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COST MANAGEMENT AND PERFORMANCE OF ROAD PROJECTS IN MACHAKOS AND MAKUENI COUNTIES, KENYA

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ABSTRACT

The main objective of the study is therefore to determine the influence of cost management on performance of road projects in the Machakos and Makueni counties in Kenya. The specific objectives were to establish the influence of resource allocation and cost control on the performance of road projects in Machakos and Makueni counties. The study adopted explanatory research design with a target population of 42 road projects that have been completed in the last 5 years in Machakos and Makueni counties. The unit of analysis were the 42 road projects while the unit of observation were three key personnel in each project representing clients, contractors and consultants giving a total of 126 respondents selected for the purpose of this study. Thus, a census of all the 126 respondents were conducted since the population is less than 200 respondents. Primary data was utilized in the study, which was gathered using a structured questionnaire. SPSS software was employed in the analysis of data. The study concluded that resource allocation and cost control had a positive and significant impact on the performance of road projects in the counties of Makueni and Machakos. The study recommended that . The National Construction Authority, NEMA as well as the Engineers board of Kenya ought to formulate policies that ensures quality project implementation that marches with the road standards, cost requirements as well as environmental conservation.

Key Words: Cost Management, Resource Allocation, Cost Control, Performance, Road Projects

Background of the Study

The road network in a country form forms part of the driving force for the growth of the economy. The roads open up market access for the producers and the consumers. The road network stimulates the growth of the economy by creating employment opportunities as well as facilitate the provision of quality education, health and better social wellbeing for all. The road network is part of the crucial link between the intended factories, markets and production centers that stimulate the growth of the economy manifested through employment opportunities created as well as social, health and education (Wandiri & James, 2020). Construction of quality road network requires extensive budgets. The quality of road construction projects can be measured on the degree of the road meeting the expected goal or usage or could be measured on the durability of the road. Constructed roads require regular maintenance because the usage of these roads makes them to wear off quickly. Therefore, both construction and maintenance require availability of funds lack of which inhibits the development.

The classification of roads in Kenya is based on the function the road serves. Class A roads (International Trunk Roads) serves as a link between centers of international importance and crossing international boundaries. Class B roads (National Trunk Roads) links centers of national importance as well as urban centers. Class C roads or primary roads links provisionally important areas, Class D road links locally important centers to each other and class E roads link minor centers and markets (KERRA, 2024). The government established Kenya National Highways Authority (KeNHA), Kenya Urban Roads Authority (KURA) and the Kenya Rural Roads Authority (KeRRA) to oversee construction and repair of roads through an Act of Parliament in 2007 (KRB, 2007). There are a number of road projects that have been conducted by both the national and county governments in Machakos County.

The performance of road projects can be measured in terms of within the stipulated budgets, time constraints as well as the technical specifications. The project performance measures revolve around the completion of the project with scope of budget, schedule, and quality (Meshram et al., 2020; Takim & Akintoye, 2002). Thus, the road projects performance is said to have been achieved when the road projects are completed within budget, schedule, and quality specification (Wandiri & James, 2020). Because project budget is one of the measures of road project performance, it is therefore crucial to be keen on the cost management in the course of project implementation in order achieve the intended objectives within the technical, time and budget requirements and specifications.

Cost management in the road projects is an essential requirement because the progress and the actual cost of the project would be measured against the budget. Cost management entail all the efforts put in place to ensure the project is delivered within the budget (Turner, 2022). Cost management can also be defined as the processes that emphasizes on efficiency optimization and focuses on both the customer and profitability. Cost management comprises six steps, understanding the causes of costs and revenues, understanding and reducing inter-functional complexity, providing the tools of managing costs, involving staff in making decisions, increasing effectiveness and continuously improving costs and measuring decisions against strategic plans (Faten Albtoush *et al.*, 2020).

Cost is an essential and basic resource of the project and thus, failure by the construction companies to effectively manage the costs leads to costs overruns where the implementation of the project is done beyond the set budget limits. For construction companies wishing to remain sustainable and competitive, then cost management is key in the construction projects (Okereke et al., 2022). The effective control of costs is the foundational element of the success of the construction management. It ensures that the expenditures of the project are cubed within the stipulated budgets thus minimizing the implications of cost overruns as well as achieving the

objectives of the project, meeting the stakeholder expectations and generally enhancing the overall project performance. The various strategies that could be employed in cost control include budget adherence, value engineering, earned value management and change management (Hassan, 2023).

During the process of construction, road projects face a number of problems including the cost overrun issues (Kumbhani & Malek, 2018). The construction projects are high consumer of capital resources whereas cost management of these projects remain a challenge (Chigara et al. 2013). An average of 35-60% of projects initiated in Kenya face cost overruns while time overrun is most severe with an average of 35-73% projects overrunning their schedule. The trend of cost overruns is more severe in developing countries where these overruns sometimes exceed 100% of the anticipated cost of the project. In addition, other than the cost overruns, time overruns issue is a serious concern, especially with government-related funded projects (Ong'ondo et al., 2019). An average of 35-60% of projects initiated in Machakos and Makueni counties face cost overruns while time overrun is most severe with an average of 35-73% projects overrunning their schedule (Mwangi, 2019).

Even with the perceived benefits of the road construction projects to the economies of various countries, the projects suffer from material shortages, poor quality, cost overruns as well as delayed completion (Yap et al., 2022). These challenges can be attributed to inappropriate approach of management to the resources dedicated to the project. A s a result of poor cost performance, the projects have failed to meet the client requirements as well as project specification requirements and also led to failed performance in terms of cost budgets and planned schedules. This is a problem affecting affected both developing and developed economies (Okereke et al., 2022). The implications of cost overruns include the impacts on financial health of the stakeholders, stakeholder satisfaction, quality and schedules, which could be a recipe for legal complications, disputes, strained relationships as well as delays in projects (Hassan, 2023).

The cost management in construction projects entail cost estimating as well as cost plans (Faten Albtoush et al., 2020). However, there are a number of factors that affect cost management in the construction projects. The factors include inappropriate management and poor leadership, excessive wastage of materials in sites, inefficient deployment of resources, and theft of materials on sites, complex payment mechanisms as well as the variations during construction works (Fagbenle et al., 2018).

Statement of the Problem

The road network in a country forms part of the driving force for the growth of the economy because it opens up market access for the producers and the consumers. Furthermore, it stimulates the growth of the economy by creating employment opportunities as well as facilitate the provision of quality education, health and better social wellbeing for all. The road infrastructure forms a critical segment in the achievement of Kenya Vision 2030 of transforming Kenya into middle-income country (Republic of Kenya, 2008). The construction of quality road network requires extensive budgets. The quality of road construction projects can be measured on the degree of the road meeting the expected goal or usage or could be measured on the durability of the road. Both construction of new road network and maintenance of existing road network require funds and hence a budget. Lack of funds inhibits the development.

An average of 35-60% of projects initiated in Machakos and Makueni counties face cost overruns while time overrun is most severe with an average of 35-73% projects overrunning their schedule (Mwangi, 2019). However, a report by KERRA (2022) indicated that the main challenge facing the roads construction and maintenance in Kenya was the suspension of works by contractors and further the slow progress of construction works as a result inadequate cost management of the road projects resulting to cost overruns. An average of 35-60% of projects initiated in Kenya face cost overruns while time overrun is most severe with an average of 35-73% projects overrunning their

schedule (KERRA, 2022). The Auditor General's report (2023) for example further noted the delayed construction of Kathemboni Road in Machakos Municipality where more than a quarter of the contract amount had already been paid to the contractor. This has negatively impacted on the progress of works, compelling several Contractors to either claim interest on delayed payments, issue notice to suspend works, reduce rate of work or suspend works. The consequence to this was an output of 646.23Kms against a target of 668.83Km for roads upgraded to bitumen standard.

The performance of road network in Machakos and Makueni counties has been faced with a number of challenges. Some of these challenges include cost overruns and time overruns. In order to address these challenges and improve the performance of the road projects in Machakos and Makueni counties, the study sought to determine the influence of cost management on performance of road projects in the Machakos and Makueni counties. The cost management included resource allocation and cost control.

Past studies have presented research gaps. A study by Lee and Kim (2021) did not elaborate the cost management employed hence conceptual gap. In Pakistan, Manthar et al. (2017) highlighted the major factors of budget overrun in construction of road project but did not establish the cost control and how they affect road project performance. A study by Makokha and Ngugi (2022) on the influence of resource allocation on project implementation by Busia County Government, Kenya indicated that proper allocation of resource helps the project manager to identify problems, avoid over allocation and adapt to change. However, Makokha and Ngugi (2022) did not indicate the extent resource allocation affect project performance hence methodological gap. It is against tis that the proposed study sought to determine the influence of cost management on performance of road projects in Machakos and Makueni counties, Kenya.

Research Objectives

i. Determine the influence of resource allocation on the performance of road projects in Machakos and Makueni counties.
ii. Establish the influence of cost control on the performance of road projects in Machakos and Makueni counties.

LITERATURE REVIEW

Theoretical Review

The Theory of Constraints

Furthermore, the study was based on the theory of constraints. The theory of constraints was developed by Eli Goldratt in 1988. The theory of constraints states that constraints determine the performance of a system. A constraint is anything that prevents a system from achieving a higher performance relative to its goal. A system is any collection of interconnected parts sharing a common goal. The theory of constraints is based on the idea that every system has at least one bottleneck, which can be defined as any kind of situation that impedes the system to reach high performance level in terms of its purposes. The main aim of every company is increasing the profit. However, constraints are main obstacles at achieving companies' aims. If companies can handle constraints in their system and manage these constraints, they would have a continuous improvement management system thus they could achieve higher performance (Şimşit et al., 2014).

The theory of constraints is a tool of management, which considers that any system of management is limited by various constraints in achieving its objectives. According to theory of constraints, there is always, at least, one single constraint, and theory of constraints implements a concentrating process to detect the constraint and restructure the remaining of the organization around it (Tabish & Syed, 2015). Theory of constraints includes five steps including identifying the constraint,

exploiting the constraint, subordinate other processes to the constraint, elevating the constraint and repeating the cycle (Orouji, 2016). However, the theory has been criticized as it fails to account for operating expenses as it considers the expenses as the costs. Further, the theory focuses on fixing the items in short run and does not consider the items in the long-run (Hummel-Rossi & Ashdown, 2002).

The critiques of the theory argue that it does not take into account the variability and uncertainty inherent in many systems and oversimplifies complex processes. The theory treats many items including prices, demand, product mix, constrained resources, and capacity and production technology as fixed and inflexible. The theory tends to fragment the critical path, is static and that constraints make it more difficult to investigate schedule scenarios (Coad, 2010).

The theory of constraints is relevant to the study because various costs affect the performance of the road projects in Machakos and Makueni counties. The theory recognizes these costs as constraints towards the effective performance of the road projects. The theory further provides various steps of mitigating these costs including identifying the constraint, exploiting the constraint, subordinate other processes to the constraint, elevating the constraint and repeating the cycle.

Conceptual Framework

Conceptual framework is a representation that shows how the variables in a study relate with each other (Bryman, 2016). The framework helps the reader see at a glance the proposed relationships between the variables in the study graphically or diagrammatically. The figure 2.1 presents the relationships among the study variables.

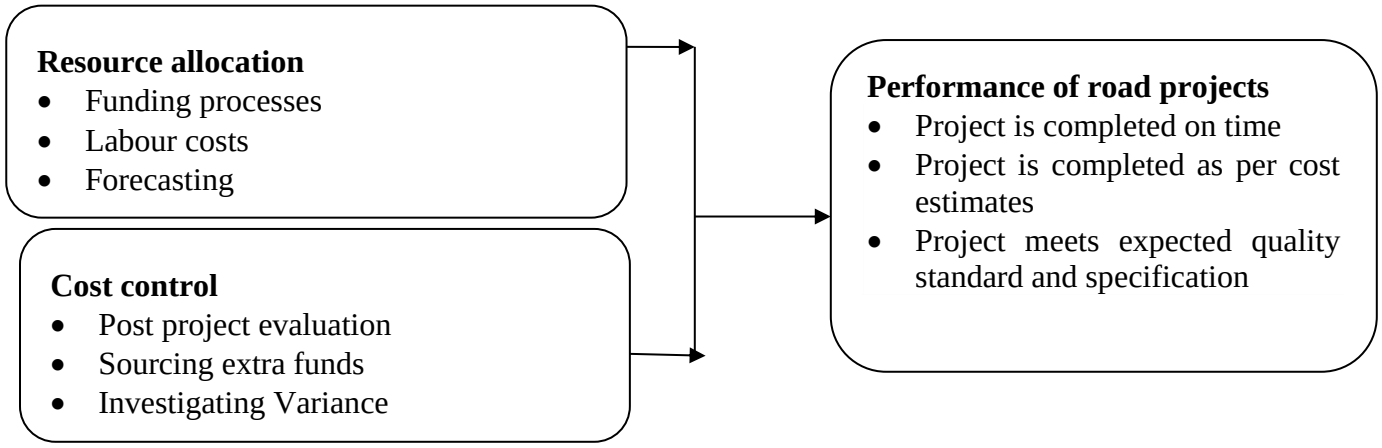

Figure 2.1: Conceptual Framework

Resource Allocation in Road Projects

Resource allocation is the process of strategically selecting and assigning available resources to a task or project in support of business objectives. Project resource allocation involves the identification of technical, physical, human, and most importantly, financial resources and organizing the resources in a manner that ensures successful project completion (Steiss, 2019). Resource scheduling is crucial in construction projects, especially due to their high stakes nature that needs efficient resource utilization. The project managers have to make complex scheduling decisions under the varied scheduling needs such as resource constraints and smooth resource utilization along with the inherent uncertainty in construction projects (Ronoh, 2020).

Resource allocation is the process of assigning and managing assets in a manner that supports an organization's strategic planning goals. Resource control entails ensuring the availability of planned physical resources, monitoring them against the plan, and taking corrective actions when required (Mahapatro, 2022). Even though a well-formulated plan, a strong and effective talent pool and human capital constitute critical resources for successful strategy, a weak resource management process is one of the main hindrances in successful implementation of the strategy, which leads to failed organizations (Karugia & Lango, 2015).

Cost Control in Road Projects

Cost control involves the strategic process that emphasizes on the optimization of efficiency and focuses on the customer and on profitability. It aims to create more value at lower cost, and consist of six steps, understanding of what causes the cost and revenue structure of the business, understand and reduce inter-functional complexity, provide the tools to manage costs, involve employees in decisions, increase effectiveness and continuously improve costs, measure decisions against the strategic business plan (Faten Albtoush et al., 2020).

The various strategies that could be employed in cost control include budget adherence, value engineering, earned value management and change management. Cost control stands as one of the major challenges in construction projects. The ability to monitor the project expenditures in accordance with the budgets defines the success of the project. Cost control in construction project management involves a comprehensive set of strategies, practices, and methodologies aimed at minimizing the risk of cost overruns while optimizing project performance. Successful cost control not only ensures financial stability but also contributes to the timely delivery of high-quality results that meet or exceed stakeholder expectations (Hassan, 2023).

Empirical Review

Resource Allocation and Performance of Road Projects

Karugia and Lango (2019) conducted a study on strategic resource allocation and the performance of low cost housing construction projects in Kenya. The building industry is the catalyst for improving the country's infrastructure and revenues. In the economy of the country, the Kenyan construction industry is a key sector and their level of activity indicates the overall economic success of the country. The core business of the building industry is conducting projects to build new and renovate existing structures for a range of customers ranging from of low cost, differentiation and focus markets. Construction project success or failure has been tied to the cost, time, technology, economic resources and performance pillars. Planning is probably the biggest role a project manager plays in a building project.

Karugia and Lango (2015) did carry out a research study on strategic resource allocation and the performance of low-cost housing construction project in Kenya. A descriptive research design with a cross-sectional survey design was adopted. The study indicated that even though a well-formulated plan, a strong and effective talent pool and human capital constitute critical resources for successful strategy, a weak resource management process is one of the main hindrances in successful implementation of the strategy, which leads to failed organizations. The study defined the resources to include all assets, capabilities, organizational structures, corporate features, data and expertise that a company controls, helping it to formulate and execute strategies to increase efficiency and effectiveness. The study however presented contextual and conceptual gaps as the current study is focused on performance of road projects in Machakos and Makueni counties.

A research study was conducted by Makokha and Ngugi (2022) on the influence of resource allocation on project implementation by Busia County Government, Kenya. Primary data was employed in the study with a descriptive research design being adopted. The study concluded that proper allocation of resource ensures that the project has the right staff, equipment, money, etc. as

efficiently as possible and helps the project manager to identify problems, avoid over allocation and adapt to change. The efficient use of the resources available and their distribution among various aspects of the projects are also ensured by proper resource allocation. The study however presented contextual and conceptual gaps.

Ronoh (2020) conducted a research study on the influence of resource scheduling on the performance of residential construction projects in Nairobi City County, Kenya. A descriptive survey research design was made use by the study. The results of the analysis indicated that proper allocation of project equipment facilitates smooth operations and successful project completion. Proper allocation of resources ensures no project activity stalls due to lack of equipment and facilities; hence, the project undertaken can be completed within the shortest time and as scheduled. The study however presented contextual, methodological and conceptual gaps as the current study is focused on performance of road projects in Machakos and Makueni counties using descriptive research design.

A study was carried out by Abdi (2020) on resource management and the performance of road infrastructure projects in Wajir County, Kenya. The research adopted a descriptive research design. Resource planning, resource scheduling, resource allocation and resource monitoring were found to have a positive and significant effect on project performance. The study concluded that a key benefit to resource planning is that it helps organizations to fulfill task specifications efficiently. Successful resource scheduling allows in different ways to solve problems related to resource availability and job efficiency. Efficient resource allocation allows project managers prepare to allocate resources to the task and effectively manage them. Reporting requires daily tracking of key elements of project performance in terms of inputs, actions and outcomes. The study however presented contextual and conceptual gaps as the current study is focused on performance of road projects in Machakos and Makueni counties.

Cost Control and Performance of Road Projects

A research study was conducted by Hassan (2023) on cost control measures for successful construction project management. The study pointed out that cost control in construction project management involves a comprehensive set of strategies, practices, and methodologies aimed at minimizing the risk of cost overruns while optimizing project performance. Successful cost control not only ensures financial stability but also contributes to the timely delivery of high-quality results that meet or exceed stakeholder expectations. Effective cost control measures are imperative for the successful management of construction projects. The dynamic and challenging nature of the construction industry necessitates proactive strategies to prevent cost overruns, ensure financial stability, and enhance overall project performance. The study however presented a conceptual gap.

Oyeyipo and Odusami (2016) carried out a study on post contract cost management of contractors in Nigeria. A cross-sectional survey research design was adopted for the study. A structured questionnaire was used as the principal instrument for collecting data from respondents. The study emphasized that cost management consists of cost estimation and cost control. Project cost estimating entails coming up with an approximation of the costs of the resources needed to complete project objectives. It is the continuing process to keep the project within cost objectives and satisfy client's needs. Cost control system serves as a link between the cost estimate and the actual construction cost. Its main objective is to maintain costs within the construction budget. It is carried out to reduce to the barest minimum the deviation of the final cost from the initial cost. The study however presented contextual and conceptual gaps as the current study is focused on performance of road projects in Machakos and Makueni counties.

In New Zealand, Zhao et al. (2017) did a study on a better modelling and assessment of key factors affecting cost performance of building projects. The study findings outlined that cost management entails having the knowledge of how and why the costs occur and taking effective action based on

the relevant information. Most of the key industry professionals require a roadmap to estimate and monitor their project cost properly as effective project cost management is fundamental to construction project success. Effective cost management requires the contribution and collaboration of all the key stakeholders involved in the project. In addition, firms should be aware that they have to make investments in resource management if they want to gain competitive advantages. The study however presented a contextual gap as.

Bwankarikari and Irechukwu (2022) did a study on project cost control and performance of Bugarama rice project in Rwanda. The descriptive case study research based on qualitative and quantitative approaches were used. The study made the conclusion that keeping proper track of the project costs and realistic project budget leads to project minimum cost. Thus, a system ought to be in place where the project manager can track the unnecessary costs. The study found a statistically significant effect of project planning on project performance measured in terms of cost, time and quality as well as scope. The study however presented contextual and conceptual gaps as the current study is focused on performance of road projects in Machakos and Makueni counties.

Performance of Road Projects in Machokos and Makueni Counties, Kenya

A study was conducted by Kisavi and Ngugi (2019) on the critical factors and their influence on performance of road construction projects in Kiambu County, Kenya. The research adopted a descriptive research design. Data was collected from a census of 9 road construction projects in the county. The target population was the 158 officers, who worked in the Kiambu regional offices for KURA, KeRRA, KeNHA and the county's Ministry of Public Works as well as representatives of the contractors undertaking the road construction projects that were ongoing as at the time of the study. The study found out that performance of road construction projects in Kiambu County, Kenya was affected by project funding, contractor capacity, project planning and project monitoring and evaluation.

Kamarkor et al. (2023) did carry out social-cultural factors and performance of roads construction projects in Nairobi City County, Kenya. This study used the descriptive and explanatory research design. The target population of this research was the 176 completed roads construction projects in Nairobi City County by Kenya Rural Roads Authority (KERRA). The unit of observation was the road engineers, project planners and directors (KERRA), road supervisors, road inspectors, road surveyors, contractors, and project implementation teams' members (KERRA). The unit of analysis was the completed roads construction projects in Nairobi City County. The study concludes that human relationship influences project performance since projects operate within the society. Project culture is developed by communicating priority, status, and the alignment of official and operational rules.

A study was conducted by Wandiri and James (2020) on project management and performance of rural road construction projects in Machakos County, Kenya. The study conducted a census of all the 18 rural road construction projects in Machakos County by census. These projects were at various stages of completion. The number of respondents selected was 100 and in order to narrow down on these respondents, simple random sampling technique was used. The study found out that project planning, project execution and project monitoring and control all had a positive and significant relationship with project performance.

Ronoh (2020) in a study on project management practices and performance of residential construction projects in Nairobi City County, Kenya adopted a census and administered a questionnaire as the data collection tool for primary data collection. . Results revealed that all the project management practices had a positive and significant relationship with implementation of road projects in Nairobi City County, Kenya. However, the magnitude of the influence was different for the specific project management practices.

RESEARCH METHODOLOGY

The study adopted a descriptive design in answering its research questions. The target population of this research were 42 road projects that have been completed in the last 5 years in Machakos and Makueni counties. The unit of analysis was the 42 road projects while the unit of observation were three key personnel in each project representing clients, contractors and consultants giving a total of 126 respondents selected for the purpose of this study. Thus, a census of all the 126 respondents were conducted since the population is less than 200 respondents. This research embraced primary data that was assembled by aid of issuing of questionnaires. The pilot test for this study was conducted in Machakos County. Those who participated in the pilot study was 10% of the total sample and was not included in the final study. A total of 13 respondents participated in the study.Both descriptive and inferential analysis was carried out. The descriptive statistics involved the means and the standard deviation. Inferential statistics encompassed both correlation and regression analysis.

RESULTS AND DISCUSSION

126 respondents were contacted to participate in the study. However, 98 questionnaires were dully filled and returned. This represented 77.8% response rate, which is good for a research study. Morton et al. (2012) indicated that a response rate of 70% and above is ideal for a research study.

Resource Allocation

The study used primary data in its analysis. Structured questionnaires were administered to the respondents. A Likert scale ranging from 1 to 5 was used to measures the level of agreement or disagreement of the respondents with the statements presented in the questionnaire. A summary of the responses on the questions on resource allocation are tabulated in Table 1.

Table 1: Descriptive Results for Resource Allocation

	SD	D	N	A	SA		
	f %	f %	f %	f %	f %	M	S Dev
Adequate labour is allocated to the project to facilitate performance	2 2%	15 15.3%	16 16.3%	36 36.7%	29 29.6%	3.8	1.1
Adequate financial requirements is assigned to the project to facilitate performance	6 6.1%	9 9.2%	17 17.3%	33 33.7%	33 33.7%	3.8	1.2
Enough technical assistance is allocated to the project to facilitate performance	7 7.1%	9 9.2%	24 24.5%	22 22.4%	36 36.7%	3.7	1.2
Necessary equipment is allocated to the project to facilitate performance	8 8.2%	9 9.2%	20 20.4%	31 31.6%	30 30.6%	3.7	1.2
The resource allocation varies from time to time to facilitate performance	6 6.1%	13 13.3%	18 18.4%	29 29.6%	32 32.7%	3.7	1.2
There is efficacy in the allocation of resources in the project	5 5.1%	13 13.3%	14 14.3%	34 34.7%	32 32.7%	3.8	1.2
There is optimum availability of financial resources throughout the project implementation phase	9 9.2%	18 18.4%	17 17.3%	26 26.5%	28 28.6%	3.5	1.3
n = 98							

It is clear from the results tabulated that the statement, adequate labour is allocated to the project to facilitate performance received the following responses. 29(29.6%) of the responses recorded a strong opinion, 36(36.7%) of them agreed whereas 16(16.3%) did not take any side. The line mean of the statement was 3.8 whereas its corresponding standard deviation was 1.1 indicating that the responses agreed that adequate labour is allocated to the project to facilitate performance.

Adequate financial requirements is assigned to the project to facilitate performance on the other hand received the responses as follows. 17(17.3%) of the participants in the study did not take any position regarding the statement, 33(33.7%) of those contacted agreed and 33(33.7%) had a strong agreement. The mean and standard deviation of the statement were 3.8 and 1.2 in that order. This implies that the respondents were in agreement that adequate financial requirements is assigned to the project to facilitate performance.

Furthermore, with regards to the question, enough technical assistance is allocated to the project to facilitate performance, 36(36.7%) of the respondents recorded a strong opinion with regards the statement, 22(22.4%) of them agreed and 24(24.5%) of them were neutral. The line mean and standard deviation of the statement were 3.7 and 1.2 in that order implying that the respondents agreed that enough technical assistance is allocated to the project to facilitate performance. Necessary equipment is allocated to the project to facilitate performance received the responses as follows. 20(20.4%) of the participants in the study did not take any position regarding the statement, 31(31.6%) of those contacted agreed and 30(30.6%) had a strong agreement. The mean and standard deviation of the statement were 3.7 and 1.2 in that order. This implies that the respondents agreed that necessary equipment is allocated to the project to facilitate performance.

With respect to the question, the resource allocation varies from time to time to facilitate performance, 32 (32.7%) of the responses recorded a strong opinion, 29(29.6%) agreed whereas 18(18.4%) held a neutral stand. The mean and the line standard deviation were 3.7 and 1.2 indicating that the resource allocation varies from time to time to facilitate performance. There is efficacy in the allocation of resources in the project on the other hand received the responses as follows. 14(14.3%) of the participants in the study did not take any position regarding the statement, 34(34.7%) of those contacted agreed and 32(32.7%) had a strong agreement. The mean and standard deviation of the statement were 3.8 and 1.2 in that order. This implies that the respondents agreed that there is efficacy in the allocation of resources in the project.

It can be observed from the results tabulated that the statement, there is optimum availability of financial resources throughout the project implementation phase received the following responses. 28(28.6%) of the responses recorded a strong opinion, 26(26.5%) of them were in agreement whereas 17(17.3%) did not take any side. The line mean of the statement was 3.5 whereas its corresponding standard deviation was 1.3 indicating that the responses were in agreement that there is optimum availability of financial resources throughout the project implementation phase.

Cost Control

The study used primary data in its analysis. Structured questionnaires were administered to the respondents. A Likert scale ranging from 1 to 5 was used to measures the level of agreement or disagreement of the respondents with the statements presented in the questionnaire. A summary of the responses on the questions on cost control are tabulated in Table 2.

Table 2: Descriptive Results for Cost Control

	SD	D	N	A	SA		
	f %	f %	f %	f %	f %	M	S Dev
The implementation of the project is done in accordance with the set project cost	5 5.1%	15 15.3%	16 16.3%	30 30.6%	32 32.7%	3.7	1.2
The project cost evaluation is done periodically is done in the course of project implementation	7 7.1%	9 9.2%	23 23.5%	23 23.5%	36 36.7%	3.7	1.2
Approvals are sought in cases where additional expenses outside the budgets are necessary	4 4.1%	9 9.2%	22 22.4%	30 30.6%	33 33.7%	3.8	1.1
There is efficiency in the implementation of road project	7 7.1%	12 12.2%	18 18.4%	31 31.6%	30 30.6%	3.7	1.2
There is adequate investigation of the road project cost variance when it occurs	8 8.2%	5 5.1%	18 18.4%	34 34.7%	33 33.7%	3.8	1.2
There is timely implementation of projects	8 8.2%	12 12.2%	21 21.4%	27 27.6%	30 30.6%	3.6	1.3
There is an efficient management road project team	7 7.1%	17 17.3%	19 19.4%	27 27.6%	28 28.6%	3.5	1.3
n = 98							

The implementation of the project is done in accordance with the set project cost received the responses as follows. 16(16.3%) of the participants in the study did not take any position regarding the statement, 30(30.6%) of those contacted agreed and 32(32.7%) had a strong agreement. The mean and standard deviation of the statement were 3.7 and 1.2 in that order. This implies that the respondents were in agreement that the implementation of the project is done in accordance with the set project cost. It can be observed from the results tabulated that the statement, the project cost evaluation is done periodically is done in the course of project implementation received the following responses. 36(36.7%) of the responses recorded a strong opinion, 23(23.5%) of them were in agreement whereas 23(23.5%) did not take any side. The line mean of the statement was 3.7 whereas its corresponding standard deviation was 1.2 indicating that the responses were in agreement that the project cost evaluation is done periodically is done in the course of project implementation.

Furthermore, with regards to the question, approvals are sought in cases where additional expenses outside the budgets are necessary, 33(33.7%) of the respondents recorded a strong opinion with regards the statement, 30(30.6%) of them were in agreement and 22(22.4%) of them were neutral. The line mean and standard deviation of the statement were 3.8 and 1.1 in that order implying that the respondents were in agreement that approvals are sought in cases where additional expenses outside the budgets are necessary. It can be observed from the results tabulated that the statement, there is efficiency in the implementation of road project received the following responses. 30(30.6%) of the responses recorded a strong opinion, 31(31.6%) of them were in agreement whereas 18(18.4%) did not take any side. The line mean of the statement was 3.7 whereas its corresponding standard deviation was 1.2 indicating that the responses were in agreement that there is efficiency in the implementation of road project.

It is clear from the results tabulated that the statement, there is adequate investigation of the road project cost variance when it occurs received the following responses. 33(33.7%) of the responses recorded a strong opinion, 34(34.7%) of them were in agreement whereas 18(18.4%) did not take

any side. The line mean of the statement was 3.8 whereas its corresponding standard deviation was 1.2 indicating that the responses were in agreement that there is adequate investigation of the road project cost variance when it occurs. There is timely implementation of projects recorded the responses as follows. 21(21.4%) of the participants in the study did not take any position regarding the statement, 27(27.6%) of those contacted agreed and 30(30.6%) had a strong agreement. The mean and standard deviation of the statement were 3.6 and 1.3 in that order. This implies that the respondents were in agreement that there is timely implementation of projects.

It can be seen from the results tabulated that the statement, there is an efficient management road project team received the following responses. 28(28.6%) of the responses recorded a strong opinion, 27(27.6%) of them were in agreement whereas 19(19.4%) did not take any side. The line mean of the statement was 3.5 whereas its corresponding standard deviation was 1.3 indicating that the responses were in agreement that there was an efficient management road project team.

Performance of Road Projects

The study used primary data in its analysis. Structured questionnaires were administered to the respondents. A Likert scale ranging from 1 to 5 was used to measures the level of agreement or disagreement of the respondents with the statements presented in the questionnaire. A summary of the responses on the questions on performance of road projects are tabulated in Table 3.

Table 3: Descriptive Results for Performance of Road Projects

	SD	D	N	A	SA		
	f %	f %	f %	f %	f %	M	S Dev
The road project meet the technical specification required	7 7.1%	14 14.3%	18 18.4%	24 24.5%	35 35.7%	3.7	1.3
The road project is implemented within the set budget limits	6 6.1%	12 12.2%	22 22.4%	22 22.4%	36 36.7%	3.7	1.3
The road project is implemented within the set time limits	8 8.2%	11 11.2%	21 21.4%	28 28.6%	30 30.6%	3.6	1.3
The road project is implemented within the set project scope	7 7.1%	10 10.2%	14 14.3%	29 29.6%	38 38.8%	3.8	1.3
The road project is implemented meet the client specification	6 6.1%	13 13.3%	21 21.4%	18 18.4%	40 40.8%	3.7	1.3
n = 98							

It can be noted that the question, the road project meet the technical specification required recorded the following responses. 35(35.7%) of the responses recorded a strong opinion, 24(24.5%) of them were in agreement whereas 18(18.4%) did not take any side. The line mean of the statement was 3.7 whereas its corresponding standard deviation was 1.3 indicating that the road project meet the technical specification required. The road project is implemented within the set budget limits received the responses as follows. 22(22.4%) of the participants in the study did not take any position regarding the statement, 22(22.4%) of those contacted agreed and 36(36.7%) had a strong agreement. The mean and standard deviation of the statement were 3.7 and 1.3 in that order. This implies that the respondents were in agreement that the road project is implemented within the set budget limits.

It is clear from the results tabulated that the statement, the road project is implemented within the set time limits received the following responses. 30(30.6%) of the responses recorded a strong opinion, 28(28.6%) of them were in agreement whereas 21(21.4%) did not take any side. The line mean of the statement was 3.6 whereas its corresponding standard deviation was 1.3 indicating that the responses were in agreement that the road project is implemented within the set time limits.

The road project is implemented within the set project scope received the responses as follows. 14(14.3%) of the participants in the study did not take any position regarding the statement, 29(29.6%) of those contacted agreed and 38(38.8%) had a strong agreement. The mean and standard deviation of the statement were 3.8 and 1.3 in that order. This implies that the respondents were in agreement that the road project is implemented within the set project scope.

Furthermore, with regards to the question, the road project is implemented meet the client specification, 40(40.8%) of the respondents recorded a strong opinion with regards the statement, 18(18.4%) of them were in agreement and 21(21.4%) of them were neutral. The line mean and standard deviation of the statement were 3.7 and 1.3 in that order implying that the respondents were in agreement that the road project is implemented meet the client specification.

Correlation Statistics

The study determined the correlation between

resource allocation, cost control and performance of road projects. The results are presented in Table 4.

Table 4: Correlation Results

		Performance	Resource Allocation	Cost Control
Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
Resource Allocation	Pearson Correlation	.560**	1	
	Sig. (2-tailed)	0.000		
Cost Control	Pearson Correlation	.542**	.416**	1
	Sig. (2-tailed)	0.000	0.000	
n	98			

The relationship between resource allocation and performance of road projects from the analysis of the results of the study portrayed a positive and statistically significant relationship ($r=0.560$, $p=0.000<0.05$). This has the implication that resource allocation positively affects performance of road projects. Finally, cost control has positive (0.542) and statistically significant relationship ($p=0.000<0.05$) with performance of road projects implying that cost control positively affects performance of road projects.

Regression Results

The study further conducted a regression analysis to determine the linear relationship between the performance of road projects and the independent variables, which are, resource allocation and cost control.

Table 5: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.700a	0.59	0.568	0.49497

a Predictors: (Constant), Cost Control, Resource Allocation

From the findings shown in Table 5, it is clear that the estimated model explains to a tune of 59% of the total variations in the performance of road projects. This is supported by the R Square value of 0.59 in the estimated model. This therefore has the implication that the identified variables including resource allocation and cost control are significant in explaining the variations in the performance of road projects. The remaining 41% of the total variations in the performance of road projects are explained by other variables not included in the study that are significant in explaining the variations of in the performance of road projects.

Table 6: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	21.85	4	5.462	22.296	.000b
Residual	22.784	93	0.245		
Total	44.634	97			

a Dependent Variable: Performance
b Predictors: (Constant), Cost Control, Resource Allocation,

The results presented in Table 6 points out that the estimated model is statistically significant. This is supported by the estimated P value in the model (0.000<0.05) as well as the estimated F value (22.296) less than the F critical 2.4472 in the F tables. The estimated results can therefore be used to give reliable inference.

Regression Coefficients

The coefficients of the variables of study, resource allocation and cost control were estimated in the study. The coefficients were used to estimate the linear regression model of the study. The results are outlined in Table 7

Table 7: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.194	0.389		0.498	0.62
Resource Allocation	0.350	0.111	0.278	3.146	0.002
Cost Control	0.237	0.098	0.227	2.413	0.018

The estimated linear regression model was,

$$\mathbf{Y = .194 + .350X_1 + .237X_2}$$

Where:

Y = Performance of road projects
$\mathbf{X_1}$ = Allocation
$\mathbf{X_2}$ = Cost control

The coefficient of resource allocation was positive (0.35) and statistically significant (0.002<0.05). This means that a unit improvement in resource allocation results in 0.35 units improvement in the performance of road projects. Thus, the null hypothesis that resource allocation has no significant effect on the performance of road projects in Machakos and Makueni counties was thus rejected and the study concluded that resource allocation has a significant positive effect on the performance of road projects. The findings are in tandem with the findings of Karugia and Lango (2015) who indicated that even though a well-formulated plan, a strong and effective talent pool and human capital constitute critical resources for successful strategy, a weak resource management process is one of the main hindrances in successful implementation of the strategy, which leads to failed organizations.

The coefficient of cost control was positive (0.237) and statistically significant (0.018<0.05). This means that a unit improvement in cost control results in 0.237 units improvement in the performance of road projects. Thus, the null hypothesis that cost control has no significant effect on the performance of road projects in Machakos and Makueni counties was thus rejected and the study concluded that cost control has a significant positive effect on the performance of road

projects. The findings concur with the findings of Hassan (2023) who pointed out that successful cost control not only ensures financial stability but also contributes to the timely delivery of high-quality results that meet or exceed stakeholder expectations. Effective cost control measures are imperative for the successful management of construction projects. The dynamic and challenging nature of the construction industry necessitates proactive strategies to prevent cost overruns, ensure financial stability, and enhance overall project performance.

Conclusions

The study concludes that resource allocation had a positive and significant impact on the performance of road projects in the counties of Makueni and Machakos. Resource allocation is the process of assigning and managing assets in a manner that supports an organization's strategic planning goals. Resource allocation is the process of strategically selecting and assigning available resources to a task or project in support of business objectives. Project resource allocation involves the identification of technical, physical, human, and most importantly, financial resources and organizing the resources in a manner that ensures successful project completion. Resource scheduling is crucial in construction projects, especially due to their high stakes nature that needs efficient resource utilization.

The study concludes that cost control had a positive and significant impact on the performance of road projects in the counties of Makueni and Machakos. Resource control entails ensuring the availability of planned physical resources, monitoring them against the plan, and taking corrective actions when required. Cost control involves the strategic process that emphasizes on the optimization of efficiency and focuses on the customer and on profitability. It aims to create more value at lower cost, and consist of six steps, understanding of what causes the cost and revenue structure of the business, understand and reduce inter-functional complexity, provide the tools to manage costs, involve employees in decisions, increase effectiveness and continuously improve costs, measure decisions against the strategic business plan.

Recommendations to Practice

The study recommends that the project managers as well as the project stakeholders in the road projects in Makueni and Machakos counties ought to ensure the availability of adequate resources before the commencement of the projects. In addition, thorough public participation ought to be conducted for effective cost management as well as resource allocation to the priority road projects.

Policy Recommendations

The study recommends that the National Construction Authority, NEMA as well as the Engineers board of Kenya ought to formulate policies that ensures quality project implementation that marches with the road standards, cost requirements as well as environmental conservation. This includes formulating policies on the percentage minimum resources requirements as well as policies on control and utilization of the resources.

Recommendations for Further Research

The study recommends that further studies be conducted on the effect of project management on the performance of road projects in the Counties of Makueni and Machakos. The cost management practices, processes and leadership may differ from county to county. There are other factors that affect project completion that do not fall under cost management but fall under a project management phases like planning, monitoring and evaluation. This brings about an empirical gap in which future research might seek to fill by expanding the scope to include project management phases as control variables.

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