

IMES SYSTEM APPRAISAL FRAMEWORK AND PERFORMANCE OF ROAD PROJECT IN KENYA

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ABSTRACT

Road projects in Kenya have been characterized by substandard quality, cost overruns, delays, and weak stakeholder coordination, largely attributed to inefficiencies in project management systems. System appraisal framework (IMES) have been adopted to enhance project performance; however, limited empirical attention has been given to specific components such as the system appraisal framework. This study therefore examined the relationship between IMES System Appraisal Framework and the performance of road projects in Kenya, while also assessing the moderating effect of project risks on this relationship. The study focused on road construction projects implemented by national government road agencies, namely KeNHA, KeRRA, and KURA, between 2015 and 2022. The unit of analysis was the road projects, while project managers formed the unit of observation. A sample size of 126 respondents was determined using Fisher's formula, and data were collected using semi-structured questionnaires. A pilot study was conducted to ensure reliability and validity of the instruments. Quantitative data were analyzed using descriptive and inferential statistics, including regression and moderated

regression analysis, with the aid of SPSS. The findings revealed that the IMES System Appraisal Framework has a positive and statistically significant influence on the performance of road projects in Kenya. Additionally, project risks were found to have a significant moderating effect on this relationship, indicating that the effectiveness of system appraisal frameworks varies depending on the level and management of project risks. The study concludes that strengthening system appraisal mechanisms within IMES enhances project performance outcomes. It is therefore recommended that road project implementing agencies institutionalize robust appraisal frameworks that incorporate continuous performance evaluation and integrate proactive risk management strategies to improve efficiency, accountability, and overall project success.

Keywords: System appraisal framework (IMES), System Appraisal Framework, Project Risks, Performance, Road Projects, Kenya

INTRODUCTION

Background of the Study

Effective execution of public infrastructure projects is a critical driver of economic growth, as governments allocate substantial resources toward the development of road networks, bridges, and related infrastructure. However, road construction projects globally and within Kenya

continue to experience performance challenges, including cost overruns, delays, poor quality outputs, and weak stakeholder coordination. These challenges are largely attributed to inefficiencies in project management and monitoring systems, highlighting the need for robust evaluation mechanisms to enhance accountability and performance outcomes (Diaz, 2020; Tengan et al., 2021).

System appraisal framework (IMES) have increasingly been adopted as a strategic tool to improve project performance through structured tracking, assessment, and feedback mechanisms. Within IMES, the system appraisal framework plays a critical role by providing mechanisms for continuous evaluation, performance measurement, and alignment of project implementation with predefined objectives. Despite the growing adoption of IMES, evidence suggests that such systems often function sub-optimally due to weaknesses in appraisal and evaluation processes, limiting their effectiveness in enhancing project outcomes (Welime, 2019).

Globally, road infrastructure projects have recorded persistent performance inefficiencies, with cost overruns and delays being the most prominent. For instance, a significant proportion of road projects in developed economies have failed to meet performance expectations due to inadequate monitoring and evaluation mechanisms. These challenges underscore the importance of strengthening system appraisal frameworks to enhance oversight, improve decision-making, and ensure project success. Weak appraisal mechanisms limit the ability to detect deviations early, thereby exacerbating inefficiencies in project delivery (Huo et al., 2018; Falcetelli et al., 2022).

In the African context, similar performance challenges persist, with road projects frequently experiencing inefficiencies linked to inadequate project control and monitoring systems. Evidence from countries such as Nigeria and South Africa indicates that poor performance in road projects is largely associated with weak evaluation and appraisal structures, which fail to provide timely feedback and corrective mechanisms. This highlights the need for stronger system appraisal frameworks that can support effective monitoring and enhance project performance outcomes (Anigbogu et al., 2019).

In Kenya, road infrastructure development remains a key priority under national development agendas such as Vision 2030. Despite increased investment in road construction projects, performance challenges persist, including delays, cost overruns, and inefficiencies in project execution. The adoption of IMES was intended to address these challenges by improving monitoring and evaluation practices. However, the effectiveness of specific components such as the system appraisal framework remains insufficiently examined. Strengthening system appraisal mechanisms is essential for improving project oversight, enhancing accountability, and ensuring that project objectives are achieved efficiently (Lakmeharan et al., 2020).

Furthermore, the effectiveness of system appraisal frameworks is influenced by project risks, which may arise from environmental, political, financial, or operational uncertainties. These risks can alter the strength and direction of the relationship between appraisal systems and

project performance by introducing variability in implementation outcomes. As such, understanding the moderating role of project risks is critical in determining the extent to which system appraisal frameworks contribute to improved performance of road projects in Kenya.

Statement of the Problem

Road infrastructure development in Kenya continues to receive significant financial investment due to its critical role in economic growth and national development. Despite these investments, road construction projects continue to experience persistent performance challenges, including cost overruns, delays, poor quality outputs, and non-adherence to project specifications. Empirical evidence from national reports indicates that a substantial proportion of projects implemented by KeNHA, KeRRA, and KURA exhibit poor cost performance, negative cost variance, and schedule delays, reflecting inefficiencies in project execution (KENHA, 2022; KRB, 2022).

These performance challenges have been widely attributed to weaknesses in project management and monitoring systems. While System appraisal framework (IMES) have been adopted to enhance oversight and improve project outcomes, their effectiveness remains inconsistent. In particular, limited attention has been given to the role of the system appraisal framework, which is critical in evaluating project progress, identifying deviations, and informing corrective actions. Weak or ineffective appraisal mechanisms undermine the ability of IMES to deliver timely and actionable performance insights, thereby contributing to continued inefficiencies in road project implementation.

Existing studies have examined various determinants of project performance, including contract management, financial controls, and general monitoring and evaluation practices. However, these studies largely treat monitoring and evaluation as a broad construct, with minimal focus on specific components such as system appraisal frameworks. Consequently, there remains a significant knowledge gap regarding how system appraisal mechanisms within IMES influence the performance of road projects in Kenya.

Furthermore, project performance outcomes are often affected by project risks arising from environmental, operational, and institutional uncertainties. These risks may alter the effectiveness of appraisal systems by influencing how performance information is generated, interpreted, and utilized in decision-making processes. Despite this, limited empirical attention has been given to the moderating role of project risks in the relationship between system appraisal frameworks and project performance. Therefore, this study sought to address these gaps by examining the influence of the IMES System Appraisal Framework on the performance of road projects in Kenya, while also assessing the moderating effect of project risks on this relationship.

Specific Objectives

The following are the specific objectives that guided this study:

- i. To evaluate the relationship between IMES System appraisal framework and performance of road projects in Kenya

- ii. To determine the moderating effect of project risks on the relationship between IMES and performance of road projects in Kenya

Research Hypotheses

The study sought to test the following hypotheses

H01: IMES System appraisal framework has no significance impact on performance of road projects in Kenya

H02: Project Risks has no significance moderating effect on relationship between IMES System appraisal framework and performance of road projects in Kenya

LITERATURE REVIEW

Theoretical Literature Review

Soft systems methodology is an approach for solving messy situations of all kinds. It is an action-oriented process of inquiry into situations. This enables the users to learn their way through finding out about the situation, then taking an improvement action. To achieve this, an organized process is set up in which the situation is explored using a set of models of purposeful action (Reynolds & Holwell, 2020).

Soft system methodology, (Shaked *et al.*, 2017) originated from the perspective that “hard” Systems Thinking was insufficient for the intricacy of large organizational issues. According to Kogetsidis, (2021), in 1960s, Peter Check land created Soft system methodology in order to deal with such issues. For the long time of his career, he had worked with many hard systems methodologies. He identified how the systems were inadequate in dealing with high levels of complex problems, which had a large social component. Suryaatmaja *et al.*, (2019) argue that system methodology focuses on specific steps. First, the evaluator must determine the situation then think about different systems and if could or not be employed in the situation. Lastly, the thinking to the systems should be measured and action be taken depending on previous information learned. There are three vital aspects regarding the purposes and context of System appraisal that are supposed to be considered. One is to provide information on the progress and current status of the strategies, processes and activities used by an organization to fulfill its objective. Secondly is to support decisions regarding improvements of the appraised system. Lastly is to motivate those in positions to take the highlighted decisions (Mohseni *et al.*, 2021). These aspects are vital in analyzing the components of IMES System Appraisal Framework.

Conceptual Framework

A conceptual framework is a visual or written product that explains graphically or in narrative form the main things to be studied. This includes the key factors, concepts and the presumed relationships among them (Sarma *et al.*, 2021). According to Duvenage, (2019) the conceptual framework explains the path of a research. The main purpose of the framework being to make research findings more meaningful, acceptable to the theoretical constructs in the research field and ensures generalization. The concepts also assist in stimulating research while ensuring the extension of knowledge by providing both direction and an incentive to the research inquiry. The conceptual framework of this study sought to demonstrate the relationship between Integrated Monitoring and Evaluation System and performance of road projects in Kenya.

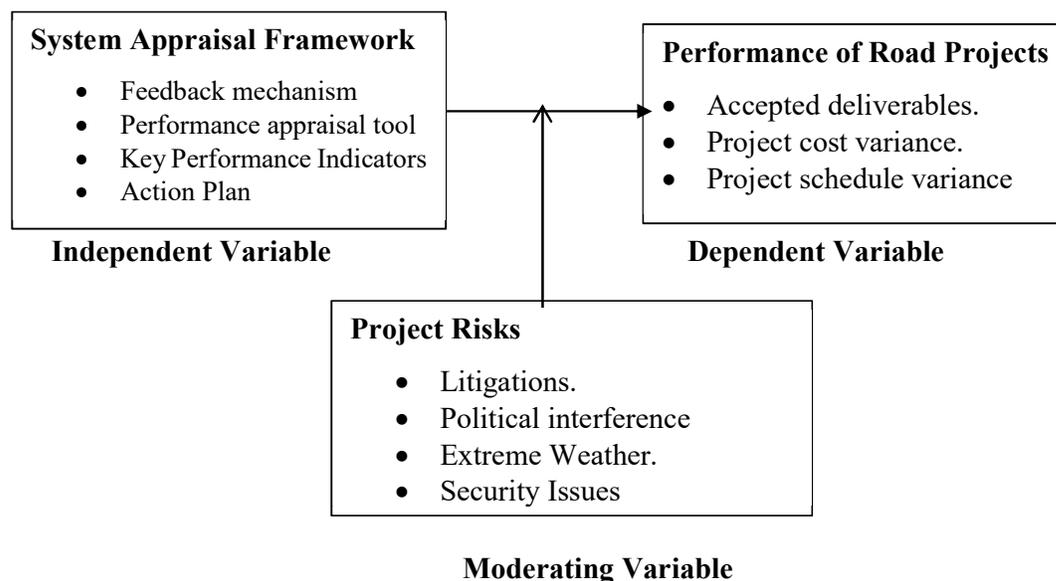


Figure 1: Conceptual Framework

System Appraisal Framework

A successful M&E involves the creation of a sustainable and a well-functioning Monitoring and Evaluation system within a government. This is where good quality M&E information is well used. According to Dixon *et al.*, (2019) utilization of M&E system information should be embraced. This is where the information is used to support government policy making, development, and analysis and program development. Secondly, the information should be of Good quality. This should include sound system performance pointers or well-organized types of evaluations. The third aspect is system sustainability. This relates to the likelihood of the system to survive a change in government administration. Good monitoring and evaluation system must comprise key features (Cagliero *et al.*, 2021). First, it must produce monitoring information and evaluation findings which are judged valuable by key stakeholders (Tirivanhu & Jansen, 2018). An arrangement of the system is another important component. This should include a good mechanism for data verification and auditing. This is whether evaluations are to be conducted internally within government, or contracted out to academia and consultants. The third aspect is to avoid the common danger of over-engineering the system. Lastly, the system must provide room for diagnosis of existing monitoring and evaluation functions. Such diagnoses are themselves a form of evaluation because they are useful for information and insight hence raising the shared awareness of stakeholders about the importance of monitoring and evaluation (Demeke, 2018).

Project Risks

Construction related Risks are unforeseen events that occur during the process of construction projects (Viles *et al.*, 2020). The construction industry (Alaloulet *et al.*, 2020) is subjected to uncertainties than any other industry. This is because of the complex nature of construction business activities, process, environment and organization. Being able to identify and manage

risks requires robust strategic project management. When risks occur, they can negatively affect successful completion of road projects. Deep *et al.*, (2022) state that risks that occur in highway projects lead to inability to achieve desired project objectives. So, risk assessment consisting of risk identification, risk classification and risk analysis is necessary for maintaining cost, schedule and quality of road construction project. It is the duty of the project team to collaborate in mitigating risks using appropriate processes and tools. Katushabe *et al.*, (2022) state that before a prevention plan is fully put in place, the project team needs to understand the security risks such as equipment theft, vandalism, Arson, Cyber and other threats it might be facing. This enables the team to develop methods to strengthen security and reduce project related losses. Construction has always been a sector impacted by weather related risks. Disruptions such as increased rainfall can cause delays and inflate project costs (Adu-Gyamfi *et al.*, 2023).

According to Cruz and Polinar, (2023) litigation and disputes in the construction industry occur because of miscommunication, lack of manpower or inexperience. To remain profitable, most players in the industry need to focus on effective methods that reduce unexpected job delays, conflicts, and costs. Some road projects instigate serious social unrest. Tassadiq, (2022) points out that in the initial phases of development, real or perceived inadequacies in community consultation can be flash-points for conflict hence affecting project delivery.

Road Project Performance

Infrastructure project development presents numerous challenges such as projects are time consuming, costly, and not always sustainable. Amiril *et al.*, (2018) argue that Sustainability performance across the life cycle of construction project is a crucial aspect in achieving the goal of sustainable development. Sustainability factors have the function of monitor and drive performance towards the construction project performances. Hence, the degree of sustainability performance of construction project is highly influenced by the implementation of sustainability factors such as customer satisfaction (Kivilä *et al.*, 2017). According to Bertram *et al.*, (2019) cost and schedule growth in construction projects occurs due to various reasons. Some of the factors influencing the cost and schedule growth are project characteristics, project delivery methods, contract types, unforeseen site conditions, inaccurate bidding design fees and weather conditions.

Empirical Literature Review

System appraisal plays an important aspect in determining the extent to which the system achieves the intended goals. The study by Hassan, (2013) to evaluate the influence of monitoring and evaluation system on project success found out that project mission, structural capacity, processes and outcome mapping individually influence project quality. It was also found out that all the components correlate positively. In a study that sought to examine how M&E factors, influence project performance deliverables in the County, Wanjiku, (2015) targeted project managers, field officers, employees in finance and procurement departments as well as employees in infrastructure and road department as the respondents. The study found out that there is very poor management of monitoring and evaluation information. The inadequacy of the management of information system was characterized by poor means of

monitoring and evaluation data storage, poor data processing, poor means of dissemination of monitoring and evaluation information. In a study to establish Key helping factors on establishment of a good Monitoring and Evaluation systems in South Africa, (Phillips, *et al.*, 2014), pointed out political commitment, strong programme leadership, and some strong institutions as the promoting factors. On the other hand, predominant compliance culture of M&E, poor programme planning, and poor administrative data were established as the Inhibiting factors. Ocharo and Rambo, (2020) concludes that monitoring and evaluation frameworks is correlated to performance of public agricultural projects in Galana Kilifi County, Kenya, as seen from test of hypothesis that value of $0.000 < 0.05$ level of significance. This study was done to establish how monitoring and evaluation frameworks influence performance of public agricultural projects in Galana Kilifi County, Kenya.

RESEARCH METHODOLOGY

Research Design

The study adopted a descriptive research design to examine relationships between variables without manipulation. This design was appropriate for assessing the influence of the IMES System Appraisal Framework on project performance and for testing the moderating role of project risks (Veal, 2017; Rahman, 2017).

Research Philosophy

The study was guided by the positivist research philosophy, which emphasizes objective measurement and statistical testing of relationships among variables. This approach enabled hypothesis testing using quantitative data and ensured generalizable findings (Ghiara, 2020; Stahl & King, 2020).

Target Population and Sampling

The target population comprised 188 road construction projects implemented by KeNHA, KeRRA, and KURA between 2015 and 2022. A sample size of 126 respondents was determined using Fisher's formula with finite population correction. Purposive sampling was used to select project managers as respondents due to their expertise and involvement in project implementation.

Data Collection Methods

Primary data were collected using structured questionnaires containing both open-ended and closed-ended questions. The instruments captured information on system appraisal practices, project risks, and project performance. Data collection was conducted through both physical administration and electronic means.

Reliability and Validity

Reliability was assessed using Cronbach's alpha, with a threshold of 0.7 indicating acceptable internal consistency. Validity was ensured using discriminant validity to confirm that the constructs measured were distinct and appropriate for the study (Mugenda & Mugenda, 2003; Taherdoost, 2016).

Data Analysis

Data were analyzed using descriptive and inferential statistics. Multiple linear regression was used to test the effect of the IMES System Appraisal Framework on project performance. Moderated multiple regression analysis was conducted to examine the moderating effect of project risks on this relationship. Statistical significance was tested at the 95% confidence level, and model strength was evaluated using the coefficient of determination (R^2) (Bunea et al., 2019).

The regression models were specified as:

$$Y = \alpha + \beta_1 X + \epsilon$$
$$Y = \alpha + \beta_1 XZ + \epsilon$$

Where:

Y= Performance of road projects

X= IMES System Appraisal Framework

Z= Project Risks (moderator)

Diagnostic Tests

To ensure robustness of results, diagnostic tests were conducted, including linearity (correlation analysis), multicollinearity (Variance Inflation Factor), normality (Shapiro-Wilk test), and homoscedasticity (Breusch-Pagan test). These tests ensured that regression assumptions were satisfied and that the results were reliable (Long & Ervin, 2019; Chatterjee & Hadi, 2019).

RESEARCH FINDINGS AND DISCUSSION

The number of questionnaires, administered to all the respondents was 126. A total of 110 questionnaires were properly filled and returned from the project managers implementing roads projects in KeNHa, KURA and KeRRA. This represented an overall successful response rate of 87%. According to Mugenda and Mugenda (2019), a response rate of 50% or more is adequate for data analysis and reporting rate of 60 percent is good and a response rate of 80 percent and over is excellent. Babbie (2018) also asserted that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good. This implies that 87% response rate for this study was suitable for data analysis and reporting.

Descriptive Statistics

System Appraisal Framework

The first objective of the study was to analyze the relationship of IMES System appraisal framework on performance of road projects in Kenya. The study findings in table 1 illustrate that 30% of the respondents indicated that performance feedback mechanism plays a role in the performance of road projects to a very large extent, 20.9% of the respondents indicated to a large extent, while 21.8% indicated to a medium extent and 14.5% indicated to a small extent. However, 12.7% of the respondents indicated that performance feedback mechanism does not play a role in the performance of road projects. On a 5-point scale, the average mean of the responses was 3.32 which implies that majority of the respondents agreed to a moderate extent on the statement; however, the answers were varied as shown by the standard deviation of

1.306. The respondents were asked to indicate whether performance appraisal tool affects the performance of road projects, 40% of the respondents indicated to a very large extent, 35.5% indicated to a large extent, and 10% indicated to a small extent. The mean score for the statement is 3.87 implying that majority of the respondents agreed on the statement; however, the answers were varied as shown by the standard deviation of 1.293. This study agrees with Ocharo and Rambo, (2020) conclusion that monitoring and evaluation frameworks is correlated to performance of public agricultural projects in Galana Kilifi County, Kenya. In regards to whether key performance indicators affect the performance of road projects; 37.3% of the respondents indicated to a very large extent, 25.5% indicated to a large extent while 20.9% indicated to a medium extent and 8.2% to a small extent. The mean score for the statement was 3.75 which imply that majority of the respondents agreed with the statement; however, the answers were varied as shown by the standard deviation of 1.265. On the statement “An action plan affects the performance of road projects”, 39.1% of the respondents agreed to a medium extent, 34.5% agreed to a large extent while 18.2% agreed to a very large extent and 8.2% indicated that an action plan has no influence on the performance of road projects. The mean score for the statement was 3.63 which imply that majority of the respondents agreed with the statement; however, the answers were varied as shown by the standard deviation of 1.148. The aggregate mean score for this section was 3.62 which imply that IMES system appraisal framework influences the performance of road projects to a large extent.

Table 1: System Appraisal Framework

Statement	No influence	Small extent	Medium extent	Large extent	Very large extent	Mean	Std. Deviation
Performance feedback mechanism plays a role in the performance of road projects.	12.7%	14.5%	21.8%	30.0%	20.9%	3.32	1.306
Performance appraisal tool affects the performance of road projects.	9.1%	10.0%	5.5%	35.5%	40.0%	3.87	1.293
Key performance indicators affect the performance of road projects.	8.2%	8.2%	20.9%	25.5%	37.3%	3.75	1.265
An action plan affects the performance of road projects.	8.2%	0.0%	39.1%	34.5%	18.2%	3.55	1.055
Aggregate Score	9.6%	8.2%	21.8%	31.4%	29.1%	3.62	1.230

Project Risks and IMES System Appraisal Framework

The respondents were asked to indicate whether Litigations raises IMES System Appraisal Framework implication on the performance of road projects, 36.4% of the respondents

indicated to a medium extent, 30.9% indicated to a large extent, and 24.5% indicated to a very large extent as shown in Table 2. The mean score for the statement is 3.64 implying that majority of the respondents agreed on the statement; however, the answers were varied as shown by the standard deviation of 1.107. In regards to whether, security issues raise IMES System Appraisal Framework implication on the performance of road projects; 50.9% of the respondents indicated to a large extent, 30% indicated to a very large extent and 10.9% indicated to a medium extent. The mean score for the statement was 3.95 which imply that majority of the respondents agreed with the statement; however, the answers were varied as shown by the standard deviation of 1.074. In addition, 50.9% of the respondents indicated that Extreme weather raises IMES System Appraisal Framework implication on the performance of road projects to a medium extent, 26.4% to a very large extent and 22.7% to a large extent. The mean score for the statement was 3.75 which imply that the respondents agreed with the statement to a large extent. On whether security issues raise IMES System Appraisal Framework implication on the performance of road projects; 58.2% of the respondents indicated to a very large extent, 29.1% indicated to a large extent while 12.7% indicated to a medium extent. The mean score for the statement was 4.45 which implies that majority of the respondents agreed with the statement; however, the answers were varied as shown by the standard deviation of 0.712. The aggregate mean score for this section was 3.95 which imply that project risk and IMES system appraisal framework influences the performance of road projects to a large extent

Table 2: Project Risks and IMES System Appraisal Framework

Statement	No influence	Small extent	Medium extent	Large extent	Very large extent	Mean	Std. Deviation
Litigations raise IMES System Appraisal Framework implication on the performance of road projects.	8.2%	0.0%	36.4%	30.9%	24.5%	3.64	1.107
Political interference raises IMES System Appraisal Framework implication on the	8.2%	0.0%	10.9%	50.9%	30.0%	3.95	1.074

performance of road projects.								
Extreme weather raises IMES System Appraisal Framework implication on the performance of road projects.	0.0%	0.0%	50.9%	22.7%	26.4%	3.75	0.848	
Security issues raise IMES System Appraisal Framework implication on the performance of road projects.	0.0%	0.0%	12.7%	29.1%	58.2%	4.45	0.712	
Aggregate Score	4.1%	0.0%	27.7%	33.4%	34.8%	3.95	0.935	

Project Performance

Table 3 presents descriptive statistics for road construction performance measured by eight constructs. Most of the respondents agreed to a large extent that IMES influences the performance of road construction projects in Kenya (mean score=4) and detailed in table 4.12

Table 3: Road Project Performance

Statement	N	Minimum	Maximum	Mean	Std. Deviation
Effective IMES improves on the efficiency and/or productivity and effectiveness of the road construction projects.	110	1.00	5.00	3.7636	.86658
Embracing IMES improves on resources utilization, benefits ratio and reduces maintenance costs and learning possibilities.	110	3.00	5.00	4.4182	.66886
Use of IMES reduces response time to incidents and complaints in road construction projects.	110	1.00	5.00	3.6364	1.34592

Effective IMES helps to track on investments protection on road construction projects	110	1.00	5.00	3.7455	1.10409
Effective use of IMES helps to improve on level of public acceptability or reduce opposition to road projects	110	1.00	5.00	3.7455	1.10409
Use of effect IMES improves on speed reliability, affordability, integration and satisfaction in road construction projects	110	1.00	5.00	3.6364	1.34592
Effective IMES reduces operating costs, increase welfare of communities and unit saving in fuel.	110	1.00	5.00	3.8727	1.29295
Embracing effective IMES helps in reducing design risks, promoting functionality and increasing designed life span of roads.	110	1.00	5.00	3.5455	1.05480

Correlation Analysis

The present study used Pearson correlation analysis to determine the strength of association between independent variable (system appraisal framework) and the dependent variable (performance of road project in Kenya). Pearson correlation coefficient range between zero and one, where by the strength of association increase with increase in the value of the correlation coefficients.

Table 4: Correlation Coefficients

		Project Performance	System Appraisal Framework
Project Performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	110	
System Appraisal Framework	Pearson Correlation	.801**	1
	Sig. (2-tailed)	.003	
	N	110	110

The results revealed that there was a very strong relationship between system appraisal framework and performance of road project in Kenya ($r = 0.801$, p value = 0.003). The relationship was significant since the p value 0.003 was less than 0.05 (significant level). The findings are in line with the results of Ocharo and Rambo, (2020) who revealed that there is a very strong relationship between system appraisal framework and project performance.

Test for Hypothesis One

The first objective of the study was to evaluate the relationship between IMES System appraisal framework and performance of road projects in Kenya. The corresponding hypothesis was IMES System appraisal framework has no significance impact on performance of road projects in Kenya.

A univariate analysis was therefore conducted to test the null hypothesis. From the model summary findings in Table 5, the r -squared for the relationship between system appraisal framework and performance of road projects in Kenya was 0.199; this is an indication that at 95% confidence interval, 19.9% variation in performance of road projects in Kenya can be attributed to changes in system appraisal framework. Therefore, system appraisal framework can be used to explain 19.9% change in performance of road projects in Kenya. However, the remaining 80.1% variation in performance of road projects in Kenya suggests that there are other factors other than system appraisal framework that explain performance of road projects in Kenya.

Table 5: Model Summary for System Appraisal Framework

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.446 ^a	.199	.198	.70542

a. Predictors: (Constant), system appraisal framework

The analysis of variance was used to determine whether the regression model is a good fit for the data. From the analysis of variance (ANOVA) findings in Table 4.31, the study found out that that $\text{Prob} > F_{1, 108} = 0.000$ was less than the selected 0.05 level of significance. This suggests that the model as constituted was fit to predict performance of road projects in Kenya. Further, the F -calculated, from the table (26.83) was greater than the F -critical, from f -distribution tables (3.929) supporting the findings that system appraisal framework can be used to predict performance of road projects in Kenya.

Table 6: ANOVA for System Appraisal Framework

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	14.009	1	14.009	26.83	.000 ^b
1 Residual	56.331	108	0.522		
Total	70.34	109			

a. Dependent Variable: performance of road projects in Kenya

b. Predictors: (Constant), system appraisal framework

From the results in table 7, the following regression model was fitted.

$$Y = 0.298 + 0316 X_I$$

(X_I is System Appraisal Framework)

The coefficient results showed that the constant had a coefficient of 0.298 suggesting that if system appraisal framework was held constant at zero, performance of road projects in Kenya would be at 0.298 units. In addition, results showed that system appraisal framework coefficient was 0.316 indicating that a unit increase in system appraisal framework would result in a 0.316 unit improvement in performance of road projects in Kenya. It was also noted that the P-value for system appraisal framework was 0.001 which is less than the set 0.05 significance level indicating that system appraisal framework was significant. Based on these results, the study rejected the null hypothesis and accepted the alternative that system appraisal framework has positive significant influence on performance of road projects in Kenya.

Table 7: Beta Coefficients for System Appraisal Framework

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	0.298	.078		3.821	.003
1 system appraisal framework	0.316	0.089	0.315	3.551	0.001

a. Dependent Variable: performance of road projects in Kenya

Test for Hypothesis Two

The second objective of the study was to determine the moderating effect of project risks on the relationship between IMES system appraisal framework and performance of road projects in Kenya. Moderation happens when the relationship between the dependent variable and the independent variables is dependent on a third variable (moderating variable). The effect that this variable has is termed as interaction as it affects the direction or strength of the relationship between the dependent and independent variable. To achieve the fifth research objective, the study computed moderating effect regression analysis. This (moderating effect regression analysis) also guided the study in testing the fifth research hypothesis. Project risks (M) was introduced as the moderating variable.

Ho₂: Project Risks has no significance moderating effect on relationship between IMES system appraisal framework and performance of road projects in Kenya.

From the model summary findings in Table 8, the first model for which is the regression between system appraisal framework (X) without moderator, project risks (M) and interaction, the value of R-squared was 0.356 which suggests that 35.6% change in performance of road projects in Kenya can be explained by changes in system appraisal framework. The p-value for the first model (0.000) was less than the selected level of significance (0.05) suggesting that the model was significant. The findings in the second model which constituted system appraisal framework, project risks and performance of road projects in Kenya (X*M) as predictors, the r-squared was 0.621. This implies that the introduction of project risks in the second model led to a 0.265 increase in r-squared, showing that project risks positively moderates performance of road projects in Kenya.

Table 8: Model Summary for Moderation Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.597 ^a	.356	.357	.65170	.356	386.860	1	108	.000
2	.788 ^b	.621	.620	.52727	.621	537.10	2	107	.000

a. Predictors: (Constant), system appraisal framework

b. Predictors: (Constant), system appraisal framework, project risks, Interaction (X*M)

From the model summary findings in Table 9, the F-calculated for the first model, was 281.996 and for the second model was 438.141. Since the F-calculated for the two models were more than the F-critical, 3.929 (first model) and 3.081 (second model), the two models were good fit for the data and hence they could be used in predicting the moderating effect of project risks on performance of road projects in Kenya.

Table 9: ANOVA for Moderation Effect

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	72.191	1	72.191	281.996	.000 ^b
1	Residual	27.621	108	0.256		
	Total	99.812	109			
	Regression	111.287	2	55.644	438.141	.000 ^c
2	Residual	13.621	107	0.127		
	Total	124.908	109			

a. Dependent Variable: performance of road projects in Kenya

b. Predictors: (Constant), system appraisal framework

c. Predictors: (Constant), system appraisal framework, project risks, Interaction

Further, by substituting the beta values as well as the constant term from the coefficient's findings for the first step regression modelling, the following regression model was fitted:

$$Y = 0.244 + 0.329X$$

Where X is System appraisal framework

The findings show that when system appraisal framework is held to a constant zero, performance of road projects in Kenya will be at a constant value of 0.244. The findings also show that system appraisal framework has a statistically significant effect on performance of road projects in Kenya as shown by a regression coefficient of 0.329 (p-value= .002).

By substituting the beta values as well as the constant term from model 2 emanating from the second step in regression modeling the following regression model was fitted:

$$Y = 0.297 + 0.281 X + 0.341 M + -0.354 X*M$$

Where X is system appraisal framework; M is project risks and X*M is the interaction term between system appraisal framework and project risks.

The findings show that when system appraisal framework, project risks, interaction (X*M) are held to a constant zero, performance of road projects in Kenya will be at a constant value of

0.297. The model also indicated that system appraisal framework had a positive and statistically significant effect on performance of road projects in Kenya as shown by a regression coefficient of 0.281 (p-value= 0.003). However, it is seen that project risks had a negative and significant effect on performance of road projects in Kenya as shown by a regression coefficient -0.341. On the other hand, interaction of system appraisal framework and project risks (X*M) also had a negative and insignificant effect on performance of road projects in Kenya as shown by a regression coefficient of -0.354 (p-value= 0.000).

It is therefore seen that system appraisal framework on its own has 28.1% effect on performance of road projects in Kenya. However, when interacted with project risks, it has an effect of -35.4%. This is a clear indication that introduction of project risks as moderating variable has a negative influence on performance of road projects in Kenya. The study therefore fails to reject the null hypothesis that project risks has no significant moderating effect on the relationship between system appraisal framework and performance of road projects in Kenya.

Table 4.1: Beta Coefficients for Moderation Effect

Model	Unstandardized		Standardized	t	Sig.
	Coefficients				
	B	Std. Error	Beta		
(Constant)	0.244	.063		3.873	.000
1 system appraisal framework	.329	.088	.328	3.739	.002
(Constant)	0.297	0.079		3.759	.000
2 system appraisal framework	.281	.073	.282	3.849	.003
project risks	-.341	.091	.340	-3.747	.061
Interaction (X*M)	-.354	.093	.255	-3.806	.062

a. Dependent Variable: performance of road projects in Kenya

Conclusions

The first null hypothesis test was ‘IMES System appraisal framework has no significance impact on performance of road projects in Kenya. The study found that system appraisal framework is statistically significant in explaining performance of road projects in Kenya. The influence was found to be positive. This means that unit improvement in system appraisal framework would lead to an increase in performance of road projects in Kenya. Based on the findings, the study concluded that system appraisal framework positively and significantly influences performance of road projects in Kenya.

The second research hypothesis tested was that ‘Project Risks has no significance moderating effect on relationship between IMES system appraisal framework and performance of road projects in Kenya. The study found that project risks had a negative and significant effect on performance of road projects in Kenya. On the other hand, interaction of system appraisal framework and project risks (X*M) also had a negative and insignificant effect on performance

of road projects in Kenya. It is therefore seen that system appraisal framework on its own has 28.1% effect on performance of road projects in Kenya. However, when interacted with project risks, it has an effect of -35.4%. This is a clear indication that introduction of project risks as moderating variable has a negative influence on performance of road projects in Kenya. The study therefore fails to reject the null hypothesis that project risks has no significant moderating effect on the relationship between system appraisal framework and performance of road projects in Kenya.

Recommendations

The study also recommends that the management of road projects in Kenya should implement a standardized, multi-criteria appraisal framework that evaluates projects based on economic, environmental, social, and technical viability before approval. This ensures that only well-justified and feasible projects are selected for implementation, reducing the risk of delays, cost overruns, and project abandonment.

In addition, the study recommends that the management of road projects in Kenya should embed proactive risk management protocols within the M&E framework. This involves identifying potential risks early in the project lifecycle and continuously assessing their likelihood and impact through the M&E system.

Recommendations for Further Studies

This study was limited to the relationship between system appraisal framework (IMES) and the performance of road project in Kenya hence the study findings cannot be generalized to performance of projects in other sectors in Kenya. The study therefore suggests further studies on the relationship between system appraisal framework on performance of projects in other sectors in Kenya.

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