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ABSTRACT

Project's performance is severely harmed by the delays. The road projects have been delayed for a number of reasons, including insufficient access to cash, management abilities, organizational culture, and technical expertise. However, the case is different in Machakos County where road construction projects have been successfully implemented without encountering huge challenges. This study's goal was to assess key success criteria that affect how well road projects work in Kenya's Machakos County. The main objectives of this study were to assess how road projects in Machakos County were carried out in relation to the procurement process, project planning, stakeholder involvement, and constructor capability. The study relied on urgency theory, constraint theory, and institutional theory. These hypotheses were similar to the objective of the study, which determined how procurement procedure influenced the effectiveness of road. The procurement procedure is a critical step in making sure the project is implemented properly overall. The project management team decides how much it will cost to complete the project and how profitable it will be. To make it easier to determine links between success factor variables and builders' performance, this study used descriptive research approach. Data for this project was collected through interviews and semi-structured questionnaires, utilizing a combination of qualitative and quantitative approaches. A total of 170 individuals were selected to participate in the study, including two representatives from each ward, county engineers, and ward representatives. However, the sample size for the study was narrowed down to 90 participants. Content analysis was employed to analyze the qualitative data obtained from the study. The findings indicated a correlation between the procurement process, project planning, stakeholders' participation, and contractor capacity. The research recommended the involvement of stakeholders in road construction projects to enhance performance. Additionally, it emphasized the importance of well-defined procurement processes, proper project planning, and contractor capacity as key priorities in road construction projects.

Key Words: *Procurement Process, Project Planning, Stakeholders' Participation, Contractor Capacity*

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INTRODUCTION

Infrastructure plays a key in solution to development challenges globally. According to World Bank (2011), without infrastructure simplifying green and expansion, nations will not be easy to meet their stated goals and objectives. According to the FIDIC Report (2006), unsatisfactory standards and project delays are the two most pressing problems facing the world's construction sector. Research shows that the building industry aids in the socio-economic growth of its labor, housing, and infrastructure sectors (Usman et al., 2012). The construction sector makes is a significant in any country's economy. Construction activities account for more than 16.0% of (GDP) and have employed at least 20% of the labor force across the world (Ayangade, 2018).

In global content, the USA has the most extensive road infrastructure across the global. China and India, take the second and third position respectively. The overall length of the road network in the United States surpasses 6.58 million kilometers, with around 4.3 million kilometers of paved roads making up that total length Muute and James, (2019). The overall length of roads in China is more than 4.24 million kilometers, according to statistics from 2012, whereas the total length of roads in India is more significant than 4.1 million kilometers. The top three nations in terms of the size of their transport systems are nations of Brazil, Siberia, Japan, Canada, France, Germany, and Spain in that order Naji, Ibrahim, and Hassan, (2018).

Performance measurement systems (PMS) is one of the most crucial aspects of analyzing the success of a project. However, the system has received very little attention in the construction sector, especially in developing nations. Consequently, there is a gap between the actual outcomes gained concerning the execution of significant projects and the stakeholders' expectations. The construction industry depends three fundamental factors to assess the degree to which a project was successful. These criteria are time, cost, and quality. At the organizational level, performance assessment methods generally depend on financial metrics, which are virtually always trailing indicators since the financial measures are linear. The UK construction industry created a number of Key Performance Indicators in response to the Egan Report (KPIs). These KPIs include project production levels, errors and faults, supplier product quality, degree overall service satisfaction, safety systems, and construction cost and time predictability (Gitahi, & Tumuti, 2019).

Evaluation of project deliverables about key performance indicators allows for determining the success or failure of road-building projects (KPI). Using these key performance indicators, one may choose whether or not projects are completed on schedule, without going over budget, error-free, efficiently, correctly the first time, safely, and profitably Muute and James, (2019). When evaluating the success of a project, one looks at whether or not it was done within the allotted budget, whether or not it was finished within the allotted amount of time, and whether or not it met the functional and technical requirements.

In Kenya, project construction delays are very rampart, as indicated by Raphael and Phillip (2016). Most road constructions are delayed and hence unable to meet their requirements standards. Most projects experience delays in completing and use more resources than the estimated cost.

Critical success factors refer to components of organizational practices vital for its future success. Determinants of project success or performance are associated with the management system, which has indirect and direct effects on project productivity. According to Silva *et al*. (2016), critical factors in project success are the one that leads to a substantial effect on schedule, quality, and budget. Silva *et al*. (2016) argue that project managers must consider all the components that influence standard requirements of a construction plan. According to Nduka et al. (2019), road construction in North Africa registers poor performance due to financial issues such as late payment, delays, poor planning, and

selection of contractors. On the other hand, Pal, Wang, and Liang (2017) argued poor planning, site managing, and limited resources are the key causes for a project delay.

Machakos is among the 47 counties that make up the country of Kenya with a population density is 1,421,932 as of (Census 2019). Machakos County has been rampantly due to its closeness to Nairobi, the capital of Kenya. The vast population in Machakos County encouraged enormous investment in infrastructural road projects. The National Governments funds Machakos County Government receives funds to construct its road network (County Allocation of Revenue Act, 2014). Road Machakos County Government enhance seamless connectivity across different regions within the county and in other counties to impart economic growth. During financial year 2019/ 2021, the County Government budgeted Ksh. 2 billion for Transport and Infrastructural develop in Machakos County (Controller of Budget, 2021).

Machakos County Government funds allocation has been prioritized on infrastructure projects. Of the total amount allocated for Transport and Infrastructure, more than 50% was used on road infrastructure. Therefore, there is a need to analyze, research, and make sure that there is a successful execution of road infrastructure projects Ndunda, Paul & Mbura, (2017). Project managers must conduct technical, financial, and human feasibility studies to execute road projects successfully. Failure to evaluate the project's technical viability may cause poor cost budgeting and inefficient planning for pavement structures. Technical feasibility comprises various activities material examination of materials, assessing hydrological levels, and evaluating the geometric and structural design. Technical feasibility provides the road construction team with quantities overview requirements. For example, Makutano to Kithimani (C100) road lacked a feasibility study and as a result it required an extra cost of 765 million. Most of the road projects in Machakos lack feasibility studies, stakeholder participation, and contractors experience delay payments. Payments to contractors may delay by more than one year.

Road construction promotes economic development by opening the nation to goods transportation. Sustainable and reliable roads facilitate seamless connectivity, providing an opportunity for revenue collection for the county and national Government. Nonetheless, poor planning for construction and the inability of the mangers to mitigate risks will lead to unnecessary costs (Ngundo & James, (2018**).** For example, poor-quality roads do not enhance economic development due to the high cost of road maintenance involved. It is palpable that project assessment, design methodology, stakeholder involvement, monitoring, and evaluation helped to reduce costs in road projects in Machakos County.

In Machakos County, several ongoing road development projects are not finished on schedule, resulting in increased expenses. Even more problematic are those road building projects that are ultimately completed but at a far higher cost than anticipated and on a date that is further in the future than was initially planned in the road project timetable. For example, the Kariobangi Machakos town bridge was finished, but within months the bridge crumbled owing to poor craftsmanship on the part of the contractors. Lack of technical abilities or knowledge in the construction industry may cause accidents and huge losses. Some road-building projects have been finished. However, some roads do not meet the quality standards (Kenya Engineer Magazine, 2021). As a result, this study conducts an analysis of the essential success elements that influence the performance of road construction projects in Machakos County, Kenya.

Problem Statement

Road infrastructures promotes economic development of a country. Also, the projects act as pillars for the achievement of Vision 2030. The contractors are responsible for total project time, with the estimated budget per the standard requirements. However, most road projects

constructed locally fail to complete due to capital constraints, lack of competitive managers, poor company culture, and lack of technical skills. As a result, those roads have poor performance scores (Brown and Adams, 2017). Road projects involve different stakeholders including the Government, road contractors, and regulators and the locals. Cost management, people management skills, technical skills, and organizational culture play vital roles in the completion of projects. However, these roles vary and have not been well understood, especially in road construction projects. Studies show that that skills capital and regulators organizational culture have a degree of influence in the performance of roads projects. These studies have focused on different projects from different jurisdictions.

Additionally, the research by Gathoni and Karanja (2018), indicates the general road construction especially the feeder roads that connect the developing estates are in poor state. According to other research, factors influencing the accomplishment of road projects include project managers' technical prowess, financial accessibility, and level of technology (Wambui Ombui & Kagiri, 2017). This research was conducted in Muranga/Igembe and focused on only county government roads. It did not look at the aspects of cost management and corporate culture of the contractor and the sponsor organization. According to Nyika (2019), only 20.8% of public construction projects complete on time and within the estimated, while 79.2% of the projects experience delay and have lower performance. The research stated that the project failed because of poor execution strategy, management, and political intervention.

Consequently, factors affecting the performance of contractors are essential for any construction company. Only a few studies have researched about the performance road construction industry in Kenya. There are no studies that show the relationship between KPI and roads construction industry in Machakos County. As a result, the purpose of this study was to evaluate the essential success determinants for road project performance in Kenya, specifically focusing on the case of Road Contractors in Machakos County.

Objectives of the study

The objective of this study was to investigate the effect of critical success factors on the performance of road construction projects in Machakos County Kenya. The Study was guided by the following objectives;

- To evaluate the effects of procurement process on the performance of road projects in Machakos County.
- To investigate the effects project planning on the performance of county-funded public road projects in Machakos County.
- To determine how stakeholder participation has affected the performance of road development projects in Machakos County
- To determine how contractors' capacity affects the performance of road projects in Machakos County.

LITERATURE REVIEW

Theoretical Framework

Agency Theory

Ross offered the Agency idea for the first time in 1974, and Mitnick later improved it in 1975.The idea was reinforced by Jensen and Meckling (1976) in handling the so-called 'urgent issue,' for instance, the problem associated with separation between project management and ownership, and has been the most common theoretical point of view adopted in studying project implementation. The theory has also been adopted in other industries, particularly in the public sector and its internal relation, for instance, internal relation. Despite the success of this theory, there are numerous critics of the idea; for example, Perrow (1986) stated that Agency theory researchers had focused more on the agent perspective of principal-agent dilemma' and explained that the difficulty might arise from on high.

The Agency theory provides that organizations attend to urgent activities, realize profit and achieve a competitive edge in the road sector. Moreover, the theory depicts the role of the management towards achieving the building venture goals. In addition, the connection between the project, its stakeholders, and its employees is an aspect that affects the achievement of the project. Similar to Agency theory, first objective procurement process in the roads sector, is an urgent process. The management determines both the cost and productivity levels of the project. Agency theory concept can help managers to determine the best approach to enhance project productivity. Construction firms can subcontract agents and facilitate corporation effectiveness (Panda, & Leepsa, 2017). Agency theory is vital for Study because construction managers have the urgency to complete projects and improve the projects' performance levels. Road construction managers can use this level to solve industry issues. The current study applied the ideas or concepts from the Agency theory to develop solutions for challenges that affect Construction firms.

Constraints Theory

Goldratt introduced idea of constraint theory in 1984. The theory provides that a system may face challenges that hinder it from achieving its goals. Some limitations occur in different stages of system management, including production, planning, and control, supervision, logistics, bookkeeping, and performance measurement. Constraints refer to the final product of a system.

The management of any organization must determine the most appropriate approach to reduce constraints within the system of an organization. As a result, it can effectively meet its goals and maximize profits. Goldratt (2006) provides that the constraint theory offers insights on the best approaches to deal with constraints within a system. An organization cannot operate without a strategy. A design refers to a group of independent and correlated process that works jointly and turns produce a given output. The challenge behind constraints theory is that constraints may hinder an organization from achieving its goals (Noreen, Smith & Mackey, 2008). The constraint theory relates to the constraint theory since road construction projects involve constraints, inadequate capital management skills, and poor leadership styles, which affect contractors during project implementation. The project managers providing solutions to the issues arising during project execution to enhance project success. Stakeholders in road projects should actively participate in project management since they influence the performance of the project outcome (Ruhl, 2011).

As discussed earlier, the primary obstacles impeding the progress of road projects lack of funding, and incompetent management. These challenges lead to project failure because of inefficiencies and delays in the project's costs. However, proponents of the constraint theory argue that involving the staff and stakeholders during the project implementation facilitates the identification of problems and position to viable solutions during the initial moments of project development to enhance project success (Noreen *et al*., 2012).

Institutional Theory

Institutional Theory was developing in 1995 by Richard Scott (1995). The theory emphasizes that organizations should have a set of processes and procedures facilities achievement of organizational goals. Choge and Muturi, (2014) support the institutional theory by emphasizing the significance of norms, routines and rules in facilitating ethics in an organization. On the other hand, Brammer, Jackson and Matten, (2012), provide that implementation of the institutional theory cannot guarantee the success of a project. As a result, it is very necessary to make certain that the processes and procedures in an organisation are focused towards fostering the effective completion of tasks inside the organisation.

The theory can help contractors to define the appropriate procedures that can help in the success

implementation of projects. However, the contractors should pay attention to the processes and procedures set by the government to control the quality of road construction. The government can employ processes and procedures in various areas including tendering processes, M and E of projects.

Empirical Literature Review

Procurement process in roads projects constitutes numerous activities. A study on the impact of various procurement processes, such as joint specifications, cooperative procurement procedures, and little bid invitation, was undertaken by Haapasalo et al. (2015) in the industry in Sweden that deals with building. This research adopted a descriptive research approach to demonstrate that there is a high association between the execution of infrastructure projects and the procurement process.

Ekanayake and Perera (2016) conducted research in Sri Lanka to look into how procurement processes affect building projects. To choose the respondents for the study, basic random selection was used. The study's findings suggest that using the right procurement strategies can help better identify project priorities. The study makes it easier to compare many choices before choosing the best strategy. Additionally, the procurement procedure used had a big impact on the project's success. The procedure must be accurate and transparent and achieve a high degree of customer satisfaction. Competitive approaches to procurement are advised because they encourage bias-free communication, are cost-effective, and efficient. In a separate study, Ghazali et al. (2017) investigated the influence that procurement practices had on the accomplishment of a building project in Kenya. The literature review provides the selection criteria factors for procurement, including the process tendering approaches and the diverse success factor for a project. According to the results of the study, there were no significant differences between the bidding procedures used and the effective completion of the project. The tendering methods exhibit similar effects on project performance.

Amer, Okasha, and Arafa (2019) investigated the elements that influence project completion in Kiambu County for a study. In order to evaluate the connection between the variables in the present study, a cross-sectional research design was implemented. In addition, a regression model facilitated determination of relationship between variables for this study. The study demonstrates how inadequate planning negatively affects the project's completion. Apart from delayed project completion, the Study indicated that project quality was also affected. Moreover, the study depicted that adequate and proper planning allowed contractors to understand the project's scope. There is also less variation in scope in the construction phase; hence project execution is not disputed.

Hassan and Guyo (2017) show determinants of project delay and success factors for construction projects in Nairobi. Additionally, the correlation model utilized by the researcher was used to establish a link between inadequate planning and project performance. According to the report, poor planning is the primary reason projects fail, making it challenging for the team to reach its deadlines. The Study indicated that frequent changes or modifications in project planning contributed.

The stakeholders each have a unique and vital function, as well as an impact, in the execution of the project; hence, contractors must determine the most effective stakeholders. Incompetent stakeholders can cause adverse impacts on the project's accomplishment. It is essential to acknowledge that stakeholders can negatively or positively affect the project. In most cases, stakeholders who oppose the project tend to be ignored, negatively affecting the project implementation. Ahimbisibwe *et al*. (2017), studied stakeholders' effect on project performance or execution in Uganda. The researchers adopted a simple random sampling to choose projects. The Study shows the support of the stakeholders in a project is crucial before its execution. Stakeholder

involvement is a critical factor for project accomplishment.

In their project, Otieno, Owuor, and Richard (2017) examined how engagement of stakeholders influenced the effectiveness of implementation and completion of a project in Kisumu County. The researchers adopted to descriptive research design to outline variable characteristics. The Study shows that involving stakeholders in decision-making helps to improve project performance. Researchers showed that stakeholders in road construction projects must include government agencies and the community. The Study showed that there is a requirement to consider all stakeholder's interests in practical execution and performance.

Studies indicate that contractor's capacity in terms of technical skills, financial availability, quality of materials, and modern equipment have an impact on the success or road contractors. The contractor's success depends on their ability optimize resources and complete the project within the specified time. Simiyu (2018) investigated how project management success in Nairobi County related to the competency of the contractors. The researcher used inference-based statistics; correlation analysis to indicate the contractor's capacity and project implementation. The research demonstrations a significant link between the contractor's competency and project accomplishment. Most of road construction ventures in Kenya are achieved by foreign companies in first-world countries such as China. Therefore, the contractors' capacity is crucial towards the success of project execution.

In a case study of Bungoma County, Wakoli, Maiyo, and Limo (2019), performed investigation to evaluate the result of contractors' knowledge on a project's accomplishment. Researchers used descriptive statistics to determine the contractor's experience or expertise. The Study noted that an experienced contractor is in a position to forecast challenges that can negatively affect project execution hence taking necessary measures to curb them. This is important in ensuring there are no project delays in the project implementation. The Study also shows experienced contractors provide realistic project cost estimates. The practical assessment reduces project delays that can arise from negotiation. The financiers have an easy time because they have confidence in the budget estimates from experienced contractors. Contractors should learn different techniques and practices to reduce the risks involved execution of long-term agreements.

METHODOLOGY

The descriptive method of research was adopted as the strategy of choice for this particular study's investigation. There were 40 county wards in Machakos County where road construction is done. The County Government hired 14 County engineers 36 road contractors, 40 ward representatives and 80 public members who worked together to finish road projects in various county wards. As such, the study target 170 consisting of County ward representatives, county engineers, and road contractors, two public members from each ward.

For this study, the sample of the population for each group was more than 30 %. The researcher selected 57.14% of the county engineers, 53% of the ward representatives a, 50% of the road contractors,52.53% of the public members. On aggregate, researcher selected 52.94% of the target group. The researchers that a sample size of 90 which was sufficient to address the study's objectives.

To gather primary data for the study, questionnaires and interviewing protocols used. Surveys that are semi-structured was be used in the study. Participants able to express their opinions in response to this kind of question. The open-ended questions facilitated data collection, essential in discussing the findings. The questions in the structured questionnaires are created based on the goals of the study. Closed-ended questions used because they are easy to assess and allow coordination of participants' materials. A five-point

Likert scale questionnaire helped to encourage respondents to information relevant to this Study.

Data processing can be described as the procedure of editing, coding, and classification. On the other hand, data presentation involves use of various techniques such as tables and charts to show relationship between different data (Kothari, 2004). The qualitative data was analyzed using a theme method. Based on the objectives, the main themes found in the qualitative data were presented. Comparatively, quantitative data was purified, entered into SPSS, and then subjected to descriptive statistics analysis (such as frequencies, percentages, means, and standard deviations). To ascertain how interdependent variables, affect the dependent variable, a multivariate regression model was used.

Here is the regression model:

$$Y=\beta\ 0+\beta\ 1\ X\ 1+\beta\ 2\ X\ 2+\beta\ 3\ X\ 3+\beta\ 4\ X\ 4+\propto$$

RESULTS

Descriptive Statistics for Study Variables

Table 1: Procurement Process

Procurement Process	S D	D (%)	N (%)	A (%)	SA (%)	Mean (%)	Std. Dev. (%)
Planning involves an interactive process agile rethinking as the based on changes in the environment.	10 11.11 %	15 16.67%	25 27.78%	25 27.78%	15 16.67%	3.22	9.41
Rigorous formal planning facilitates organizing the work on the projects in KURA	10 11%	14 16%	12 13%	30 33%	24 27%	3.23	9.37
Procurement project planning affects the strategic choices in KURA	5 6%	12 13%	18 20%	35 39%	30 33%	3.73	9.26
Proper outline of activities in KURA promotes successful procurement process.	9 10%	11 12%	18 20%	32 36%	20 22%	3.47	9.16
Proper task scheduling in KURA promotes to successful procurement.	12 13%	9 9%	18 20%	31 34%	20 22%	3.42	10.17
Aggregate	**8**	**10**	**14**	**42**	**14**	**3.5**	**9.32**

Source: (Survey, 2023)

In the table above 1 the participants to moderate extent (mean of 3.22) agreed that planning requires an interactive process and agile rethinking especially in new work environments. Additionally, the participants moderately agreed (mean of 3.23) that a rigorous formal planning enhances task scheduling projects in KURA. Also, to a large extent mean of (3.73), the procurement project planning affects the strategic choices in KURA. Participants to a moderate extent (mean of 3.47) agreed that proper activities definition in KURA creates a successful procurement process. Also, to a reasonable extent (mean of 3.42), participants agreed that proper scheduling of events in KURA leads to proper procuring. Overall, to a large extent the participants agreed that procurement processes played a crucial role towards the completion of projects.

Project Planning

The research sought to determine project planning indicators impacted the road construction projects

performance in Machakos County. The indicators include systematic task plan and schedules, communication channels, budget, policies and procedures, the initial planning process and risk management processes as indicated in Table 2 below.

Table 2: Project Planning

Project Planning	SD	D	N	A	SA	Mean	Std. Dev.
Development of systematic work plans and schedules	9%	11%	13%	38.88%	27%	3.67	9.67
Adherence task plans and schedules	6%	17%	22%	35%	20	3.37	8.79
Developing communication channels	14%	19%	22%	29%	16%	3.25	10.59
Estimation resources and proper budgeting a project starts.	6%	11%	16%	40%	27%	3.69	9.08
Risk management techniques are available	9%	13%	16%	47%	15%	3.5	9.32
Aggregate						**3.50**	**9.49**

Source; (Survey, 2023)

In Table 2, point out that most of the participants (mean of 3.67) agreed that the project managers' road construction used a systematic work plan and schedules. A moderate number of the respondents (mean of 3.37) agreed to that the project managers adhered to the developed work plan and schedules. Also, a moderate number of the participants (mean of 3.25) agreed that project managers developed communication channels for both project team and the stakeholders. A large number of respondents (mean of 3.69) agreed that the contractors made appropriately accurately estimated resources and the budget before the start of the projects. Also, participants strongly agreed (mean of 3.5) that the project projects managers developed strategies for dealing with risks. Similarly, the World Bank report demonstrations that majority of the construction projects in Kenya have efficient plans (World Bank, 2014). The road contractors in Machakos County Contractors actualize the same plan during the execution of the projects.

Stakeholder Participation

Table 3 Indicated that participants agreed the project managers engaged the stakeholders throughout the road construction project.

Table 3: Stakeholder Participation

Stakeholder Participation	SD	D	N	A	SA	Mean	Std. Dev.
Involving stakeholders throughout the road construction projects	6%	22%	17%	33%	22%	3.44	9.18
Building consensus with stakeholder through negotiations	11%	22%	13%	33%	20%	3.28	10.21
Assessing environment and social impact of the project to the host community.	20%	28%	16%	29%	22%	2.81	10.3
The project managers Never creates awareness to the community about roads projects before implementation	14 16%	18 20%	30 33%	15 17%	13 14%	2.98	9.53
Aggregate						**3.12**	**9.83**

Source (Survey, 2023)

Participants agreed moderate extent (mean of 3.44) that the negotiations to with stakeholders facilitate the project managers to build consensus with the stakeholders. Additionally, participants agreed to a

moderate extent (3.24) that the contractors assessed the societal influence of the venture to the public. It is a legal requirement for the contractors to conduct a social impact assessment before execution of road construction projects. Project managers must conduct the social impact assessment and submit it to the National Environmental Management Authority (NEMA) (Kenya Roads Board, 2016) before the approval of any project. Participants agreed to a small extent (mean of 2.81) at the project managers do not create awareness to community about road projects before implementations. Participants agreed to small extent that the county and national government officers work independently in the County road project. In a similar vein, Macharia (2016) undertook research that studied stakeholder engagement in a road building project in Nairobi County, Kenya. The research shows that the project managers engaged stakeholders during the planning phase of the project to enhance smooth running of the project during the employment phase. The contractors consulted with the stakeholders of the Outering Road through workshops and public meetings to capture their interests and assist in creating the Environmental social Impact Assessment (ESIA). Stakeholders participated in the forums include; community leaders, traders, government institutions such water regulatory authorities, Kenya National Highway Authorities (KENHA) and Kenya Urban Roads Authority (KURA) that Participants agreed to a moderate extent that the project managers create awareness to the road projects before implementation

Table 4: Contractor Capacity

Contractor Capacity	SD	D	N	A	S A	Mean	Std. Dev.
Project managers had adequate resources by meet possible financial delays from financier	12 13%	10 11%	20 22%	28 29%	22 24%	**3.4**	**8.76**
The Project manager has adequate experience in the road construction industry	6 7%	7 **8%**	21 23%	31 34%	25 28%	**3.69**	**6.14**
The project manager have adequate quality materials	**0** **0**	4 4%	12 13%	37 41%	37 41%	4.19%	**6.14**
The project managers had right quality equipment	0 0	2 2.22	23 25.56%	41 45.56%	24 26.67%	**3.97**	
Project managers have accessible funds for road projects.	11 12.22%	31 34.44%	17 18.90%	16 17.77%	15 16.67%	**2.92**	
Total						**3.55**	

Source (Survey, 2023)

Table 4 showed that participant agreed to moderate extent (mean of 3.44) that the contractors possessed adequate to cater for financial delays from the financier. Additionally, the participants strongly agreed that the project managers have enough experience (Mean of 3.69), the project team involved skilled labor (mean of 4.19), quality materials were used for the project (mean of 3.97). However, the participants to small extent (mean of 2.92) agreed that the project managers had the capacity to access funding and they had strong financial statement, influenced the contractors'

performance in Machakos County. However, participants agreed to moderate extent that the strong financial statements from the contractor which indicated the strength of the financial capacity, guaranteed timely completion of the project**.**

Project Performance

The aim of the research was to assess the performance of road construction projects in Machakos County. The research utilized several parameters, including budget estimates, project delivery time, and project quality, to evaluate the completion of projects.

Table 5: Project Performance

Project Performance	**SD**	**D**	**N**	**A**	**SA**	**M**	**Std. Dev.**
Projects are finished on time.	12 13%	16 17%	19 32%	33 36%	10 31%	3.14	10.05
Projects are finished on estimated budget.	4 4%	5 6%	22 24%	33% 37%	26 29%	3.8	7.96
Finished project meet quality standards	3 6%	6 17%	26 22%	35 39%	20 22%	3.7	8.25
Projects should be assessed to determine the impacts of the road projects	3 3%	7 8%	26 29%	37 41%	17 19%	3.64	7.42
High quality of both tasks in progress and finished	0 0%	12 13%	18 20%	35 39%	25 28%	3.37	7.27
Aggregate						**3.53**	**8.19**

Source (Survey, 2023)

The respondents (mean of 3.14) agreed to a modest extent that the project executives completed the project within the allocated time. Respondents moderately agreed that project managers utilized the allocated budget for the project (mean of 3.8). Respondents strongly agreed that that road construction projects were delivered in the right quality (mean of 3.6). Respondents strongly agreed that project managers should assess the benefits of the implemented road projects (mean of 3.7). The research indicates that participants agreed, to a modest level both in progress and finished tasks, were outstanding (mean of 3.4). The findings suggest that the amount of people who participate in the project, as well as its cost, length of completion, and overall quality, all have an effect on how well road construction projects turn out.

Pearson Correlation Method

Pearson correlation coefficient is a tool that shows the linear association independent and dependent variables. This research used a Pearson correlation coefficient determine relationship between the critical success factors and road performance as indicated in table 6.

Table 6: Pearson Product and Moment Correlation Coefficient

		Road Construction Performance	Procurement Process	Project Planning	Stakeholder Involvement	Contractor Capacity
Road Construction Performance	Pearson Correlation	1				
	Sig(2 tailed)	0.000				
Procurement Process	Pearson Correlation	0.656	1			
	Sig. (2 tailed)	0.000				
Project Planning	Pearson Correlation	0.633**	0.762	1		
	Sig.(2 tailed)	0.000	0.000			
Stakeholder Involvement	Pearson Correlation	0.562	0.485	0.590	1	
	Sig.(2 tainted)	0.000	0.002	0.000		
Contractor capacity	Pearson Correlation	0.770	0.698	0.051	0.391	1
	Sig.(2 tainted	0.000	0.000	0.000	0.000	0.000

Source (Survey, 2023)

The results of Pearson correlation method depicted a significant and positive association (0.633) between the procurement method and the success of road projects. This highlights the significance and significant impact of an effective procurement procedure on achieving favorable outcomes in road projects. Similarly, Sheikh and Kiarie (2016) conducted a study with similar objectives, which concluded that procurement techniques, tender evaluation, and contract award processes significantly influenced the completion of projects.

Furthermore, the correlation study indicated a significant connection between planning and the completion of projects. The p-value of 0.000 confirms the significance of planning in influencing the outcome. This aligns with the research conducted by Wambugu (2013), who examined factors impacting countryside electrification initiatives in Kenya and found that effective planning enhanced project outcomes. Additionally, Marzouk and Tarek (2014) identified poor planning as a key factor contributing to delayed building projects in Egypt.

In terms of stakeholder engagement, the correlation study showed a correlation coefficient of 0.562 with the overall performance of road building projects. However, the associated p-value of 0.16 suggests that this relationship did not reach statistical significance. These findings are consistent with the conclusions of Maina (2013), highlighting the importance of proactive stakeholder involvement in project development. Conversely, a sensitive method where interested party engage only once glitches arise tends to result in project delays.

Regarding project funding, the correlation study revealed a positive connection between the completion of projects and the total amount of

funding received for construction, with a connection coefficient of 0.656. The associated p-value of 0.000 indicates statistical significance. These results align with Olatunji's (2010) study, which found that contractors' ability to address financial concerns impacted project quality and timely completion. Fapohunda and Stephenson's (2010) research similarly emphasized the importance of knowledgeable service providers in anticipating and proactively addressing project challenges. Additionally, Hamzah (2012) argued that contractors can execute projects cooperatively when employing skilled workers.

Furthermore, this study aimed to examine the impact of servicer capability on the completion of projects in Machakos County, Kenya. The data analysis confirmed a significant connection between contractor competency and project success. Particularly, the availability of public funds exhibited the highest correlation coefficient of 0.775% and a significant p-value of 0.000.

Coefficient of Determination

Coefficient of determination refers to a statistical measurement that evaluates the difference between one variable and another to predict the outcome of a given event. In a regression study, the coefficient of determination, often known as r-squared (r2), is a metric that assesses how strong the linear connection is that exists between two variables. We were able to assess the degree to which the independent variables impacted the results of road building projects in Machakos County by making use of the coefficient of determination. These projects took place in Machakos County.

Table 7; Coefficient of Determination

R	R Square	Adjusted R Square	Std. Error of the Estimate
.92	.84	0.82	.70

Source (Survey, 2023)

With an adjusted coefficient of determination (r2) of 0.82, we learn that the independent factors had 82% impact on the success of road building projects. As a result, this study can only account for 18% of the variation in the response variable, leaving 23% attributable to other causes.

Anova

The findings of the ANOVA show that the threshold of significance was 0.03, which is significantly lower than 0.05. Given that 0.03 is significantly lower than 0.05, this suggests that the value of F (3.21), which is statistically significant. According to the results, the variables that contributed to the success of road building projects in Machakos County were the procurement process, project planning, stakeholder participation, and contractor ability. In addition, the performance of road development projects in the county was shown to be strongly correlated with the aforementioned characteristics, making them excellent predictors.

Table 8: ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	25.983	4	6.5	53.5	0.03
	Residual	5.07	85	0.06		
	Total	31.053	89	0.34		

a) Dependable Variable; Performance of road projects in Machakos County.

b) Predictors; Procurement Process, Project planning, Stakeholder participation, and Contractor capacity.

Multiple Regression Analysis

In this research, we used the use of multiple linear regression analysis to look at how the independent variables affected the dependent one, and we evaluated the data we got out in the field by setting the significance threshold to 5%.

Table 9: Regression Analysis

	Coefficients	Standard errors	T stat	P-value	Lower 95%	Upper 95%
Constant	-0.56	0.65	-0.78	0.26	-2.18	0.84
Procurement Process	0.16	0.16	1.23	0.00	- 0.18	0.42
Project Planning	0.21	0.19	1.82	0.009	-0.21	0.66
Stakeholder participation	0.14	0.10	1.49	0.14	-0.05	0.35
Contractor capacity	0.38	0.22	3.08	0.00	0.25	1.12

Source (Survey, 2023)

The regression analysis can be presented as follows; Project Performance= -0.56+0.16X1+ 0.21*X2+ 0.14*X3+0.68*X4

Project Procurement Process and Project Performance

The research team in this study set out to learn how the procurement process affected the timeliness and quality of road construction in Machakos County. A very small p-value of 0.00 shows statistical significance at the 0.05 level, and the survey findings showed a regression coefficient of 0.16, which is also significant. This data supports the hypothesis that road building projects benefit from the procurement procedure. As such, the research suggest that longer procurement timelines result in better road building project outcomes. In line with this, Kimutai and Osman (2019) found that the procurement process benefited the road building projects they studied.

Project Planning and Project Performance

The study set out to determine how important project planning was to the final outcome of a road construction project in Machakos County. With a p-value of 0.00, the study found that a regression coefficient (B) of 0.21 is statistically significant. This suggests that planning has a major impact on project performance, since even a little change in planning may have an effect. The research results are dependable with a conclusion by Kisavi (2015) that emphasized the significance of proper planning in maximising the competence of road building in Kiambu County. According to Wambugu (2013), inadequate planning of the projects that led to the rural electrification of Kenya's communities resulted in negative repercussions. In addition, research by Marzouk and Tarek (2014) demonstrates that inadequate planning is the root of the delays that occur in Egyptian building projects.

Stakeholder Participation and Project Performance

The research's overarching goal was to discover how include locals in road construction efforts in Machakos County affected their outcomes. A regression coefficient (B) of 0.14 was found in the study's results. The obtained p-value of 0.14 fell short of reaching statistical significance, which typically requires a threshold below 0.05. As a result, the findings of this study did not provide substantial evidence to establish a statistically significant relationship. Consequently, the results suggest that there is insufficient support to conclude a significant link between stakeholder involvement and the successful execution of road projects. These results run counter to the research of Osman and Kimutai (2019), who found a link between the participation of intended beneficiaries in road building and the success of road projects.

Contractor Capacity and Project Performance

The primary aim of this study was to analyze the influence of contractor ability on the overall success of projects in Kenya. The results showed a significant coefficient (B) of 0.38, with a p-value of 0.00, surpassing the significance threshold of 0.05. These findings highlight a strong correlation between the capability of contractors and the positive outcomes of road completion in Machakos County.

According to the data, an enhancement in contractor capacity is expected to yield higher performance in road building projects, under the assumption that all other factors remain unchanged. These observations

align with the research conducted by Kisavi (2019), which similarly underscored the effect of contractors on the quality and efficiency of road construction. Thus, the outcomes of this study provide further reinforcement and additional contextual insights into the conclusions drawn by Kisavi.

CONCLUSIONS AND RECOMMENDATIONS

The study examined impact of procurement process, project planning stakeholder's involvement, and constructor capability (critical factors of success) to the road projects performance in Machakos. The success of project completion was based on the time, quality and cost of delivery.

According to the descriptive statistics, most participants believed that factors such as the procurement procedure, the planning of the project, and the contractor's ability all had an effect on how well the road building project turned out. On the other hand, a fair proportion of participants agreed with the statement that the engagement of stakeholders affected the efficiency of road building. The normality of distribution indicates the data is normal. The Test for Multiconillearity indicates that the data did not have multicollinearity. The findings of Levene's experiment showed that the assumption of normality and the homoscedasticity of variance had a positive connection with one another. The ANOVA analysis yielded noteworthy findings regarding the impact of multiple factors on the completion of projects in Machakos County. Specifically, the results showed that procurement, planning, stakeholder engagement, and contractor capacity collectively influenced the overall success of these projects.

Further analysis through regression revealed significant and positive effects of the procurement process, project planning, and contractor capability on the completion of projects. However, it was revealed that stakeholder engagement did not emerge as a significant determinant of road building success. These findings emphasize the importance of effective procurement practices, meticulous project planning, and competent contractor selection in ensuring favorable outcomes for road construction endeavors.

The research aimed to determine how procurement process influenced the road projects performance in Machakos County, Kenya. The study results indicate a positive correlation between the procurement process and completion of projects. Also, majority of the participants (mean of 3.6) agreed that procurement process influenced the project completion in Machakos County. Therefore, the procurement process had an impact on project completion in Machakos County.

The project aimed at assessing the effect of project planning on project completion in Machakos County. Project planning is positively correlated with road construction projects. Also, project planning has a strong significance to the road projects performance. Therefore, when other aspects are relentless, a positive modification in project planning would attribute to a positive change in the completion projects. This study shows the project planning has an impact on the road projects performance.

Moreover, the paper was to assess stakeholder influence of stakeholder participation on the road project performance in Machakos County. The outcomes demonstration that the contractors moderately involved the interested party in the decision in project (mean aggregate of 3.2). The contractors in Machakos County engaged stakeholders in various project milestones. Contractors and the stakeholders negotiated on the impact of the road construction project. Participant participation and the performance of road network have a positive correlation. Therefore, contractors involved the stakeholders in different stages of the project execution

The primary objective of the research was to explore the correlation between contractor proficiency and completing the project on time in the County. This result revealed a clear and favorable association

between the capabilities of contractors and the successful execution of road projects. The data strongly support the notion that a higher level of contractor capacity significantly contributes to improved performance in road construction endeavors as well as a considerable influence from this association. Therefore, an increase in contractor capacity may contribute to greater performance in road building projects, provided that all other criteria remain the same. According to the findings of the study, local contractors have the capability to take part completion of the project, as demonstrated by a mean aggregate score of 3.55.

This study suggested that project arrangement is imperative in the completion of projects. This study shows that road proper planning of road facilitated completion of road projects. Availability of project funding promoted road projects success in Machakos. The speed of funding approval at the County Government determines the road construction performance. Timely release of funds enhances timely delivery of high-quality projects have access to, or create, the necessary resources, technology and labor.

This research shows that the contractor capacity can impact the completion of the projects in Machakos County. Contractors capacity comprises of resource availability, skilled labor, experience and knowledge. Contractors' capacity enables them to prepare achievable budgets and work plans and adjust resources especially during the time delayed funds project. Such decisions have a huge impact to the effectiveness and delivery of a project.

The results of this study demonstrate the significance of interested party involvement in road construction projects performance in Machakos County. The contractors examined social impact of the road project to the community, both the county and the Central government collaborated to avoid duplication of activities of the project. Also, the project managers created awareness to the community before the implementation of the project.

As such, this project suggests that proper project planning should be developed before undertaking any road construction project. Project planning should have clear work schedules, realistic budgets, and proper policies and procedures for road projects. Proper planning facilitates adequate preparation and reduces inefficiencies that may occur in during different stages of project execution.

Also, this research recommends project supervisors should include interested party in a variety of ways throughout the project aspects of the road construction projects including resource allocation and project scheduling. The project funding impacts the performance of road projects. Therefore, sponsors of road project should finance the project on time. Time and adequate funding helped to reduce delays and enhance acquisition of adequate and quality resources for construction of road projects

Moreover, contractor capacity requires work capacity to succeed in road projects. Therefore, the government should assess the contractors' capacity when awarding tenders to project managers. Also, government and the road building sector have enough information about the incentives and rules that can support regional and national economic development and better performance in the construction sector.

Further Research Suggestions

Due to the fact that the research was only done in Machakos County, it is necessary to carry out additional research in different counties and on a national scale. These subsequent studies would aim to assess whether the factors examined in this study can be applied more broadly to impact the effectiveness of road construction projects throughout Kenya.

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