

Resource Planning and Performance of Projects by Kenya Urban Roads Authority in Nakuru County, Kenya

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Abstract: Kenya Urban Roads Authority (KURA) projects have faced significant delays, largely due to resource planning challenges, especially the untimely allocation of funds. These delays not only extend completion timelines but also escalate costs, compromise work quality, and deter the operational efficiency. The current study examined the effect of resource planning, within integrated project planning, on the performance of road projects by KURA in Nakuru County, Kenya. The study was anchored on resource dependency theory. The study adopted a descriptive research design. The target population comprised 35 ongoing KURA projects in Nakuru County, with project managers, contractors, and community leaders as respondents; three per project, totaling 105. These individuals formed the unit of observation. Data was collected using a structured questionnaire, while analysis involved descriptive methods and inferential techniques, including regression and correlation analysis. Descriptive research findings revealed that integrated project planning significantly affects the performance of projects. The correlation analysis revealed a strong, positive, and significant relationship between resource planning and project performance ($r=0.723^{**}$, $p=0.000$). This implies that effective planning for material, financial, and contingency resources plays a crucial role in project outcomes. Additionally, regression analysis indicated a coefficient of determination (R^2) of 0.523, meaning that resource planning accounts for 52.3% of the variation in project performance. The statistically significant t-value of 8.883 ($p=0.000$) at the 95% confidence level further reinforces the critical influence of resource planning on the performance of Kenya Urban Roads Authority projects.

Keywords: Resource Planning, Integrated Project Planning, Project Performance, Kenya Urban Roads Authority

I. Introduction

Project management focuses on achieving defined objectives through structured processes (Kayelle, Rabbani, & Macedo, 2023). Within this framework, project planning emerges as a critical stage, addressing timelines, resources, and deliverables. Effective planning bridges the gap between project goals and their execution. However, challenges often arise when isolated components operate without alignment. According to Camacho and Cruz (2022) integrated project planning addresses this by unifying disparate project elements, ensuring synchronization and enhancing overall project efficacy. This approach establishes a holistic framework that aligns project objectives with organizational strategies, coordinating activities across project phases and integrating diverse management processes to promote cohesion and consistency in implementation. Central to integrated project planning is its emphasis on fostering collaboration, communication, and shared understanding among stakeholders (Evans & Farrell, 2023). By consolidating planning tasks and recognizing interdependencies among project components, this approach streamlines processes and improves efficiency. It enables teams to anticipate challenges, allocate resources effectively, and adapt to dynamic project conditions. Ultimately, integrated project planning not only enhances coordination but also strengthens the alignment of project outcomes with strategic priorities, ensuring successful delivery within established constraints (Camacho & Cruz, 2022).

Resource planning, as an integral practice within project management, serves as a systematic approach to identifying, allocating, and optimizing the use of resources across the lifecycle of a project (Kayelle et al., 2023). It operates within the broader framework of integrated project planning, ensuring that resource allocation aligns seamlessly with project objectives, timelines, and deliverables. By forecasting resource requirements and mapping them to project phases, this practice mitigates the risk of shortages or surpluses, thereby enhancing operational efficiency. Furthermore, it facilitates the synchronization of interdependent tasks, enabling project managers to anticipate dependencies and allocate

resources in a manner that minimizes disruptions and maximizes productivity. This proactive approach not only supports the achievement of project goals but also ensures that resources are utilized in a cost-effective and sustainable manner. The integration of resource planning into project management fosters a cohesive alignment between strategic objectives and operational execution, creating a unified framework for decision-making (Dahalan, Rahman, Hassan, & Ahmad, 2023). By employing tools such as resource leveling, capacity modeling, and scenario analysis, project teams can dynamically adjust to changing conditions while maintaining alignment with project constraints. This practice also promotes transparency and collaboration among stakeholders, as it provides a clear overview of resource availability and utilization across the project. Such visibility enables informed prioritization and risk mitigation, particularly in complex projects with competing demands (Evans & Farrell, 2023).

Resource planning enhances the adaptability and resilience of project teams, ensuring that resources are deployed effectively to meet evolving challenges and deliver outcomes within defined parameters of scope, time, and budget (Dahalan et al., 2023). Project performance in road construction and maintenance is critically evaluated based on timely completion, adherence to budget, and scope fulfillment. However, cost overruns frequently disrupt planning, straining available resources and complicating project execution. Schedule deviations further exacerbate these challenges, leading to prolonged timelines and increased operational costs. In the context of the Kenya Urban Roads Authority (KURA), these issues are particularly pronounced, significantly impeding project delivery (Kiai, 2020). Persistent cost overruns, for instance, create discrepancies between projected and actual expenditures, placing undue pressure on public funds and hindering the Authority's ability to complete projects within financial constraints. Poorly managed scope changes further compound these challenges, resulting in uneven resource allocation and frequent adjustments that disrupt project timelines (Kiprop & Yusuf, 2022).

As of June 30, 2022, the Auditor General revealed that KURA owed contractors Sh.38.6 billion in unpaid invoices. Between April 2016 and September 2020, the Authority awarded 91 projects totaling Sh.180.7 billion, with Sh.16.2 billion disbursed as advance payments. Despite this, many projects remain incomplete due to payment delays, which disrupt contractors' cash flow and impede their ability to mobilize resources. These delays not only exacerbate project timelines but also undermine KURA's operational efficiency and its ability to deliver on its mandate. Consequently, the Authority's failure to address these systemic issues jeopardizes project outcomes, erodes public trust, and compromises its mission to develop urban road infrastructure effectively. Although the integrated project planning ensures the alignment of resources with project objectives, its link to project performance remains underexplored. Kiai (2020) found that 86.10% of variation in Kenya Urban Roads Authority (KURA) project implementation in Laikipia County was influenced by procurement, team competency, resource availability, and stakeholder participation. Similarly, Kiprop and Yusuf (2022) highlighted the significant impact of construction risks on KURA projects in central Kenya. However, these studies overlook the integration of resource planning within a holistic planning framework, crucial for optimizing performance and sustainability. The current study examined the effect of resource planning on the performance of road projects by Kenya urban roads authority in Nakuru County, Kenya.

II. Objective of the Study

The objective of the study was to examine the effect of resource planning on performance of projects by Kenya Urban Roads Authority in Nakuru County.

III. Literature Review

Resource planning within integrated project planning is a strategic process that ensures the effective management and allocation of resources critical for project success (Sohaib et al., 2024). A central element of this process is material planning, which involves identifying, procuring, and managing the materials required for project activities. This includes assessing material needs based on project specifications, devising procurement strategies, and ensuring timely availability to prevent disruptions. According to Shabani, Malvik, Johansen, and Torp (2023), effective material planning not only optimizes resource use but also mitigates risks linked to supply chain inefficiencies, ensuring projects adhere to schedules and maintain quality standards. Equally important is financial planning, which focuses on estimating, allocating, and monitoring financial resources to support project activities (Chepng'eno & Kimutai, 2021). This entails creating detailed budget forecasts, prioritizing fund allocation, and tracking expenditures to ensure compliance with financial constraints. As Lwanga (2021) notes, robust financial planning empowers project managers to control costs, allocate resources efficiently, and make informed decisions about investments and contingencies. By maintaining financial transparency and oversight, organizations can foster stakeholder trust and ensure fiscal stability throughout the project lifecycle (Wadhvani, 2022).

included 39 road construction projects underway by the Kenya Urban Roads Authority and Kenya National Highway Authority across the Nairobi metropolitan area. Primary data was gathered using a semi-structured questionnaire. The findings indicated that effective scheduling of project resources had a favorable and statistically significant impact on the performance of road construction projects within Nairobi Metropolitan, Kenya. The study concludes that proficient financial resource scheduling empowers organizations to mitigate risks arising from project outcome fluctuations.

Wairimu and Ngugi (2023) examined the project management practices and performance of road projects in Nairobi City County. The study employed a descriptive research design to investigate road projects managed by KeNHA and KURA over an eight-year period from 2008 to 2013. The research utilized a census approach, encompassing all fifty-one road projects as the target population. Data was gathered from 102 project managers and engineers affiliated with KeNHA and KURA, encompassing both qualitative and quantitative aspects. The findings of the study highlight that effective project cost management significantly enhances the performance of road projects within Nairobi City County, Kenya. Furthermore, the study underscores that proficient project team management also contributes positively and significantly to project performance.

Gichohi, Iravo, and Muchelule (2023) conducted a study on the top management support and performance of road construction projects in Kenya. This study employed a cross-sectional research design within a positivist research paradigm. It focused on road construction projects overseen by National Government Road Agencies (KURA, KeRRA, and KeNHA) in Kenya, with management employees involved in project implementation as the unit of observation. The target population comprised 695 respondents, including director generals, directors, project engineers, resident engineers, site engineers, and surveyors engaged in these projects. The findings revealed that top management support significantly and positively correlates with the performance of road construction projects in Kenya. Furthermore, organizational culture was identified as a significant moderator, enhancing the positive relationship between top management support and project performance. These results underscore the critical role of supportive top management and conducive organizational culture in fostering successful project outcomes and stakeholder satisfaction in the infrastructure sector.

Mokua and Nyaberi (2024). Project resource planning and performance of county-funded rural road projects in Nakuru County. The study employed a descriptive research design grounded in project management theory. It focused on 135 rural road projects implemented across 9 sub-counties (Naivasha, Subukia, Bahati, Molo, Njoro, Kuresoi North, Kuresoi South, and Rongai) during the fiscal year 2022/2023 by the County Government of Nakuru. The units of analysis were these 135 projects, with observations drawn from 135 contractors, 9 engineers, and 9 project managers, totaling 153 respondents. The findings revealed a significant and strong positive correlation between project resource planning and the performance of county-funded rural road projects. The present study aimed to bridge research gaps observed in previous empirical studies. Rwamba et al.'s (2024) research focused exclusively on financial resources, neglecting planning for material and human resources. In contrast, this study comprehensively explored material and contingency resource planning and their impact on project performance.

Additionally, Wairimu and Ngugi's (2023) study lacked adequate emphasis on project planning, particularly in integrated project planning encompassing resource management, a gap this study sought to fill. Moreover, Gichohi et al.'s (2023) investigation into top management support and project performance also overlooked integrated project planning, limiting insights into how holistic planning including scope, schedule, and cost management could synergize with top management support for project success. In the current study, procurement resource planning and its implications for project performance was thoroughly described to address this gap. Additionally, Mokua and Nyaberi's (2024) research on project resource planning lacked focus on feedback loop iteration, a component that was incorporated into the current study to enhance project planning effectiveness.

IV. Methodology

The current study employed a descriptive research design. This design was justified by its capacity to furnish valuable insights into the attributes and phenomena of interest without manipulating variables or establishing causal relationships. Descriptive research design was ideal for assessing resource planning within integrated project planning. The target population was the 35 ongoing KURA projects in Nakuru County. In particular, the project managers, contractors and community leaders were involved thus 3 respondents per project and 105 in total. Therefore, 105 project managers, contractors and community leaders at the said projects were the unit of observation. Structured questionnaire was used in data collection. Descriptive and inferential methods were utilized in data analysis. Descriptive analysis incorporated frequencies, percentages, means and standard deviations. In inferential analysis, regression analysis and

correlation analysis were applied. Findings were presented through tables. The following regression analysis model was utilized:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Y = Project Performance.

β_0 = Constant.

β_1 = Beta Coefficient.

X_1 = Resource Planning.

ε = Error margin.

V. Findings and Discussions

This section outlines the findings and discussions on the impact of resource planning on the performance of projects undertaken by the Kenya Urban Roads Authority. The study targeted a population of 105, and an equivalent number of questionnaires were prepared and distributed. Of these, 74 were fully completed and returned, representing a response rate of 70.5%, which was deemed sufficient for analysis.

5.1 Descriptive Findings and Discussions

The study sought to establish effect of resource planning on project performance of projects by Kenya Urban Roads Authority. Findings are detailed in Tables 1 and 2:

Table 1: Effect of Resource Planning on Project Performance

	N	SA	A	N	D	SD	Mean	Std. Dev
		5	4	3	2	1		
	Percentage (%)							
We have a comprehensive plan for managing all necessary material resources.	74	55.4	25.7	13.5	2.7	2.7	4.28	0.986
Material resources are allocated according to the project's requirements and schedule.	74	39.2	37.8	23	0	0	4.16	0.777
The project budget is effectively planned to address all financial needs.	74	18.9	16.2	37.8	17.6	9.5	3.18	1.209
We maintain adequate financial resources to handle cost overruns.	74	37.8	43.2	14.9	1.4	2.7	4.12	0.906
Sufficient contingency resources are allocated to handle potential risks and unexpected issues.	74	43.2	29.7	20.3	5.4	1.4	4.08	0.990
The planning for contingency resources is successful in anticipating and addressing potential project challenges.	74	25.5	18.9	40.5	12.2	2.7	3.53	1.088

The study findings indicates that 55.4% of the respondents strongly agreed and 25.7% also agreed thus 81.1% at least agreed (Mean; Std. Dev.=0.986) that they have a comprehensive plan for managing all necessary material resources. This implies that a detailed plan for overseeing all required material resources guarantees their prompt availability and effective use during the project lifecycle. This improves project outcomes by minimizing delays, maximizing cost-effectiveness, and facilitating smooth execution of project activities. 77% of the respondents agreed (Mean=4.16; Std. Dev.=0.777) that material resources are allocated according to the project's requirements and schedule. This coordination improves project performance by facilitating a seamless workflow, maximizing efficiency, and adhering to project schedules. However, 37.8% of the respondents were indifferent (Mean=3.18; Std. Dev.=1.209) that the project budget is effectively planned to address all financial needs. Properly planning the project budget to meet all financial requirements guarantees that adequate funds are accessible for each stage, averting financial limitations that could interfere with project operations. This improves project performance by sustaining financial stability, allowing for the prompt acquisition of resources, and facilitating the attainment of project objectives within the designated budget.

The findings showed that 81% of the respondents agreed (Mean=4.12; Std. Dev.=0.906) that they maintain adequate financial resources to handle cost overruns. It means that sufficient allocation of financial resources to address cost

overruns guarantees that the project can proceed seamlessly, even when faced with unforeseen expenses. This enhances project performance by reducing delays, sustaining progress, and avoiding interruptions caused by budget constraints. 43.2% of the respondents strongly agreed and 29.7% also agreed hence 72.9% at least agreed (Mean=4.08; Std. Dev.=0.990) that sufficient contingency resources are allocated to handle potential risks and unexpected issues. Therefore, allocating sufficient contingency resources to address potential risks and unexpected issues helps mitigate disruptions that may arise during the project. This strengthens project performance by ensuring that resources are readily available to manage uncertainties, keeping the project on track and within scope. Further, 40.5% of the respondents had differing views (Mean=3.53; Std. Dev.=1.088) that the planning for contingency resources is successful in anticipating and addressing potential project challenges. Effective planning for contingency resources allows for the anticipation and addressing of possible project challenges, ensuring that unexpected issues are handled efficiently. This enhances project performance by reducing interruptions, preserving workflow continuity, and protecting project timelines and goals.

Table 2: Project Performance

	N	SA	A	N	D	SD	Mean	Std. Dev	
		5	4	3	2	1			
	Percentage (%)								
Our activities are aligned with the costs constraints.	74	52.7	35.1	9.5	2.7	0	4.38	0.771	
Our project objectives are clearly defined.	74	35.1	40.5	14.9	8.1	1.4	4.00	0.979	
The quality of our project outcomes meets the established quality expectations.	74	32.4	45.9	12.2	9.5	0	4.01	0.914	
Changes to the project time scope are managed effectively and communicated clearly.	74	33.8	47.3	16.2	2.7	0	4.12	0.776	
We strive to achieve deliverables within the specified time.	74	25.7	43.2	21.6	6.8	2.7	3.82	0.984	
The project team works collaboratively and efficiently to achieve the project goals.	74	41.9	36.5	12.2	5.4	4.1	4.07	1.064	

The findings showed that 87.8% of the respondents agreed (Mean=4.38; Std. Dev.=0.771) that their respective activities are aligned with the costs constraints. 75.6% of the respondents agreed (Mean=4.00; Std. Dev.=0.979) that their project objectives are clearly defined. Additionally, 78.3% of the respondents concurred (Mean=4.01; Std. Dev.=0.914) that the quality of their project outcomes meets the established quality expectations. Moreover, 81.1% of the respondents agreed (Mean=4.12; Std. Dev.=0.776) that changes to the project time scope are managed effectively and communicated clearly. Furthermore, 78.4% of the respondents agreed (Mean=4.07; Std. Dev.=1.064) that the project team works collaboratively and efficiently to achieve the project goals. Descriptive research findings revealed that integrated project planning significantly affects the performance of projects conducted by the Kenya Urban Roads Authority (KURA). Overall, the results showed that resource planning maximizes the allocation of financial, human, and material resources, reducing wastage and enhancing efficiency and ultimately improves the project performance.

5.2 Inferential Findings and Discussions

Inferential analysis was performed to determine the connection between resource planning and the performance of projects by the Kenya Urban Roads Authority, utilizing correlation and regression analysis methods.

5.2.1 Correlation Analysis Statistical Results

The correlation analysis established the strength and direction of relationship between resource planning and project performance. The findings are displayed in Table 3:

Table 3: Correlation Analysis Statistical Results

		Project Performance
Resource Planning	Pearson Correlation	.723**
	Sig. (2-tailed)	.000
	N	74

** . Correlation is significant at the 0.01 level (2-tailed).

According to the correlation analysis results, there was a strong, positive and significant correlation ($r=0.723^{**}$; $p=0.000$) between the resource planning and project performance. This implies that the planning for material, financial, and contingency resources have a significant effect on project performance. Efficient material resource planning ensures the timely delivery of the appropriate quality and quantity of materials, thus minimizing interruptions. Additionally, financial resource planning secures sufficient funding for project tasks, which lowers the chances of delays due to budget deficiencies. Moreover, contingency resources serve as a backup to address unexpected risks, enabling projects to adjust without sacrificing timelines or quality. These results emphasize that improving resource planning processes directly boosts project efficiency, enhances stakeholder satisfaction, and increases the project performance.

5.2.2 Regression Analysis Statistical Results

Regression analysis statistical results are presented in Tables 4, 5, and 6:

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.723 ^a	.523	.516	.29220

a. Predictors: (Constant), Resource Planning

The model summary shows a correlation coefficient (R) of 0.723 and a coefficient of determination (R²) of 0.523, indicating that 52.3% of the variation in project performance is caused by resource planning. The results indicates a significant effect of resource planning on improving project performance for the Kenya Urban Roads Authority.

Table 5: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.737	1	6.737	78.900	.000 ^b
	Residual	6.148	72	.085		
	Total	12.884	73			

a. Dependent Variable: Project Performance

b. Predictors: (Constant), Resource Planning

The ANOVA results showed a highly significant F-value of 78.900 ($p=0.000$), demonstrating that the overall model was fit. This highlights the critical role of resource planning in influencing project performance at the Kenya Urban Roads Authority.

Table 6: Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	1.427	.299		4.770	.000
Resource Planning	.678	.076	.723	8.883	.000

a. Dependent Variable: Project Performance

The regression model utilized was interpreted as $Y = 1.427 + 0.678X_1 + \epsilon$. This indicates that a one-unit change in resource planning results in a 0.678-unit variation in project performance. The results indicates that the project performance of Kenya Urban Roads Authority is affected by resource planning. The results indicated that the t-value of 8.883 was statistically significant ($p=0.000$) at the 95% confidence level. This confirms that resource planning has a significant relationship with the performance of projects undertaken by the Kenya Urban Roads Authority.

VI. Conclusion

The study concludes that resource planning affects the project performance. It was established that on-time availability of materials prevents delays and facilitates seamless project execution, preserving momentum throughout the project lifecycle. However, KURA has encountered delays in projects, and this can be attributed in part, to the lack of timely availability of adequate materials. It was also concluded that financial resources are just as vital, as proper planning and budget allocation guarantee that funds are accessible when required, preventing financial obstacles. Effective management of financial resources also supports cost control and enhances the value achieved within the project's financial limits. The scope creep and quality problems found in KURA projects can thus be attributed to insufficient financial resources and their mismanagement. Additionally, contingency resources further enhance project performance

by equipping the team to handle unexpected situations, allowing the project to advance smoothly despite unforeseen challenges. The proactive planning of these contingency resources offers a safety net that reduces disruptions, ensuring the project stays on schedule and within scope.

Recommendation

The study recommends that Kenya Urban Roads Authority should integrate resource planning with all other project planning areas to ensure seamless coordination and efficient allocation. Regularly assessing both resource availability and performance throughout the project will help align resources with evolving project needs. Additionally, fostering flexibility in resource planning allows for adaptive responses to changes, ensuring continuous alignment with overall project goals.

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