



**PROJECT PLANNING PRACTICES AND PERFORMANCE OF KENYA RURAL
ROADS AUTHORITY PROJECTS IN MACHAKOS COUNTY**

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ABSTRACT

The purpose of this study was to examine the influence of project planning practices on the performance of Kenya Rural Roads Authority projects in Machakos County. On the other hand, the specific objectives of the study were: to determine the influence of project scope planning; and to establish the influence of project schedule planning on the performance of Kenya Rural Roads Authority projects in Machakos County. The study was pegged on theory of change. The study conducted both descriptive and inferential analysis. The study found that project scope planning ($\beta = .913$, sig = .000), project schedule planning ($\beta = .904$, sig = .000) had significant positive relationship with performance of Kenya Rural Roads Authority projects in Machakos County. The study recommended the adoption of project planning practices in Kenya Rural Roads Authority (KeRRA) projects in Machakos County to improve performance.

Keywords: Project planning practices, KeRRA, performance of projects

INTRODUCTION

Background of the Study

Rural roads are crucial to the economic growth and prosperity of nations around the world. They provide communities living in rural areas with mobility and access to vital services such as markets, education institutions, healthcare facilities, and other essential services. Rural road projects therefore, help to improve the quality of life for people living in rural areas by providing them with improved connectivity. Governments and international organizations around the world have been making investments in rural road projects because they recognize their importance. However, despite the benefits they bring, rural road projects, particularly in developing nations with limited resources still experience challenges. Some of these challenges include completion delays, cost overruns, and subpar results. These challenges can be attributed to inadequate planning, inadequate designs, insufficient resources, lack of skilled personnel, lack of stakeholder involvement, bureaucratic hurdles, payment delays and political interference. (Alashwal & Alashwal, 2023; Kabiti & Kikwatha, 2022; Msomba et al, 2018; Tadewos & Patel, 2018).

According to a study conducted in India by Lende and Rathod (2018), most road projects experience time and cost overruns. The author postulates that the main causes of this poor performance are delays in project approval, delays in relocation of utilities, changes in design during the construction phase, changes in the cost of services, changes in materials quantities, and delays in payments. The authors attribute change in cost of services and changes in design to lack of adequate project planning.

A study carried out in Ethiopia by Tadewos and Patel (2018), found that most of the road projects are not completed within the planned timelines and estimated budget. The study sought to identify the factors that bring about delays and overruns in road projects in Addis Ababa. Each of the 10 projects that were investigated experienced schedule overruns varying from 25% to 264.38% and cost overruns from 4.11% to 135.06%. The primary causes of project completion delays and cost overruns according to the authors are; acquisition of land, lack of enough materials and equipment, inadequate planning, design changes, and financial related problems.

Most road projects in Kenya are not completed by the initial timelines set forth (Seboru, 2015). Local Kenyan contractors have trouble completing projects on schedule, within budget, and with acceptable quality (Densford et al., 2018). Delays in road projects in Kenya are attributed to the following five causes: bureaucracy; lack of adequate planning/scheduling; payment delays by clients; rain; and claims (Seboru, 2015). In Kenya, cost overruns for rural road projects range from 5.31% to 24.92% over the original contract amounts (Lukale, 2018).

Statement of the Problem

The successful implementation of infrastructure projects is very vital for the sustainable development of any country or region. Infrastructure is one of the sectors upon which the economic, social, and political pillars of Kenya Vision 2030 are anchored on (Government of the Republic of Kenya [GoK], 2007). According to GoK (2007), the 2030 vision aspires for a country firmly interconnected through a network of roads. To achieve this, the Government of Kenya through the Kenya Roads Act of 2007, has created several road agencies, among them KeRRA, which plays a vital role in enhancing rural connectivity through the implementation of rural road projects. KeRRA has and is implementing several road projects in Machakos County. However, despite the strategic importance of these projects, most of them have failed to perform to their expectations as they experience completion delays, cost overruns, compromised quality, and inadequate benefits to the community. Data obtained from an audit report titled *Ministry of Transport, Infrastructure, Housing and Urban Development: Performance Audit Report on Management of Road Projects by KeRRA, KeNHA & KURA (2017)*, indicated that, KeRRA road projects experience time overruns of between 2 to 24 months and cost overruns ranging between 5.8% to 14.97%. Poor project planning is to blame for delays in road construction projects.

Research Objectives

- i. To determine the influence of project scope planning on the performance of Kenya Rural Roads Authority projects in Machakos County.
- ii. To establish the influence of project schedule planning on the performance of Kenya Rural Roads Authority projects in Machakos County.

LITERATURE REVIEW

Theoretical Review

Theory of Change

Theory of change was first articulated by Peter Drucker in the year 1954. This theory defines long-term goals and then maps back to identify the necessary preconditions for achieving the defined goals. Theory of change is an important tool for articulating causal pathways toward desired outcome (Douglass et al., 2019). A theory of change approach adds a valuable layer of strategic thinking and impact assessment. It guides project planners in understanding how activities and interventions lead to change, fostering a more deliberate and thoughtful planning process. In project scope planning, this theory prompts the identification of assumptions that underlie the logic of the project. This, in turn, helps to define realistic and achievable project boundaries. This theory fosters clarity, stakeholder involvement, risk management, and adaptability, ultimately contributing to the development of a well-defined and impactful project scope. A coherent theory of change enhances strategies and maximizes results by identifying the work that needs to be done, the anticipated indications of success, and the feasible pathways of achieving the desired results (Gienapp & Hostetter, 2022). Theory of change was relevant to this study in the sense that, after project goals and objectives have been identified, it is necessary to define the project scope that will lead to the attainment of the project objectives. Theory of change helps to clearly define project's objectives and outcomes, which in turn, informs the boundaries and parameters of the project scope (Stein & Valters, 2012).

Conceptual Review

The conceptual framework shows the relationship between the independent variables (project scope planning, project schedule planning) and the dependent variable (performance of KeRRA projects).

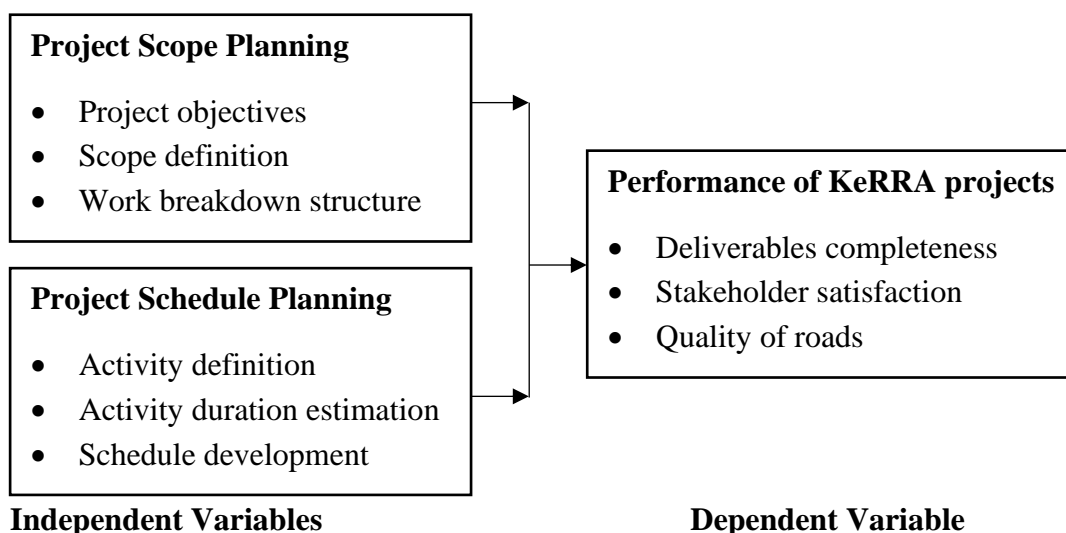


Figure 1: Conceptual Framework

Project Scope Planning

This study adopted the PMI (2017) definition of project scope planning which refers to the process of developing a detailed scope statement that outlines the boundaries, deliverables, and requirements of a project. According to the PMI (2017), project scope planning falls under Project Scope Management (PSM) under the planning process group. Collecting requirements, defining the project scope, and creating a work breakdown structure (WBS) fall under the

planning process group of PSM. Verification and controlling of the scope are the other activities under PSM and they fall in the monitoring and controlling process group (PMI, 2017). The total of all project deliverables that are necessary is the project scope (Kerzner, 2017). The author emphasized that a well-defined scope statement is the foundation for successful project implementation. Kerzner (2017) highlighted that scope planning establishes the boundaries of a project, helping project managers to understand the objectives and deliverables, thereby reducing the risk of scope creep, which can be detrimental to a project's success. Project scope planning is a critical and fundamental aspect of project management that plays a pivotal role in the success of any project. It serves as a foundation upon which the entire project is built, establishing the boundaries and clarifying what is within and outside the project's purview. The indicators of project scope planning that were involved in this study are project objectives, scope definition and WBS.

Project Schedule Planning

Project schedule planning refers to the process of establishing the start and finish dates, and the sequence of project activities (PMI, 2017). In the planning process group, there are four project schedule planning activities as follows: definition of project activities; sequencing of the project activities; estimation of the activity's durations; and development of the schedule. According to Kerzner (2017), effective project schedule planning is essential for aligning project tasks, allocating resources, and ensuring that projects are completed on time and within budget. Kerzner emphasized that a well-structured project schedule plays a critical role in project success. Project schedule planning involves breaking down a project into manageable tasks, estimating durations, and establishing dependencies (Heagney, 2016). Heagney (2016) emphasized that a well-constructed project schedule serves as a roadmap for project teams and facilitates efficient execution and control. Activity definition, activity duration estimation, and schedule development are the indicators associated with project schedule planning that were involved in this study.

Project Performance

Project performance refers to what a project has achieved in comparison to what was initially planned (Meredith & Mantel, 2012). Project performance serves as a critical axis around which the assessment and evaluation of projects revolve. It is a combination of various aspects and factors, each contributing to the overall success or failure of a project. Project performance is a multi-faceted concept that comprises of both quantitative and qualitative aspects. Rivera et al. (2020) in their study on causes of delay in road projects in developing countries, reported lack of experience, inadequate planning, and land acquisition issues to have the most significant impact on project performance. In this study, project performance was assessed in terms of the following indicators: deliverables completeness, stakeholder satisfaction, and quality of roads.

Empirical Review

This section presents past literature that is relevant to project scope planning, project schedule planning and project performance.

Project Scope Planning and Project Performance

Fageha and Aibinu (2014), argued that a complete definition of project scope at the inception of a project facilitates smooth project implementation. The authors argued that if definition of project scope is done at the project's onset, it gives the project team a clear understanding of the works that needs to be done and what the project is meant to achieve. The authors further recommended that, the project team should evaluate project scope definition completeness before deciding whether or not to proceed with the project. Mirza et al. (2013), in their study posited that in order to deliver a quality product or project on time and within budget that meets customer's requirements and expectations, a clear vision for the product or project is required. Establishing this clear vision for the product or project involves clearly defining the product or project scope at the inception of the project. The authors also reported that lack of

comprehending or definition of the project scope at the beginning of the project contributes majorly to project failure.

Project Schedule Planning and Project Performance

A study carried out by Gonzalez et al. (2013) in Santiago, Chile, demonstrated that planning and subcontractors' noncompliance together account for nearly 80% of project delays, with planning being the most prominent accounting for almost 46%. Project delays lead to cost overruns. With adequate project schedule management planning, all the project activities will be delivered on time as planned and this means that the overall project duration will not be exceeded past the scheduled time. Frimpong et al. (2003) in a study carried out in Ghana identified that 75% of the groundwater construction projects in Ghana experienced time delays due to poor project scheduling. The authors recommended that training programs on project planning, scheduling and control should be carried out to equip project team members with these necessary vital skills. According to PMI (2017), project scheduling provides a plan that shows when the project will deliver the products defined in the project scope.

RESEARCH METHODOLOGY

Descriptive survey design was adopted in this study because the researcher was interested in the state of affairs as they are in the field without any manipulation of the research variables. This study targeted 14 rural road projects in Machakos County. The unit of observation in this study comprised of project managers, site agents, site administrators, supervising engineers, project surveyors, materials engineers, and works inspectors who were 126 respondents. A census survey was adopted where all the 126 respondents were involved in the study. This study utilized structured questionnaires to collect data from the respondents.

RESEARCH FINDINGS AND DISCUSSIONS

Response Rate

A total of 126 questionnaires were distributed to the respondents and a total of 103 questionnaires were duly filled and returned giving an 81.7% response rate.

Descriptive analysis

The descriptive statistics attempt to explain the responses for the items in each variable in relation to the study objectives. Frequencies, means, and standard deviations were tabulated.

Project Scope Planning

The first specific objective was to determine the influence of project scope planning on the performance of Kenya Rural Roads Authority projects in Machakos County. To measure the variable, project objectives, scope definition, and WBS were used. The PMI (2017) defined project scope planning as the process of developing a detailed scope statement that outlines the boundaries, deliverables, and requirements of a project. Kerzner (2017) highlighted that scope planning establishes the boundaries of a project, helping project managers to understand the objectives and deliverables, thereby reducing the risk of scope creep, which can be detrimental to a project's success. Project scope planning is a critical and fundamental aspect of project management that plays a pivotal role in the success of any project. It serves as a foundation upon which the entire project is built, establishing the boundaries and clarifying what is within and outside the project's purview (PMI, 2017). From Table I, the composite Mean of 3.35 did not clearly indicate the existence of project scope planning activities in the road projects. The respondents were asked to rate their level of agreement with various statements relating to project scope planning.

Respondents (58.2%) agreed that the project scope plans were made available to the project team throughout the project implementation process ($M = 3.22$, $SD = 1.662$). The statistics also established that the process of collecting project requirements was well-defined and structured as agreed by 78.6% of the respondents ($M = 4.34$, $SD = .955$). The respondents also agreed (76.7%) that there was collaboration among project stakeholders in defining the projects' scope

(M = 4.00, SD = 1.112). The project objectives were used in developing the scope statement as supported by 52.4% of the respondents (M = 3.24, SD = 1.242). On the question of whether the projects had clear scope statements that conformed with project objectives, the majority of respondents (59.2%) disagreed (M = 2.50, SD = 1.368). Most respondents (64.1%) concurred that the projects had a WBS (M = 3.44, SD = 1.419). 51.4% of respondents agreed that a WBS provided a log frame for allocating project activities while 41.8% disagreed (M = 2.86, SD = 1.428). The majority of respondents (80.6%) concurred that a WBS served as a tool for tracking project progress in terms of the project scope.

Table I: Descriptive Statistics for Project Scope Planning

Project Scope Planning	SD	D	N	A	SA	M	SD
	%	%	%	%	%		
The project scope plans are made available to the project team throughout the project implementation process.	30.1	6.8	4.9	27.2	31.0	3.22	1.662
The process of collecting project requirements is well-defined and structured.	1.0	3.9	16.5	17.5	61.1	4.34	.955
There is collaboration among project stakeholders in defining the scope of the project.	4.9	8.7	9.7	35.9	40.8	4.00	1.112
The project objectives are used in developing the scope statement.	17.5	11.7	18.4	45.6	6.8	3.24	1.242
The project has a clear scope statement which is in line with the project objectives.	45.6	13.6	1.9	34.0	4.9	2.50	1.368
The project has a work breakdown structure.	16.5	12.6	6.8	38.8	25.3	3.44	1.419
A work breakdown structure provides a logical framework for organizing project activities.	30.1	11.7	6.8	44.6	6.8	2.86	1.428
A work breakdown structure serves as a tool for tracking project progress in terms of the project scope.	0	12.6	6.8	35.9	44.7	4.13	1.007
Composite Mean for Project Scope Planning						3.35	.627

Project Schedule Planning

The second specific objective was to establish the influence of project schedule planning on the performance of Kenya Rural Roads Authority projects in Machakos County. To measure the variable, activity definition, activity duration estimation, and schedule development were used. According to PMI (2017) project schedule planning is the process of establishing the start and finish dates, and the sequence of project activities. Kerzner (2017) posited that effective project schedule planning is essential for aligning project tasks, allocating resources, and ensuring that projects are completed on time and within budget. A well-structured project schedule plays a critical role in project success. Oburu (2020) viewed project scheduling as the art of planning and designing all project activities to enable a project to achieve its anticipated goals and priorities within the constraints of time and cost. From Table II, the composite Mean of 3.36 did not clearly indicate the existence of project schedule planning activities in the road projects. Meredith and Mantel (2012), assert that project scheduling is extremely important since creating a well-thought-out and comprehensive schedule is essential to creating monitoring and control systems. Bagaya and Song (2016) argued that project schedule delay is considered one of the most recurring problems facing projects around the world. The respondents were

requested to indicate their level of agreement with various statements relating to project schedule planning.

The activity definition process assisted in breaking down the projects into smaller, more manageable tasks according to the majority of respondents (58.2%; $M = 3.22$, $SD = 1.662$). Additionally, the data demonstrated that the project team members could easily understand the activity definitions as supported by a majority of 68.9% of the respondents ($M = 3.31$, $SD = 1.276$). Respondents also agreed (58.2%) that the activity duration estimation techniques relied on historical data obtained from similar road projects ($M = 3.25$, $SD = 1.642$). On the accuracy of the activity duration estimates, the activity durations were deemed accurate by the majority of the respondents (78.6%; $M = 4.34$, $SD = .955$). Statistics also revealed that 76.7% of respondents ($M = 3.99$, $SD = 1.142$) agreed that the projects' activities were well sequenced. Majority of the respondents (52.4%) also acknowledged the availability of the project schedules ($M = 3.13$, $SD = 1.242$). Finally, respondents disagreed (47.5%) on whether the project schedules developed incorporated all project activities ($M = 2.50$, $SD = 1.468$).

Table II: Descriptive Statistics for Project Schedule Planning

Project Schedule Planning	SD	D	N	A	SA	M	SD
	%	%	%	%	%		
The activity definition process helps to breakdown complex project activities into small and manageable tasks.	30.1	6.8	4.9	27.2	31.0	3.22	1.662
The activity definitions are easily understandable by all project team members.	20.4	2.9	7.8	63.1	5.8	3.31	1.276
The activity duration estimation techniques rely on historical data obtained from similar road projects.	30.1	6.8	4.9	27.2	31.0	3.25	1.642
The activity duration estimates are accurate.	1.0	3.9	16.5	17.5	61.1	4.34	.955
The project has well sequenced activities.	4.9	8.7	9.7	35.9	40.8	3.99	1.142
Project schedules are available.	17.5	11.7	18.4	45.6	6.8	3.13	1.242
The project schedules developed incorporate all project activities.	45.6	1.9	13.6	34.0	4.9	2.50	1.468
Composite Mean for Project Schedule Planning						3.36	.489

Performance of KeRRA Projects in Machakos County

The main objective of the study was to examine how project planning practices influenced the performance of Kenya Rural Roads Authority projects in Machakos County. Deliverable completeness, stakeholder satisfaction, and quality of roads were used to measure project performance. From Table III, the composite Mean of 3.31 did not clearly reveal the performance status of Kenya Rural Roads Authority projects in Machakos County due to project planning practices. The respondents were requested to indicate their level of agreement with various statements relating to the performance of Kenya Rural Roads Authority projects in Machakos County.

Majority of the respondents (36.8%) disagreed on whether the scope plans helped to ensure that the projects were implemented within their agreed scope though only 29.2% agreed while 34% were undecided ($M = 2.90$, $SD = 1.264$). The statistics showed that the projects deliverables were completed as per the scope statements as supported by a majority of 69.9% of the respondents ($M = 3.46$, $SD = 1.036$). A majority of the respondents (40.8%) agreed that the projects had adhered to the project schedules and thus completed within the planned timelines.

However, 38.8% disagreed while 20.4% were undecided on the matter ($M = 3.02$, $SD = 1.180$). The respondents (60.2%) agreed that the projects were implemented within the planned budget ($M = 3.40$, $SD = 1.536$). Majority of the respondents (72.8%) also agreed that adherence to the risk plans ensured the projects were delivered with minimal risks ($M = 4.05$, $SD = 1.149$). The statistics also proved that the road projects were of the desired quality standards agreed in the planning stage as supported by 72.8% of the respondents ($M = 3.78$, $SD = 1.111$). It was established that project stakeholders were satisfied with the projects delivered as supported by 47.6% of the respondents while 32% disagreed and 20.4% remained undecided.

Table III: Descriptive Statistics for Performance of KeRRA Projects

Performance of KeRRA Projects	SD %	D %	N %	A %	SA %	M	SD
The scope plans have helped ensure that the projects are implemented within their agreed scope.	16.5	20.3	34.0	14.6	14.6	2.90	1.264
The projects deliverables are completed as per the scope statement.	8.7	10.7	10.7	66.0	3.9	3.46	1.036
The projects have adhered to the project schedules and thus completed within the planned timelines.	9.7	29.1	20.4	31.1	9.7	3.02	1.180
The projects are implemented within the planned budget.	22.3	6.8	10.7	29.1	31.1	3.40	1.536
Adherence to the risk plans has ensured the projects are delivered with minimal risks.	4.9	5.8	16.5	25.2	47.6	4.05	1.149
The road projects are of the desired quality standards agreed in the planning stage.	4.9	11.6	10.7	46.6	26.2	3.78	1.111
The project stakeholders are satisfied with the projects delivered.	12.6	19.4	20.4	37.9	9.7	3.13	1.210
Composite Mean for Performance						3.31	.481

Inferential Analysis

The study used correlation analysis and regression analysis to determine the relationship between the independent variables and the dependent variable.

Correlation Analysis

The significance, magnitude, and direction of the relationship between the independent variables and the dependent variable in this study was determined by correlation analysis. Using the Pearson correlation (r) the strength of association between the independent variables and the dependent variable was determined. The findings in Table IV indicated that project scope planning had a significant weak positive correlation ($r = .192$, $\text{sig} = .026$) with performance of KeRRA projects in Machakos County. The findings demonstrate a direct relationship between the variables. This suggests that an increase in project scope planning leads to an increase in the performance of KeRRA projects in Machakos County. The findings are also supported by Miringiro and Dushimimana (2023) who found project scope planning had a strong positive ($r = .503$) and significant ($\text{sig} = .000 < .05$) correlation with performance of a lease project in Kigali. Project schedule planning had a significant strong positive correlation ($r = .563$, $\text{sig} = .000$) with performance of Kenya Rural Roads Authority projects in Machakos County. The findings show that there is a direct relationship between the variables which suggests that an increase in project schedule planning leads to an increase in project performance. Ondiek and Makokha (2018) also found a strong positive ($r = .523$) and significant ($\text{sig} = .003 < .05$) correlation between time planning and project performance.

Table IV: Correlation Matrix

		Project Scope Planning	Project Schedule Planning
Performance of Kenya Rural Roads Authority Projects (PP)	Pearson Correlation (r)	.192**	.563**
	Sig. (2-tailed)	.026	.000
	N	103	103

Regression Model

The regression coefficients were used to determine the optimal model.

Table V: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	1.033	.205		5.032	.000
Project Scope Planning	.913	.089	1.189	10.221	.000
Project Schedule Planning	.904	.119	.920	7.610	.000

a. Dependent Variable: Performance of Kenya Rural Roads Authority Projects

Project scope planning had a positive ($B = .913$) and significant ($\text{sig} = .000 < .05$) relationship with project performance. Additionally, there was a very strong correlation ($\beta = 1.189$) between project scope planning and performance. In interpretation, there was a direct relationship between project scope planning and performance suggesting that project scope planning had a significant positive influence on the performance of Kenya Rural Roads Authority projects in Machakos County. The findings are also supported by Mwaniki and Yusuf (2021) who found scope planning had a significant effect on performance of road infrastructure projects in Nyeri County. Kabede (2019) opined that poor scope definition adversely affects the final costs of a project due to certain changes, lowers the productivity of the workforce, and delays project completion.

Project schedule planning had a positive ($B = .904$) and significant ($\text{sig} = .000 < .05$) relationship with project performance. Additionally, there was a very strong positive correlation ($\beta = .920$) between project schedule planning and performance. In interpretation, there was a direct relationship between project schedule planning and performance indicating that project schedule planning had a significant positive influence on the performance of Kenya Rural Roads Authority projects in Machakos County. Ndavi and James (2019) in another study in Nairobi also found that schedule planning significantly and positively contributes to project performance.

The final model was fitted as follows:

$$PP = 1.033 + .913PSP + .904SP \dots \dots \dots (i)$$

Where; PSP is project scope planning, SP is project schedule planning, and PP is performance of KeRRA projects in Machakos County.

Conclusion

The study found a significant strong positive correlation between project scope planning and project performance. The study thus concluded that project scope planning had a significant influence on the performance of Kenya Rural Roads Authority projects in Machakos County.

The study also found a significant strong positive correlation between project schedule planning and project performance. The study thus concluded that project schedule planning had a significant influence on the performance of Kenya Rural Roads Authority projects in Machakos County.

Recommendations

This study recommends that project managers working on rural road projects should adopt efficient scope planning techniques so that project requirements are precisely identified and the scope of work is well defined. Involvement of stakeholders in the scope planning process is also highly recommended. This study also recommends that rural road project managers should have clear activity definitions and accurate activity duration estimates for a comprehensive schedule to enhance the performance of KeRRA projects.

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