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Perceived Uncertainty and Perceived Performance of Public-Private Partnerships in Kenya: A Project-Level Stakeholder Survey

Perceived Uncertainty and Perceived Performance of Public-Private Partnerships in Kenya: A Project-Level Stakeholder Survey

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Abstract
Anchored in Transaction Cost Economics (TCE), this study examined the association between perceived uncertainty and perceived performance of public-private partnerships (PPPs) in Kenya. Uncertainty was measured as perceived exposure to force majeure events, regulatory and policy change, and market volatility, and performance through project efficiency, financial viability, service delivery and stakeholder satisfaction. Adopting a positivist philosophy and an explanatory, cross-sectional survey design, the study collected primary data with structured five-point Likert questionnaires from respondents engaged in PPP implementation across six sectors. A design-stage target of 260 respondents was set from an estimated population of 400; 215 usable questionnaires (82.7% of the target) were returned and aggregated to 67 PPP projects. Data were analysed with descriptive statistics, Pearson correlation and simple linear regression. Projects whose respondents reported more uncertainty also reported lower performance ($r = -.66$, $p < .001$; $B = -0.34$, 95% CI [−0.43, −0.24]), and the fitted line accounted for 43% of the sample variance in rated performance. The null hypothesis (H_0: $\beta_1 = 0$) was rejected in favour of H_1: $\beta_1 < 0$. The study concluded that perceived uncertainty and perceived performance are negatively associated across the projects studied.

Introduction
Governments increasingly rely on public-private partnerships (PPPs) to deliver infrastructure and public services where public resources are constrained (Suhendra et al., 2023). The World Bank defines a PPP as a long-term agreement between a government agency and a private party to provide a public good or service, in which the private partner carries substantial risk and is paid according to performance (World Bank, 2017). In Kenya, the PPP Directorate's status report as at 10 July 2025 lists five operational projects worth KES 123.1 billion, three under construction and 27 in development, 35 projects in all (Public-Private Partnerships Directorate, 2025).

PPP contracts run for many years, so their outcomes depend on events that neither party can fully foresee. In Kenya, a survey of employees of nine public universities found that interest-rate, revenue-stream and exchange-rate variability each significantly influenced the adoption of PPPs (Asakania et al., 2020). Other Kenyan PPP research has examined governance, accountability and implementation challenges in PPP procurement (Thiga, 2025) and the effect of financing structure on the completion of geothermal projects (Olando et al., 2024). For concessionaires, financiers and contracting agencies, uncertainty is therefore a risk that shapes contract terms, pricing and willingness to invest, and not only a background condition.

Theoretical Review

Theoretical framework

Transaction Cost Economics (TCE) holds that the cost of organising an exchange depends on three attributes of the transaction: asset specificity, uncertainty and frequency (Williamson, 1975, 1979, 1985). It builds on Coase's (1937) argument that using the market is costly. Because decision-makers are boundedly rational, they cannot foresee every contingency, so contracts are incomplete, leaving room for opportunism and strategic adaptation (Williamson, 1985). The central proposition of TCE is one of alignment: transactions marked by uncertainty, especially together with asset specificity, are governed more efficiently under flexible, relational or hierarchical arrangements than under rigid market contracts, and misalignment between governance and transaction attributes raises costs and weakens performance (Williamson, 1985; Cuypers et al., 2021).

Knight (1921) distinguished risk, whose outcomes can be assigned probabilities, from uncertainty, whose outcomes cannot. In TCE, uncertainty is commonly divided into environmental uncertainty, which arises from unpredictable change in the environment, and behavioural uncertainty, which arises from the difficulty of monitoring partners' conduct and performance (Williamson, 1985; Rindfleisch & Heide, 1997). Both raise transaction costs by increasing monitoring needs and the likelihood of renegotiation (Deng & Zhang, 2020; Wijanarko & Ye, 2023). In this study, 'uncertainty' means stakeholders' perceived exposure to unforeseen external events of three kinds. Some of them, such as interest-rate and exchange-rate movements, are partly measurable and so closer to risk in Knight's sense. They are treated as sources of uncertainty because respondents cannot forecast how they will affect a long-term project, and the study measures perceived exposure to them, not their objective variance.

In PPPs, force majeure is a contractual allocation of risk and not a category of events: the project agreement determines what counts as force majeure and who bears its consequences, and where it is silent or ambiguous the parties fall back on doctrines such as frustration (Chadee et al., 2023; Nduhura et al., 2021). In Kenya, the Public-Private Partnerships Act, 2021 sets the statutory framework within which PPP project agreements, risk allocation and fiscal commitments are approved. Because the study examined no contracts, it measures perceived exposure to disruptive events such as epidemics, natural disasters and acts of government, and not the content of any clause.

Regulatory and policy change refers to new, revised or repealed laws, regulations and policies that affect a project after the contract is signed. In PPPs it is a recognised source of renegotiation (Guasch et al., 2008) and, in TCE terms, of contractual incompleteness.

In the finance literature, volatility is the degree to which prices deviate from their average over time (Bhowmik & Wang, 2020). That definition assumes a traded price series, which many PPPs lack because they earn regulated tariffs or availability payments. For PPPs, market conditions reach project cash flows mainly through the cost of capital, exchange-rate movements on foreign-currency debt and inputs, and revenue variability (Ehrlich & Tiong, 2012; Asakania et al., 2020). The study measures perceived exposure through these channels.

Conceptual Framework

Figure 1 shows the framework estimated in this study. Perceived uncertainty, a composite of three perceived sources, is the single predictor, and perceived PPP performance, a composite of four dimensions, is the single outcome. The model contains no mediators, moderators or controls, and the arrow denotes a statistical association tested in H_1, not a causal path.

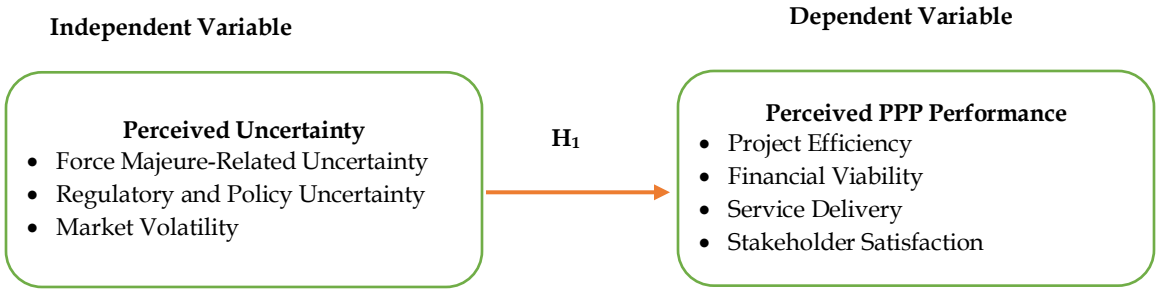


Figure 1: Conceptual Framework of the Estimated Model"

Note. Composite scores combine the dimensions shown in each box. H_1 is the directional hypothesis tested in the Results.

Empirical Review

Uncertainty and PPP performance

Studies of PPPs generally find that uncertainty undermines performance, though they differ on how far it can be managed. In Pakistan, Tipu et al. (2024) found that environmental uncertainty moderated the link between critical success factors and sustainable performance. Lower uncertainty went with better technical, procurement, economic and sustainability outcomes, while high uncertainty weakened the effect of those success factors. In Chinese water PPPs, Qian and Cao (2024) found that contract governance (output-based specifications, flexibility, good-faith cooperation and protection of the public interest) improved project outcomes and mitigated environmental and behavioural uncertainty. Haqq and Gultom (2022) took a transaction cost view of a single Indonesian PPP, using 16 interviews. They identified political and economic transaction costs as the main obstacles, including agency inexperience, coordination difficulties, and financial and political risks. In Kenya, Odhiambo et al. (2020) surveyed stakeholders in geothermal renewable-energy PPPs and reported that inflation, interest rates and national debt were negatively related to project success, whereas exchange rates and development expenditure had no significant effect. Geng et al. (2023) modelled uncertainty in an Australian education PPP using a hierarchical reliability framework.

Force majeure

Nduhura et al. (2021) stressed defining qualifying events explicitly in public procurement and PPP contracts, and keeping termination as a last resort because of high switching costs. Chadee et al. (2023) recommended addressing recurring pandemics explicitly in construction contracts in small island states. Manurung and Heliany (2020) found that, although COVID-19 could qualify as force majeure in Indonesia, parties still had to show a direct causal link to their inability to perform. In buyer-supplier relationships, force majeure declarations significantly influenced how recipients responded (Burkhart & Bode, 2025). None of these studies examines the performance consequences of force majeure in PPPs.

Regulatory and policy change

Guasch et al. (2008) analysed 307 transport and water concessions awarded in Latin America between 1989 and 2000 and examined how regulatory institutions, economic shocks and contract characteristics affect the probability of renegotiation. In Kenya, Thiga (2025) examined governance, accountability and implementation challenges in PPP procurement. Onyedikachi et al. (2022) found that government policies influenced small-enterprise development and economic growth in Nigeria. Rakhmawati et al. (2020) found that government regulation improved green supply-chain practice and, through it,

financial and environmental performance in Indonesia. Drinkwater and Robinson (2023) found that African firms in politically unstable or corrupt environments, and in low-income countries, were more likely to report customs and trade regulations as barriers. Regulation in these studies is treated as exogenous, and none concerns PPP performance.

Market volatility

Evidence on the cost of capital and currency exposure in PPPs is limited. Ehrlich and Tiong (2012) developed a model of foreign-exchange exposure in PPP infrastructure projects and applied it to a coal-fired power project in Southeast Asia. In Kenya, Asakania et al. (2020) found that interest-rate, revenue-stream and exchange-rate variability each significantly influenced the adoption of PPPs by public universities, whereas Odhiambo et al. (2020) found no significant effect of exchange rates on PPP success. Elsewhere the evidence comes mainly from banking and stock markets. Ahmad et al. (2024) found that inflation and market volatility reduced stock returns in Pakistan, while interest rates had negligible effects. Shrestha (2024) found that interest-rate and exchange-rate volatility depressed stock prices and returns in Nepal. Chindengwike (2023) found, for seven listed Tanzanian banks, that corporate returns were somewhat negatively related to share-price volatility. Abubakar (2020) found non-significant effects of exchange-rate volatility on the returns of Nigerian banks. These studies concern financial institutions, not PPP projects, so their relevance is indirect.

Most studies report that uncertainty worsens performance, but the size and mechanism of the effect depend on what 'uncertainty' means. Tipu et al. (2024) and Qian and Cao (2024) treat it as a condition that governance can buffer, whereas Haqq and Gultom (2022) trace it to institutional and political weakness that contract design alone cannot fix. In Kenya, only some macroeconomic proxies were significant in one study (Odhiambo et al., 2020), while all three financial-risk measures were significant in another (Asakania et al., 2020). Three gaps follow. First, applications of TCE to PPPs are largely case-based, such as the single-project studies of Haqq and Gultom (2022) and Wijanarko and Ye (2023). Second, quantitative PPP surveys exist, including multi-country questionnaire surveys of success factors and implementation constraints (Cheung et al., 2012; Osei-Kyei & Chan, 2017) and a Kenyan survey with a composite risk predictor (Odhiambo et al., 2020), but we are not aware of one that treats perceived uncertainty from several sources as a TCE attribute across the sectors of Kenya's PPP programme. Third, the regulatory and market evidence rests largely on firms and banks. This study extends the Kenyan survey tradition to six sectors and estimates how perceived uncertainty and perceived performance covary across projects.

Hypotheses

H_0: $\beta_1 = 0$. Across PPP projects in Kenya, perceived uncertainty is unrelated to perceived PPP performance.

H_1: $\beta_1 < 0$. Projects whose respondents report higher uncertainty report lower performance. TCE predicts the negative sign. The decision is tested at $\alpha = .05$ and is the same whether the test is one-tailed or two-tailed.

Method

Design

The study adopted a positivist philosophy and an explanatory, cross-sectional survey design (Saunders et al., 2016). A cross-sectional survey identifies covariation and not effects, it estimates how rated performance varies with rated uncertainty across projects, in a model without controls. The unit of analysis was the PPP project. The unit of observation was the individual respondent involved in implementing it: PPP Directorate officials, contracting-agency managers, private concessionaires and financiers, and regulatory and oversight officers.

Population and sampling

At the design-stage the population was estimated at 37 PPP projects and 400 respondents across six sectors (Table 1). Yamane's (1967) formula at 95% confidence and 5% precision gave a sample of 200, which was raised by 30% for non-response to a planned sample of 260, that is, the sample size targeted at the proposal stage before fieldwork began.

Table 1: Design-Stage Population and Planned Sample by Sector

Sector	PPP projects	Population	Planned sample
Transport	12	120	78
Energy	8	80	52
Health	6	70	45
Housing and urban development	5	60	39
Education	3	35	23
Water and sanitation	3	35	23
Total	**37**	**400**	**260**

Respondents were selected by stratified random sampling. The population was divided into the six sectors in Table 1, the planned sample was allocated to each sector in proportion to its size, and individual respondents were then drawn at random from each sector's list. Those lists were compiled on the 37-project frame. Fieldwork showed the project population to be larger than projected: 67 projects across the same six sectors, 30 more than at design-stage.

Data Collection Method

Data were collected using structured, self-administered questionnaires administered to the selected respondents drawn from the various stakeholder categories involved in Public–Private Partnerships (PPPs) in Kenya. The questionnaires comprised closed-ended questions designed to obtain standardised and comparable responses on uncertainty and PPP performance. The study variables were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). This approach enabled respondents to independently express their perceptions and experiences regarding the study variables while facilitating the systematic quantification, comparison, and statistical analysis of the collected data.

Measures

Data came from structured, self-administered questionnaires using five-point Likert items (1 = strongly disagree, 5 = strongly agree). Uncertainty was measured through three dimensions: force majeure-related uncertainty, regulatory and policy uncertainty, and market volatility. The uncertainty composite is the mean of the dimension scores (α = .87). PPP performance was measured through project efficiency, financial viability, service delivery and stakeholder satisfaction (α = .89) and is the mean of the four-dimension scores. Both alphas exceed .70 (Taber, 2018). A pilot of 26 respondents, about 10% of the planned sample (Connelly, 2008), was drawn from projects outside the main sample. It led to simpler wording and the splitting of double-barrelled items. Supervisors, a statistician and industry experts reviewed the instrument for face and content validity.

Analysis

Data were analysed in SPSS version 30, using both descriptive and inferential statistics. Means and standard deviations were interpreted using continuous cut-points: below 1.50 strongly disagree, 1.50 to below 2.50 disagree, 2.50 to below 3.50 neutral, 3.50 to below 4.50 agree and 4.50 to 5.00 strongly agree. Regression diagnostics were conducted before hypothesis testing: normality from a histogram of standardised residuals, homoscedasticity through the Breusch–Pagan test, and linearity from residual scatterplots. Inferential analysis then proceeded in two stages. Pearson correlation established the bivariate association, and simple linear regression ($Y = \beta_0 + \beta_1 X + \varepsilon$, where Y is PPP

performance and X is uncertainty) tested the hypothesis. Model fit was assessed through ANOVA and R^2. H_0 was rejected if $p < .05$.

Ethics

The study received clearance from the Institutional Scientific and Ethics Review Committee (ISERC) of United States International University Africa (reference USIU-A/ISERC/US1224-2025) and a research permit from the National Commission for Science, Technology and Innovation (licence no. NACOSTI/P/25/4182917). Participation was voluntary, respondents could withdraw at any stage, written informed consent was obtained, and responses were anonymised using codes.

Results

This section reports respondent-level descriptive statistics (n = 215) and the inferential tests, which use the 67 project-level observations.

Descriptive statistics

Tables 2 and 3 give respondent-level item means and standard deviations (n = 215) for uncertainty and PPP performance.

Table 2: Respondent-Level Item Statistics for Perceived Uncertainty (n = 215)

Dimension and item	M	SD
Force majeure-related uncertainty	**4.11**	**0.86**
Force majeure events (e.g., pandemics, natural disasters) significantly disrupt the performance of PPP projects.	4.01	0.97
Ambiguous force majeure clauses increase the likelihood of disputes in PPP contracts.	4.12	0.82
Force majeure events increase the likelihood of project delays and cost overruns in PPPs.	4.21	0.78
Regulatory and policy uncertainty	**4.12**	**0.99**
Frequent changes in government regulations create uncertainty that affects PPP performance.	4.12	1.00
Bureaucratic inefficiencies delay PPP implementation and reduce performance outcomes.	4.15	0.93
Inconsistent policy enforcement increases uncertainty for PPP stakeholders.	4.10	0.98
Regulatory uncertainty discourages private sector investment in PPP projects.	4.12	1.03
Market volatility	**3.86**	**1.03**
Exchange rate fluctuations increase uncertainty in PPP financing and repayment.	3.84	1.18
Interest-rate volatility increases the cost of capital for PPP investments.	3.97	1.01
Market volatility increases the risk of default in PPP contracts.	3.76	0.92

Respondents rated all three sources of uncertainty highly (dimension means 3.86 to 4.12). The first two-dimension means (4.11 and 4.12) are effectively equal. The highest-rated item was that force majeure events increase the likelihood of delays and cost overruns (M = 4.21, SD = 0.78), followed by bureaucratic inefficiency delaying implementation (M = 4.15, SD = 0.93).

Table 3: Respondent-Level Item Statistics for Perceived PPP Performance (n = 215)

Dimension and item	M	SD
Project efficiency	**3.59**	**1.11**
Resources are optimally utilised in PPP projects to achieve planned outputs.	3.67	1.15
Project timelines are consistently met without major delays.	3.22	1.03
Effective allocation of financial resources reduces wastage in PPP projects.	3.88	1.16
Financial viability	**3.80**	**1.00**
PPP projects generate sufficient revenue to cover operating expenses.	3.39	1.13
Adequate financial planning ensures long-term sustainability of PPP projects.	4.14	0.86
Strong cash flow management enhances the success of PPP projects.	4.12	0.91
PPPs are financially stable enough to attract external investment.	3.55	1.10
Service delivery	**3.64**	**0.94**
PPP projects consistently meet the service expectations of beneficiaries.	3.51	0.96
Quality of services delivered through PPPs meets international standards.	3.72	0.93
Service delivery mechanisms are scalable to meet increasing demand.	3.70	0.92
Stakeholder satisfaction	**3.86**	**0.82**
PPP projects deliver outcomes that meet the needs of stakeholders.	3.91	0.69
Continuous communication enhances stakeholder satisfaction in PPP projects.	4.03	0.94
Stakeholders feel adequately engaged throughout the PPP project lifecycle.	3.58	0.96
PPP projects balance the interests of multiple stakeholder groups.	3.91	0.69

Performance was rated in the agree band on all four dimensions (3.59 to 3.86), with timeliness the lowest-rated item (M = 3.22, SD = 1.03, neutral band) and sufficiency of operating revenue the second lowest (M = 3.39, SD = 1.13).

Inferential statistics

Diagnostics

The homoscedasticity test was not significant ($F(1, 65) = 0.43$, $p = .514$), and the residual plots showed approximate normality and a linear relationship. The assumptions therefore appear acceptable on these checks.

Correlation

Projects whose respondents reported more uncertainty also reported lower performance, a strong negative correlation ($r = -.66$, 95% CI [−.78, −.50], $p < .001$, $n = 67$; Table 4).

Table 4: Correlation between Perceived Uncertainty and Perceived PPP Performance

Variable	PPP performance	Uncertainty
PPP performance	1	−.658**
Uncertainty	−.658**	1

Regression

The fitted line accounts for 43% of the sample variance in rated performance ($R^2 = .43$, adjusted $R^2 = .43$; $F(1, 65) = 49.74$, $p < .001$; Tables 5 and 6). Each one-unit higher uncertainty score was associated with a 0.34-unit lower performance score (B = −0.34, 95% CI [−0.43, −0.24], $t(65) = -7.05$, $p < .001$; Table 7). The model is PPP performance = 4.613 − 0.335 (uncertainty).

Table 5: Model Summary for the Regression of Perceived PPP Performance on Perceived Uncertainty

Model	R	R^2	Adjusted R^2	SE of the estimate
1	.658	.433	.425	0.436

Note. Predictor: (constant), uncertainty. Dependent variable: PPP performance.

Table 6: ANOVA for the Regression of Perceived PPP Performance on Perceived Uncertainty

Source	SS	df	MS	F	p
Regression	9.437	1	9.437	49.736	< .001
Residual	12.333	65	0.190		
Total	21.771	66			

Note. Dependent variable: PPP performance. Predictor: (constant), uncertainty.

Table 7: Coefficients for the Regression of Perceived PPP Performance on Perceived Uncertainty

Predictor	B	SE	95% CI for B	β	t	p
Constant	4.613	0.135	[4.34, 4.88]		34.141	< .001
Uncertainty	−0.335	0.048	[−0.43, −0.24]	−.658	−7.052	< .001

Since $p < .05$, H_0 is rejected in favour of H_1: across the 67 projects, higher perceived uncertainty is associated with lower perceived performance.

Discussion

The findings indicate a statistically significant negative relationship between uncertainty and the performance of PPPs in Kenya, leading to the rejection of the null hypothesis. Across the 67 projects, higher perceived levels of uncertainty were associated with lower perceived performance ($r = −.66$; $B = −0.34$, 95% CI [−0.43, −0.24]). The regression model further indicated that uncertainty accounted for 43% of the variance in perceived PPP performance ($R^2 = .43$). This suggests that projects whose respondents reported higher levels of uncertainty also tended to receive lower performance ratings. The direction of this relationship is consistent with Transaction Cost Economics (TCE), which posits that uncertainty complicates the management of long-term contractual relationships, particularly where contracts are necessarily incomplete and cannot anticipate all possible future contingencies. The finding also aligns with Tipu et al. (2024), who established that environmental uncertainty weakened the influence of critical success factors on PPP performance in Pakistan. Similarly, Qian and Cao (2024) observed that flexible and cooperative contractual governance mechanisms can help mitigate the adverse implications of uncertainty in PPP arrangements.

Nevertheless, the study did not measure transaction costs directly. Therefore, although the negative regression coefficient is consistent with the TCE proposition that uncertainty can increase the costs associated with contracting, monitoring, renegotiation, and enforcement, the study cannot establish that these costs explain the observed relationship. This interpretation is, however, supported by Haqq and Gultom (2022), who identified political and economic transaction costs associated with PPP implementation in Indonesia. Accordingly, the present findings demonstrate an association between uncertainty and PPP performance but do not establish the specific transaction cost mechanisms through which this relationship may operate.

At the level of individual uncertainty dimensions, respondents agreed that ambiguity in force majeure clauses increases the likelihood of contractual disputes ($M = 4.12$). This finding is consistent with Chadee et al. (2023) and Nduhura et al. (2021), whose studies emphasise the importance of clearly specifying qualifying force majeure events and the associated contractual obligations. Clearer provisions can reduce interpretational differences between contracting parties and provide a basis for managing unforeseen events. Similarly, the relatively high ratings of regulatory uncertainty items are consistent with Guasch et al. (2008), who demonstrated that regulatory and other external shocks can influence the likelihood of concession renegotiation. However, since their study focused on Latin America, its findings provide comparative rather than direct evidence for the Kenyan PPP context.

Respondents also agreed that interest-rate volatility increases the cost of capital ($M = 3.97$), suggesting that fluctuations in financing conditions are perceived as an important source of uncertainty in PPP

implementation. The exchange-rate uncertainty item recorded a mean of 3.84, indicating agreement that exchange-rate fluctuations are relevant to PPP performance. However, empirical evidence on the effects of exchange-rate movements in Kenya is mixed. Asakania et al. (2020) reported significant effects on PPP adoption in public universities, whereas Odhiambo et al. (2020) did not establish a significant effect on the success of geothermal PPPs. Consequently, the present finding should be interpreted as evidence of respondents' perceptions rather than conclusive evidence that exchange-rate volatility directly affects PPP performance. Studies examining uncertainty in banking and stock markets (Abubakar, 2020; Ahmad et al., 2024; Shrestha, 2024) offer additional insights into the broader implications of financial volatility, although their relevance to PPP performance is indirect.

The findings have theoretical and practical implications, although these should be interpreted in light of the study's measurement approach. Theoretically, they provide perception-based empirical evidence from Kenyan PPP projects that is consistent with the TCE proposition that uncertainty complicates contractual relationships and is associated with increased governance challenges. However, the findings do not independently establish that uncertainty increases transaction costs, since these costs were not directly measured. Furthermore, the study does not provide sufficient evidence to confirm TCE's broader proposition that governance structures should be aligned with the levels of uncertainty and asset specificity characterising individual transactions. This would require an explicit examination of the interaction between uncertainty, asset specificity, and alternative governance arrangements.

From a practical perspective, the negative relationship suggests that public authorities and private partners should give greater attention to identifying and managing uncertainty throughout the PPP project cycle. Nevertheless, because uncertainty was assessed using a composite measure, the regression results do not establish the relative contribution of contractual, regulatory, and macroeconomic uncertainty to variations in PPP performance. They therefore cannot, on their own, determine which specific intervention would yield the greatest improvement. A more targeted approach would involve assessing these sources of uncertainty separately, strengthening the relevant contractual provisions, and developing appropriate risk-management and contingency measures in response to the uncertainty profiles of individual PPP projects.

Conclusion

The study concludes that uncertainty arising from force majeure events, regulatory and policy instability, and market volatility is negatively associated with the performance of Public–Private Partnerships (PPPs) in Kenya. The findings further indicate that PPPs are not exposed to a single dominant source of uncertainty; rather, they operate within an environment characterised by concurrent contractual, regulatory, and macroeconomic uncertainties. This finding is consistent with the propositions of Transaction Cost Economics (TCE), which recognise that bounded rationality limits the ability of contracting parties to anticipate and make comprehensive provisions for all possible future contingencies. Consequently, uncertainty may result in contractual incompleteness, increased renegotiation, and higher transaction costs, thereby undermining PPP performance. Based on the statistical findings, the null hypothesis that uncertainty has no statistically significant effect on the performance of PPPs in Kenya was rejected.

The study had several limitations. First, its cross-sectional, perception-based design limits causal interpretation and does not rule out reverse causality. Second, using the same respondents and questionnaire to measure uncertainty and performance introduces potential common-method bias, while perceived performance may differ from actual project performance. Third, some uncertainty items overlapped with performance outcomes, potentially inflating the observed relationship, and the composite measure did not distinguish between contractual, regulatory, and market uncertainty.

Fourth, the project sample changed from 37 to 67 during data collection without recalculating the sample, while respondents were aggregated across projects of unequal group sizes without assessing within-project agreement. This may have affected the reliability of the estimates. Fifth, the regression model did not control for key project characteristics, including sector, project size, lifecycle stage, contract type, and governance arrangements. Sixth, validity assessment was limited, as dimensionality and convergent and discriminant validity were not established. Regression diagnostics and checks for influential observations were also limited, and the reported regression results could not be fully reconciled with the descriptive statistics. Finally, the findings are specific to the 67 projects studied and should not be generalised to all PPPs in Kenya.

Future studies should use objective indicators of uncertainty and PPP performance alongside perceptual measures. They should examine contractual, regulatory, and market uncertainty as separate predictors, and test how asset specificity and governance structures moderate their effects on performance. Further research should also employ longitudinal and multilevel designs, control for project characteristics, and compare PPP projects across sectors and developing-country contexts to establish whether the observed relationships persist over time and across different institutional settings.

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