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PROJECT MANAGEMENT PROCESSES AND PERFORMANCE OF ROAD CONSTRUCTION PROJECTS: A CASE OF KENYA NATIONAL HIGHWAYS AUTHORITY, SOUTH RIFT REGION, KENYA

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ABSTRACT

Road construction projects are expected to achieve planned time, cost, quality, scope and user-satisfaction outcomes, yet delays, cost pressures and implementation challenges remain evident in Kenya. This study examined the influence of project initiation, project planning, project execution, and project monitoring and control on the performance of road construction projects implemented by the Kenya National Highways Authority (KeNHA) in the South Rift Region. The study used a mixed research design combining descriptive survey and correlational approaches. The target population was 215 respondents drawn from NCA-registered contractors, RACECA members, ACEK consulting engineers and KeNHA officials. A sample of 140 respondents was selected using proportionate stratified sampling, and 117 questionnaires were returned, giving an 83.5% response rate. Structured questionnaires and key-informant interviews were used for primary data collection. Quantitative data were analysed using descriptive statistics, Pearson correlation, simple linear regression and multiple regression; qualitative information was analysed thematically. The study found generally positive perceptions of project management practices. Project initiation, planning, execution, and monitoring and control recorded overall means of approximately 3.90, 3.90, 3.93 and 3.90, respectively. Project performance was moderately high, although timely completion was the weakest performance dimension. Pearson correlations with project performance were 0.65 for initiation, 0.71 for planning, 0.76 for execution and 0.73 for monitoring and control, all statistically significant at $p < 0.01$. The combined regression model was statistically significant and explained 71% of the variation in project performance ($R^2 = 0.71$; $F = 78.56$, $p < 0.001$). In the combined model, project initiation ($\beta = 0.20$), planning ($\beta = 0.25$), execution ($\beta = 0.33$), and monitoring and control ($\beta = 0.23$) were positive and statistically significant predictors ($p < 0.001$). The study concludes that the four processes are complementary components of project delivery and recommends stronger stakeholder engagement, realistic planning, effective contractor coordination, performance measurement, and timely corrective action.

KEYWORDS: *Project Initiation; Project Planning; Project Execution; Monitoring and Control; Project Performance; Road Construction; KeNHA; South Rift.*

1. INTRODUCTION

1.1 Background and problem statement

Road infrastructure supports trade, mobility, access to services and regional development. Project management processes influence how infrastructure projects are initiated, planned, executed and controlled, with implications for time, cost, quality and stakeholder outcomes (PMI, 2021; World Bank, 2023). Evidence reviewed in the study indicates that road projects in Africa continue to experience delays, budget pressures and implementation difficulties. In Kenya, these concerns are also reflected in project-status and audit reporting, while studies have linked road-project performance to planning, contractor capability, supervision, stakeholder participation and monitoring (Kinyua & Mwangi, 2021; Kweyu & Kidombo, 2018; Office of the Auditor-General–Kenya, 2023).

The South Rift Region provides an important setting because national roads support agriculture, tourism, trade and mobility across counties including Nakuru, Narok, Kericho, Kajiado and Bomet. The study period covered projects initiated or implemented between 2018 and 2024. The original study identified delays, cost pressures, disrupted implementation and stakeholder concerns as continuing challenges. For example, the Naivasha–Njabini (C67) project commenced in March 2020 with a 30-month construction period but remained classified as ongoing after its original completion date (KeNHA, 2021). The study therefore focused on whether project-management processes help explain variation in project performance.

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The problem is not limited to contractor performance or financing. Weak needs assessment, stakeholder engagement and feasibility work at initiation may create uncertainty; unrealistic schedules, budgets and risk plans may weaken implementation; inadequate supervision and coordination may affect execution; and weak monitoring may delay corrective action. Previous Kenyan studies have examined individual determinants of road-project performance, but the study identified limited region-specific evidence on the individual and combined statistical influence of initiation, planning, execution, and monitoring and control on KeNHA road projects. This study addressed that gap.

1.2 Objective and hypotheses

The general objective was to examine the influence of project management processes on the performance of road construction projects implemented by KeNHA in the South Rift Region. Specifically, the study examined project initiation, project planning, project execution, monitoring and control, and their combined influence on project performance.

The null hypotheses were that project initiation, project planning, project execution, and project monitoring and control have no statistically significant influence on project performance, and that the four processes have no significant combined influence on project performance.

1.3 Variables and conceptual focus

The independent variables were project initiation, project planning, project execution, and project monitoring and control. The dependent variable was project performance. Performance was assessed through timely completion, adherence to budget, quality conformity, scope achievement and stakeholder satisfaction. The operational focus of each independent variable was as follows: initiation included needs assessment, stakeholder identification, feasibility assessment and goal setting; planning included resource allocation, scheduling, budgeting and risk planning; execution included implementation, supervision, coordination and adherence to technical specifications; and monitoring and control included progress tracking, reporting, quality control and corrective action.

Variable	Operational indicators	Role
Project Initiation	Needs assessment; stakeholder identification; feasibility; clear goals	Independent
Project Planning	Resource allocation; scheduling; budgeting; risk planning	Independent
Project Execution	Implementation; supervision; coordination; technical compliance	Independent
Monitoring & Control	Progress tracking; reporting; quality control; corrective action	Independent
Project Performance	Time; cost; quality; scope; stakeholder satisfaction	Dependent

2. LITERATURE REVIEW

2.1 Theoretical perspective

The study drew on complementary perspectives to explain the project life cycle. Stakeholder Theory supports attention to players who affect or are affected by a project and therefore provides a basis for examining stakeholder identification and participation during initiation. The Rational Planning perspective supports systematic goal setting, alternatives, budgeting, scheduling and risk planning. Implementation Theory explains the translation of plans into action through coordination, supervision and decision-making. Systems Theory views a project as an interconnected system of inputs, processes, outputs and feedback, supporting the monitoring-and-control dimension. Contingency Theory provides a basis for considering the combined processes in relation to project characteristics and environmental conditions. Together, these perspectives support examination of the four management processes as interrelated rather than isolated activities.

2.2 Empirical review and research gap

Research reviewed in the study consistently connects project initiation with later project outcomes. Matu et al. (2020) found that stakeholder participation in project initiation supported completion of urban road transport infrastructure projects in Kenya. Other studies reviewed by the researcher associated needs assessment, feasibility work and stakeholder engagement with fewer disputes, clearer objectives and better implementation. However, much of the evidence concerns individual practices or projects outside the South Rift context.

Planning research emphasizes resource allocation, scheduling, budgeting and risk assessment. Oloo et al. (2019) and Samo et al. (2023) linked planning practices with road-project performance in Kenya, while Githongo and Njoroge (2021) reported that structured planning

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and stakeholder involvement can improve resource use and implementation. Risk planning is also important because construction projects are exposed to uncertainty in costs, land, climate and implementation conditions.

Execution literature highlights implementation quality, supervision, contractor coordination and technical compliance. Kimani and Mose (2022) associated project-management leadership with successful completion of KeNHA road projects, while Muriithi and Mwenda (2023) linked technological exposure with road-construction quality. Monitoring studies similarly indicate that progress reporting, evaluation, quality assurance and corrective action contribute to performance (Mutua et al., 2020; Thuo & Ndung'u, 2024; Wasike et al., 2023).

The literature nevertheless leaves a contextual and analytical gap. Existing studies often examine single practices, individual projects, or national and county-level performance without testing the individual and combined influence of the four project-management processes in KeNHA's South Rift projects. The present study therefore integrated the four processes in one empirical model and assessed project performance using time, cost, quality, scope and stakeholder-satisfaction dimensions.

3. METHODOLOGY

3.1 Research design and population

The study adopted a mixed research design combining descriptive survey and correlational approaches. The descriptive component captured respondents' perceptions of project-management practices and performance, while the correlational component examined relationships between the independent variables and project performance without manipulating the variables. The target population comprised 215 respondents: 100 representatives of NCA-registered road contractors in Categories 1–4, 50 RACECA members, 40 ACEK consulting engineers and 25 KeNHA officials. The unit of analysis was the KeNHA road construction project; the unit of observation was the professional respondent involved in project initiation, planning, execution, supervision or monitoring.

3.2 Sampling and Data Collection

Yamane's formula at a 5% margin of error produced a sample of 140 respondents. Proportionate stratified sampling was used to represent the four population strata: 65 contractors, 33 RACECA members, 26 ACEK consultants and 16 KeNHA officials. Structured five-point Likert-scale questionnaires were used for quantitative data collection, while semi-structured key-informant interviews provided qualitative information. A pilot study involving 42 respondents was conducted in Naivasha outside the core study area. The questionnaire was refined following pilot feedback. Content validity produced an S-CVI of 0.93, while exploratory factor analysis produced a KMO of 0.846 and factor loadings ranging from 0.672 to 0.911.

3.3 Data analysis and Ethics

Quantitative data were coded and analysed using SPSS. Frequencies, percentages, means and standard deviations were used for descriptive analysis. Pearson's correlation assessed the direction and strength of relationships, simple linear regression assessed the individual predictive effects, and multiple regression assessed the combined influence of the four independent variables. Statistical significance was evaluated at $\alpha = 0.05$. Diagnostic tests addressed normality, linearity, multicollinearity, heteroscedasticity and autocorrelation before regression analysis. Qualitative interview data were analysed thematically to contextualize the quantitative findings. Ethical clearance was obtained from Kabarak University Research Ethics Committee and a NACOSTI permit was secured; participation was voluntary and confidentiality was maintained.

4. RESULTS

4.1 Response rate and descriptive results

Of the 140 questionnaires issued, 117 were completed and returned, giving an 83.5% response rate. The response provided an adequate basis for the planned statistical analysis. Respondents generally reported that the four project-management processes were implemented to a large extent.

Construct	Overall mean	SD	Key interpretation
Project initiation	3.92	1.14	Generally well implemented; needs assessment, stakeholder identification and feasibility were positively rated.
Project planning	3.90	1.12	Generally well implemented; resource allocation, scheduling, budgeting and risk planning were important.
Project execution	3.94	1.11	Highest descriptive mean; implementation, supervision, coordination and technical compliance were positively rated.
Monitoring & control	3.90	1.10	Reporting and oversight were positive, but performance indicators and corrective-action responsiveness were weaker.
Project performance	3.79	1.08	Moderately high overall; timely completion was the weakest dimension.

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For project performance, completion within the original timeline recorded the lowest mean (3.40), while final cost within the approved budget recorded 3.46. By contrast, no significant cost overruns recorded 3.98, improved mobility and safety 4.06, PSV-driver satisfaction with road quality 3.97, minimal first-year maintenance 3.97, community satisfaction 3.91, and improved access to services and markets 3.92. These results indicate that user and quality-related outcomes were perceived relatively positively, while schedule adherence remained a concern.

4.2 Correlation analysis

All four project-management processes had positive and statistically significant correlations with project performance. Project execution had the highest correlation (r = 0.76), followed by monitoring and control (r = 0.73), planning (r = 0.71), and initiation (r = 0.65). The correlations indicate association, not by themselves proof of causation.

Independent variable	Correlation with performance (r)	Significance
Project initiation	0.65	$p < 0.01$
Project planning	0.71	$p < 0.01$
Project execution	0.76	$p < 0.01$
Monitoring & control	0.73	$p < 0.01$

4.3 Regression analysis and hypothesis testing

The individual simple regression models were statistically significant. Project initiation explained 42% of variation in project performance ($R^2 = 0.42$; $F = 84.10$, $p < 0.001$); project planning explained 50% ($R^2 = 0.50$; $F = 126.50$, $p < 0.001$); project execution explained 58% ($R^2 = 0.58$; $F = 168.20$, $p < 0.001$); and monitoring and control explained 53% ($R^2 = 0.53$; $F = 140.30$, $p < 0.001$).

The combined multiple regression model produced $R = 0.84$ and $R^2 = 0.71$, with an adjusted R^2 of 0.69. The ANOVA was significant ($F = 78.56$, $p < 0.001$), indicating that the four predictors jointly explained a substantial proportion of variation in project performance.

Predictor	B	Standardized β	t	p-value	Decision on H_0
Project initiation	0.18	0.20	3.60	<0.001	Reject
Project planning	0.23	0.25	3.83	<0.001	Reject
Project execution	0.30	0.33	6.00	<0.001	Reject
Monitoring & control	0.21	0.23	4.20	<0.001	Reject

The regression results show positive and statistically significant unique associations for all four processes after controlling for the other predictors. Project execution had the largest standardized coefficient in the combined model ($\beta = 0.33$), followed by planning ($\beta = 0.25$), monitoring and control ($\beta = 0.23$), and initiation ($\beta = 0.20$). The five null hypotheses were therefore rejected at the 5% significance level, including the hypothesis concerning the combined influence of the four processes.

5. DISCUSSION

The results indicate that project initiation matters because needs assessment, stakeholder identification, feasibility analysis and clear objectives establish the foundation for subsequent project decisions. The positive relationship between initiation and performance is consistent with Kenyan evidence on stakeholder participation and road-project completion (Matu et al., 2020). It also supports the study's stakeholder-oriented theoretical perspective.

Planning was positively associated with performance, consistent with research linking resource allocation, scheduling, budgeting and risk assessment to road-project delivery (Oloo et al., 2019; Samo et al., 2023). The finding suggests that planning provides the operational framework through which project objectives are translated into resources, schedules and risk responses.

Execution showed the largest correlation and standardized coefficient. This result is consistent with literature emphasizing supervision, contractor coordination, technical compliance and implementation capability as important determinants of construction outcomes (Kimani & Mose, 2022; Muriithi & Mwenda, 2023). The result should be interpreted as a statistical association within the study design rather than proof that execution alone determines project success.

Monitoring and control also showed a strong positive relationship with performance. The descriptive results, however, reveal that some control practices—particularly performance indicators and corrective-action responsiveness—were weaker than other monitoring practices. This distinction is important: the existence of reporting and monitoring mechanisms does not necessarily mean that deviations are corrected promptly. The finding is consistent with studies emphasizing monitoring and evaluation as mechanisms for improving road-project outcomes (Mutua et al., 2020; Wasike et al., 2023).

The combined model explained 71% of variation in performance, indicating that project management processes collectively provide a substantial explanatory framework within the study context. Because the predictors are interrelated, their standardized coefficients in the combined model are smaller than some simple-regression relationships. The remaining 29% suggests that other factors outside the model may also contribute to project performance, including financing conditions, procurement, contractor capacity, inflation, weather and other contextual factors identified in the original study.

6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study concludes that project initiation, planning, execution, and monitoring and control are positively and significantly associated with the performance of KeNHA road construction projects in the South Rift Region. Initiation provides the foundation through needs assessment, stakeholder engagement and feasibility; planning translates objectives into resources, schedules, budgets and risk responses; execution converts plans into physical deliverables through supervision, coordination and technical compliance; and monitoring and control provides feedback, reporting, quality assurance and corrective action. The processes therefore operate as complementary components of the project life cycle.

6.2 Recommendations

First, KeNHA and other road-sector institutions should strengthen project initiation by ensuring documented needs assessments, stakeholder mapping, feasibility studies and clear project objectives before implementation. Second, project teams should improve planning documentation, resource allocation, realistic scheduling, budget preparation and risk planning, with periodic review where project conditions change. Third, execution should be strengthened through adequate site supervision, contractor coordination, technical compliance, communication and timely resolution of implementation constraints. Fourth, monitoring and control should focus not only on reporting but also on measurable performance indicators, timely escalation of deviations, independent quality checks and documented corrective actions. Finally, future research should examine additional factors not included in the model because 29% of performance variation remained unexplained, and should consider longitudinal or project-level data to complement respondents' perceptions.

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