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PROJECT RESOURCE MANAGEMENT PRACTICES AND IMPLEMENTATION OF ROAD CONSTRUCTION PROJECTS IN MOMBASA COUNTY, KENYA

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ABSTRACT

This research examined the influence of project resource management practices on implementation of road construction projects in Mombasa County, Kenya. The theoretical framework underpinned by the resource-based theory, theory of constraints and theory of change. The study employed the correlational research design to test non-causal relationships among study variables. The target population consisted of 316 members of the project implementation team responsible for the 6 road construction projects under the Kenya National Highways Authority (KeNHA) in Mombasa County, Kenya. The proportionate stratified random sampling technique was used to select a sample size of 177 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya. A cross-sectional survey-based approach was used to collect primary data. With the help of 3 research assistants, the researcher utilized the drop and pick method to hand deliver the survey questionnaires to the project implementation team in charge of the road construction projects. The collected data was processed and entered into the statistical package for social sciences (SPSS) version 26 to create a data sheet used for statistical analysis. The collected data was analyzed using descriptive statistics and inferential statistics. The Pearson's product moment correlation results indicated that project planning practices had positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. The regression results indicated that that project resource planning and project resource monitoring had positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. The project managers should recognize the importance of project resource management practices and apply them to foster the implementation of road construction projects. The policymakers should initiate policy review to motivate project managers to recognize the importance of project resource management practices and apply them to foster implementation of road construction projects. Future researchers should examine the moderating effect of project complexity on the relationship between project resource management and implementation of road construction projects in other regions or contexts.

Key words: Implementation of road construction projects, Project resource management practices, Project resource monitoring, Project resource planning, Kenya

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INTRODUCTION

The successful road construction is a catalyst for economic growth. The successful completion of road construction projects contributes to the continued economic growth and development of the nation (Cheserek & Sangoro, 2023). The success of road construction projects is essential to the expansion and development of any economy, generating cash and jobs, road construction projects are significant for the economy (Kabiti & Kikwatha, 2022). However, some road construction projects are struggling to maintain their relevance, while others have outright failed (Adagba, Hassan, & Umar, 2023). The delay in construction projects has been a global phenomenon, hence one of the most important problems in the construction industry (Feresew, 2022; Oluwafunmilola, Sadiq, & Idris, 2022). The road construction projects can experience delays due to a variety of reasons (Matisi & Marani, 2023). The road construction projects that do not meet quality and performance standards can be viewed from various perspectives (Willar, Trigunarsyah, Dewi, & Makalew, 2023). Existent literature posits that one of the poor project performances is project delay, which results in several economic, political, social, and other consequences (Tamene, 2023; Umulisa, Mbabazize, & Shukla, 2023).

The construction industry is one of the key industries for any country. However, it is evident from the literature that most of the construction projects are seriously affected by delays (Memon, Memon, Khahro, & Javed, 2023). The delays in road construction projects are one of the many expensive, frequent, hazardous, and complicated issues that arise in the completion of road projects (Ghanbari, Zolfaghari, & Yadegari, 2023). The project delays pose a substantial challenge in the construction sector and often render previously viable technical and economic plans obsolete in the face of changing circumstances (Al Musawi & Naimi, 2023; Ghanbari & Hasani, 2024). The construction delays are the most common issue and creates many adverse effects in any construction industry (Hoque, Safayet, Rana, Bhuiyan, & Quraishy, 2023). Moreover, meeting quality and performance targets is still challenging (Şirin, Sarıkaya, Yıldırım, & Kıvak, 2021). The reoccurrence of failed and abandoned projects in Kenya has become an issue of concern as huge investments end up being wasted (Kabiti & Kikwatha, 2022). However, project planning is widely thought to be an important contributor to project success (Akinradewo, Oguntona, Ogunbayo, Aigbavboa, & Chimbadzwa, 2023; Smith, 2021).

Project resource management is the strategic process of planning, scheduling, and allocating human, financial, and material resources to complete projects efficiently. It is the systematic process of identifying, acquiring, planning, allocating, and controlling resources, including people, equipment, materials, and finances to ensure a project is completed efficiently, on time, and within budget (Bouchrika, 2024). Effective project resource management increases project efficiency, reduces risks of delays, and prevents team burnout by balancing workloads (Olugboyega, Ajayi, Kelly-Chukwudi, & Olusola, 2025). The key aspects include acquisition, team management, and tracking utilization (Lawuo, 2026). It ensures the right resources are available at the right time, minimizing bottlenecks, controlling costs, and maximizing productivity (Nikoukar & Tavakolan, 2026). However, inadequate project resource management, including poor allocation, lack of monitoring, and inefficient scheduling, significantly hinders road construction project implementation, leading to delays, cost overruns, and subpar quality (Kumar & Hooda, 2024; Mohib & Çelik, 2026; Sikhupelo & Amoah, 2026).

Statement of the Problem

Despite being pivotal to the global economy, the construction projects are seriously affected by delays (Memon *et al.*, 2023). The delays in construction projects have been a global phenomenon, and one of the most important problems in the construction industry (Oluwafunmilola *et al.*, 2022). Although the Kenyan government has implemented a number of policies to improve the efficiency of road construction projects, most of the road construction projects have not been completed within the deadlines that were previously planned for them (Cheserek & Sangoro, 2023). Only 35% of projects met the desired quality requirements and about 55 percent of the road construction projects in the country face a variety of difficulties, that prevent them from being completed on time, incurring cost overruns, or failing to meet the required quality requirements (Kabiti & Kikwatha, 2022). The successful completion of road construction projects contributes to the continued economic

growth and development of the nation (Cheserek & Sangoro, 2023). However, the reoccurrence of failed and abandoned projects in Kenya has become an issue of concern as huge investments end up being wasted (Kabiti & Kikwatha, 2022). The construction delays are the most common issue and creates many adverse effects in any construction industry (Hoque *et al.*, 2023; Mahamid, 2022). The project delays pose a substantial challenge in the construction industry and often render previously viable technical and economic plans obsolete in the face of changing circumstances (Ghanbari & Hasani, 2024; Ghanbari *et al.*, 2023; Shedaga, Sahle, & Mekonen, 2024).

Effective resource management is crucial for the success of any project, ensuring all necessary resources, including time, money, and personnel, are appropriately allocated and utilized (Acharya, Yadav, & Thakur, 2026; Bouchrika, 2024). Effective project resource management is essential to enhance overall project performance (Isbahi & Mohamed, 2026). However, inadequate project resource management, including poor allocation, lack of monitoring, and inefficient scheduling, significantly hinders road construction project implementation, leading to delays, cost overruns, and subpar quality (Kumar & Hooda, 2024; Mohib & Çelik, 2026; Sikhupelo & Amoah, 2026). Project managers who fail to improve project planning can observe a decrease in performance (Tuo, 2022). The general business problem is that poor project resource management practices negatively affect the implementation of road construction projects. The specific business problem is that some project managers lack effective project resource management to improve the implementation of road construction projects.

Research Objectives

The general objective of the study was to examine the influence of project resource management practices on implementation of road construction projects in Mombasa County, Kenya.

The specific research objectives of the study were:

- To establish the influence of project resource planning on implementation of road construction projects in Mombasa County, Kenya.
- To assess the influence of project resource monitoring on implementation of road construction projects in Mombasa County, Kenya.

In this study, two null hypotheses were tested.

- H_{01} : Project resource planning has no significant influence on implementation of road construction projects in Mombasa County, Kenya.
- H_{02} : Project resource monitoring has no significant influence on implementation of road construction projects in Mombasa County, Kenya.

LITERATURE REVIEW

Theoretical Framework

Theoretical framework is the lens through which the researcher uses to connect the literature with the study results and methodology (Bingham, Mitchell, & Carter, 2024). This research was guided by the resource-based theory, the theory of constraints, and the theory of change.

Resource-Based Theory

This research underpinned by the resource-based theory (RBT) of the firm as the underpinning theory for its research model. The RBT of the firm (Barney, 1991; Penrose, 1959; Peteraf, 1993) provides an explanation as to why some organizations are performing better and how an organization can perform better (Wu, Yan, & Umair, 2023). The RBT (Rumelt, 1984; Wernerfelt, 1984; Wernerfelt, 1995) recognizes the existence of cost factors and resources, and therefore, informs proper planning so as to realize proper utilization an allocation of these resources towards achieving the project objectives (Teece, 2023a). The RBT of the firm posits that firms' competitiveness even in the same industry varies based on a firm's resources and capabilities (Zulkiffli, Zaidi,

Padlee, & Sukri, 2022). The RBT of the firm is a relevant underpinning theoretical framework to explain the influence of project resource planning, project resource monitoring, project procurement planning and project risk resource management on implementation of road construction projects in Mombasa County, Kenya.

The RBT of the firm emerged in the 1980s, when a number of strategic-management scholars began theorizing that a firm earns rents from leveraging its unique resources (Teece, 2023b). The RBT of the firm (Barney, 1986; Barney, Ketchen Jr, & Wright, 2011) proposes that the valuable, rare, inimitable and non-substitutable (VIRN) resources give a firm the ability to be more competitive (Chatterjee, Chaudhuri, Vrontis, & Thrassou, 2023). The RBT of the firm suggests that the VRIN resources are difficult to monetize directly through contracting arrangements that would allow other firms to utilize the resources in exchange for service fees (Vieira, Jaramillo, Agnihotri, & Molina, 2023). The RBT of the firm postulates that the VIRN framework is used to help companies identify certain resources and capabilities that can provide them with a sustained competitive advantage (Alvarez, Newman, Barney, & Plomaritis, 2023). Therefore, the RBT of the firm is a relevant underpinning theory to explain the influence of project resource planning and project resource monitoring on implementation of road construction projects in Mombasa County, Kenya.

Theory of Constraints

The theory of constraints (Goldratt & Cox, 1984; Goldratt, 1990) asserts that any manageable system is limited in achieving more of its goal by a very small number of constraints, and that there is always at least one constraint (Shenhar *et al.*, 2023). The theory of constraints (Goldratt, 1996) is based on the premise that the rate of goal achievement is limited by at least one constraining process and it's only by increasing flow through the constraint can overall quantity or output can be increased (Leybourne, 2024; Opoku, Nyamah, Nyamah, Agyapong, & Frimpong, 2023). The theory of constraints proposes that all projects contain risks and restrictions that might make it difficult to complete high-quality projects (Loffredo, Frigerio, Lanzarone, & Matta, 2024). The theory of constraints is a relevant theoretical framework to explain the influence of influence of project resource management on implementation of road construction projects in Mombasa County, Kenya.

The theory of constraints (Kohli & Gupta, 2010) is a methodology for identifying the most important limiting factor or constraint that stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting constraint (Opoku *et al.*, 2023). The theory of constraints (Mabin & Balderstone, 2003) is a multi-faceted systems methodology that has been developed to assist people and organizations to think about their problems, develop breakthrough solutions and implement those solutions successfully (Opoku *et al.*, 2023). The core concept of the theory of constraints (McKinsey, 2001) is that every process has a single constraint and that total throughput can only be improved when the constraint is improved (Loffredo *et al.*, 2024; Shenhar *et al.*, 2023).

The theory of constraints (Goldratt, 1990) provides an action plan for improvement. The constraints theory has provided a substantially better insight into the dimensions and complexity of the problem facing work breakdown structures in project management (Wanjau *et al.*, 2023). The theory of constraints states that the most used project planning practices may perform well or poorly from an organizational standpoint (Leybourne, 2024). The theory of constraints basically states that a set of constraints prohibits any management system from achieving more of its objectives (Kabiti & Kikwatha, 2022). As the road construction projects experience constraints such as cost, time and scope, the theory of constraints is a relevant theoretical framework to explain the influence of project resource planning and project resource monitoring on implementation of road construction projects in Mombasa County, Kenya.

Theory of Change

The theory of change (Connell & Kubisch, 1998; Weiss, 1995) is a theory of how and why an initiative works (Foglieni, De Salvo, Cagnin, & Maffei, 2023). The theory of change (Lewin, 1943; Msila & Setlhako, 2013) proposes that in order to achieve the envisaged outcomes, stakeholders should look at short-term outcomes that will help them achieve their specified targets (Mejía-Trejo & Aguilar-Navarro, 2023). The theory of change

(Quinn & Cameron, 1988; Serlin, 1987) is used for programme and project planning, design, monitoring, assessment and evaluation (Drabble, Allen, Morelli, de Götzen, & Simeone, 2023). Therefore, the theory of change explains the influence of project resource planning and project resource monitoring on implementation of road construction projects in Mombasa County, Kenya. The theory of change (Fullan, 2007; Hernandez & Hodges, 2003) is an all-inclusive illustration as well as explanation of how and why a change that is desired is expected to take place in a given setting (Mejía-Trejo & Aguilar-Navarro, 2023). The theory of change (Funnell & Rogers, 2011; Weiss, 1999) is a rigorous yet participatory process where groups and stakeholders in a project planning process articulate their long-term goals and identify the conditions required for the goals to be met (Widodo, Maysarah, Runturambi, Hanita, & Wasitova, 2023). The theory of change (Walton, Cutcher-Gershenfeld, & McKersie, 2000) helps the project manager understand how engaging stakeholders can be effective towards promoting expected change in a project (Simeone, Drabble, Morelli, & de Götzen, 2023). The theory of change (Funnell & Rogers, 2011) focuses on bridging the gap between what a change or program initiative does and how those changes generate preferred goals being attained (Foglieni *et al.*, 2023).

The theory of change (Chen, 1990) is a tool used for developing solutions to complex social problems (Simeone *et al.*, 2023). The theory of change provides a comprehensive picture of early and intermediate term changes that are needed to reach a long term set goal (Mejía-Trejo & Aguilar-Navarro, 2023). The theory of change provides a model of how a projects should be planned, and provides ways to test and refine through monitoring and evaluation (Foglieni *et al.*, 2023). The theory of change is a specific and measurable description of change that forms the basis for planning, implementation and evaluation (Drabble *et al.*, 2023). Therefore, the theory of change is a relevant theoretical framework to explain the influence of project resource planning and project resource monitoring on implementation of road construction projects in Mombasa County, Kenya.

Conceptual Framework

The conceptual framework illustrates that the implementation of road construction projects is conceptualized as the dependent variable. The conceptual framework portrays that project resource planning and project resource monitoring are conceptualized as the independent variables. Figure 1 presents the conceptual framework.

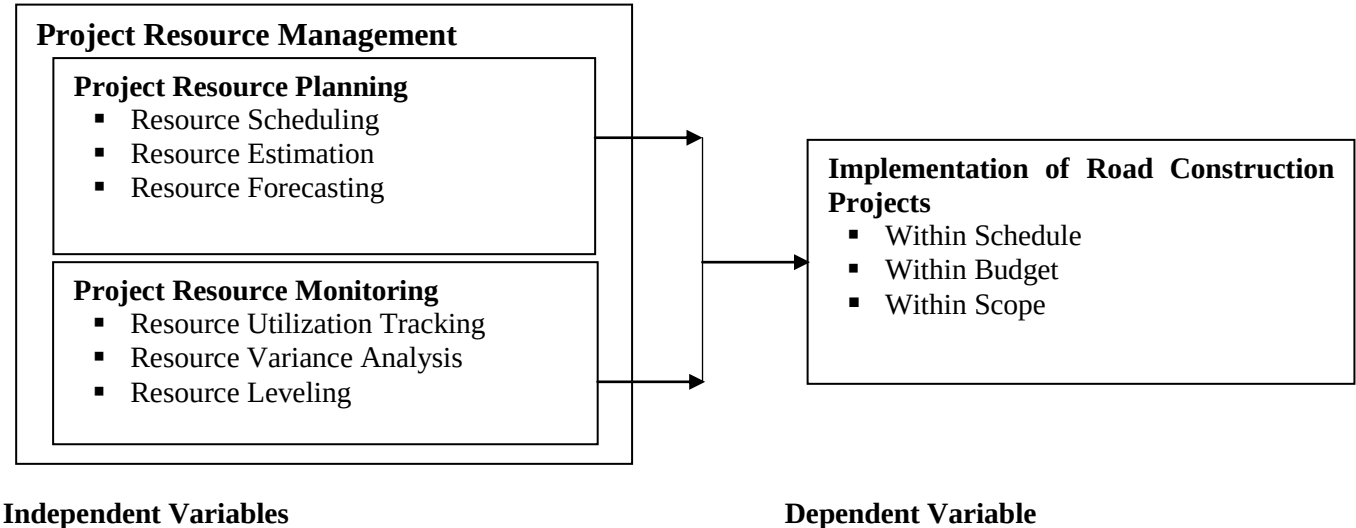


Figure 1: Conceptual Framework

Review of Literature on Variables

Project Resource Planning

Project resource planning is the forecasting of the human resources, financial resources and material resources required to perform the scope of work within the time plan (Mohite *et al.*, 2024). Existent literature posits that project resource planning is the forecasting of the resources required to perform the scope of work within the time plan (Shenhar *et al.*, 2023). Project resource planning is an essential aspect of project management, ensuring that the right resources are allocated effectively to achieve project goals (Lwanga, 2021). The project resource planning organizes, identifies and lists the resources required to complete a project successfully (Himmah *et al.*, 2024). A proper resource plan maps out the exact quantity of the necessary resources (Sinton, 2022). The project budget considers human resources planning, financial resource planning and time and material resource planning (Ahmed *et al.*, 2021). The resource planning document can help you manage an extensive project (Himmah *et al.*, 2024). Therefore, a project budget is prepared to fix in advance the resources needed and represents the planned costs of a project at its start (Shenhar *et al.*, 2023).

The project resource planning considers the identification of resources requirements a project performance (Shenhar *et al.*, 2023). A resource plan is an internal document that allows project managers to estimate how they can meet a project's needs with the available resources (Ahmed *et al.*, 2021). The resource plan aims to use resources in the most efficient manner possible, contributing to the overall productivity of the project (Himmah *et al.*, 2024). While effective resource management is essential to the project's success as it directly affects the budget, the schedule, and the project's financial results, conventional techniques to resource allocation frequently fall short, due to the complexity of project contexts (Mohite *et al.*, 2024). Thus, resource planning can help a company prevent delays and optimize its staff and budget (Lwanga, 2021; Mohan, 2021). The extant literature posits that project resource planning has a positive and significant relationship with performance of road construction projects (Ayele, 2023; Kabiti & Kikwatha, 2022). Moreover, some literature postulates that project resource planning has a positive and significant influence on performance of express highway construction projects (Maina, 2023).

Project Resource Monitoring

Project resource monitoring is a critical component of project management aimed at ensuring that resources are used efficiently, preventing burnout or overallocation, and keeping the project aligned with its budget and schedule. It refers to the continuous, ongoing process of tracking and analyzing the utilization of project resources, including personnel, finances, equipment, and time—throughout the project lifecycle (Juhala, 2026). Project resource monitoring involves the continuous tracking, evaluation, and analysis of resources such as people, materials, equipment, and budget to ensure they are utilized efficiently and aligned with project goals (Kumar, Verma, & Verma, 2025). It involves comparing actual usage against the project plan, identifying bottlenecks or shortages early, and adjusting allocations to keep the project on schedule and within budget (Bouchrika, 2024). Project resource monitoring helps to prevent last-minute delays due to unavailable resources, reduces project overruns, mitigates risks, and improves team morale by balancing workloads (Bhatti, Cheema, & Baig, 2026; Govindaras, Wern, Kaur, Haslin, & Ramasamy, 2023). Therefore, project resource monitoring helps in reducing costs, mitigating risks, and ensuring the efficient completion of project deliverables.

The key aspects of project resource monitoring include tracking utilization, performance evaluation, variance analysis, and proactive adjustments. Tracking utilization and capacity involves regularly monitoring how resources are being used, identifying idle resources, and evaluating team capacity to prevent overloads (Benoit, Chien, & Robert, 2026). Performance evaluation involves assessing whether resources (especially the team) are working within performance standards, providing feedback, and resolving issues (Li *et al.*, 2026). Variance analysis involves comparing actual resource consumption against the initial planned allocations to detect and correct deviations, such as overspending or inefficient use of time (Acharya, Yadav, & Thakur, 2026). Proactive adjustments involve using data to reallocate resources or adjust plans before small issues turn into major

disruptions (Önden, 2026). Therefore, effective monitoring allows project managers to proactively manage capacity, avoid burnout, and prevent cost overruns (Govindaras *et al.*, 2023).

Implementation of Road Construction Projects

Implementation of road construction projects is a complex process driven by effective stakeholder management, rigorous planning, and technical competence, which directly impact project success. It has an impact on increasing production capacity and intensification of commercial processes, also, it makes it possible to provide the conditions for human existence (Rustam, Witjaksana, & Purnama, 2026). Implementation of construction projects is an important element determining the economic development of cities (Lykourantzou, Apostolopoulos, & Liargovas, 2026). The key factors include adhering to budgets, maintaining strict schedules, ensuring quality standards, and mitigating risks through proper project design (Musonye, Ngatia, & Ngugi, 2026). However, effective implementation demands complex coordination, stakeholder engagement, and addressing spatial, legal, and environmental constraints (Bauer, 2025; Rashidi, Sarvari, Chan, Olawumi, & Edwards, 2026). The key success factors include robust financial management, experienced human resources, and efficient, well-planned logistics (Bhardwaj, 2025; Mukanwa & Chibomba, 2026). Therefore, the key success factors in the implementation of road construction projects include robust financial management, experienced human resources, and efficient, well-planned logistics, which are critical for delivering projects on time, within budget, and to the required quality standards.

The implementation of road construction projects measures how well a project has adhered to its planned budget, schedule, technical specifications (quality), and stakeholder expectations. It acts as a bridge between the planning phase and the final outcomes, assessing the efficiency and effectiveness of resource utilization and operational management (Willar, Trigunarsyah, Dewi, & Makalew, 2023). A successful road project is generally defined as one that is completed on time, within budget, and to the required quality standards while minimizing environmental impact and satisfying stakeholders (Abdulla, 2026). The implementation of road construction projects is a critical phase that bridges planning with final outcomes, measured by adherence to budget, schedule, technical specifications (quality), and stakeholder expectations (Mohammed, 2025). Therefore, effective implementation requires balancing these, often conflicting, objectives to ensure the project meets its intended purpose.

Empirical Review

Project Resource Planning and Implementation of Road Construction Projects

Kyalo and Kising'u (2024) examined the influence of project resource planning practice on performance of road construction projects in Kwale County, Kenya. The results indicated that project resource planning practice had a positive and significant relationship with performance of road construction projects. The findings showed that project resource planning practice had a positive and significant effect on performance of road construction projects.

Njenga and Makokha (2024) examined the influence of resource planning on implementation of housing construction projects in Nakuru City County, Kenya. The results indicated that resource planning had a positive and significant relationship with implementation of housing construction projects. The findings showed that resource planning had a positive and significant effect on implementation of housing construction projects.

Shenhar *et al.* (2023) examined the effect of project resource planning on the success of skills development fund projects in Kigali City, Rwanda. The findings showed that project resource planning had a positive and significant relationship with the success of skills development fund projects. The results indicated that project resource planning had a positive and significant effect on the success of skills development fund projects.

Maina (2023) examined the influence of road project resource planning on performance of express highway construction projects in Nairobi City County, Kenya. The findings indicated that human resource planning, financial resource planning, material usage planning and time management had positive and significant

relationship with project performance. The results showed that project resource planning had a positive and significant influence on performance of express highway construction projects.

Jepkorir and Pedo (2023) assessed the influence of project resource planning on implementation of information communication and technology projects in Kakamega County, Kenya. The findings indicated that project resource planning had positive and significant relationship with implementation of information communication and technology projects. The results showed that project resource planning had a positive and significant influence on implementation of information communication and technology projects.

Kabiti and Kikwatha (2022) examined the influence of project resource planning on performance of KeRRA road construction projects in Meru County, Kenya. The results indicated that project resource planning had a positive and significant relationship with performance of road construction projects. The findings showed that project resource planning had a positive and significant effect on performance of road construction projects.

Lwanga (2021) examined the influence of project resource planning on implementation of urban road projects in Nairobi County, Kenya. The findings showed that project resource planning had a positive and significant relationship with implementation of urban road projects. The results indicated that project resource planning had a positive and significant effect on implementation of urban road projects.

Project Resource Monitoring and Implementation of Road Construction Projects

Rasugu (2024) examined the influence of effect of resource monitoring and evaluation systems on sustainability of donor-funded programs in Nairobi County, Kenya. The results indicated that resource monitoring and evaluation systems had positive and significant relationship with sustainability of donor-funded programs. The findings showed that resource monitoring and evaluation systems had positive and significant effect on sustainability of donor-funded programs.

Oyier and Tumuti (2025) examined the influence of project resource scheduling and performance of residential construction projects in Nairobi City County, Kenya. The results indicated that project resource scheduling had a positive and significant relationship with performance of building construction projects. The findings showed that project resource scheduling had a positive and significant influence on performance of building construction projects.

Mwanza (2026) examined the effect of project monitoring practice and evaluation practice on performance of building construction projects in Kakamega County in Kenya. The results indicated that project monitoring practice and evaluation practice had a positive and significant relationship with performance of building construction projects. The findings showed that project monitoring practice and evaluation practice had a positive and significant effect on performance of building construction projects.

Kalunde and Samson (2022) examined the effect of project monitoring and evaluation on completion of government housing projects in Makueni County, Kenya. The results indicated that project monitoring and evaluation had positive and significant relationship with completion of government housing projects. The findings showed that project monitoring practice and evaluation practice had positive and significant effect on performance of completion of government housing projects.

METHODOLOGY

Research Philosophy

The research was guided by the positivist research philosophy which regards the world as made up of observable and measurable facts and assumes that there is an objective reality out there. The positivist research philosophy regards the world as made up of observable and measurable facts and assumes that there is an objective reality out there (Ma & Xie, 2023).

Research Design

Drawing on a quantitative non-experimental research methodology, the research utilized a correlational cross-sectional survey research design to examine the non-causal relationship between study variables. The design was appropriate for collecting data once from many individuals at a single point in time to test statistical relationships between two or more variables without the researcher controlling or manipulating any of them (Aryuwat *et al.*, 2024).

Target Population

The target population consisted of 316 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya. The project managers, site agents, resident engineers and assistant resident engineers. The target population is as per the KeNHA (2025)'s database. The unit of analysis consisted of the road construction project, while the unit of observation consisted of the project implementation team. Table 1 presents the target population.

Table 1: Target Population

Strata	Target Population	Percentage
Project Managers	6	1.9%
Site Engineers	6	1.9%
Resident Engineers	6	1.9%
Assistant Resident Engineers	12	3.8%
Quantity Surveyors	24	7.6%
Civil Engineers/Technicians	91	28.8%
Environmentalists/Sociologists	12	3.8%
Contractor Representatives/Subcontractors	158	50.0%
Regional Directors	1	.3%
Total	316	100.0%

Sampling Frame

The sampling frame for this research consisted of the list of 316 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya. The sampling frame was as per the KeNHA (2025)'s data base as at 31st December, 2025.

Sample Size and Sampling Techniques

Sample Size

The Yamane (1967) formula was used to calculate sample size at 95% confidence level and 5% significance level to ensure that the sample size was truly reflective of the target population.

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = Sample Size;

N = Target Population;

e = Margin of Error = 0.05.

With a target population of 316 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya, the minimum recommended sample size

for the study was calculated as:

$$n = \frac{316}{1 + 316(0.05)^2} = 177$$

Therefore, the minimum recommended sample size consisted of 177 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya. Table 2 presents the sample size.

Table 2: Sample Size

Strata	Target Population	Sample Size
Project Managers	6	3
Site Engineers	6	3
Resident Engineers	6	3
Assistant Resident Engineers	12	7
Quantity Surveyors	24	13
Civil Engineers/Technicians	91	51
Environmentalists/Sociologists	12	7
Contractor Representatives/Subcontractors	158	89
Regional Directors	1	1
Total	316	177

Sampling Techniques

The proportionate stratified random sampling technique was used to select a sample size of 177 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya. The choice of the proportionate stratified random sampling technique was justified by the heterogeneous target population.

Data Collection Methods

A self-administered structured questionnaire was the means for collecting primary data. The data collection method was appropriate, because of its ability to collect a large amount of information in a reasonably quick span of time (Saunders & Kulchitsky, 2021).

Data Collection Procedures

A cross-sectional survey-based approach was used to collect primary data. Through the drop and pick method, the researcher and three research assistants hand delivered the survey questionnaire to a random sample of 177 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya. A continuous follow up on responses was made by the researcher and research assistants.

Pilot Study

A pilot study was conducted to test the validity and reliability of the constructed survey questionnaire. The pilot study was carried out with a pilot trial sample size of 18 members of the project implementation team responsible for the 6 road construction projects under the KeNHA in Mombasa County, Kenya. Generally, at least 30 representative participants from the target population provides a reasonable minimum recommendation for a pilot study (Snell *et al.*, 2021).

Data Processing and Analysis

The collected data was checked for accuracy, completeness and consistency. The data was coded, edited, and entered into the Statistical Package for Social Sciences (SPSS) version 26 to create a data sheet that was used for analysis. The descriptive statistics were used to compute, summarize the data in respect to each of the study

variables and describe the sample's characteristics. The Pearson's product moment correlation analysis was performed to confirm or deny the relationship between the study variables. A multiple linear analysis was performed with project performance as the dependent variable and project resource planning and project resource monitoring as the predictor variables.

Model Specification

The multiple linear regressions model was specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \quad \dots\dots\dots \text{Model 1}$$

Where:

Y = Implementation of Road Construction Projects

β_0 = Constant Term

X_1 = Project Resource Planning

X_2 = Project Resource Monitoring

$\beta_1 - \beta_2$ = Regression Coefficients to be Estimated

ε = Stochastic Error Term

Hypotheses Testing

In this research, two null hypotheses were tested at 5% level of significance ($\alpha = 0.05$; $t = 1.960$) at a 95% confidence level to statistically help draw acceptable and realistic inferences. Therefore, the decision rule was to reject the H_{0i} if the $P \leq 0.05$, and otherwise fail to reject the H_{0i} if the $P > 0.05$.

Table 2 presents the hypotheses testing procedure.

Table 2: Hypotheses Testing				
Hypotheses	Model	Hypotheses Testing	Decision Rule	
H_{01} : Project resource planning has no significant influence on implementation of road construction projects in Mombasa County, Kenya.	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$ Model 3.1	Standard Multiple Regression Analysis	$H_{01}: \beta_1 = 0$ $H_{11}: \beta_1 \neq 0$ If the $P \leq 0.05$ reject the H_{01} . If the $P > 0.05$ fail to reject the H_{01} .	
H_{02} : Project resource monitoring has no significant influence on implementation of road construction projects in Mombasa County, Kenya.			$H_{02}: \beta_2 = 0$ $H_{12}: \beta_2 \neq 0$ If the $P \leq 0.05$ reject the H_{02} . If the $P > 0.05$ fail to reject the H_{02} .	

FINDINGS

Response Rate

Out of the 177 survey questionnaires distributed for the main survey, only 158 valid responses were obtained. Therefore, there was a valid response rate of 89.3%, which was adequate for data processing and analysis. Existent literature posits that survey response rates of 80% or higher are needed if findings are to be considered generalizable (Ericson *et al.*, 2023). Table 3 presents the response rate results.

Table 3: Response Rate

Strata	Frequency	Response Rate
Response	158	89.3%
Non-Response	19	10.7%
Total	177	100.0%

Correlation Results

The Pearson's product moment correlation analysis was performed to confirm or deny the relationships between the study variables. The correlation results indicated that project resource planning had a moderately strong positive and significant relationship with implementation of road construction projects ($r = 0.620$, $p \leq 0.05$) in Mombasa County, Kenya. However, the correlation results showed that project resource monitoring had a strong positive and significant relationship with implementation of road construction projects ($r = 0.710$, $p \leq 0.05$) in Mombasa County, Kenya. Table 4 presents the Pearson's product moment correlation results.

Table 4: Correlation Results

Variable		X ₁	X ₂	Y
Resource Planning (X ₁)	Pearson Correlation	1		
	Sig. (2-tailed)			
	n	158		
Resource Monitoring (X ₂)	Pearson Correlation	.399**	1	
	Sig. (2-tailed)	.000		
	n	158	158	
Implementation of Road Construction Projects (Y)	Pearson Correlation	.620**	.710**	1
	Sig. (2-tailed)	.000	.000	
	n	158	158	158

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

Multiple Regression Results

A standard multiple linear analysis was performed with implementation of road construction projects as the dependent variable and project resource planning and project resource monitoring as the predictor variables. The multiple regression analysis was performed to test to what extent, if any, the two project planning practices significantly predict implementation of road construction projects in Mombasa County, Kenya.

Model Summary

From the model summary in table, it is clear that the value of coefficient of correlation (R) was 0.800, while the value of coefficient of determination (R^2) was 0.639, while the value of the adjusted R^2 was 0.635. The value of the std. error of the estimate was 0.232 and the value of the Durbin-Watson test was 2.076. The R value of 0.800 suggested that there was a strong positive correlation between the project planning practices and implementation of road construction projects in Mombasa County, Kenya. The R^2 value of 0.639 suggested that the overall model as a whole (the model involving constant, project resource planning and project resource monitoring) was able to significantly predict and explain approximately 63.9% of the variance in implementation of road construction projects in Mombasa County, Kenya.

The Adjusted R Square value of 0.635 suggested that the overall model as a whole (the model involving constant, project resource planning and project resource monitoring) significantly predicted and explained 63.5% of the variance in implementation of road construction projects in Mombasa County, Kenya. The std. error of the estimate value of 0.232 suggested that there could be other factors not included in the model in the current study that could also predict and explain the remaining 34.3% of the variance in implementation of road construction projects in Mombasa County, Kenya. Therefore, there is in need for future research to discover the other variables not included in the model in the current study that also predict the remaining variance in

implementation of road construction projects in Mombasa County, Kenya.

From the model summary table, the Durbin-Watson test statistic had a value of 2.076, falling within the optimum range of 1.5 to 2.5, suggesting that there was no severe autocorrelation detected in the in the residual values in the datasets. Generally, Durbin-Watson statistics falling within the optimum range of 1.5 to 2.5 indicates that there is no severe autocorrelation detected in the in the residual values in the datasets (Hair *et al.*, 2021). Table 5 presents the model summary results.

Table 5: Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.800 ^a	.639	.635	.232	2.076

a. Predictors: (Constant), Resource Monitoring, Resource Planning

b. Dependent Variable: Implementation of Road Construction Projects

Analysis of Variance

From the Analysis of Variance (ANOVA) table, the overall model as a whole (the model involving constant, project resource planning and project resource monitoring), achieved a high degree of fit, as reflected by $R^2 = 0.639$, adj. $R^2 = 0.635$, $F(2, 155) = 137.447$, $p \leq 0.05$. The null hypothesis was that the linear combination of predictor variables (project resource planning and project resource monitoring) was not able to significantly predict implementation of road construction projects in Mombasa County, Kenya. However, the alternative hypothesis was that the linear combination of predictor variables (project resource planning and project resource monitoring) was able to significantly predict implementation of road construction projects in Mombasa County, Kenya. The standard multiple linear regression results showed that the linear combination of predictor variables (project resource planning and project resource monitoring) significantly predicted implementation of road construction projects in Mombasa County, Kenya. The null hypothesis was rejected in favor of the alternative hypothesis. Therefore, the decision was that the linear combination of predictor variables (project resource planning and project resource monitoring) significantly predict implementation of road construction projects in Mombasa County, Kenya. Table 6 presents the ANOVA results.

Table 6: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.811	2	7.405	137.447	.000 ^b
	Residual	8.351	155	.054		
	Total	23.162	157			

a. Dependent Variable: Implementation of Road Construction Projects

b. Predictors: (Constant), Resource Monitoring, Resource Planning

Multiple Regression Coefficients

From the coefficients table, when the unstandardized regression coefficients (B) were substituted to the multiple regression model specified for the study, the final predictive equation was:

$$Y = 1.534 + 0.245X_1 + 0.373X_2$$

The final predictive equation suggested that holding all factors in to account constant (project resource planning and project resource monitoring), constant at zero, implementation of road construction projects in Mombasa County, Kenya would be 1.534. The final predictive equation postulated that with all other factors held constant, a unit increase in project resource planning would lead to 0.245 unit increase in implementation of road construction projects in Mombasa County, Kenya. The final predictive equation suggested that with all other factors held constant, a unit increase in project resource monitoring would lead to 0.373 unit increase in implementation of road construction projects in Mombasa County, Kenya. Based on the magnitude of the

unstandardized regression coefficients (B) of the independent variables, project resource monitoring was the best predictor of the variance in implementation of road construction projects in Mombasa County, Kenya.

The multiple regression results indicated that project resource planning had a positive and significant influence on the implementation of road construction projects ($\beta_1 = 0.401$; $t = 7.627$; $p \leq 0.05$) in Mombasa County, Kenya. The regression results indicated that project resource monitoring had a positive and significant influence on the implementation of road construction projects ($\beta_2 = 0.550$; $t = 10.459$; $p \leq 0.05$) in Mombasa County, Kenya. Table 7 presents the multiple regressions coefficients results.

Table 7: Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	1.534	.142		10.838	.000		
Resource Planning	.245	.032	.401	7.627	.000	.687	1.456
Resource Monitoring	.373	.036	.550	10.459	.000	.615	1.627

a. Dependent Variable: Implementation of Road Construction Projects

Hypotheses Test Results

In this research, 4 null hypotheses were tested. The hypotheses were tested at 5% level of significance, $\alpha = 0.05$, $t = 1.960$, and 95% confidence level to statistically help draw acceptable and realistic inferences. Therefore, the decision rule was to reject the null hypothesis H_{0i} if the $P \leq 0.05$, and otherwise fail to reject the null hypothesis H_{0i} if the $P > 0.05$.

Hypothesis One Test Results

The H_{01} predicted that project resource planning has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The decision rule was to reject the H_{01} if the $\beta_1 \neq 0$, $t \geq 1.960$, $P \leq 0.05$, and otherwise fail to reject the H_{01} if the $\beta_1 = 0$, $t < 1.960$, $P > 0.05$. The standard multiple regression results showed that project resource planning had a positive and significant influence on the implementation of road construction projects ($\beta_1 = 0.401$; $t = 7.627$; $p \leq 0.05$) in Mombasa County, Kenya. The H_{01} was rejected, providing the empirical support for H_{11} . Therefore, deduction was made that project resource planning has a significant influence on implementation of road construction projects in Mombasa County, Kenya.

Hypothesis Two Test Results

The H_{02} predicted that project resource monitoring has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The decision rule was to reject the H_{01} if the $\beta_1 \neq 0$, $t \geq 1.960$, $P \leq 0.05$, and otherwise fail to reject the H_{01} if the $\beta_1 = 0$, $t < 1.960$, $P > 0.05$. The standard multiple regression results showed that project resource monitoring had a positive and significant influence on the implementation of road construction projects ($\beta_2 = 0.550$; $t = 10.459$; $p \leq 0.05$) in Mombasa County, Kenya. The H_{02} was rejected, providing the empirical support for H_{12} . Therefore, deduction was made that project resource monitoring has a significant influence on implementation of road construction projects in Mombasa County, Kenya. Table 8 presents the hypotheses test results.

Table 8: Hypotheses Test Results

Hypothesis	β	t	Sig.	Decision
H ₀ 1: Project resource planning has no significant influence on implementation of road construction projects in Mombasa County, Kenya.	.401	7.627	.000	Reject the H ₀ 1
H ₀ 2: Project resource monitoring has no significant influence on implementation of road construction projects in Mombasa County, Kenya.	.550	10.459	.000	Reject the H ₀ 2

Discussions

The purpose of this quantitative correlational research was to examine the influence of project planning practices on implementation of road construction projects in Mombasa County, Kenya. Specifically, the research sought to examine the influence of project resource planning and project resource monitoring on implementation of road construction projects in Mombasa County, Kenya. The Pearson's product moment correlation analysis was performed to confirm or deny the relationship between the study variables. The correlation results indicated that the project planning practices had positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. A standard multiple linear analysis was performed with implementation of road construction projects as the dependent variable and project resource planning and project resource monitoring as the predictor variables. The regression results showed that the project planning practices had positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. The results are consistent to the results of previous studies (Kabiti & Kikwatha, 2022; Maina, 2023; Oroni, 2023; Winnie & Yusuf, 2021).

The first specific objective was to establish the influence of project resource planning on implementation of road construction projects in Mombasa County, Kenya. The first null hypothesis (H₀1) predicted that project resource planning has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The Pearson's correlation results indicated that project resource planning had a moderately strong positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. The regression results showed that project resource planning had a positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. The H₀1 was rejected, providing the empirical support for the H₁1. Therefore, the decision was that project resource planning has a significant influence on implementation of road construction projects in Mombasa County, Kenya. The results are consistent to the results of previous studies (Kabiti & Kikwatha, 2022; Kyalo & Kising'u, 2024; Maina, 2023). The results are in harmony with the results of prior studies (Jepkorir & Pedo, 2023; Lwanga, 2021; Shenhar *et al.*, 2023).

The second specific objective was to assess the influence of project resource monitoring on implementation of road construction projects in Mombasa County, Kenya. The second null hypothesis (H₀2) predicted that project resource monitoring has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The Pearson's correlation results indicated that project resource monitoring had a strong positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. The regression results showed that project resource monitoring had a positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. The H₀2 was rejected, providing the empirical support for the H₁2. Therefore, the decision was that project resource monitoring has a significant influence on implementation of road construction projects in Mombasa County, Kenya. The results are in harmony with the results of past studies (Kabiti & Kikwatha, 2022; Kalunde & Samson, 2022; Mwanza, 2026; Oyier & Tumuti, 2025; Rasugu, 2024).

SUMMARY

The purpose of this quantitative correlational research was to examine the influence of project planning practices on implementation of road construction projects in Mombasa County, Kenya. The Pearson's product moment correlation analysis was performed to confirm or deny the relationship between the study variables. The correlation results indicated that the project planning practices had positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. A standard multiple linear analysis was performed with implementation of road construction projects as the dependent variable and project resource planning and project resource monitoring as the predictor variables. The regression results showed that the project planning practices had positive and significant influence on implementation of road construction projects in Mombasa County, Kenya.

The first specific objective was to establish the influence of project resource planning on implementation of road construction projects in Mombasa County, Kenya. The first null hypothesis (H_{01}) predicted that project resource planning has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The Pearson's correlation results indicated that project resource planning had a moderately strong positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. The regression results showed that project resource planning had a positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. The H_{01} was rejected, providing the empirical support for H_{11} . Therefore, the decision was that project resource planning has a significant influence on implementation of road construction projects in Mombasa County, Kenya.

The second specific objective was to assess the influence of project resource monitoring on implementation of road construction projects in Mombasa County, Kenya. The second null hypothesis (H_{02}) predicted that project resource monitoring has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The Pearson's correlation results indicated that project resource monitoring had a strong positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. The regression results showed that project resource monitoring had a positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. The H_{02} was rejected, providing the empirical support for H_{12} . Therefore, the decision was that project resource monitoring has a significant influence on implementation of road construction projects in Mombasa County, Kenya.

CONCLUSIONS

The purpose of this quantitative correlational research was to examine the influence of project planning practices on implementation of road construction projects in Mombasa County, Kenya. The Pearson's product moment correlation analysis was performed to confirm or deny the relationship between the study variables. The correlation results indicated that the project planning practices had positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. A standard multiple linear analysis was performed with implementation of road construction projects as the dependent variable and project resource planning and project resource monitoring as the predictor variables. The regression results showed that the project planning practices had positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. Therefore, the conclusion was that project planning practices have significant influence on implementation of road construction projects in Mombasa County, Kenya.

The first specific objective was to establish the influence of project resource planning on implementation of road construction projects in Mombasa County, Kenya. The first null hypothesis (H_{01}) predicted that project resource planning has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The Pearson's correlation results indicated that project resource planning had a moderately strong positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. The regression results showed that project resource planning had a positive and significant influence on

implementation of road construction projects in Mombasa County, Kenya. The H_{01} was rejected, providing the empirical support for H_{11} . Therefore, the first conclusion was that project resource planning has a significant influence on implementation of road construction projects in Mombasa County, Kenya.

The second specific objective was to assess the influence of project resource monitoring on implementation of road construction projects in Mombasa County, Kenya. The second null hypothesis (H_{02}) predicted that project resource monitoring has no significant influence on implementation of road construction projects in Mombasa County, Kenya. The Pearson's correlation results indicated that project resource monitoring had a strong positive and significant relationship with implementation of road construction projects in Mombasa County, Kenya. The regression results showed that project resource monitoring had a positive and significant influence on implementation of road construction projects in Mombasa County, Kenya. The H_{02} was rejected, providing the empirical support for H_{12} . Therefore, the second conclusion was that project resource monitoring has a significant influence on implementation of road construction projects in Mombasa County, Kenya.

RECOMMENDATIONS

Managerial Implications

From the findings of this research, the research recommends that managers implement project planning practices to foster the implementation of road construction projects.

Policy Implications

From the findings of this research, the research recommends that policy makers within construction industry should to review the policy framework to encourage project managers to implement project planning practices to foster the implementation of road construction projects.

Limitations and Future Research

This research paper generates novel insights into how project planning practices predict the implementation of road construction projects. However, the current research has a number of limitations that need to be taken into consideration. First, the research was limited to the influence of project planning practices on implementation of road construction projects in Mombasa County, Kenya. Subsequently, caution should be taken when attempting to generalize the results beyond the construction industry. Future research could examine the influence of project planning practices on project performance in other sectors or in other regions. Second, the research was contextually limited to only two project planning practices, namely project resource planning and project resource monitoring. Future research should examine the influence of other project planning practices on implementation of road construction projects. Third, as the research paper relied on a cross-sectional survey design, no inferences about the causality of relationships can be made. Therefore, future researchers should consider conducting a longitudinal study on the influence of project planning practices on implementation of road construction projects.

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