linking expenditure to legitimate physical achievement.

However, the same mechanism can become a financial bottleneck when certificate preparation, verification or approval is excessively delayed. Effective financial execution should therefore monitor both the quality and timeliness of certification processes. The objective should not be to weaken verification requirements, but rather to ensure that legitimate claims are reviewed and processed within clearly defined contractual and administrative timelines.

2.8 Delayed Payment and Contractor Performance

Payment delays can produce consequences throughout the construction supply chain. A contractor who does not receive payment on time may subsequently delay payments to subcontractors and suppliers, reducing access to materials, labour and specialised services required to sustain implementation. In addition, contractors may become increasingly dependent on commercial borrowing or other short-term financing, which raises financing costs and may eventually generate contractual claims.

Chadee et al. (2023) identify increased contractor indebtedness and delayed payments to suppliers and subcontractors as important consequences of delayed payment. Related research also indicates that administrative complexity, contractual disputes and weak adherence to agreed payment arrangements can undermine contractor performance. The cost of delayed payment should therefore not be measured merely by the amount outstanding. Its wider consequences may include interest charges, extensions of time, reduced productivity, disputes, claims and delayed delivery of public benefits.

2.9 Reallocation of Project Funds

Reallocation of funds may sometimes be necessary in response to changing government priorities or broader fiscal constraints. Nevertheless, reallocating resources away from an active infrastructure project can create serious implementation consequences where contractual commitments have already been established.

Removing financial resources does not automatically remove the obligations associated with an existing contract. Rather, it may convert previously financed commitments into outstanding liabilities and delayed payments. For this reason, fund-reallocation decisions should be preceded by a systematic assessment of existing commitments, likely payment obligations, implications for project completion, potential interest and claims, consequences for contractor mobilisation and costs associated with remobilisation. Financial flexibility should therefore be exercised cautiously and should not become synonymous with arbitrary movement of project resources.

2.10 Land Acquisition and Financial Implementation

Infrastructure performance is also influenced by processes that may initially appear non-financial. Land acquisition provides a clear example. Delays in securing access to project land may slow implementation even when construction financing is available, while delays in compensation financing may themselves create or prolong land-access problems.

The relationship between finance and implementation is therefore interdependent. Some delays classified as land-related or technical may contain underlying financial dimensions, particularly where compensation payments or other enabling expenditures have not been incorporated into project cash requirements. Effective

cash-flow implementation should consequently coordinate compensation and land-access financing with construction expenditure rather than treating them as isolated processes.

2.11 Project Performance

Project performance has traditionally been assessed through time, cost and quality. Contemporary project-management scholarship, however, increasingly recognises that successful infrastructure delivery also involves stakeholder satisfaction, operational effectiveness, public value and sustainable benefits (Ika & Pinto, 2022).

Within this study, infrastructure-project implementation was interpreted through time, cost, quality, safety and overall execution. Cash-flow implementation may affect these dimensions through several interconnected mechanisms. Delayed financing can extend project duration; extended duration may increase supervision, labour and financing costs; liquidity constraints can weaken contractor mobilisation; and repeated payment problems may generate disputes and reduce stakeholder confidence. The relationship between cash-flow implementation and infrastructure performance should therefore be understood as multidimensional.

2.12 Conceptual Orientation and Hypothesis

The article conceptualises cash-flow implementation as the transmission mechanism between approved financial intentions and physical project outputs. In practical terms, the process moves from an approved financial plan to fund release, commitment, certification and payment, which subsequently sustains project activities and contributes to infrastructure delivery.

Weakness at any stage in this financial chain can interrupt implementation. Accordingly, the study proposes that stronger cash-flow implementation should be associated with stronger infrastructure-project implementation.

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

METHODOLOGY

3.1 Research Design

The article was developed from a parent study examining cash-flow management and the implementation of public infrastructure projects at the Uganda National Roads Authority. A convergent mixed-methods research design was employed, 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 mixed-methods designs are particularly useful where a research problem requires both statistical measurement and contextual explanation. This approach was appropriate because cash-flow implementation incorporates measurable organisational practices as well as stakeholder experiences of financial execution. The quantitative component established the magnitude and statistical significance of relationships, while the qualitative and documentary evidence helped explain how financial-execution weaknesses translated into practical implementation consequences.

3.2 Study Setting and Population

The study focused on ten substantially completed UNRA road-infrastructure projects. The study population consisted of stakeholders directly involved in infrastructure financing and implementation, including project engineers, station engineers, section managers, procurement officers, accountants, project managers, supervisors, technical personnel, directors and community representatives.

The multidisciplinary composition of the respondents was important because cash-flow implementation cuts across several organisational functions. Finance personnel participate in budget execution and payment, engineers verify physical progress, procurement personnel manage expenditure commitments, project managers

coordinate implementation, while communities and local stakeholders may affect land access, compensation and project continuity. Their combined perspectives therefore provided a broader understanding of how financial execution affects infrastructure delivery.

3.3 Sample and Response Rate

The quantitative component targeted 92 respondents, of whom 78 returned usable questionnaires, representing an 85% questionnaire response rate. In addition, ten key informants were interviewed, producing an overall participation rate of approximately 86.3%.

The relatively high level of participation provided substantial evidence for analysing cash-flow implementation within the selected projects. Nevertheless, because the research focused specifically on UNRA road projects, the findings should be generalised cautiously to other public infrastructure institutions and sectors.

3.4 Data-Collection Methods

The study employed structured questionnaires, semi-structured interviews, observation and documentary review. Questionnaires generated standardised quantitative assessments of cash-flow implementation and infrastructure-project implementation, while semi-structured interviews provided deeper explanations of institutional practices and implementation challenges.

Observation offered additional contextual understanding of project-management processes. Documentary review was particularly important because it provided evidence concerning project-time extensions, financial changes, delayed payments and other implementation consequences. Using multiple methods strengthened the study by enabling respondent perceptions to be interpreted alongside documentary and contextual evidence.

3.5 Measurement of Variables

Cash-flow implementation constituted the independent variable and incorporated indicators relating to policies guiding fund release, approval of expenditure, predictability and guarantee of funds, procurement transparency, merit-based allocation, payment of contractors and suppliers, financial reallocations and execution of approved financial obligations.

The dependent variable, implementation of public infrastructure projects, was assessed through time, cost, quality, safety and overall project execution. Quantitative responses were measured using a six-point agreement scale.

3.6 Data Analysis

Quantitative data were analysed using descriptive and inferential statistical techniques. Descriptive analysis summarised respondents' assessments of cash-flow implementation practices, while Pearson's correlation coefficient was used to determine the strength and direction of the relationship between cash-flow implementation and project implementation. Simple linear regression was subsequently used to estimate the predictive contribution of cash-flow implementation.

Qualitative and documentary evidence were organised thematically, with particular attention to fund release, procurement, payment certification, contractor payments, land acquisition, fund reallocation, interest costs and project-time extensions. Integrating these different forms of evidence enabled the statistical findings to be interpreted in relation to actual project-management processes.

3.7 Ethical Considerations

The study observed established ethical principles, including informed consent, voluntary participation, confidentiality and responsible use of research information. Participants were informed about the academic

purpose of the study, and information obtained from respondents and project records was used only within the scope of the research.

RESULTS

4.1 Descriptive Findings

Respondents generally acknowledged that formal policies existed to guide the release and utilisation of project funds and that infrastructure expenditure was subject to institutional approval. These findings indicate that cash-flow implementation operated within an established regulatory framework.

However, confidence was noticeably weaker in relation to procurement transparency, timely guarantee of funds, merit-based allocation and payment of contractors, suppliers and service providers. The importance of this finding lies in the distinction between **formal control and operational predictability**. Financial policies may clearly prescribe how resources should be released and utilised, but infrastructure implementation ultimately depends on whether those procedures function consistently, transparently and within appropriate timelines.

A substantial proportion of respondents questioned whether funds were reliably guaranteed to contractors on merit. This suggests uncertainty concerning either resource availability, the criteria used to make allocation decisions, or both. Such uncertainty can influence implementation behaviour because contractors facing unpredictable payment conditions may adopt more cautious mobilisation strategies, while project managers may find it difficult to maintain realistic implementation schedules.

Respondents also expressed dissatisfaction with the timeliness of funding. This finding is particularly important because timeliness represents the defining operational dimension of cash flow. Financial resources released after contractual obligations have fallen due may eventually settle the accounting liability, but they cannot fully reverse implementation consequences already produced by the delay.

4.2 Documentary Findings

Documentary evidence reinforced the concerns identified through respondent perceptions. The projects reviewed experienced substantial time increments and cost escalation, with reported causes including delayed fund disbursement, delayed approval of interim payment certificates, land-acquisition difficulties, reallocation of project funds, changes in scope and interest charges arising from overdue payments.

These findings indicate that weaknesses in cash-flow implementation generated both direct and secondary effects. Delayed payment itself represents a direct financial consequence, while interest on overdue obligations represents a secondary cost created by the failure to settle the original obligation on time. Similarly, delayed disbursement may directly restrict the availability of project resources, while reduced mobilisation, extended project duration and cost escalation emerge as subsequent consequences.

The documentary evidence therefore demonstrates that the cost of weak cash-flow implementation extends considerably beyond the value of unpaid obligations. A financing delay may progressively alter the entire economics of infrastructure delivery.

4.3 Inferential Findings

Table 1 Relationship Between Cash-Flow Implementation and Infrastructure-Project Implementation

Statistic	Value
Pearson correlation (r)	.536
Significance	$p < .001$

Unstandardised coefficient (B)	.618
Standardised beta (β)	.536
R^2	.287
Adjusted R^2	.273
F	20.122

Pearson's correlation analysis established a moderate positive relationship between cash-flow implementation and public infrastructure-project implementation ($r = .536$), and the relationship was statistically significant. This indicates that stronger cash-flow implementation was associated with stronger infrastructure implementation within the study sample.

Regression analysis further confirmed a statistically significant predictive relationship. The standardised beta coefficient was $\beta = .536$, while the model produced an R^2 of .287, demonstrating that cash-flow implementation explained approximately 28.7% of the observed variation in project implementation. The adjusted R^2 of .273 indicates that the explanatory relationship remained meaningful after statistical adjustment, while the F statistic of 20.122 confirmed the overall significance of the model.

From a managerial perspective, explaining 28.7% of project-performance variation through a single financial-management dimension is substantial. Nevertheless, the remaining 71.3% indicates that other factors also influence infrastructure performance, including contractor capability, procurement performance, land acquisition, project governance, technical complexity, institutional capacity, scope changes and broader fiscal conditions. The regression result should therefore be interpreted as evidence of significant prediction rather than proof that cash-flow implementation alone determines project performance. Because the study was cross-sectional, definitive causal claims should similarly be avoided.

DISCUSSION

The findings establish cash-flow implementation as an important component of infrastructure-project performance. The positive correlation indicates that projects experiencing stronger financial execution also tended to exhibit stronger implementation outcomes, while the regression model demonstrates that cash-flow implementation explains a meaningful proportion of variation in project performance.

These results support the central argument of the study: infrastructure delivery depends not merely on whether projects have approved financial plans, but on whether those plans are converted into actual, timely and accountable expenditure.

5.1 From Budget Approval to Financial Execution

One of the most important lessons emerging from the findings is that budget approval does not, by itself, constitute effective project financing. Public infrastructure financing becomes operationally meaningful only when legitimate project obligations are settled in accordance with implementation requirements.

Budget discussions frequently emphasise how much has been appropriated while paying less attention to when those resources are actually released and paid. Consequently, an institution may appear adequately funded at aggregate level while individual projects experience severe liquidity interruptions. Cash-flow implementation therefore provides the essential connection between budgetary authority and operational project delivery.

5.2 The Policy-Implementation Gap

Respondents recognised the existence of formal financial policies but expressed weaker confidence in procurement transparency, funding guarantees and contractor-payment processes. This pattern indicates a gap between formal institutional design and operational execution.

Policies remain necessary because they establish the rules governing public expenditure. However, their practical value depends on how consistently they are implemented. A sophisticated financial framework may contribute little to project performance if approval processes are excessively slow or allocation decisions remain unpredictable. The finding is broadly consistent with wider assessments of Uganda's public investment-management system, which identify relatively strong formal arrangements but continuing challenges in making budget releases and multi-year commitments sufficiently predictable (IMF, 2022).

Project-performance assessment should therefore move beyond determining whether appropriate policies exist and examine whether those policies produce timely, transparent and reliable financial outcomes.

5.3 Delayed Payment as a Cascading Risk

The documentary findings demonstrate that payment delays rarely remain isolated financial events. A contractor awaiting payment may reduce labour deployment, delay purchase of materials or rely on commercial borrowing. Suppliers and subcontractors may subsequently experience delayed settlement, physical implementation may slow, and the contractor may eventually submit claims for financing costs, compensation or extension of time.

One delayed obligation can therefore produce a cascading sequence of financial and implementation consequences. This interpretation is consistent with Chadee et al. (2023), who found that delayed payments can increase contractor debt and disrupt payments to subcontractors and suppliers, and with Nguyen et al. (2024), who show that payment delays can significantly affect subcontractor business performance.

The present study therefore demonstrates that delayed financial execution should be treated as a project risk rather than merely as an accounting inconvenience.

5.4 Interim Payment Certificates as a Control Point

The documentary evidence also identified delayed approval of interim payment certificates as an important source of financial and implementation pressure. This stage is particularly important because payment certification sits at the intersection of technical verification and financial execution.

Certification protects the public institution by ensuring that payments correspond with work actually completed. However, excessively slow certification processes may unintentionally become sources of project-financing delay. The appropriate response is therefore not to weaken verification requirements but to establish clear service standards for reviewing and approving legitimate certificates. Certification performance should be monitored with the same seriousness as physical construction progress.

5.5 Funding Predictability and Contractor Behaviour

Respondents' concerns regarding guaranteed funding demonstrate that predictability is central to successful implementation. Contractors make decisions regarding labour, equipment, materials and suppliers partly on the basis of expected payment. Predictable financing supports confident mobilisation, whereas uncertainty may encourage contractors to reduce exposure through slower mobilisation or conservative implementation strategies.

Payment predictability should therefore be regarded as an input into contractor performance. The implementing agency and contractor are financially interdependent: where the employer's cash-flow system becomes unreliable, financial pressure may progressively transfer to the contractor and subsequently to suppliers and subcontractors.

5.6 Reallocation of Project Funds

The documentary findings further showed that reallocation of funds contributed to implementation difficulties. Although resource reallocation may sometimes be necessary in public financial management, its effects on ongoing projects should be carefully assessed.

An active infrastructure project may already have generated legally binding commitments. Removing funding does not remove those obligations; rather, it may transform funded commitments into arrears or delayed payments. Before significant reallocations are approved, decision-makers should therefore consider existing certificates, contractor obligations, continuity of works, implications for completion dates, financing claims and remobilisation costs.

This would ensure that expenditure reprioritisation reflects the true costs and consequences of moving resources away from ongoing projects.

5.7 Land Acquisition and Financial Interdependence

Land-acquisition difficulties demonstrate that infrastructure performance cannot be explained through financial variables alone. Nevertheless, land and finance often interact closely. Delayed compensation may prevent access to project sites, while delayed site availability may disrupt construction programmes and generate standing-time or extension-related costs.

Cash-flow implementation should therefore incorporate compensation and access-related obligations where these affect the implementation schedule. The finding reinforces the need for integrated infrastructure management rather than separate departmental approaches to technical, financial and land-related challenges.

5.8 Transparency and Merit-Based Allocation

Respondents' concerns regarding procurement openness and merit-based resource allocation also raise important governance issues. Infrastructure-financing decisions influence which projects continue, which obligations receive priority and when contractors are paid.

Where such decisions are perceived as arbitrary or insufficiently transparent, institutional trust may decline. Financial transparency should therefore include clear and auditable criteria governing commitment approval, fund allocation, payment prioritisation, project-resource reallocation and resolution of payment backlogs. Transparency is not merely an anti-corruption mechanism; it also strengthens predictability, legitimacy and coordination among project stakeholders.

5.9 Interpreting the Regression Result

The finding that cash-flow implementation explains 28.7% of variation in project implementation is substantial but should not be interpreted as suggesting that financial execution is the sole determinant of project success.

Rather, the result supports a systems perspective. Financial execution is important, but its effects interact with contractor competence, procurement, land acquisition, technical performance, project governance and wider institutional conditions. A technically competent contractor cannot perform effectively without financial continuity, while reliable financing cannot indefinitely compensate for poor engineering, weak procurement or unresolved access constraints.

Infrastructure performance therefore results from the interaction of multiple organisational systems, among which cash-flow implementation constitutes an important component.

5.10 From Financial Control to Financial Performance

Public financial management traditionally emphasises compliance, expenditure authority and accountability. These remain fundamental requirements. However, infrastructure management additionally requires attention to how efficiently financial processes support physical implementation.

A payment process may technically comply with all administrative procedures yet still undermine project performance if legitimate payments are consistently made late. Institutions should therefore evaluate both **financial compliance**, meaning whether expenditure follows required rules, and **financial performance**, meaning whether legitimate expenditure is processed within timelines that support project implementation.

High-performing infrastructure systems require both.

CONCLUSION

The study examined the relationship between cash-flow implementation and the delivery of public infrastructure projects at UNRA. The findings established a significant positive relationship between cash-flow implementation and project implementation, with a correlation coefficient of r = .536. Regression analysis further demonstrated that cash-flow implementation accounted for approximately 28.7% of the observed variation in project-performance outcomes.

These results position financial execution as an important project-management capability. More importantly, they demonstrate that approved budgets, formal fund-release policies and expenditure controls are insufficient where implementation processes remain slow or unpredictable. Concerns regarding funding guarantees, procurement transparency, merit-based allocation and contractor payments show that the quality of financial execution matters as much as the existence of financial rules.

Documentary evidence further demonstrates that weak cash-flow implementation generates both direct and indirect costs. Delayed disbursement and certification can interrupt project activities; overdue payments may generate interest; reduced liquidity can constrain contractor mobilisation; and extended implementation periods may subsequently increase total project costs.

The study therefore concludes that public infrastructure financing should be evaluated according to the extent to which approved resources are translated into timely, transparent and accountable project expenditure. Effective infrastructure delivery requires a financial-execution system capable of protecting fiscal discipline while also honouring legitimate contractual obligations within predictable timelines.

RECOMMENDATIONS

7.1 Align Cash Releases With Work Programmes

Quarterly and periodic cash releases should be aligned as closely as possible with realistic project work programmes and contractual payment schedules. Projects anticipating substantial expenditure during particular implementation periods should have those requirements reflected in cash-release decisions.

7.2 Establish Payment-Processing Service Standards

Clear institutional timelines should be established for processing interim payment certificates, warrants and contractor payments. Each stage should have an identified responsible office and maximum processing period, with outstanding transactions escalated once agreed deadlines are exceeded.

7.3 Introduce Electronic Payment Tracking

UNRA and comparable public institutions should maintain electronic systems that enable authorised project managers to track the submission and approval of certificates, financial verification, warrant status, payment

authorisation and actual settlement. Such systems would improve transparency and enable bottlenecks to be identified before they materially affect implementation.

7.4 Strengthen Commitment Controls

Project obligations should only be approved where realistic financing exists or is credibly expected. Commitment controls should therefore be directly linked to project cash-flow forecasts and future contractual obligations to prevent the accumulation of avoidable unfunded commitments.

7.5 Protect Funding for Active Projects

Reallocation of funds from active infrastructure projects should be subjected to formal impact analysis. Decision-makers should assess implications for existing certificates, contractual obligations, contractor mobilisation, project completion, claims, interest and overall value for money before resources are moved.

7.6 Improve Procurement and Allocation Transparency

Clear and auditable criteria should guide procurement decisions, project-fund allocation and payment prioritisation. Relevant stakeholders should understand the principles underlying significant financial-allocation decisions in order to strengthen confidence and accountability.

7.7 Integrate Land and Compensation Financing

Land acquisition and compensation requirements should form an integral part of project financial-execution plans. Major construction commitments should not proceed where critical access requirements remain financially unresolved.

7.8 Monitor the Cost of Payment Delays

Infrastructure institutions should routinely calculate and report the financial consequences of payment delays, including interest on overdue obligations, extension-of-time costs, contractor claims, additional supervision costs, remobilisation costs and other identifiable losses. Such reporting would make the true cost of weak financial execution visible to decision-makers.

7.9 Link Financial and Physical Performance Reviews

Project-review meetings should examine financial execution alongside physical progress. A project recording satisfactory physical progress but accumulating unpaid obligations should not automatically be considered financially healthy. Similarly, low expenditure should be investigated to determine whether it reflects efficiency or delayed implementation.

IMPLICATIONS OF THE STUDY

8.1 Managerial Implications

The findings demonstrate that project managers require visibility across the complete expenditure chain. Their responsibility should extend beyond preparing budgets and work programmes to understanding the status of releases, commitments, certificates and payments. Greater visibility would enable financial risks to be identified before they substantially affect physical implementation.

8.2 Public Financial-Management Implications

Public financial-management systems must continue to safeguard fiscal discipline while giving greater attention to the predictability of legitimate infrastructure payments. Multi-year infrastructure obligations require realistic

cash ceilings, credible expenditure planning and stronger integration between cash management and public investment management.

8.3 Contractor-Management Implications

Payment performance should be recognised as part of the employer's contribution to contract performance. Contractors are expected to meet technical, financial and scheduling obligations; public employers should similarly be assessed according to their ability to meet legitimate contractual payment obligations. Predictable payments can strengthen contractor planning and reduce unnecessary financing pressures.

8.4 Governance Implications

Concerns surrounding merit-based allocation and procurement transparency indicate that cash-flow implementation also has significant governance implications. Transparent allocation and payment processes can strengthen trust, accountability and stakeholder confidence and should therefore form part of project-governance arrangements.

8.5 Institutional Implications

Project-financing responsibilities are distributed across engineering, procurement, finance, contracts and senior management functions. Delayed financial execution may therefore result from weak coordination across the expenditure chain rather than from the failure of a single unit. Institutional reforms should consequently focus on improving end-to-end process performance.

8.6 Policy Implications

Policy frameworks should recognise that infrastructure projects often generate contractual commitments extending beyond individual annual budget cycles. Stronger arrangements for protecting legitimate multi-year commitments and ensuring predictable releases could substantially improve project implementation.

8.7 Research Implications

Future studies should reconstruct complete transaction-level payment histories for infrastructure projects and examine the number of days between certificate submission and approval, approval and payment, accumulated contractor arrears, interest paid on delayed obligations and relationships between payment delay, physical progress and cost escalation.

Longitudinal evidence of this nature would provide stronger causal insight than cross-sectional perception data alone.

STUDY LIMITATIONS

Several limitations should be considered when interpreting the study. First, the research employed a cross-sectional design, meaning that the observed statistical relationships establish association and prediction rather than definitive causation.

Second, part of the evidence was based on stakeholder perceptions. Although such perceptions provide valuable insight into institutional functioning, they may differ from conclusions derived entirely from audited transaction-level financial records.

Third, the documentary analysis covered ten substantially completed road-infrastructure projects, meaning that the findings reflect a specific institutional and sectoral context. Generalisation to other Ugandan public institutions or infrastructure sectors should therefore be undertaken cautiously.

Fourth, cash-flow implementation explained 28.7% of project-performance variation. While this confirms its importance, it also demonstrates that infrastructure performance is influenced by several additional factors. Future studies should therefore employ multivariate models incorporating procurement performance, contractor capability, institutional capacity and other implementation variables.

Finally, the study did not reconstruct the complete payment history of every individual project transaction. Future research should combine perception-based measures with longitudinal financial, contractual and physical-progress records.

CONTRIBUTION OF THE STUDY

This study makes several important contributions to infrastructure and public financial-management scholarship. First, it distinguishes cash-flow implementation from cash-flow planning. Planning concerns anticipated financial requirements, whereas implementation concerns whether those plans are actually converted into timely project expenditure.

Second, the study provides empirical evidence that cash-flow implementation significantly predicts infrastructure-project implementation within Uganda's road sector. Third, it demonstrates that delayed financial execution produces cascading consequences extending beyond the original payment obligation, including reduced mobilisation, interest costs, contractor claims, extended project duration and broader cost escalation.

Finally, the study demonstrates the importance of evaluating public financial systems not only according to procedural compliance but also according to their capacity to support timely infrastructure delivery. Cash-flow implementation should therefore be understood as a central component of project-production capacity and a critical link between approved public investment and actual infrastructure outcomes.

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