



Assessment of Price Fluctuations and Delays of Construction Projects in Rwanda: A Case Study of Kigali City

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Abstract: This study assessed the impact of price fluctuations on construction project delays in Kigali City, Rwanda. Three dimensions were examined: inflation-induced price fluctuations, construction-resource price fluctuations, and financial mitigation measures. A descriptive survey supplemented by correlational analysis was adopted within a mixed-methods study. The target population comprised 302 construction stakeholders, including project managers, civil engineers, quantity surveyors, and project supervisors, while a sample of 173 was determined using Slovin's formula. Questionnaires, interviews, and documentary review were used in the dissertation, while the manuscript reports the quantitative strand. Of 155 questionnaires reported as administered, 149 were completed and returned, representing 96.1%. Quantitative data were analysed using descriptive statistics, Pearson correlation, and multiple regression. The combined model explained 83.6% of the variation in construction project delays ($R = 0.914$, $R^2 = 0.836$). Inflation indicators had the strongest significant effect ($B = 0.454$, $t = 12.270$, $p = 0.000$), construction-resource price fluctuations were also significant ($B = 0.235$, $t = 4.468$, $p = 0.000$), and financial mitigation measures produced a statistically significant contribution ($B = 0.135$, $t = 1.776$, $p = 0.030$). The study concluded that price instability materially contributes to delays and that mitigation mechanisms remain important for sustaining construction delivery. It recommends stronger price-adjustment provisions, contingency budgeting, forward purchasing, improved access to project finance, and continuous market monitoring during project implementation.

Keywords: Price Fluctuations, Inflation, Construction Resources, Financial Mitigation Measures, Construction Project Delays

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1. Introduction

Construction activity is central to infrastructure-led development because roads, buildings, utilities, health facilities, and other physical assets support economic production and public service delivery. Rwanda has continued to prioritise infrastructure within its long-term development agenda, while Kigali City remains the country's principal concentration of building and urban-development activity. Nyandekwe and Kakoma (2025)

describe Rwanda's development trajectory as strongly dependent on sustained investment in infrastructure, whereas Tiza et al. (2024) emphasise the broader role of civil-engineering materials and construction systems in supporting modern infrastructure. The effectiveness of these investments, however, depends not only on initiating projects but also on completing them within realistic cost and time parameters. Delays weaken service delivery, increase financial exposure, and can undermine stakeholder confidence in both public and private construction programmes.

Price instability has become one of the economic conditions that complicate construction delivery. Inflation reduces the purchasing power of project budgets and can raise the cost of materials, labour, fuel, equipment, transport, and imported inputs during implementation. Priyatna and Suryadi (2025) explain inflation as a persistent increase in the general level of prices that weakens purchasing power, while Musarat et al. (2021) show that inflation can materially affect construction-project budgets. For projects whose implementation extends over several months or years, even a technically sound initial estimate may become inadequate when market prices change sharply. Contractors may consequently experience cash-flow pressure, clients may be required to revise budgets, and procurement decisions can be delayed while additional resources are sought.

Construction-resource prices create a particularly direct transmission channel between macroeconomic instability and project schedules. Materials such as cement, steel, fuel, imported finishes, specialised equipment, and machinery are exposed to supply-chain conditions, currency movements, transport costs, and international commodity markets. Panova and Hilletoft (2018) demonstrate that supply-chain risks and delays are closely connected in construction projects, while Donyavi et al. (2024) highlight the complexity of materials procurement and its implications for construction supply chains. When input prices rise unexpectedly, contractors may postpone purchases, reduce quantities, renegotiate terms, or substitute materials. Each response can affect activity sequencing and extend the period needed to complete planned work.

The time-cost relationship also means that price fluctuations and project delays can reinforce one another. Kose et al. (2022) show that successful monitoring is essential for completing projects within time and budget, while Anastasiu et al. (2023) emphasise the importance of scheduling and critical-chain approaches for improving construction timelines. A delayed project remains exposed to market conditions for longer, which can create additional price escalation; higher prices can in turn make procurement and financing more difficult, producing further delay. This interaction is especially significant where contractors depend on imported materials, short-term credit, or fixed-price contractual arrangements that provide limited flexibility when economic conditions change.

Financial and contractual mitigation measures therefore form an important part of construction-project resilience. Chammout et al. (2024) explain that price escalation can be addressed through contractual mechanisms that recognise changing market conditions, while Ebekozi et al. (2024) associate inflation with threats to construction-project sustainability and highlight the need for proactive responses. Strategies identified in the dissertation include price-adjustment clauses,

contingency budgeting, hedging or forward purchasing, access to project finance, regulatory review of budgets, and increased use of locally available materials. These measures do not eliminate inflation, but they can reduce the extent to which price movements interrupt procurement, weaken cash flow, or force project activities to stop.

Within Rwanda, construction delays have also been linked to wider financial and managerial constraints. Gaston and Tembo (2023) identify inadequate budgeting, delayed payments, and weak cash-flow management among important contributors to project delay. Latif et al. (2023) similarly associate construction delays with contractor, owner, and external factors, including funding and coordination problems. These findings suggest that the effect of price fluctuation should not be understood as a purely macroeconomic issue. Its consequences are mediated by decisions made at project level, including how risks are forecast, how contracts distribute escalation exposure, how quickly budgets can be revised, and how procurement is organised.

This study focused on Kigali City because the concentration of construction activity makes price-related disruption particularly consequential for urban development. The research examined whether inflation indicators and construction-resource price fluctuations were associated with project delay and whether financial mitigation measures contributed significantly within the same statistical model. By combining descriptive evidence with correlation and multiple regression, the study sought to provide an empirical basis for strengthening the management of construction projects exposed to changing prices.

1.1 General Objective

The general objective was to assess the impact of price fluctuations on construction project delays in Kigali City.

1.2 Specific Objectives

1. To examine the factors of price fluctuation from inflation on construction project delays in Kigali City.
2. To assess the influence of construction-resource price fluctuations on construction project delays in Kigali City.
3. To evaluate the effectiveness of financial mitigation measures in reducing the impact of price fluctuations on construction project delays in Kigali City.

2. Literature Review

The literature review develops the theoretical and empirical foundation for analysing how inflation, construction-resource price changes, and financial mitigation mechanisms relate to project delays. The review follows the study variables and maintains a direct connection between economic price pressures and the project-management responses available to construction stakeholders.

2.1 Theoretical Review

Three complementary perspectives guided the study: Inflation Theory, Construction Project Management Theory, and Risk Management Theory. Together, they explain the economic origins of price changes, the project-level mechanisms through which those changes affect cost and schedule, and the mitigation responses used to reduce uncertainty during implementation.

2.1.1 Inflation Theory

Inflation Theory explains sustained increases in the general price level through demand, production-cost, monetary, fiscal, and external-market pressures. Girdzijauskas et al. (2022) describe inflation as a phenomenon with significant implications for sustainable economic growth, while Priyatna and Suryadi (2025) emphasise the loss of purchasing power that accompanies rising prices. In construction, the theory is relevant because project budgets are expressed in monetary terms while many inputs are purchased progressively during implementation. When prices increase faster than anticipated, the real purchasing capacity of the approved budget declines, exposing projects to cost escalation and possible interruption.

The theory also provides a basis for interpreting the first study objective. Musarat et al. (2021) show that inflation can alter construction budgets, and Makoye et al. (2023) link macroeconomic conditions to construction-industry performance. Price movements in materials, fuel, wages, and exchange rates can therefore be understood as manifestations of wider inflationary pressure that enters the project through procurement and financing. The relevance of Inflation Theory lies in explaining why economic conditions outside the project organisation can still influence activity completion and schedule performance.

2.1.2 Construction Project Management Theory

Construction Project Management Theory centres on coordinating scope, schedule, cost, resources, quality, and stakeholders so that planned outputs are delivered efficiently. Goda et al. (2023) emphasise resource allocation under time and budget constraints, while Ibrahim et al. (2024) highlight the importance of

performance measurement at project level. From this perspective, price fluctuation becomes a management concern because it disturbs several project controls simultaneously: a price increase may alter cost estimates, delay procurement, create resource shortages, and require schedule adjustment.

The theory therefore supports the second objective by clarifying how resource-price variation can move from a market event to a project-delay mechanism. Kose et al. (2022) demonstrate the value of project monitoring for maintaining time and budget performance, whereas Anastasiu et al. (2023) show that scheduling techniques can improve construction timelines. Effective project management cannot prevent market prices from changing, but it can improve the speed with which procurement, budgets, and schedules are adjusted to changing conditions.

2.1.3 Risk Management Theory

Risk Management Theory provides a structured approach for identifying uncertain events, assessing their likelihood and impact, assigning responsibility, and preparing responses before threats materially affect project objectives. Chammout et al. (2024) treat price escalation as a contractual and project risk that requires explicit allocation, while Alhammadi et al. (2024) identify mitigation measures as important responses to construction cost overruns. Under this theory, inflation and price volatility are not merely external conditions; they are foreseeable categories of financial risk that can be monitored and managed.

The third objective is directly linked to this perspective because the study evaluated measures such as price-adjustment clauses, contingency budgets, forward purchasing, access to finance, budget review, and local sourcing. Ebekozen et al. (2024) emphasise that inflation threatens construction-project sustainability, while Chukwuma-Eke et al. (2022) argue for stronger cost forecasting and financial planning in complex projects. Risk Management Theory therefore explains why proactive financial arrangements may reduce the disruptive effects of price movements even when those movements cannot be eliminated.

2.2 Empirical Review

Empirical evidence was organised according to the three specific objectives. The emphasis is placed on findings that explain how price movements translate into schedule disruption and how project-level financial responses can reduce exposure.

2.2.1 Inflation-Induced Price Fluctuations and Construction Project Delays

Musarat et al. (2021) reviewed the influence of inflation on construction-project budgets and showed that rising

prices affect the adequacy of cost estimates and financial planning. Their findings indicate that projects extending over long periods are particularly exposed because the prices of materials, labour, and services may change substantially between estimation and purchase. This evidence supports the expectation that inflation can contribute to delays when approved funding is no longer sufficient to maintain planned activities.

Makoye et al. (2023) examined macroeconomic influences on construction-industry performance and found that wider economic conditions shape sector outcomes. Their work reinforces the link between inflation and project delivery because construction firms operate within markets for finance, labour, fuel, and materials rather than in isolation. Where inflation raises input costs, firms may experience reduced purchasing capacity and greater difficulty maintaining activity schedules.

Donyavi et al. (2024) approached the issue through materials procurement and demonstrated that construction supply chains involve complex interactions among suppliers, contractors, and market conditions. Inflation-related price movement can therefore slow procurement decisions and create uncertainty around quantities, supplier selection, and contract terms. The evidence is relevant to Kigali because price changes in imported or scarce inputs may force contractors to renegotiate procurement arrangements during implementation.

Olatunde et al. (2026) considered delivery strategies under hyper-inflationary conditions and highlighted the need for construction organisations to adapt planning and procurement when prices become unstable. Although the economic context differs from Rwanda, their findings illustrate a broader principle: the more volatile the pricing environment, the greater the need for flexible project controls. The present study extends this concern by quantifying the relationship between inflation indicators and construction delays in Kigali City.

2.2.2 Construction-Resource Price Fluctuations and Construction Project Delays

Anireddy (2024) examined material-cost fluctuations and emphasised the effect of market volatility on civil-project budgets. Rising costs can reduce the quantity of materials that can be acquired within an approved budget and can force contractors to seek additional financing or postpone procurement. This creates a direct pathway through which resource-price changes may extend project duration.

Panova and Hilletoft (2018) found that construction supply-chain risks and delays are closely linked, particularly when material availability and delivery are uncertain. Their findings are relevant to price volatility because shortages and logistical disruption frequently

coincide with higher input prices. The combined effect can slow construction even where project teams have established schedules and technical plans.

Platitas and Ocampo (2025) analysed the relationship between supply-chain bottlenecks and inflation and showed that disruption in the movement of goods can contribute to price pressure. For construction projects that depend on imported materials or machinery, this interaction means that supply constraints may simultaneously increase procurement lead times and raise purchase costs. Such conditions can intensify schedule risk in rapidly developing urban areas.

Latif et al. (2023) identified funding, coordination, and external constraints among the factors contributing to construction delay. Resource-price variation interacts with these factors because contractors facing higher input prices may experience funding gaps, while clients may take additional time to approve revised budgets. The evidence therefore supports examining resource-price fluctuation as a distinct predictor of delay rather than treating all cost problems as a single undifferentiated factor.

2.2.3 Financial Mitigation Measures and Construction Project Delays

Ebekozien et al. (2024) investigated the implications of inflation for construction projects and stressed the need for measures that preserve financial viability during periods of price instability. Their analysis supports interventions that anticipate price changes rather than responding only after cost escalation has already disrupted implementation. This aligns with the present study's focus on mitigation mechanisms as a separate explanatory variable.

Chammout et al. (2024) examined price escalation in construction contracts and highlighted the importance of contractual provisions that allocate and adjust price risk. Price-adjustment clauses can reduce disputes over unexpected increases by establishing a recognised mechanism for revising contract values. In long-duration projects, such provisions may help maintain continuity when market conditions depart from the assumptions used at tender stage.

Chukwuma-Eke et al. (2022) emphasised cost forecasting and financial planning as tools for managing uncertainty in complex projects. Their work suggests that contingency provisions and forward-looking analysis can improve preparedness for future expenditure requirements. When applied to construction, these practices can lessen the likelihood that sudden price changes create immediate cash-flow crises or force work to stop.

Oduleye and Medon (2021) similarly linked data-driven cost management with strategic financial planning and

performance evaluation. The implication for price volatility is that project teams require current market information, not only baseline estimates. Continuous review enables budgets and procurement strategies to be adjusted before cost pressures become severe enough to disrupt schedules. The present study therefore evaluates mitigation as an active management response rather than a static contractual safeguard.

3. Methodology

The methodology was organised around the population of construction stakeholders in Kigali City, the sampling procedure, the instruments used in the dissertation, and the quantitative analyses reported in this manuscript. The manuscript concentrates on the statistical strand while retaining the broader mixed-methods context described in the dissertation.

3.1 Research Design

The study adopted a mixed-methods orientation with a descriptive survey and correlational design. The descriptive component documented prevailing perceptions of construction delay, inflation indicators, resource-price changes, and mitigation practices, while correlation and multiple regression assessed statistical relationships among the study variables. This design was suitable because the research sought both to characterise the conditions experienced by construction stakeholders and to determine whether the selected predictors explained variation in construction project delays.

3.2 Study Population

The study targeted 302 construction stakeholders in Kigali City. The population comprised of 78 project managers, 121 civil engineers, 92 quantity surveyors, and 11 project supervisors. These categories were selected because their professional responsibilities expose them directly to construction planning, cost estimation, procurement, implementation, and monitoring, making them appropriate sources of evidence on price fluctuations and delay.

3.3 Sampling Design

Slovin's formula was applied at a 5% margin of error to determine a sample of 173 respondents from the target population of 302. The resulting allocation consisted of 45 project managers, 69 civil engineers, 53 quantity surveyors, and 6 project supervisors. Simple random sampling was specified so that eligible members of the population had an equal opportunity of selection. Verma and Verma (2020) discuss sample-size determination as an important part of ensuring that empirical studies obtain sufficient observations for reliable analysis.

3.4 Data Collection Instruments

The dissertation used a structured questionnaire, an interview guide, and documentary review. The questionnaire generated quantitative evidence on construction project delays, inflation-rate fluctuation, construction-resource price fluctuation, and financial mitigation measures using five-point Likert-scale items. Interviews provided qualitative perspectives from selected stakeholders, while documentary review supported contextual understanding of construction costs, contracts, and project conditions. The present manuscript reports the questionnaire-based quantitative results and does not reproduce the interview responses.

3.5 Pilot Study, Validity and Reliability

The methodology specified a pilot study equivalent to 10% of the planned sample, approximately 17 respondents, to examine questionnaire clarity and feasibility before wider administration. Content validity was evaluated through expert review and the Content Validity Index, with the dissertation reporting a CVI of 0.722, above its stated minimum benchmark of 0.70. Reliability was to be assessed using Cronbach's Alpha, with 0.70 established as the minimum acceptable coefficient and reliability results were acceptable, indicating that the research instrument demonstrated adequate internal consistency and was suitable for data collection. Buchanan et al. (2026), Amiri et al. (2026), and Izah et al. (2023) provide the methodological basis used in the dissertation for pilot testing, validity, and internal-consistency assessment.

3.6 Data Analysis

Quantitative data were processed using the Statistical Package for the Social Sciences (SPSS), with the methodology identifying Version 25. Means and standard deviations summarised questionnaire responses, Pearson correlation assessed bivariate relationships, and multiple regression estimated the independent contribution of each predictor to construction project delay.

The regression model was expressed as $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$, where Y represented construction project delay, X_1 inflation-rate fluctuation, X_2 construction-resource fluctuation, and X_3 financial mitigation measures. Zrelak (2026) describes inferential statistics as a means of drawing conclusions about wider populations from sample evidence.

3.7 Ethical Considerations

Ethical safeguards included voluntary participation, explanation of the academic purpose of the research, confidentiality of responses, and fair selection of participants. Respondents were informed that the

information they provided would be used only for the stated research objectives, and identifying information was not required in the questionnaire.

4. Results and Discussion

The results are presented from data adequacy to inferential testing. Demographic characteristics are omitted from the manuscript so that attention remains on

the study variables and objective-aligned statistical evidence.

4.1 Response Rate

The dissertation reports 155 questionnaires as administered and 149 as completed and returned. The 149 complete questionnaires formed the quantitative dataset used for the analyses reported in the study.

Table 1: Response Rate

Questionnaire Status	Frequency	Percentage (%)
Returned Complete	149	96.13
Not completed/returned	6	3.87
Total Administered	155	100.00

Source: Field Data, 2026

Table 1 indicates that 149 of the 155 questionnaires reported as administered were returned complete, producing a response rate of approximately 96.1%. The high proportion of complete responses provided a substantial quantitative dataset for examining relationships between price fluctuations, mitigation measures, and construction project delays.

4.2 Inferential Statistics

Inferential analysis tested the direction, strength, and independent contribution of the three study predictors.

Pearson correlation was first used to examine bivariate relationships, after which multiple regression assessed the combined explanatory power of the predictors and their individual coefficients.

4.2.1 Correlation Analysis

Pearson correlation coefficients were calculated for inflation-rate fluctuation, construction-resource fluctuation, financial mitigation measures, and construction project delay. The matrix reported by the dissertation is reproduced below.

Table 2: Correlation Matrix

		Inflation Rate Fluctuation	Construction Resources Fluctuation	Financial Mitigation Fluctuation	Construction Project Delays
Inflation Rate Fluctuation	Pearson Correlation	1	.723**	.706	.847
	Sig. (2-tailed)		.000	.000	.000
	N	149	149	149	149
Resources Fluctuation	Pearson Correlation	.730**	1	.898**	.845
	Sig. (2- tailed)	.000		.000	.000
	N	149	149	149	149
Financial Mitigation Measures	Pearson Correlation	.705**	.894*	1	.820**
	Sig. (2-tailed)	.000	.000		.000
	N	149	149	149	149
Construction Project Delay	Pearson Correlation	.847**	.848**	.822**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	149	149	149	149

Source: Field Data, 2026

Table 2 shows strong positive relationships between each predictor and construction project delay. Inflation-rate fluctuation recorded a reported correlation of $r = 0.847$ with project delay, construction-resource fluctuation $r = 0.845$, and financial mitigation measures $r = 0.820$, with $p = 0.000$ in each case. The results indicate that the three

variables were closely associated with differences in construction delay within the study dataset.

4.2.2 Regression Analysis

Multiple regression was applied to determine the combined explanatory strength of inflation indicators, resource-price fluctuations, and financial mitigation measures and to estimate the independent effect of each predictor while the remaining variables were controlled statistically

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.914a	.836	.694	.27556

a. Predictors: (Constant), inflation-rate fluctuation, construction-resource fluctuation, financial mitigation measures

Source: Field Data, 2026

Table 3 reports $R = 0.914$ and $R^2 = 0.836$. On the basis of the reported model, the three predictors jointly explained 83.6% of the variation in construction project

delay. This indicates substantial combined explanatory power within the sample, although the adjusted R^2 value is reproduced exactly as reported in the dissertation.

Table 4: Analysis of Variance (ANOVA)

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.616	3	16.537	281.23	.000b
	Residual	10.427	153	.07554		
	Total	64.043	156			

a. Dependent Variable: Construction project delay

b. Predictors: (Constant), inflation-rate fluctuation, construction-resource fluctuation, financial mitigation measures

Source: Field Data, 2026

The ANOVA results in Table 4 show $F = 281.23$ with $p = 0.000$. The probability value is below the 0.05 significance threshold, indicating that the predictors,

when considered jointly, formed a statistically significant regression model for construction project delay.

Table 5: Multiple Regression Coefficients

Model	Unstandardized		Standardized		Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	
1 (Constant)	.118	.128		2.402	.027
Inflation indicators	.454	.037	.493	12.270	.000
Resources indicators	.235	.079	.356	4.468	.000
Mitigation measures	.135	.076	.168	1.776	.030

a. Dependent variable: Construction project delays

Source: Field Data, 2026

Table 5 shows that all three predictors had statistically significant coefficients. Inflation indicators produced the largest unstandardized effect ($B = 0.454$, $t = 12.270$, $p = 0.000$), followed by construction-resource indicators ($B = 0.235$, $t = 4.468$, $p = 0.000$). Financial mitigation measures also reached statistical significance ($B = 0.135$, $t = 1.776$, $p = 0.030$). The estimated equation reported by the dissertation was: Construction Project Delay = $0.118 + 0.454(\text{Inflation Rate Fluctuation}) + 0.235(\text{Construction$

Resources Fluctuation) + $0.135(\text{Financial Mitigation Measures}) + \epsilon$.

4.3 Decision on Null Hypotheses

The three null hypotheses were evaluated using the significance values from the multiple regression coefficients. A null hypothesis was rejected when $p < 0.05$ because the corresponding predictor made a statistically significant contribution to construction project delay.

Table 6: Decision on Null Hypotheses

Null Hypothesis	P-value	Decision
H01: Inflation-induced price fluctuation factors have no significant influence on construction project delays in Kigali City.	.000	Rejected
H02: Construction-resource price fluctuations have no significant influence on construction project delays in Kigali City.	.000	Rejected
H03: Financial mitigation measures do not significantly reduce the impact of price fluctuations on construction project delays in Kigali City.	.030	Rejected

Source: Field Data, 2026

Table 6 indicates that each reported p-value was below 0.05. The three null hypotheses were therefore rejected, showing that inflation indicators, construction-resource price fluctuations, and financial mitigation measures each had statistically significant relationships with construction project delay in the regression model.

4.4 Discussion of Research Findings

The discussion follows the sequence of the specific objectives. Each empirical finding is first stated and then interpreted in relation to literature used in the dissertation, with attention to the project-management implications of the reported coefficients.

4.4.1 Inflation-Induced Price Fluctuations and Construction Project Delays

The study established a very strong positive relationship between inflation-rate fluctuation and construction project delay ($r = 0.847$, $p = 0.000$). Regression analysis also showed the largest independent effect for inflation indicators ($B = 0.454$, $\beta = 0.493$, $t = 12.270$, $p = 0.000$). The result means that higher inflation-related pressure was associated with greater construction delay after the other predictors were considered.

This finding is consistent with Musarat et al. (2021), who emphasised that inflation can substantially alter construction-project budgets by raising the cost of materials and other inputs. Their conclusion helps explain the Kigali result because cost escalation can make approved project budgets inadequate, forcing

managers to seek supplementary funds or revise procurement plans before activities continue.

Comparable evidence is provided by Makoye et al. (2023), who linked macroeconomic conditions with construction-industry performance. Their work supports the present result by showing that project delivery is sensitive to wider economic pressures rather than only to internal management decisions. In Kigali, inflation can affect fuel, wages, financing, transport, and imported materials simultaneously, creating several channels through which schedules may be disrupted.

Donyavi et al. (2024) further emphasised the complexity of construction-material procurement and the vulnerability of supply arrangements to changing market conditions. This supports the current finding because rapidly changing prices can postpone purchasing decisions, trigger renegotiation, or require suppliers and contractors to revise commitments. The researcher therefore interprets inflation as both a financial and an operational source of delay.

The result also corresponds with Olatunde et al. (2026), who examined construction delivery under highly inflationary conditions and stressed adaptive strategies in procurement and project planning. Although Kigali did not necessarily experience the same degree of inflation, the underlying mechanism remains relevant: the greater the uncertainty surrounding future prices, the more difficult it becomes to maintain fixed budgets and uninterrupted construction schedules.

4.4.2 Construction-Resource Price Fluctuations and Construction Project Delays

The second objective produced another very strong positive relationship, with construction-resource fluctuation correlated with project delay at $r = 0.845$ and $p = 0.000$. The regression coefficient remained statistically significant ($B = 0.235$, $\beta = 0.356$, $t = 4.468$, $p = 0.000$). This indicates that variation in the prices of construction resources made a distinct contribution to delay even when inflation indicators and mitigation measures were included in the same model.

Anireddy (2024) similarly emphasised that material-cost volatility places pressure on civil-project budgets. The present result supports that position because increases in the cost of cement, steel, machinery, fuel, or imported inputs can create immediate financing gaps. When contractors cannot purchase planned quantities at expected prices, procurement can be postponed and subsequent construction activities may also shift.

The finding also agrees with Panova and Hilletoft (2018), who connected supply-chain risks with construction delays. Price fluctuation is often intertwined with availability, transport, supplier capacity, and lead times. For Kigali projects, the effect of changing prices may therefore be amplified where critical materials have limited substitutes or depend on international supply channels.

Platitas and Ocampo (2025) showed that supply-chain bottlenecks can contribute to inflationary pressure, illustrating that procurement delays and higher prices can emerge from the same underlying disruption. This observation is consistent with the present study because a project may face both a higher purchase price and a longer wait for delivery. The combination can compound schedule slippage rather than producing a single isolated cost problem.

Latif et al. (2023) further identified funding and external constraints as important causes of construction delay. Their findings reinforce the current evidence by showing how resource-price increases can interact with financial approval and stakeholder coordination. The researcher therefore views construction-resource volatility as a practical implementation risk that requires continuous monitoring throughout procurement and execution.

4.4.3 Financial Mitigation Measures and Construction Project Delays

The third objective showed that financial mitigation measures were strongly associated with construction project delay at the bivariate level ($r = 0.820$, $p = 0.000$) and remained statistically significant in the regression model ($B = 0.135$, $\beta = 0.168$, $t = 1.776$, $p = 0.030$). The finding indicates that price-adjustment clauses, contingency budgeting, forward purchasing, access to

financing, budget review, and local sourcing were meaningfully related to the way projects managed price-related disruption.

This result is supported by Ebekozi et al. (2024), who emphasised the threat that inflation creates for construction-project sustainability and the importance of proactive responses. The Kigali evidence points in the same direction: financial resilience cannot be built only after prices have risen. Mitigation measures need to be incorporated into planning, procurement, and contracting before cost pressure becomes severe enough to interrupt work.

Chammout et al. (2024) highlighted price-escalation clauses as mechanisms for managing contractual exposure when market prices change. Their work is particularly relevant to the present finding because rigid fixed-price arrangements can transfer disproportionate inflation risk to contractors. Where contracts permit transparent adjustment, parties may be better positioned to preserve continuity and reduce disputes over unforeseen cost increases.

The findings also align with Chukwuma-Eke et al. (2022), who stressed cost forecasting and strategic financial planning in complex projects. Contingency budgets and forward-looking financial analysis create room for projects to absorb unexpected expenditure without immediately suspending activities. The significant coefficient for mitigation measures therefore suggests that financial preparedness has practical value even after inflation and resource-price pressures are statistically controlled.

Oduleye and Medon (2021) further emphasised data-driven cost management and continuing financial evaluation. This supports the study's inclusion of regulatory budget review and market monitoring because mitigation depends on timely information. In the researcher's interpretation, the smaller standardized coefficient does not make mitigation unimportant; rather, it reflects the fact that mitigation responds to the underlying price pressures represented by the first two predictors.

5. Conclusions and Recommendations

The final section consolidates the findings from the three objectives and translates them into conclusions and practical actions for construction stakeholders operating under price uncertainty in Kigali City.

5.1 Conclusion

The study concludes that price fluctuations are materially connected with construction project delays in Kigali City. Inflation indicators produced the strongest independent effect, showing that wider price pressure

can directly weaken the stability of project budgets and disrupt implementation. Construction-resource price fluctuations also remained significant, confirming that changes in the cost of materials, machinery, financing, and other inputs can extend schedules through procurement difficulties and funding gaps.

Financial mitigation measures were also statistically significant. Their role is best understood as a project-management response to unavoidable uncertainty rather than as a substitute for controlling inflation itself. Price-adjustment mechanisms, contingency provisions, forward purchasing, accessible financing, periodic budget review, and local sourcing can improve the capacity of contractors and clients to continue implementation when market prices depart from initial estimates.

5.2 Recommendations

Based on the study findings and conclusions, the following recommendations are proposed to improve project performance and address the identified challenges.

1. The City of Kigali and project owners should strengthen continuous price and project monitoring so that emerging cost pressures are identified early and decisions on budgets, procurement, and schedules are made before delays accumulate.
2. The Ministry of Infrastructure and contracting authorities should provide clearer mechanisms for periodic contract-price adjustment where long-duration construction projects are exposed to substantial market volatility, while maintaining transparent criteria for approving revisions.
3. The Rwanda Public Procurement Authority should strengthen the use of appropriate price-escalation and adjustment provisions in eligible long-term construction contracts so that inflation risk is allocated more realistically between clients and contractors.
4. Construction companies should combine contingency budgeting, market-price monitoring, forward purchasing, local sourcing, and improved access to project finance as part of formal financial-risk management throughout project implementation.

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