

**PROJECT MANAGEMENT AND PERFORMANCE OF RURAL ROAD
CONSTRUCTION PROJECTS IN MACHAKOS COUNTY, KENYA**

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D53/OL/23477/2013

**A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS IN
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION (PROJECT
MANAGEMENT), KENYATTA UNIVERSITY**

NOVEMBER 2020

DECLARATION

This research project is my original work and has not been presented in any other university or for any other award

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I confirm that the work in this research project was done by the candidate under my supervision.

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DEDICATION

This study is dedicated to Sylvia, my wife, my children Lynn, Liam and Lisa for their inspiration, support, encouragement and understanding throughout the research period. I also dedicate this research Caroline, Stephen, Jackline, Andrew and Claire, my brothers and sisters with whom we have shared many experiences in life and who have been my cheerers and have supported and motivated me in various ways. I am humbled by their support.

ACKNOWLEDGEMENT

Sincere and profound appreciation and gratitude is expressed to, Dr. Rosemary James, my supervisor. It is through her tireless efforts, invaluable support, attention to detail, shared experience and personal initiative that I was guided in enriching and completing the study.

I am grateful for the immense support that I have received from my parents throughout my endeavours in working to attain an education; it is through their sacrifices that I got an opportunity in school. I also acknowledge all those who supported me in any other respect for completion of the project.

Finally, I thank God for giving me a chance in life and without whose amazing grace I would not have made it through. He made my burdens lighter on my shoulders

CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix
OPERATIONAL DEFINITION OF TERMS	x
ABBREVIATION AND ACRONYMS	xi
ABSTRACT	xii
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.1.1 Project Performance	3
1.1.2 Practices in Project Management	4
1.1.3 Rural Road Constructions, Machakos County Projects	7
1.2 Statement of the Problem.....	8
1.3 Objectives of the Study	10
1.3.1 General Objectives	10
1.3.2 Specific Objectives.....	10
1.4 Research Questions.....	11
1.5 Significance of the Study	11
1.6 Scope of the Study	12
1.7 Limitation of the Study	13
1.8 Assumptions of the Study	14
1.9 Organization of the Study	14
CHAPTER TWO: LITERATURE REVIEW	15
2.1 Introduction.....	15
2.2 Theoretical Review	15
2.2.1 Theory of Constraints.....	15
2.2.2 Deming’s Theory.....	16
2.2.3 Measurement Theory.....	17
2.3 Empirical Review.....	18
2.3.1 Influence of Project Planning on Performance of Projects	18
2.3.2 Influence of Project Execution on Project Performance	21
2.3.3 Project Monitoring and Control and Performance of Projects.....	23

2.4 Summary of Literature Review.....	25
2.5 Conceptual Framework.....	26
CHAPTER THREE: RESEARCH METHODOLOGY	28
3.1 Introduction.....	28
3.2 Research Design.....	28
3.3 Target Population.....	28
3.4 Sampling Design.....	29
3.5 Data Collection Instruments	30
3.5.1 Research Instrument Validity.....	30
3.5.2 Research Instrument Reliability	31
3.6 Data Collection Procedure	32
3.7 Data Analysis and Presentation	32
3.8 Ethical Considerations	33
CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSIONS	34
4.1 Introduction.....	34
4.2 Response Rate.....	34
4.3 Demographics of the Respondents.....	35
4.3.1 Gender of Respondents	35
4.3.2 Respondents' Age	36
4.3.3 Length of Service	37
4.3.4 Education Level.....	38
4.4 Descriptive Statistics.....	38
4.4.1 Project Performance	39
4.4.2 Project planning and project performance	41
4.4.3 Project Execution and Project Performance.....	44
4.4.4 Project Monitoring and Control and Project Management	47
4.5 Regression Analysis.....	49
4.5.1 Model Summary	49
4.5.2 Analysis of Variance	49
4.5.3 Coefficients of the Regression Model.....	50
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	54
5.1 Introduction.....	54
5.2 Summary	54
5.2.1 Project Planning and Project Performance.....	55

5.2.2 Project Execution and Project Performance.....	56
5.2.3 Project Monitoring and Control and Project Performance.....	56
5.3 Conclusion	57
5.4 Recommendations.....	58
5.5 Suggestions for Further Research	59
REFERENCES.....	61
APPENDICES	64
APPENDIX I – COVER LETTER.....	64
APPENDIX II – QUESTIONNAIRE	65
APPENDIX III: ROAD CONSTRUCTION PROJECTS IN MACHAKOS COUNTY	71
APPENDIX IV – RESEARCH APPROVAL LETTER.....	72
APPENDIX V: RESEARCH PERMIT	73

LIST OF TABLES

Table 3.1: Table of Respondents.....	31
Table 4.1: Gender of Respondents	34
Table 4.2: Educational Level	38
Table 4.3: Project Performance.....	39
Table 4.4 Road Construction Project Performance Parameters	40
Table 4.5: Road Construction Project Planning Factors	42
Table 4.6: Project Execution Factors in Road Construction Projects	45
Table 4.7: Road Construction Project Monitoring and Control Factors.....	48
Table 4.8: Model Summary	49
Table 4.9: Analysis of Variance	50
Table 4.10: Regression Coefficients	50

LIST OF FIGURES

Figure 1.1: Project life cycle	7
Figure 2.1: Conceptual framework	28
Figure 4.1: Rate of Response	35
Figure 4.2: Respondents Age	36
Figure 4.3: Length of Service	37
Figure 4.4: Project Planning Influence	41
Figure 4.5: Project Plan Availability	42
Figure 4.6: Influence of Project Execution.....	44
Figure 4.7 Project Execution Plan Availability.....	45
Figure 4.8: Influence of Project Monitoring and Control	47

OPERATIONAL DEFINITION OF TERMS

Construction:	the entire process of preparing and forming buildings, building systems and civil works
Contractor:	is an entity appointed to carry out construction works and deliver the building per the agreement
Project:	is an endeavour that is temporary carried out with the goal of creating a product or service that is unique in nature
Project Monitoring and Control	is comparing where project work is or progress to where it is supposed to be or target, then taking corrective action for any deviations
Project Execution	is implementing the project plan by the actual doing of work
Project Management:	is meeting project requirements through the application of relevant knowledge, tools, techniques and skills
Project Performance	is the level of satisfaction from the customer on whether the project has delivered the desired result or not
Project Planning	is answering questions what must be done, by whom, for how much, how and when. The plan tells where the project should be
Project Success	is an evaluation of the project on how well it has met set expectations of time, quality, cost and performance

ABBREVIATION AND ACRONYMS

ANOVA:	Analysis of Variance
CDF:	Constituency Development Fund
CRA:	Commission on Revenue Allocation
KeNHA:	Kenya National Highways Authority
KPI:	Key Performance Indicator
KeRRA:	Kenya Rural Roads Authority
KRB:	Kenya Roads Board
KURA:	The Kenya Urban Road Authority
NALEP	National Agriculture and Livestock Extension Programme
NGO:	Non-Governmental Organisation
PERT:	Project Evaluation and Review Techniques
PM:	Project Manager

ABSTRACT

Good road networks have been known to open up places in both urban and rural areas and result in better access to services such as health, education, markets and other social amenities. Ultimately, roads influence the economies of the geographical locations that are connected through trade, communication, transportation and setting up of businesses. They also influence provision of basic and essential services. Project performance describes how well a project meets its technical specification, functionality, cost of implementing and time taken to deliver the project. Machakos county had road construction projects in various stages of completion. The Tala-Donyo Sabuk road was launched in June 2016 which was expected to cover 70 kilometres in length and be completed by 2018. However, it was at 22.29 percent completion with the output for constructed work in the 2016/2017 financial year being only 13.3 kilometres. Matuu-Ekalakal-Kangulu road was launched in 2015 yet it was still in mobilization stage with a planned length of 80 kilometres. Kenol-Ngoleni-Kaani / Mutituni-Kaseve road was launched in the 2016/2017 financial year although only 7.71 percent of the road has been worked on since the launch date with no construction work carried out in the 2016/2017 financial year. Construction of Kimutwa-Makaveti-Kwamutisya road which was expected to have started by the end of 2016/2017 financial year had not started with the progress noted to be only at mobilizing stage. These projects performed poorly when measured against the time expected to be completed and the project allocated funds. It was against this background that the study was carried out to evaluate the effect of project planning, project execution and project monitoring and control on the performance of rural road construction projects in Machakos county. The target population was the 18 road projects in Machakos county, both in completed and in on-going condition as at the time of the study. The respondents comprised of road construction project engineers, prequalified road contractors, auditors, project planners and ministry of transport road project engineers for each road construction project. In addition, persons selected from the committees representing the interests of residents of Machakos county were part of the respondents with the total number being 100. The study used descriptive and causal research designs and applied a questionnaire that was semi-structured in collection of data. The data that was collected was analysed using frequency distribution, standard deviation and regression analysis techniques and was presented in the form of graphs and tables. Statistical Package for the Social Sciences (SPSS) was used to perform analysis of the quantitative data. The findings indicate that the performance of rural road construction projects was influenced significantly by project planning, project execution and project monitoring and control. Of the three project management practices studied, project planning had the highest influence on project performance. The study recommends that project monitoring and control, project execution and project planning should be used through the life cycle of projects in order to ensure that the projects meet the set goals of completion on time, within budgeted cost and be of acceptable quality.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Roads form part of infrastructure systems in transportation that support mankind. They form critical links between intended markets and factories and production centres. They stimulate economic growth manifested in terms of employment opportunities as well as social, health and education all of which are useful in the fight against poverty. While constructing roads costs huge sums of money, without proper maintenance, the roads wear off quickly. In fact, neglect in maintaining built roads has been witnessed in many places. The government established Kenya Urban Roads Authority (KURA), Kenya National Highways Authority (KeNHA) and the Kenya Rural Roads Authority (KeRRA) to oversee construction and repair of roads through an Act of Parliament in 2007 due to the important roles played by roads (KRB, 2007).

In the global arena, the United States of America (USA) boasts of having the world's largest road network. China comes second while India ranks third, these being two of the world's most populous countries. The total length of the USA road network exceeds 6.58 million kilometres made up of approximately 4.3 million kilometres of paved roads. China has more than 4.24 million kilometres in total length (from 2012 data) while India has more than 4.1 million kilometres of road. The other countries in order of longest road networks after the top three are Brazil, Russia, Japan, Canada, France, Australia and Spain respectively (Praveen, 2014)

In Africa, there are major efforts being directed to road infrastructure development. On average, in the past decade Africa's road network has grown by 7,500 kilometres year on year. Among the countries leading the pack in road connectivity, Africa Development Bank names Tanzania and Lesotho who have an annual increase of 15 percent and 24 percent respectively (Barnes, 2015).

Nationally, the three roads agencies of Kenya National Highways Authority (KENHA), Kenya Urban Roads Authority (KURA) and Kenya Rural Roads Authority (KeRRA) were established by the Kenya Roads Act of 2007 with the responsibility for management, development, rehabilitation and maintenance of the different types of roads. KENHA is responsible for national roads, KeRRA covers rural roads while KURA covers public roads in cities and municipalities which by location and administration have national roads that are excluded in those covered by KURA.

According to the KeRRA annual report (2016-2017), the second medium term plan of vision 2030 targets to construct and rehabilitate 5,500 kilometres of roads from which 3,825 kilometres are national trunk roads and the remaining 1,675 kilometres being county roads. In its manifesto, the current government pledged to upgrade 10,000 kilometres of roads to paved standard over five years from 2013-2017. Out of these, 80 percent are rural roads. The Authority planned to construct and upgrade 8,197 kilometres of new roads during the 2013-2018 strategic plan.

1.1.1 Project Performance

In the construction industry particularly in developing countries, minimal attention has been given to the application of Performance Measurement Systems [PMS], despite being one of the most important factors for assessment of project success. Consequently, there appears to be always a gap between actual results obtained in relation to delivery of major projects and stakeholder expectations. The application of performance measurement systems in the construction sector has tended to rely on three basic criteria: time, cost and quality, which can be applied to determine the extent of project success. At organisational level, performance measurement systems are largely based on financial measures which are almost always lagging indicators. In response to the Egan Report, the UK construction industry developed specific Key Performance Indicators (KPIs) which include construction cost and time, cost predictability and time predictability, defects, client product and service satisfaction, safety, profitability and productivity (Alsulamy, Wamuziri and Taylor, 2012)

Determination of the performance of road construction projects can be achieved by evaluation of project deliverables against key performance indicators (KPI). These KPIs tell whether the projects are delivered on time, within budget, defect-free, efficiently, right first time, safely and profitably (Vandevoorde and Vanhoucke, 2006). A project is graded as having performed well if it is accomplished within budget, gets completed within planned timelines and conforms to functional and technical specifications.

For this research, quality, time and cost were considered as the indicators of performance for the road construction project. Time as an indicator looked at the duration taken from start of the project to completion. Quality looked at the conformance of the project to

requirements and fitness for use of the project in fulfilling its intended purpose while the cost indicator was interested in the valuation of the amount of capital and resources used in a project.

1.1.2 Practices in Project Management

A project life cycle is the series of phases that a project passes through from its start to its completion. A project phase is a collection of logically related project activities that culminates in the completion of one or more deliverables. The phases can be sequential, iterative, or overlapping. The life cycle provides the basic framework for managing the project, regardless of the specific work involved. Though projects vary in size and the amount of complexity they contain, a typical project can be mapped to the following project life cycle structure: starting the project, organizing and preparing, carrying out the work, and closing the project. From the project cycle, therefore, the project management practices are starting the project (called project conception and definition), organizing and preparing (called project planning and organization), carrying out the work (called project execution), and closing the project (PMBOK guide, 2017).

Project planning establishes a reference for the execution of activities by providing a roadmap that guides the project team. During the planning process, an initial schedule is created that lists the activities which must be accomplished, the time by which each task must be carried out, the responsible persons for completing each task and the expected deliverables. A fully completed plan is supposed to state what tasks are to be carried out, why the tasks are important, who will carry out what work and when the project is scheduled to be completed. It will also state the resources that are required and in order to

be declared complete and successful, what criteria the project must meet (Wysocki, 2017). Project planning is vital to the performance of construction projects as it helps to minimize the cost of implementation of the project by ensuring there is optimum utilization of available resources. It reduces irrationality, duplication of works and conflicts between departments. As well, it encourages innovation and creativity among the construction managers

Project Execution is putting the project plan to work. It involves organization of the people working on the project, identification of the specific resources required to accomplish the defined work in the plan, allocating the resources to activities, scheduling work and getting the plan launched. Project execution develops and produces the project's expected deliverables that must be delivered on time, within budget and, meet the agreed upon scope as well as fulfill the specified quality requirements. Initially, a project execution plan is written defining how the project will be undertaken. Specific activities in the project are detailed together with the resources that will be applied to the project and how the project will be organized. Project execution is a critical determinant of project performance because it ensures that resources are allocated properly and utilized as planned and in the right quantities and right time. It enables teams to be formed and organized in a coordinated way thus maximizing on human resources (Wysocki, 2017).

The project must have in place a system that constantly monitors project progress and measures completed work in comparison with the plan and forewarn of any potential problems by looking ahead. This is done in project monitoring and control and is important in projects because it enables the project manager and project team to have an

understanding of the project's progress and thereby have appropriate corrective actions taken when the project's performance deviates significantly from the plan and in this way ensures that the project meets all requirements. At the control point, the project charter and business documents are reexamined based on the current environment. At that time, the project's performance is compared to the project management plan to determine if the project should be changed, terminated, or continue as planned (PMBOK guide, 2017)

This study aimed to evaluate the impact of the practices of project management outlined as project monitoring and control, project execution and project planning, the three phases of a project life cycle that represent more than 90% of a project (PMBOK guide, 2017). It means that project performance is highly dependent on these variables and therefore by understanding them and their impact on projects, we become better placed to manage projects and achieve greater performance results.

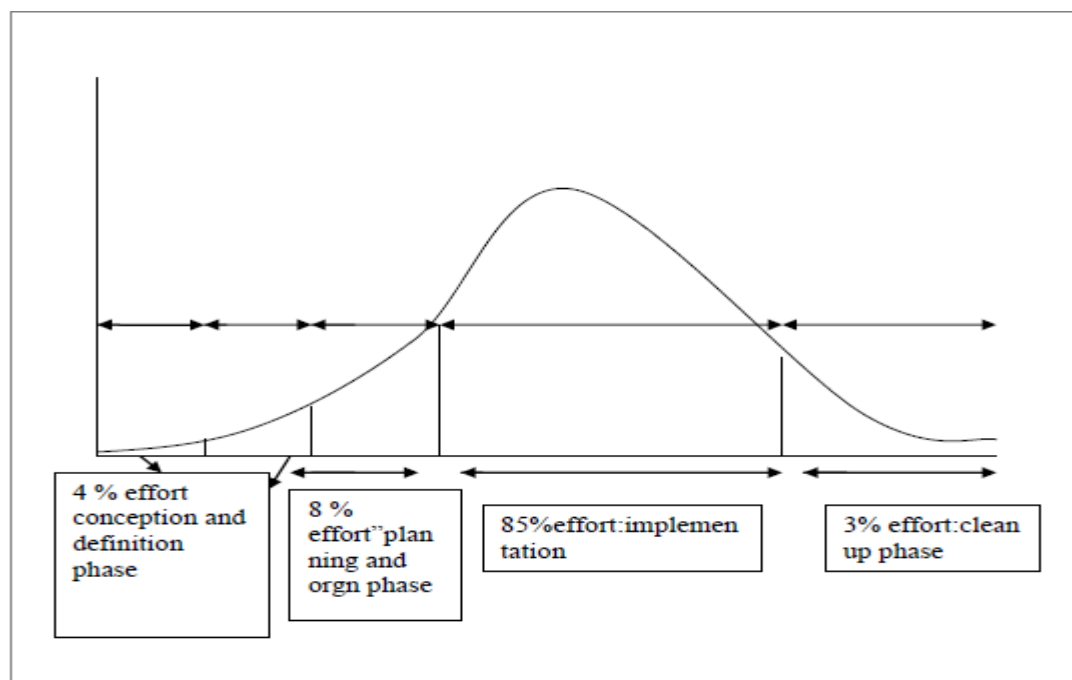


Figure 1.1: Project life cycle

Source: BMS 604 Module Notes (2014), Kenyatta University

1.1.3 Rural Road Constructions, Machakos County Projects

Machakos county integrated development plan, 2018-2022, stated that in Machakos county, there were ongoing road initiatives through partnership with the national government and other development partners. These included dualing of Mombasa road (Namanga road interchange to Makutano Kyumbi), Koma – Konza, Matuu – Ekalakala, Kenol – Kaseve, Tala – Oldonyo Sabuk roads, among others.

Machakos Investment Promotion Board (MIPB) report (2016), states that the county was in the process of tarmacking the 18km Kivandini-Masinga road in the east, which connects Yatta and Masinga. The new road was expected to boost tourism in Masinga Dam, the largest reservoir of the Seven Forks hydro-electric stations. The county has prioritized road expansion as a vital component of transforming the county from a low-income economy to become more developed and self-sustaining. In 2014, the county administration upgraded the Makutano-Kithimani road connecting Mwala and Yatta sub-counties through the towns of Makutano and Kithimani to bitumen standards

The MIPB report (2016) further states that the county government tarmacked 15km of the Kathiani-Kakuyuni-Kangundo road connecting Kathiani and Kangundo sub-counties, which together with Machakos and Matungulu constitute a rich agricultural area and are basically the county's principal breadbaskets. This means farmers in Matungulu and Kangundo can now easily access market for their produce in Machakos with relative convenience.

According to the 2016/2017 KeRRA annual report, Machakos county had 18 roads that were in various stages of completion. Some of the roads included the Tala-Donyo Sabuk

road, Matuu-Ekalakal–Kangulu road, Kenol-Ngoleni-Kaani/Mutituni–Kaseve road and Kimutwa–Makaveti-Kwamutisya road which had been launched and were yet to progress to completion with only Tala-Donyo Sabuk started but having completed 22.29 percent instead of being fully completed by 2017. The Kenol-Ngoleni-Kaani/Mutituni–Kaseve road was at 7.71 percent done and no work had been carried out in the 2016/2017 financial year. Further, the last two were at mobilizing stage with no construction started at all yet they have been launched and allocation of funds already done.

1.2 Statement of the Problem

According to the budget policy statement, 2018, Machakos county was allocated 10.5 billion shillings from the county revenue allocation fund in the 2017/2018 financial year. The statement notes that in 2016/2017, the county spent 44% on personnel, 29% on operations and maintenance and 37% on development

The development plan for the 2018/19 financial year for Machakos county states that between 2013 and 2017, over 950km of roads were graded; over 56km of roads upgraded to bitumen standards; 1,060 metres of drifts (vented and non-vented) constructed; approximately 365 metres of culverts installed and approximately Ksh.12.5 million allocated annually per ward for road maintenance and development.

However, certain road construction projects performed poorly when measured against the time taken, cost and quality. In the KeRRA annual report for 2016/2017, the Tala-Donyo Sabuk road was expected to cover 70 kilometres in length and be completed in 2018. The project was only at 22.29 percent completion rate and only 13.3 kilometres of road length were done in 2016/2017 financial year, the project launch year.

The report notes that even though the 80-kilometer Matuu-Ekalakal–Kangulu road had already been officially launched for construction, work had not yet started. It further states that the Kenol-Ngoleni-Kaani/Mutituni–Kaseve road had only 7.71 percent of the road worked on while the Kimutwa–Makaveti-Kwamutisya road had not started although it had already been launched. All these roads had funds allocated for the projects and they therefore performed poorly in terms of cost, time and quality

In this area of project management, Maendo, James & Kamau (2018) considered project monitoring and evaluation and its effect on performance of road infrastructure projects constructed by local firms in Kenya. However, the other critical areas of project planning and project execution were not covered in their study

Ngundo and James (2018), considered the influence of the practices of project management outlined as project planning, project monitoring and evaluation, stakeholder participation and technology on government projects implementation in Machakos county. The study recommended other researches to be done on other independent variables that were not covered in the study's scope

Muute and James (2018), in their study on construction projects performance in Nairobi city county, considered the effect of project planning practices of financial resource, time management, human resource and material usage planning on performance of construction projects. This study was carried out in Nairobi whose dynamics as a city and an urban centre are different from the rural areas and therefore the conclusions drawn might not be applicable to a rural setting

The studies done earlier did not review the specific practices of project management as project monitoring and control, project execution and project planning and their effect on performance of rural road construction projects. This knowledge gap as well as for the reason that the projects in the road construction sector in Machakos county did not meet the expectation of KeRRA, was the motivation for this study. The study therefore sought to investigate project management practices and their impact on performance of Machakos county's rural road construction projects.

1.3 Objectives of the Study

1.3.1 General Objectives

The general objective was to determine the effect of project management on performance of rural road construction projects within Machakos County, Kenya.

1.3.2 Specific Objectives

The study was guided by the following specific objectives:

- i. To evaluate the effect of project planning on performance of rural road construction projects in Machakos County, Kenya
- ii. To evaluate the effect of project execution on performance of rural road construction projects in Machakos County, Kenya
- iii. To evaluate the effect of project monitoring and control on performance of road construction projects in Machakos county, Kenya

1.4 Research Questions

- i. What is the effect of project planning on performance of road construction projects in Machakos county, Kenya?
- ii. What is the effect of project execution on performance of road construction projects in Machakos county, Kenya?
- iii. What is the effect of project monitoring and control on performance of road construction projects in Machakos county, Kenya?

1.5 Significance of the Study

The study determines the influence of project management on projects in the road construction sector in Machakos county and will be instrumental in ensuring future projects become successful by enriching the experience of road construction projects. It will help policy makers in formulation of new policies and enrich existing ones. It will also form a baseline for creating awareness in adopting best practices for better management and execution of projects.

The study will be a helpful resource for such stakeholders as road construction contractors, sponsors and governments because the findings help in better management and execution of projects to meet their requirements. By being aware of the influence of project management to road construction, contractors would leverage on the best practices that improve efficiencies in working and guarantee success. It also provides guidance on performance of projects and the importance of utilizing the practices that are available in project management

The findings of this research will be helpful to the government because road construction as a service that is key and provided by a government to its citizens, takes up a huge chunk of the government's expenditure in terms of the capital investment and resources required. It is, therefore, of paramount importance that the government gets the best returns from the road construction projects by guaranteeing completion of the projects within expected timelines, costs and quality standards. The study would be beneficial in ensuring that present infrastructure is improved while the ones planned to be executed in the future incorporate advancements that enhance efficiency and best practices and therefore assure the satisfaction desired by citizens.

1.6 Scope of the Study

The study was carried out in Machakos county and targeted both completed and ongoing rural road-sector construction projects. The total number of roads under study was 18 with 3 being completed projects and 15 being ongoing projects at various stages of completion for the period between 2013 and 2019. The reason for selecting this time period is because in 2010, a new constitution was promulgated in Kenya which required enactment and therefore actualization with the 2012 general elections.

The constitution introduced a new governance structure giving rise to county governments that are allocated budgetary funding on annual basis in order to execute their mandate at the county local level. These services include road construction and management. The period was therefore selected because it coincided with the set up of new county governments and was a phase of major works and projects that were carried out by the county governments, one of which is Machakos county.

The study looked at project performance being the dependent variable while independent variables were three in number outlined as project monitoring and control, project planning and project execution. The key performance indicators of performance that were studied were time, quality and cost

1.7 Limitation of the Study

There was non-responsiveness by some respondents which was brought about by various reasons. One such reason was because of fear that the information would have been used against the respondents if deemed as a different position from what their superiors would have given that would lead to workplace conflicts. The non-responsiveness was also attributed to the fear that information provided could have been accessed by respondent's competition who could use it to their advantage.

Another limitation that was faced in the study was that there was a level of bias by some respondents when answering the questionnaire. This was attributed to such reasons as respondents' affiliations and vested interests.

The researcher countered these limitations by ensuring that the respondents contacted were spoken to in person thereby giving them confidence in the process as well as getting a one-on-one discussion that provided the chance to explain the questions being filled in order to get as accurate feedback as possible. As well, the researcher shared with them the letters of introduction from Kenyatta University and the research permit issued by the National Commission for Science, Technology & Innovation (NACOSTI). The explanation and the two letters served to assure them that the study was only going to be used for academic purposes

1.8 Assumptions of the Study

The study assumed that the responses received from respondents were truthful. This is because there was an initial open fear and uncertainty exhibited when the respondents were approached to provide feedback. The study also assumed that issues such as political affiliations and vested interest did not influence the respondents through bias or dislike as they were giving feedback. The study therefore assumed that the responses represented what the respondents' independent perception, thoughts and valuations genuinely were at the time of the study.

1.9 Organization of the Study

The study is comprised of five chapters. The first chapter introduces the research background, statement of the problem, research objectives and research questions, significance of the study, the study scope, limitations, assumptions and organization. The second chapter outlines theoretical and empirical review for the related literature and the summary of literature review while chapter three covers research design, study target population and sampling design. It also has data collection instruments, data collection procedure, analysis of collected data and the ethical considerations.

Chapter four consists of research findings and analysis of the data collected from the field. Chapter five captures the summary, conclusion and recommendations of the research

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the theoretical review of literature, empirical review of the relevant literature as well as conceptualization of the research problem. It involved researching and sourcing literature that addresses project management practices in road construction.

2.2 Theoretical Review

2.2.1 Theory of Constraints

As a management philosophy, the theory of constraints (TOC) targets to enable organizations in continually achieving their goals. This philosophy views any manageable system to be limited in achievement of some or more of its set goals by certain constraints. It recognizes that at least one constraint is always present. In order to be able to identify the present constraint and enable restructuring of the rest of the organization around it, a focusing process is used. The common idiom, a chain is as strong as the weakest link is also adopted in TOC (Goldratt and Cox, 1992).

Goldratt and Cox (1992) state that processes are classified as being either a bottleneck (defined as a constraint where flow is less than demand) or a non-bottleneck. For maximum productivity, bottleneck flow should be designed to equal demand. As well, workflow must ensure that bottlenecks are used 100 percent of the time with no idle time. Therefore, to increase bottleneck throughput, the machines must be manned throughout

and in order to prevent rework, quality control check should be put in front of the machine.

In the theory of constraints, at least one constraint limits the rate of goal achievement. Buffers have to be created to protect the synchronization of processes and therefore protect the overall project and by doing so the theory helps in solving anticipated challenges and aids in achieving of set goals for the project.

The theory is useful because it ensures the project planning is done robustly in order to ensure that all possible constraints such as limited capital, time, materials, skills, machines, systems and policies are mitigated in the planning phase and therefore, during the execution phase, work progress is better planned and managed to reduce cost, save on time and produce quality products that meet the goal of the project.

2.2.2 Deming's Theory

This theory is summarized as a repetitive four stage model for continuous improvement in business process management. It is also referred to as the PCDA model defined as (Plan Do Check Act), as a logical sequence. Plan is about identifying and analysing the problem, and this will include setting goals and breaking the overall system into individual processes. Do is developing solutions and implementing the solutions by establishing experimental success criteria and implementing the solution on a pilot basis. Check is evaluating results to validate the solutions designed. Act is implementing the full-scale solution while monitoring and performing continuous improvement.

According to Sokovic, Pavletic and Pipan (2010), Plan covers quality concept and objectives, statutory considerations and control of design. Do involves procurement, just in time supplies, materials handling, servicing, documentation and records, standards and standardization and compatibility. Check employs use of statistics and charts, inspection and functional testing, quality audits and reviews while Act covers managing non-conformities and improvements, total quality management and environmental system management.

This theory is applicable in this study because at the execution stage, projects encounter many factors that determine the course of projects with some factors interfering with the smooth running of execution while others enhancing. These factors originate from the internal processes of an organization or externally from the general environment. Therefore, during the execution phase, it is imperative that continuous improvement is done through repeated and continuous monitoring and control. This follows the Plan-Do-Check-Act (PDCA) cycle which is a usual definition of control. In a construction project, the project manager is required to carry out project monitoring and control in order to provide corrective measures through continuous evaluation and checking of actual against the expected progress for existence of disparities against acceptable standards.

2.2.3 Measurement Theory

The theory of how numbers are assigned to objects and phenomena is referred to as the measurement theory. It is concerned with the measurable types of things, the relationship between different measures, and the measurement process error problem. According to Cartwright and Bradburn (2015), measurement is assigning values in a grounded and systematic way and not just simply assigning values or numbers; Metrics that are well-

grounded are applied to the thing and then the quantity of the thing is expressed in terms of that applied metric

They further state that the procedures for measuring a concept often do so only indirectly. The value of the concept is inferred from the results of measurement performed on some more readily observed quantities. Sometimes the more immediately observed quantity would be a cause of the targeted concept, sometimes an effect, sometimes the two are correlated for some other reason. What matters is that the two quantities get linked by reliable regularities. Designing a measurement is one of the central tasks in laying out and defending these regularities (Cartwright and Bradburn, 2015).

Through measurements done in the projects, the project managers are able to infer relationships and therefore carry out proper execution for instance by monitoring patterns such as reporting times and amount of active man hours spent in a day. They can also monitor times taken to deliver supplies from suppliers. This theory is applicable to the study because when measurements are carried out, proper inferences can be done that would result in the correct judgements made during construction execution and control and monitoring of projects in order to guarantee good performance.

2.3 Empirical Review

2.3.1 Influence of Project Planning on Performance of Projects

Onchoke (2012), evaluated the effect of implementation, monitoring and evaluation, financing and stakeholder involvement on performance of community-based projects in her study to evaluate the factors that influence community development project

performance in Kenya. The study concluded that performance is greatly influenced by project planning and the findings affirmed that most unsuccessful projects were as a result of poor planning or no planning at all. The study also revealed that monitoring and evaluation was important because of the continuous monitoring and tracking of actual performance against what is planned. It contributes directly to on-time completion of community development projects within the project duration. This study, however, did not cover the influence of project planning on rural road construction projects performance

Gathoni and Ngugi (2016) in the study on effective project performance drivers in national government CDF funded projects in Kiambu county, Kenya, concluded that the number of project managers who are involved in project management of NG-CDF (National Government Constituency Development Fund) projects is low leading to poor performance. This study highlighted why it is important to have project managers involved in planning and implementation of projects but did not cover rural road construction projects.

According to Maendo, James & Ngugi (2018) in the study to evaluate resource mobilization in projects and road infrastructure project performance on projects constructed by local firms in Kenya, concluded that performance was greatly affected by project resource mobilization. The study also found that physical, technical and financial resources also have a significant effect on performance the projects. The guarantee by government and public-private partnership plays an important role to aid in getting resources, both financial and technical. The study, however, did not highlight what effect the other practices of project monitoring and control, project execution and project

planning have on performance of road construction projects as it only tackled resource mobilization.

Ngundo and James (2018), in the study on the influence of project management practices on government projects implementation in Machakos county, concluded that failure to establish project planning led to failure in successfully implementing the government projects in Machakos county. The objectives of the project were not specified because there was no project plan and hence little to no measures were taken to establish all the requirements for the resources required in the project, facilitation of project reporting and arrangements review.

The progress achieved towards attaining the county goal could not be monitored by the county executives and neither could they distribute roles to the project team with clear lines of responsibility and accountability since they did not use any project planning tools. The study suggested that other researches be carried out covering other independent variables such as procurement practices effectiveness and government projects implementation. This is because with an R^2 of 0.696 which translated to 69.6%, there is a remaining 30.4% that can be explained by other factors affecting the implementation of projects that were not involved in the study that the study suggested future scholars to focus on.

Muute and James (2018), in the study on practices in project planning and their influence on construction projects performance in Nairobi county, concluded that time management, financial resource planning as well as human resource planning have an effect on performance of construction projects that is positive and significant. In this case,

the study considered financial resource planning, human resource planning, time management and material usage planning and their effect on performance of construction projects. This study, having been carried out in Nairobi, was done in a major city whose dynamics as a city and an urban centre are very different from the rural areas. Conclusions drawn from Nairobi might not be applicable to similar situations in rural settings and therefore the gap to study Machakos county rural road construction projects

2.3.2 Influence of Project Execution on Project Performance

Kagendo (2013), while analyzing the factors that affect implementation of projects successfully in NGOs within slums areas in urban Kenya, states that implementation of the strategy was influenced by several factors such as availability of financial resources. The study dwelt on projects implemented in the NGO sector at the Kibera children foundation and evaluated the factors affecting project implementation there.

This study only covered NGO projects and had nothing on road construction projects for non-NGOs. In fact, it recommended that other studies on factors affecting project implementation in government organizations be carried out. It did not elaborate the impact of project implementation on performance of projects and was also applied in a different field of study, NGO, and not on road construction projects and therefore the gap that this study aimed to fill.

According to the study by Maina (2016), on effective implementation of health projects and the factors influencing it, the researcher concluded that the execution phase is very crucial to every project. The study recommended formulation of operational strategy for implementing health projects which should be the foundational framework which guides

project implementation. The study also recommended capacity building before commencement of a particular project with the organizational leadership ensuring that every phase of the whole project has adequate personnel who have the operational pedigree to deliver on their duties as assigned in different phases of the project.

The study was mainly centralized on the effectiveness in implementing health projects, the scope of implementation and what the main issues that influenced effectiveness in delivery and subsequent realization of implementation objectives were. It was done in a different field of study, health, and not on road construction projects. It also did not elaborate the project implementation and its impact on performance of projects and therefore it presented a gap to be filled.

Wamalwa and James (2018), in their study on critical success factors in the implementation of projects by NGOs in Busia county, evaluated the communication effect on implementation of NGO projects. They evaluated the role of financing on NGO-projects implementation within Busia county and examined how local community involvement affects NGO projects implementation.

The study found out that information and funding are important components of project implementation for local NGOs. The study also concluded that local community participation was very critical in any project to guarantee success in implementation. However, it did not specifically target to evaluate the effect that project monitoring and control, project planning and project execution have on road construction projects, a gap that the study filled.

2.3.3 Project Monitoring and Control and Performance of Projects

In the controlling phase of a project, progress is tracked, and the project adapted to changing circumstances. The most asked question to a project manager is usually to know whether the project is on track (Williams, 2008).

Karanja (2012) in the study on performance of agribusiness projects and the impact of project management principles on it, had objectives to evaluate output variations in agribusiness projects, financial returns variations in agribusiness projects and establish the relationship between performance of agribusiness projects and principles of project management. As well, the study had the objective of establishing, in agribusiness projects, the percentage of application of project management principles. The study employed use of stratified sampling as the probability sampling design because of the population size. As well, descriptive research design was used

It established that quality project management practices which include planning, risks assessment, needs establishment, effective and efficient plan implementation, effective organizational framework, monitoring, controlling and evaluation of the projects' results promote the performance of agribusiness projects but the respondents from the study had not been implementing project management principles due to lack of motivation, commitment, competence and positive attitude and thus their agribusiness projects had poor performance. The study did not focus on and therefore bring out the effect of planning, execution and monitoring on projects which this study sought to focus on.

Ngiri (2012) in the study on the factors that influence performance of rural development community-based projects in Murang'a south district, Murang'a county, Kenya, had the

objective of finding out what factors affect rural development community-based project performance. The study evaluated the effect on project performance of project monitoring and evaluation, stakeholder involvement, project planning and resource adequacy.

The study also concluded that monitoring and evaluation of projects had a significant relationship with project performance and the same was concluded in relationship to project performance and adequacy of resources, stakeholder involvement and project planning. In this study, however, a very important topic of effect of project execution was not researched while the work done on planning was very minimal and was done on community-based projects which are usually not of the same characteristics as road construction projects. This presented a gap in study

Maendo, James, and Kamau (2018) considered the effect of project monitoring and evaluation on project performance on the road infrastructure projects that are constructed by local firms in Kenya. The study concluded that performance of road infrastructure projects carried out by local firms is significantly affected by project monitoring and evaluation. Therefore, performing monitoring and evaluation, allocation of sufficient finances for monitoring and evaluation activities and employment of staff with necessary skills all play a key role. However, the study only captured one aspect of the principles of project management impacting on road construction. It did not feature planning and execution of the project, a gap that was filled by this study.

Wambua and James (2018), in their study on monitoring and evaluation practices and performance, concluded that monitoring and evaluation had the lowest influence on performance of county funded projects in the education sector in Machakos county,

Kenya. The study noted that training in monitoring and evaluation would enhance project performance and is critical to eliminating serious compromises that may arise out of staff incompetence.

It suggested that the independent variables that were studied, which were four in number, explained 62.4% as the impact of the project monitoring and evaluation practices on performance of education projects that are county funded as indicated by the adjusted R². The factors that were not studied contribute to the remainder of the impact as 37.6% of the monitoring and evaluation practices. Therefore, the study recommended further research to investigate the other factors that have an influence on performance.

In their study on the success factors that are critical in the implementation of community-based projects in Kiambu County, Kenya, Wachira & James (2018) concluded that monitoring and evaluation is both necessary and sufficiently needed for the implementation of community-based projects to be successful. However, the study did not cover the other practices in project management namely project planning and project execution, a gap in study to be filled.

2.4 Summary of Literature Review

Various factors that come into play dictate the performance of a project in meeting its set objectives. These factors, if not well managed, would make the project fail to achieve its objectives. In Kenya, the report by the Commission for Revenue Allocation gives an average of 43.5 percent as roads that are deemed good and therefore the remainder at 56.5 percent considered as below performance expectation.

Machakos county is rated at having a performance level of 26.9 percent which is way below average. The study evaluated how project management affects road construction project performance in Machakos by exploring the influence by three practices of project management; project monitoring and control, project execution and project planning on project performance.

Although other researchers have done related studies, their studies were not focused on the specific project management practices of project monitoring and control, project execution and project planning and their effect on rural road construction project performance. They had at most two of the practices and did not centre on road construction projects in rural areas with areas of study being in slum areas and urban centres and also on projects executed by non-governmental organizations that have different experiences when compared to the contractors carrying out rural road construction projects funded by the national or county governments.

Therefore, this study was unique because it filled the knowledge gap. It was therefore, carried out to determine the effect of project management practices on rural road construction projects in Machakos county, Kenya

2.5 Conceptual Framework

The relationship that exists between independent variables and the dependent variable is explained in a conceptual framework. Independent variables are the causes supposed to be responsible for bringing about change(s) in a phenomenon or situation while dependent variables are the outcome or change(s) brought about by introduction of an independent variable (Kumar, 2011). The framework below shows how the independent

variables namely project planning, execution and control and monitoring, affect project performance as the dependent variable.

Independent variables

Project Management Practices

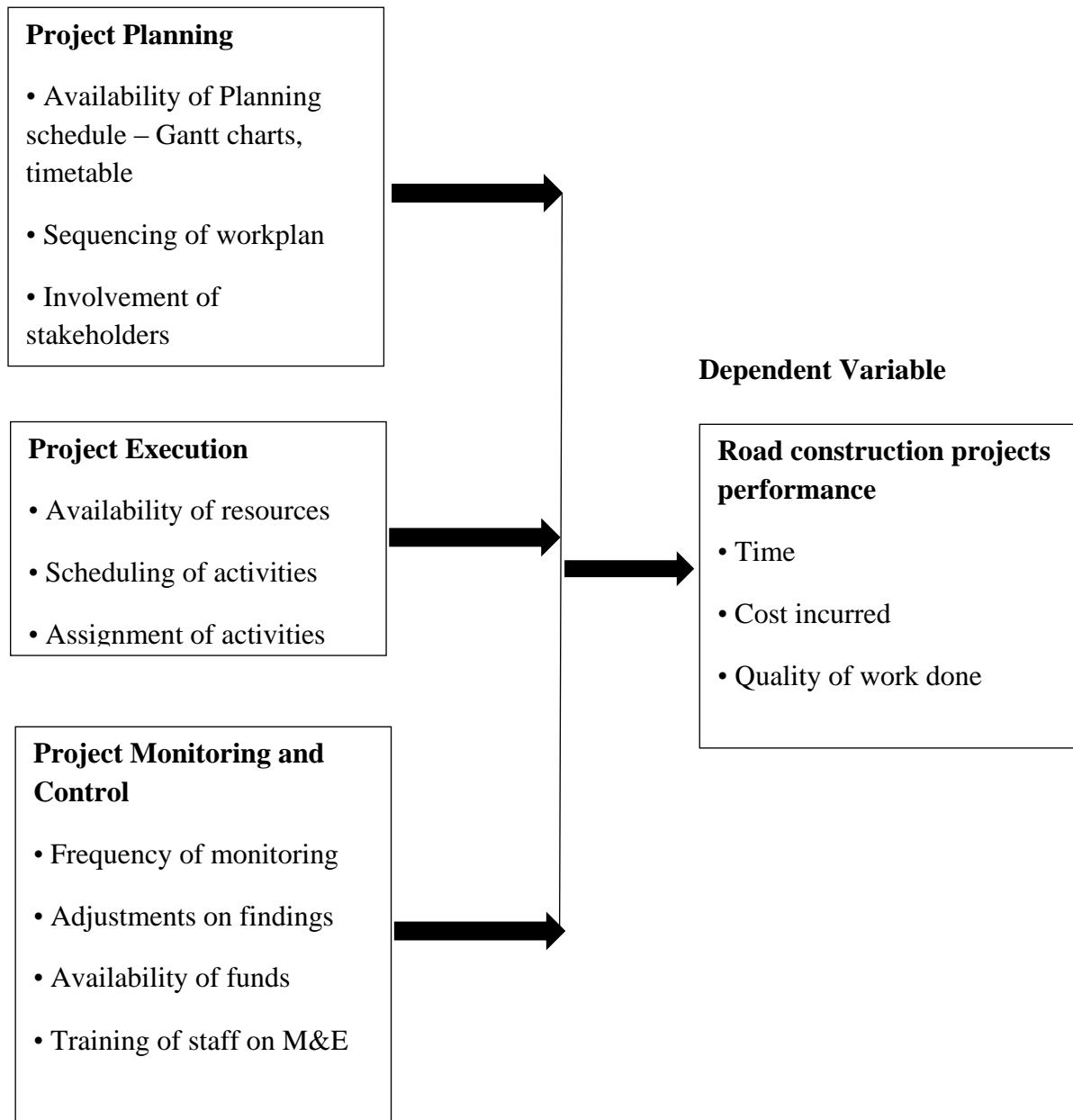


Figure 2.1: Conceptual framework

Source: Author, 2019

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on the research design, target population, sampling design and highlights the procedure for data collection. Also covered are analysis of data, presentation of data and ethical considerations.

3.2 Research Design

A combination of causal and descriptive research designs was employed. A causal research is carried out in with the aim of investigating the cause and effect relationship. It determines the cause underlying a certain behavior and whether one or more variables causes or affects one or more outcome variables. The causal study was selected because it describes the relationship or association between the independent variables and the dependent variable. The purpose of descriptive research is to describe systematically a situation, problem, phenomena, service or programme. It describes what is prevalent with respect to the issue / problem under study (Kumar, 2011).

3.3 Target Population

This consisted of all the completed and ongoing rural road projects constructed or being constructed in Machakos County built as from August 2013. The county had 18 main road projects as pointed out in the KeRRA 2016/2017 annual report. According to Hussey and Collis (2009), in descriptive studies, two categories of respondents are crucial; the

informed specialists (in our study these are the contractors) and users (in our study these are the representatives of county resident members).

It was estimated that for each road construction project, one contractor was involved who had under him/her planners, engineers and auditors. Appendix III shows the road projects, areas being connected, the status of the project in terms of whether it was completed or not and who the sponsor was for each road done in Machakos county. The respondents comprised of road construction project engineers, prequalified road project contractors, road construction project planners, technical road construction auditors, road project ministry of transport engineers and persons selected from the committee members who represented the interests of the residents of Machakos county. The total number of respondents being 100

3.4 Sampling Design

Sampling involved selecting from the population a sub-section which represented the characteristics of the entire population in the phenomenon of interest in order to obtain information regarding that population. Kombo and Tromp (2011) state that the sample selected should possess diversity, representativeness, reliability, accessibility and knowledge.

The study focused on 18 projects in road construction in Machakos county while the respondents were made up of 1 each of road project construction engineer, prequalified road project contractor, road construction project planner, project auditor and ministry of transport engineer for each road project as well as 10 persons selected from the committees representing the interests on residents of Machakos county the total number being 100

Table 3.1: Table of Respondents

Respondent	Number of Respondents per road project	Total number of Respondents for all road projects
Road Project Construction Engineers	1	18
Prequalified Road Project Contractors	1	18
Road Construction Project Planners	1	18
Technical Road Construction Project	1	18
Road Construction Project Ministry of Transport Engineers (KeRRA)	1	18
Residents Committee Members	10	10
Total		100

Source: Survey data, 2019

3.5 Data Collection Instruments

The questionnaire used in collecting data was the semi-structured type. It contained open ended as well as closed questions. It was issued to respondents for feedback and was the preferred mode of collection of data because questionnaires offer considerable advantages such as allowing respondents to use their own words in providing feedback thereby removing the interviewer's bias, that respondents give well thought out answers because of the adequate time they have and that it allows respondents who are not approachable to be reached conveniently (Kothari, 2004).

3.5.1 Research Instrument Validity

Kumar (2011) states that validity is the degree to which the researcher has measured what he has set out to measure. The accuracy of how the questions asked draw out the

information being looked for from the respondents is answered by content validity. It is equally important that the items and questions cover the full range of the issue or attitude being measured. Assessment of the items of an instrument in this respect is called content validity. In addition, the coverage of the issue or attitude should be balanced; that is, each aspect should have similar and adequate representation in the questions or items. Content validity is also judged on the basis of the extent to which statements or questions represent the issue they are supposed to measure, as judged by the researcher and experts in the field.

To assess the content validity, the researcher used expert advice including the supervisor to review and check the criteria used to develop the questionnaires and offer opinions and suggestions on content. Pre-testing was carried out on community-based projects in Machakos county with the respondents selected randomly from the population to determine the validity

3.5.2 Research Instrument Reliability

Reliability relates to the accuracy and precision of the used instrument in yielding similar results when it is applied to a similar group of respondents in a context that is similar. Each question was accurately and carefully phrased to avoid ambiguity. The respondents were informed of the purpose of the questionnaire and of the need to respond truthfully. Internal consistency of the instrument is to be tested by the Cronbach's Alpha which is considered satisfactory for measuring instruments when it is a total of 0.80 (Gottens, Carvalho, Guilhem and Pires, 2018). The questionnaire was tested for instrument reliability and gave a Cronbach's Alpha of 0.89, which being greater than 0.80, affirmed the internal validity of the instrument.

3.6 Data Collection Procedure

Authorization to collect data was given by Kenyatta University and the National Commission for Science, Technology and Innovation. Primary data was collected from the respondents in Machakos county which was used in the study. Questionnaires were issued and filled in order to receive data from the respondents. Some of the feedback was collected immediately upon completion while others were filled and picked up after a fortnight.

3.7 Data Analysis and Presentation

Kombo and Tromp (2011), state that analysis of data is the evaluation of data that has been collected in a survey and making deductions and inferences. The Statistical Package for Social Sciences (SPSS) was used in analysis of the data collected. Both descriptive statistics and inferential statistics were employed in the analysis while the findings and inferences were presented using charts, graphs and tables. The measures of dispersion that were used are the variance and standard deviation. Since the study had three independent variables, multiple regression analysis was performed. The multiple regression equation that was used is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

Where;

Y = Project performance

X₁ = Project planning

X₂ = Project execution

X_3 = Project monitoring and control

β_0 = Constant term

β_1 , β_2 , and β_3 = Regression coefficients

3.8 Ethical Considerations

The conduct that guides the researchers' behaviour while carrying out the research (Mugenda and Mugenda, 2003) is what is referred to as ethical consideration. The researcher got the informed consent of participants before the questionnaires were filled. The information received from the respondents was received in confidence and therefore was treated with confidentiality. The researcher sought the necessary approvals from the relevant government ministry and from the county authorities on road construction

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter consists of the study findings on data collected and the analysis and interpretation done on the stated data. The objective of the study was to evaluate the effect of project management practices on road construction projects in Machakos county. for the study, primary data that was collected through use of semi structured questionnaires was used. This data was analysed, presented and interpreted by using SPSS Version 23.0 for coding. The findings are presented using figures and tables.

4.2 Response Rate

In total, 100 questionnaires were distributed out to be completed by the respondents. From this, 69 were filled and received by the researcher, thus a response rate of 69% was achieved. Mugenda (2003), states that a response rate of 50% and above is sufficient for analysis and at 69%, the rate was therefore considered satisfactory for analysis.

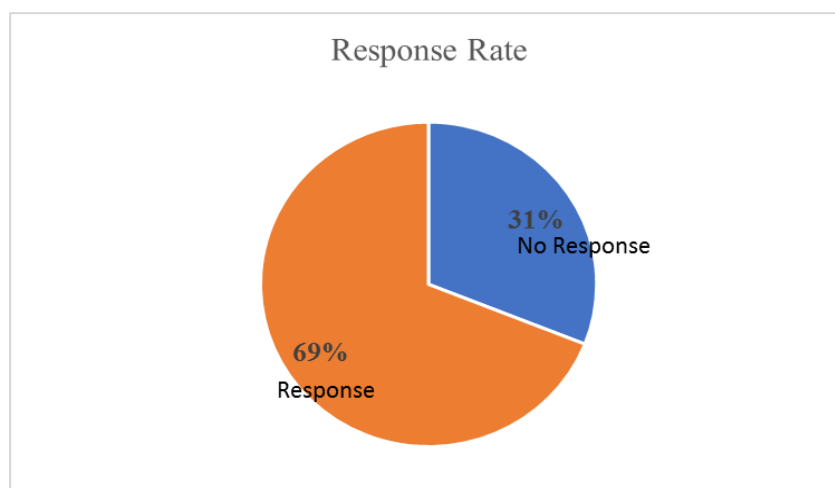


Figure 4.1: Rate of Response

Source: Survey data, 2019

4.3 Demographics of the Respondents

The research sought to find out the respondent's demographics such as gender, age, level of education and length of service in order to determine the different views represented by the different social classifications of the respondents

4.3.1 Gender of Respondents

The study asked respondents to state what gender they are and table 4.1 shows the outcome:

Table 4.1: Gender of Respondents

Gender	Frequency (Count)	Percentage (%)
Male	58	84
Female	11	16
Total	69	100

Source: Survey data, 2019

From the finding, majority of the respondents were of the male gender and these were 84% of the total respondents while females were 16%. This implies that the road construction projects in Machakos county had more men involved in as users, stakeholders or project team members as per the various respondent categories for the study as compared to women.

As well, the findings also imply that there were more men who were contacted and responded to the questionnaire compared to women. This is because more than half the questionnaires were given to males.

4.3.2 Respondents' Age

The study inquired from the participants what their ages were and figure 4.2 presents the result to this inquiry:

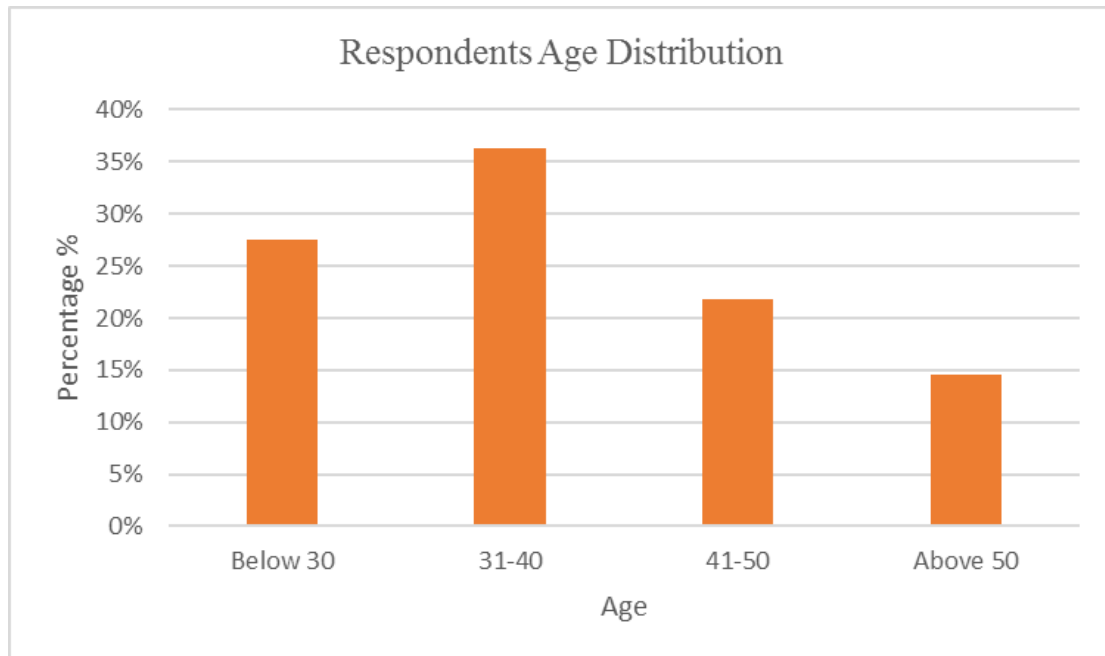


Figure 4.2: Respondents Age

Source: Survey data, 2019

From the data, the biggest percentage of the respondents was aged between 31-40 years and these constituted 36% of the respondents. The second highest percentage of respondents were those aged below 30 years at 28% while those aged between 41-50 years were 22%. The category that had the least number of respondents was aged 50 years and above. This indicates that the county government has hired and is utilizing staff of mature age who would have high levels of experience. As well, the age distribution implies that majority of the project team members are a highly productive work force that is at its prime in years.

4.3.3 Length of Service

The respondents were asked what their years of service in construction projects was and the result presented as in table 4.3:

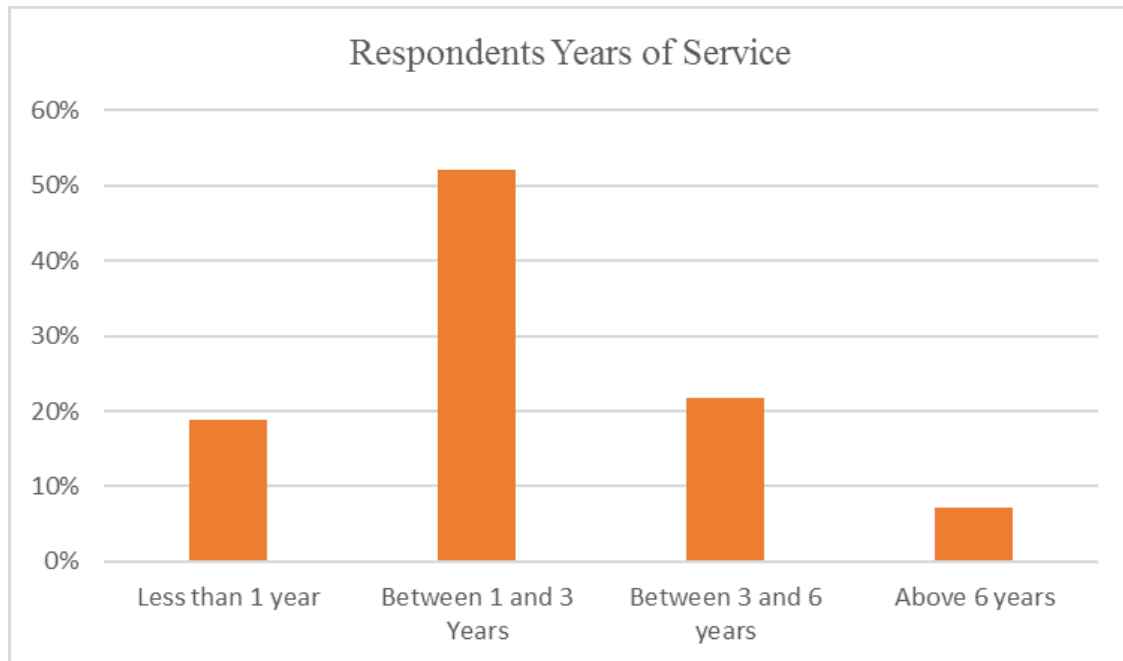


Figure 4.3: Length of Service

Source: Survey data, 2019

From the study, 52% of the respondents had worked in construction projects for a maximum durations of 3 years while 22% had been in the projects for 3 to 6 years. 19% had served for less than 1 year while 7% had work experience of over 6 years. At 81%, this indicates that the biggest number of the respondents had been involved in construction projects for more than a year and therefore had minimum basic knowledge, skills and experience in project management which they had encountered in the course of carrying out the previous projects done. The study findings indicate that majority of the respondents were experienced and in a good position to give credible information and feedback sought.

4.3.4 Education Level

The respondents were asked to state their level of education. The results are presented below in table 4.2:

Table 4.2: Educational Level

Level of Education	Frequency (Count)	Percentage (%)
Diploma	33	41%
Degree	31	52%
Post-graduate	5	7%
Total	69	100%

Source: Survey data, 2019

From educational level table, the findings indicate that majority of the respondents, at 52%, have an undergraduate degree while 41% have Diploma qualifications and lastly, 7% have a postgraduate qualification. Therefore, a big portion of the employees working in the construction projects were well educated and had the knowledge applicable in running of projects. This is so because the academic enhancement of employees advances their skills and ability to effectively handle tasks and to deliver on goals set in an organization.

4.4 Descriptive Statistics

To determine the level of agreement against each statement on the independent variables and how they influenced performance of road construction projects in Machakos County, descriptive statistics was used which applied mean from the data and standard deviation. High mean confirms strong concurrence with the statements while the degree of dispersion from the mean is indicated by standard deviation.

4.4.1 Project Performance

The respondents stated their opinion on how they considered the performance of the roads to be with the outcome as in table 4.3:

Table 4.3: Project Performance

Score	Frequency (Count)	Percentage (%)
Very Poor	10	14%
Poor	33	48%
Average	21	30%
Good	4	6%
Excellent	1	1%
Total	69	100%

Source: Survey data, 2019

From the findings, the bigger part of the respondents strongly felt that the road construction projects performed poorly. 48% of the respondents considered the performance to be poor while 14% considered the performance to be very poor. These two categories totaled 62% and as a majority, this group felt that the road construction projects performance was either poor or very poor. They considered the projects to have failed to meet their project expectations. 30% of the respondents considered the performance to be average, 6% considered it to be good while only 1% consider it to be very good. Therefore, majority of the respondents opined that the road construction projects did not meet project expectations.

The respondents were asked to state their level of agreement to the performance parameters in the road construction projects using a 5-point Likert scale of strongly

disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). Table 4.4 shows the findings

Table 4.4: Road Construction Project Performance Parameters

Parameter	N	Mean	Standard Deviation
The projects were completed within budgeted cost	69	2.49	0.27
The projects were completed within Planned time	69	2.41	0.35
The Road projects were completed to acceptable quality standards	69	3.38	0.62
Total	69	2.76	0.41

Source: Survey data, 2019

From the findings summarized above, majority of the respondents felt that the projects under review were constructed at costs above the budgeted values as affirmed by a 2.49 mean and standard deviation of 0.27. The study also established that majority of the respondents opined that the road construction projects were not completed on time as seen by the value of 2.41 mean and 0.35 as the standard deviation. Lastly, by a mean of 3.38 and 0.62 as the standard deviation, the study noted that majority of the respondents felt that the road construction projects were not up to acceptable quality standards

The findings are consistent with Muute and James (2018), who in their study state that project performance is related to client satisfaction and these expectations are usually categorized in three groups; the first is that a stated project creates the expected result with least possible defects; the second is that a given project results in the expected result

for the budgeted cost schedule and lastly that a stated project creates the preferred result in the timelines expected. These three performance indicators were used in determining the satisfaction level of the stakeholders against the road projects constructed. From the study, a bigger percentage of respondents stated that the rural road construction projects performed poorly against expectations on timelines, cost and quality. The projects were therefore neither completed on time, within budgeted costs nor at acceptable quality standards

4.4.2 Project planning and project performance

The opinion on whether respondents considered that the overall performance of the road construction projects was influenced by project planning was sought. Figure 4.4 shows the findings:

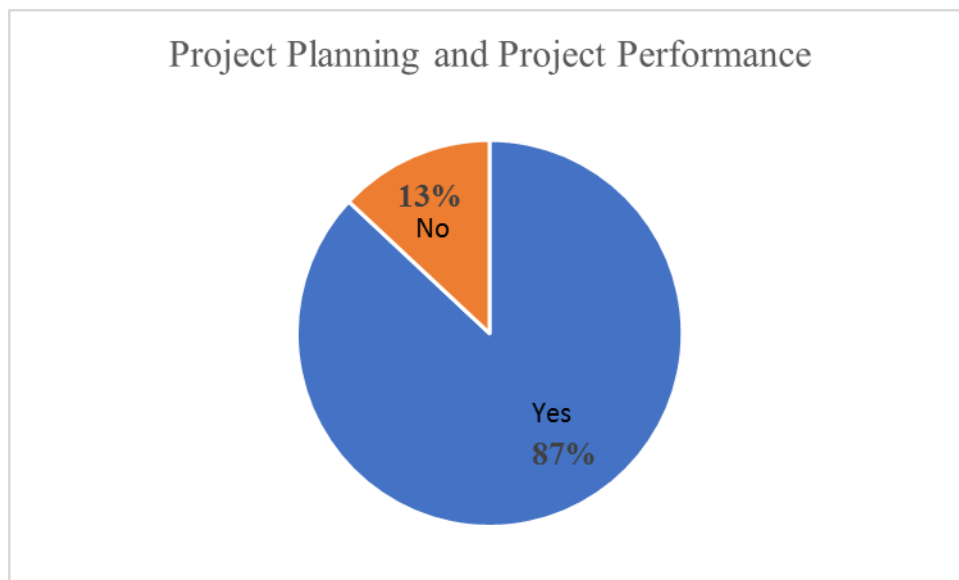


Figure 4.4: Project Planning Influence

Source: Survey data, 2019

The findings show that 87% of the respondents agreed that project planning had an influence on the overall performance of a project while only 13% disagreed.

The respondents view on whether the county of Machakos used a project plan was sought and figure 4.5 shows the result

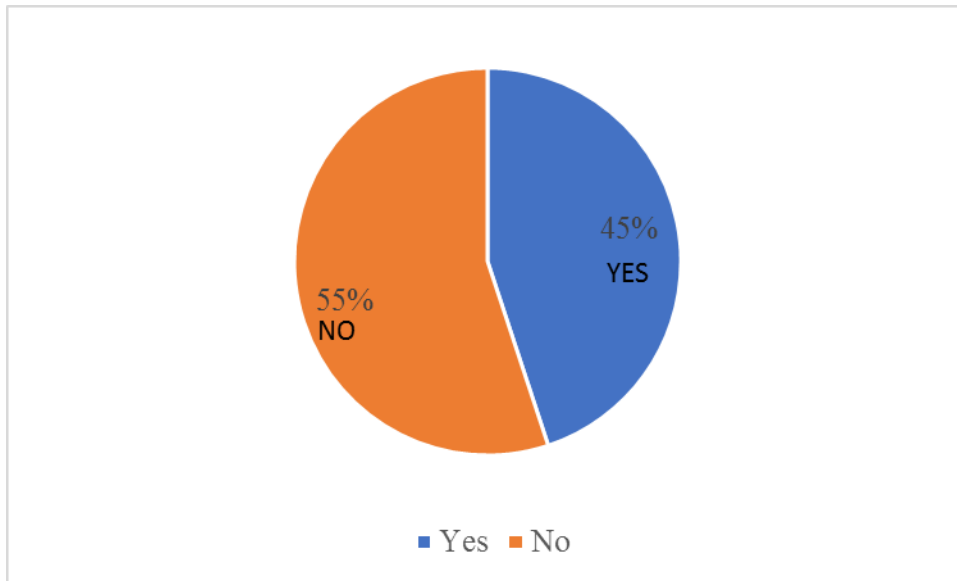


Figure 4.5: Project Plan Availability

Source: Survey data, 2019

The result shows that 55% of the respondents had the opinion that the county did not have a project plan for the road construction projects while 45% agreed. This indicates that majority of the projects did not have a project plan.

The study sought to get opinions of respondents on project planning statements applying a Likert scale with 5 points. The findings are as in table 4.5:

Table 4.5: Road Construction Project Planning Practices

Parameter	N	Mean	Standard Deviation
County government involved all stakeholders during the project planning phase	69	2.42	0.82
Project plans had clear objectives and goals.	69	3.78	0.54
The project plan identified risks and measures to reduce impact of risks	69	2.77	0.48

There were work plans detailing a responsibility matrix for project team members	69	3.88	0.64
The road construction projects utilized Gantt charts and time-plans	69	3.36	0.12

Source: Survey data, 2019

From the table, the respondents felt that the county government did not involve all stakeholders as seen by the mean of 2.42 and 0.82 as the standard deviation. As well, the study shows that most respondents stated that the project plans had clear objectives and goals as seen by the mean of 3.78 and 0.54 as the standard deviation and also that there were work plans that detailed a responsibility matrix for project team members, affirmed with the scored mean of 3.88 and 0.64 as standard deviation.

The findings indicated that the respondents believed the project plans did not adequately identify risks and measures to reduce the impact of risks. This is evident by the mean graded at 2.77 and a 0.48 standard deviation.

The study noted that the road construction projects did not involve stakeholders before commencement of implementation and therefore some stakeholders did not get the chance to have their feedback incorporated in the final design. Majority of the respondents also stated that they did not use project planning tools such as a work plans and Gantt charts that were crucial in determining the sequence of events of the project. These had an influence on the projects

The findings are consistent with the findings by Ngundo and James (2018), who in their study on project management practices and their influence on implementation of

government projects in Machakos county, concluded that projects require to have a project plan that clearly states the project goals and objectives in order for them to perform highly. They further state that the project plan would ensure that they identify all required resources, identify risks and mitigation measures as well as understand the internal and external dependencies. Failure to do this would lead to unsuccessful implementation of projects.

4.4.3 Project Execution and Project Performance

Opinion was sought on whether the respondents considered that project execution had an influence on the overall success of the projects in road construction. Figure 4.6 shows the findings:

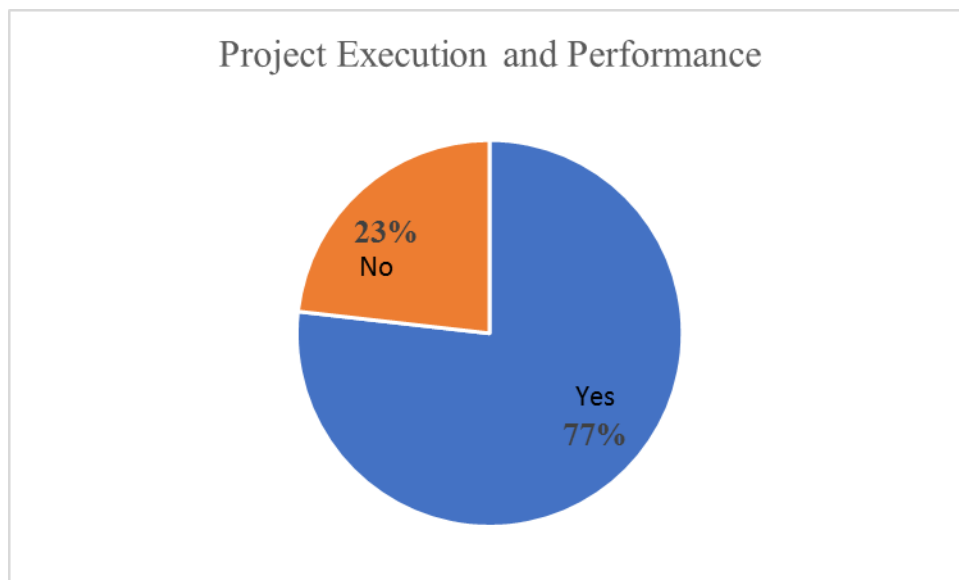


Figure 4.6: Influence of Project Execution

Source: Survey data, 2019

From the study, 77% of the respondents agreed that project execution had an influence on the overall performance of a project while only 23% disagreed.

The opinion on whether the county of Machakos had a project execution plan that details the specific activities in the project, the resources applied to the project and the organization of the project for the road construction projects was sought from the respondents. The findings are as in figure 4.7:

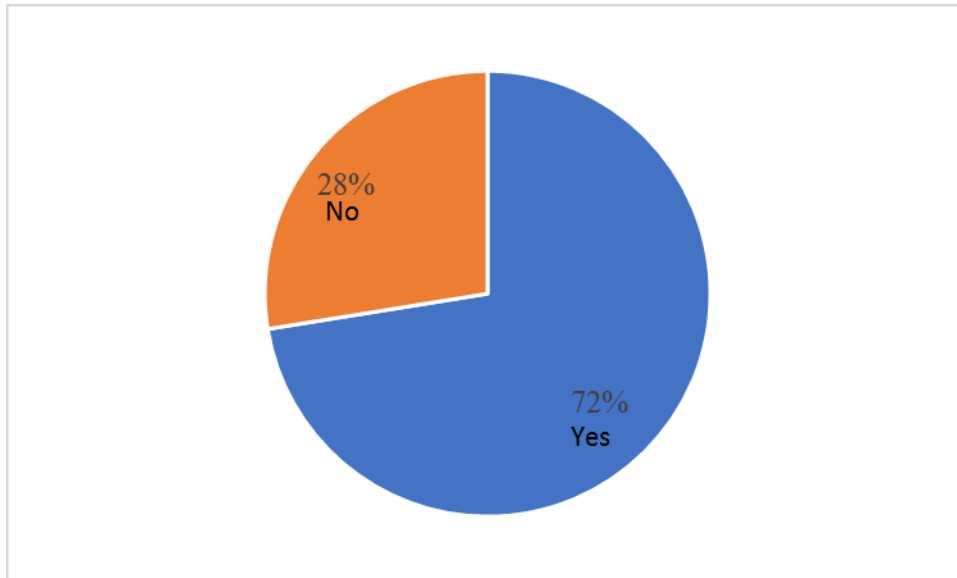


Figure 4.7: Project Execution Plan Availability

Source: Survey Data, 2019

72% of the respondents disagreed with the statement that the county developed and used a project execution plan for the road projects while 28% agreed. This indicates, therefore, that most of the respondents felt that there was no project execution plan.

The study sought to get the respondents opinions on project execution factors in road construction with the outcome as in table 4.6 using a Likert scale of 5:

Table 4.6: Project Execution Factors in Road Construction Projects

Project Execution Factor	N	Mean	Standard Deviation
The projects had a work breakdown structure with activities clearly broken down	69	3.17	0.50

The work was allocated manpower according to the skills and experiences of the team members	69	2.87	0.19
The resources needed to execute the project were availed on schedule and in required quantities	69	1.99	0.69

Source: Survey data, 2019

With a mean of 3.17 and 0.50 as standard deviation, the results showed that the road construction projects had a work breakdown structure. However, it noted that manpower was not allocated according to skills and experiences of the team members as seen by the mean of 2.87 and 0.19 as standard deviation from the study. The results of the study also indicated that the resources needed to execute the projects were not availed on schedule and in the required quantities. For this statement, the mean was 1.99 and the standard deviation 0.69

The study noted that most of the respondents were in agreement that project execution influences the overall performance of projects in the road construction sector. This concurs with Wideman (2014) in his review of George and Sidney (2013) book on total construction project management, who states that the execution phase activities represent the biggest part of the project and also that it is where risks assert themselves. He continues to state according to his experience, the risks, that have now become an issue or serious problem, can have an impact on the success of the project in terms of time and cost.

Project execution guarantees successful completion of a project through proper allocation of resources in the desired quantities with manpower provided based on their level of skills and knowledge for each required task. In this phase, the detailed engineering work

is performed that results in the engineering drawings upon which the construction project will be based. It also includes procurement of services and materials and the actual construction work done

4.4.4 Project Monitoring and Control and Project Management

The study asked respondents to state whether they considered that project monitoring and control influences the performance of the road construction projects or not. Figure 4.8 presents the findings of this question

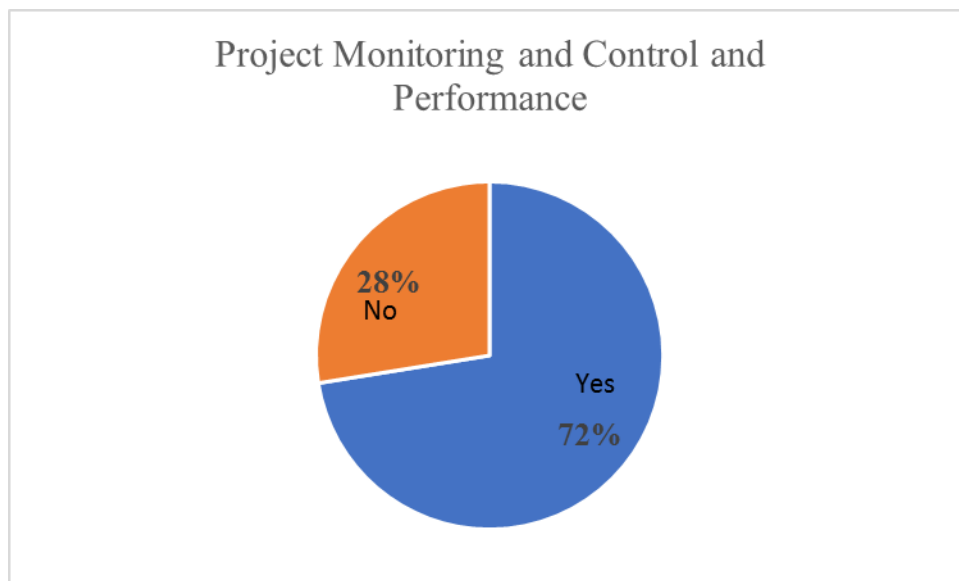


Figure 4.8: Influence of Project Monitoring and Control

Source: Survey data, 2019

72% of the respondents stated that project monitoring and control has an influence on the performance of road construction projects while 28% stated otherwise. This showed that the bigger portion of the respondents felt that project monitoring and control has an overall influence on performance of road construction projects.

On project execution factors in road construction, the opinion of the respondents was as in table 4.7:

Table 4.7: Project Monitoring and Control Factors in Road Construction Projects

Project Monitoring and Control Factor	N	Mean	Standard Deviation
There were milestones clearly marked for the projects	69	2.32	0.164
The road construction projects were periodically being tracked	69	1.94	0.213
Corrections were made on the project to steer it back on track	69	2.20	0.048

Source: Survey data, 2019

The results showed that the respondents did not feel that there were milestones clearly marked for the projects as seen by the mean of 2.32 and standard deviation of 0.164. The study also noted that the construction projects were not being tracked periodically as seen by the mean of 1.94 and the standard deviation of 0.213. The study results showed that corrections were not being made on the projects in order to steer them back on track.

The findings are consistent with Maendo, James and Kamau (2018) who state that project monitoring and evaluation has a significant influence on performance of road infrastructure projects undertaken by local firms. Their study found out that by regularly conducting monitoring and evaluation, allocating finances for monitoring and evaluation activities sufficiently and employment of staff who have the required skills play a critical role in the performance of road infrastructure projects. Majority of the respondents stated that there was no means of tracking the execution progress and no corrective actions were being done to rectify deviations.

4.5 Regression Analysis

Multiple regression analysis was used in the study to establish the relationship between project management practices and the performance of road construction projects. The model summary ANOVA and regression coefficients findings are presented in the following sections.

4.5.1 Model Summary

The model summary presents the coefficient of determination. The model defines the degree to which the dependent variable variations can be brought about by changes in the independent variables. The findings of the model summary are as illustrated in table 4.8

Table 4.8: Model Summary

Model	R	R Square	Adjusted R Square	Std Error of Estimate
1	0.832 ^a	0.692	0.678	0.26655

a. Predictors: (Constant), Project Planning, Project Execution, Project Monitoring and Control

Source: Survey Data, 2019

The adjusted coefficient of determination, R^2 , was 0.678. This means that 67.8%, of the variations in project performance which is the dependent variable, could be attributed to the three independent variables in the study; project monitoring and control, project planning and project execution. The remaining 32.2% can be explained by other factors that were not included in the study which affect implementation of projects.

4.5.2 Analysis of Variance

The Analysis of Variance (ANOVA) finding are in table 4.9

Table 4.9: Analysis of Variance

Indicator	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.367	3	3.456	48.638	1.32565E-16
Residual	4.618	65	0.071		
Total	14.986	68			

Source: Survey data, 2019

From the ANOVA output, the p-value is < 0.05 which indicates that the performance of the road construction projects in Machakos county was significantly influenced by at least one of the independent variables. Therefore, the overall regression model used was significant

4.5.3 Coefficients of the Regression Model

The multiple regression model was used to determine the influence of each of the independent variables on the performance of road construction projects in Machakos county, Kenya. The findings are as shown in table 4.10.

Table 4.10: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	P-value
	B	Standard Error	Beta		
Constant	0.789	0.209	0.372	3.774	0.00
Project Planning	0.209	0.040	0.290	5.216	0.00
Project Execution	0.192	0.033	0.258	5.825	0.00
Project Monitoring and Control	0.206	0.030	0.267	6.814	0.00

a. Dependent Variable: Project Performance

Source: Survey Data, 2019

As per table 4.11, the equation generated in SPSS is below:

$Y = Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$ becomes:

$$Y = 0.789 + 0.209 X_1 + 0.192 X_2 + 0.206 X_3$$

Where,

X_1 is project planning

X_2 is project execution

X_3 is project monitoring and control

From the findings, holding other factors constant, an increase in project planning causes an improvement in project performance. Project planning had a p value <0.05 and therefore is a significance determinant of project performance. This finding is supported by Mkutano (2018), who in his study on project management practices and performance of non-governmental organizations projects in Nairobi city county, Kenya found a positive and significant relationship between performance and project planning. Therefore, the study finding inferred that good project performance score is directly related to good project planning

Mkutano (2018), further states that project planning helps in communication of project objectives and strategies and the ways of achieving them. Project planning leads to performance of risk planning and consequently achievement of project goals being completion within time and resources

The findings show that while holding other factors constant, an increase in project execution causes an improvement in project performance. Project execution had a p value less than 0.05 and therefore project execution is a significance determinant of project

performance. At the execution stage, the bulk of the work is carried out including the major activities needed to accomplish the work of the project. This stage requires time and effort.

In her study on determinants influencing performance of agricultural projects: a case of NALEP projects in Ruiru district, Kiambu county, Kenya, Wangeci (2013), concurs with the study and affirms that project implementation is critical to project performance as it ensures that the plans are put into practice. Wangeci (2013), further states that 80-85% of the total project work is accounted for in the implementation phase and hence needs to be completed as fast as possible and within least possible resources. This therefore calls for greater need for coordination, monitoring and control along with application of all project management techniques of in this phase including the planning effort, communication management, change management as well as team and team member motivation. At execution stage, the quality of work and cycle time for the project will be highly affected by how effective the project team is in utilizing available resources.

The findings also established that while holding other factors constant, an increase in project monitoring and control causes an improvement in project performance. Project monitoring and control had a p value <0.05 and therefore project monitoring and control is a significance determinant of project performance. The findings are supported by Wambua and James (2018), who in his study on monitoring and evaluation practices and performance of county funded education projects in Makueni county, Kenya, observed that there exists a positive correlation between monitoring and evaluation training and project performance. Further, the study states that if trainings in monitoring and

evaluation are increased the performance of county funded projects also improves due to accuracy of feedback got from monitoring and evaluation units.

For effective project control it is essential to measure the project progress against the project plan. A project manager needs to know what is going on so that he or she can take corrective action. The author further states that effective progress measurement helps to identify the variances.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary for the study findings about evaluation of the influence of project management practices of project monitoring and control, project execution and project execution on rural road construction projects performance in Machakos county. Also covered in this chapter are the conclusions as well as recommendations made from the findings and suggestions on areas of further research

5.2 Summary

The objective of the study was to determine the influence of project management practices on performance of road construction projects in Machakos county, Kenya. The Motivation for carrying out the study was that the county had reported a number of road construction projects that failed to meet completion within the expected timelines and budget allocation. The specific objectives were to determine the influence of project planning, project execution and project control and monitoring on performance of road construction projects in Machakos county. Causal and descriptive research design was adopted for this study and it used primary data which was collected by application of questionnaires that were of semi-structured nature.

The target population was all the completed and the ongoing rural road construction projects in Machakos county while the respondents comprised of road construction project engineers, prequalified road contractors, road construction project planners,

technical road construction auditors and ministry of transport road project engineers as well as persons selected from the committees representing the interests of the residents.

5.2.1 Project Planning and Project Performance

The study established that most of the respondents strongly felt that the road construction projects performed poorly. The characteristics of performance that the study considered were time, cost and quality. Majority of the respondents considered the road construction projects to have performed poorly at best. The study established that road construction projects in the county of Machakos failed to be completed as planned within the budgeted costs in which a bigger percentage of the respondents were of the opinion that costs incurred was beyond what was planned to be utilized.

The study findings indicated that project planning affects the performance of rural road construction projects. The regression analysis done showed that there existed a positive and significant relationship between project planning and project performance. The factors of project planning that were studied include stakeholder involvement, clarity of objectives and goals in the project plan, identified risks and measures to mitigate the anticipated impact, availability and use of work plans and Gantt charts.

The study showed that the county government did not involve all stakeholders throughout the lifecycle of the projects and although it noted that the projects had project plans with clear objectives and goals and also showed that there were work plans that detailed a responsibility matrix for members of the project team, the project plans did not adequately identify risks and measures to reduce the impact of risks.

5.2.2 Project Execution and Project Performance

The study findings concluded that project execution affects the performance of rural road construction projects. The regression analysis done showed that there existed a positive and significant relationship between project execution and project performance. The factors of project execution that were studied were the work breakdown structure, allocation of manpower and resources and availability of the resources within required timelines and in the right quantities.

The study showed that although the road construction projects had a work breakdown structure, the manpower was not allocated according to skills and experiences of the team members. The findings indicated that while resources needed to undertake the projects were availed to the project team, they were not provided within the timelines and schedule required. Also, they were not availed in the required quantities

5.2.3 Project Monitoring and Control and Project Performance

The study findings indicated that project monitoring and control affects the performance of rural road construction projects. The regression analysis done showed that there is a positive and significant relationship between project monitoring and control and project performance. The factors of project monitoring and control that were studied were availability of milestones, tracking of work progress through comparison of the plan against the actual work done and corrections carried out in order to return the project on track if any deviations were noted.

The results indicated that the respondents did not feel that there were milestones clearly marked for the projects and that they also observed that the construction projects were not being tracked periodically. Consequently, the results showed that corrections were not being made on the projects in order to steer them back on track.

5.3 Conclusion

The study aimed to evaluate the influence of project management practices of project planning, execution and monitoring and control on the performance of the rural road construction projects in Machakos county. Based on the findings, the study concluded that project performance is greatly influenced by project planning. If the project planning phase is carried out well, the possibility of having a well performing project increases.

The study further concluded that during the planning phase, stakeholders should be involved in order to have their expectations and feedback well put into the project design. As well, in order to have better performance on projects, planning tools such as work plans and Gantt charts that facilitate proper planning should be used in projects. These are useful as they determine the sequence of work and therefore ultimately influence performance.

Further, the study found out that projects need to have a project plan with well defined objectives and goals and should identify risks and measures to reduce the impact of those risks. Lastly, the study concluded that the project needs a work plan with clear responsibility matrices for project members

On project execution, the study found that project execution has significant influence on road construction projects. If project execution phase is carried out satisfactorily, the chances of a project performing well increase. The study concluded that for better performance of projects, resources should be allocated in the right quantities and be availed at the right time. As well, the study concluded that projects need a work breakdown structure with activities broken down for clarity and ease of execution with the work being allocated according to the project team members' skills and experiences.

On project monitoring and control, the findings of the study showed that road construction project performance was influenced significantly by project control and monitoring. Therefore, when project monitoring and control is carried out well, the chances of the project performing well become higher. The study concludes that for better performance, periodic tracking of the project utilizing defined milestones is necessary and, in this way, it would be possible to make corrections as a result of any deviations experienced.

5.4 Recommendations

Project managers are required to establish a project plan that specifies project goals and objectives as recommended by the study. All the resources that are required for execution of the project should be identified. Any risks posed to the project and the consequent risk mitigation factors should be identified and established in the project plan. Also recommended by the study is that the project managers would do well when they use

project planning tools such as Gantt charts and time plans that assist in running a project successfully.

The project manager should involve the relevant stakeholders throughout the project by in order to clearly understand their expectations and get their feedback. A detailed responsibility matrix for the team members which would define how all project members are related in terms of tasks and reporting lines should be developed. When executing the project, the project managers should ensure that resources are availed and allocated at the right place, time and quantities with deliberate actions taken to manage actual implementation of tasks per plan and includes managing internal and external relationships. Manpower should be allocated according to the skills and experiences of the team members for optimum results

Project managers need to incorporate use of project monitoring and control tools in order to ensure high performance of the projects. This would ensure that the tasks are tracked as they are implemented and if there are deviations, the problems causing the deviations are identified and the corrective actions executed. In this regard, the study recommends that milestones should be identified that mark the project progress. Tracking can then be done to evaluate actual progress against expected progress and corrections carried out whenever there are deviations.

5.5 Suggestions for Further Research

This study centered on the effect of project management practices on performance of rural road construction projects in the county of Machakos. The study suggests that a similar research needs to be performed on non-governmental organization (NGO)

sponsored construction projects. These have different stakeholders who have different expectations on the performance of the projects and also have different modes of mobilizing financing as well as management.

The study considered three independent variables of project planning, project execution and project monitoring and control. According to the findings, these three variables contribute to 67.8% of performance in road construction projects as represented by the adjusted R^2 . This score, therefore, suggests that further research work needs to be done to establish the other contributors affecting performance of projects and which form the remaining 32.2%

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APPENDICES

APPENDIX I – COVER LETTER

Cornelius Wandiri

P.O Box 62889-00200

NAIROBI

November 2019

Dear Respondent,

REF: RESEARCH QUESTIONNAIRE

I am undertaking a research study titled “**PROJECT MANAGEMENT AND PERFORMANCE OF RURAL ROAD CONSTRUCTION PROJECTS IN MACHAKOS COUNTY, KENYA**” at Kenyatta University in partial fulfillment of my course requirements.

I hereby request you to participate in the research study and therefore forward the attached research questionnaire for your kind response. The information given is strictly for academic uses and will be treated with utmost confidence.

I thank you for taking your time to complete this questionnaire.

Yours faithfully,

Cornelius Wandiri

RESEARCHER

APPENDIX II – QUESTIONNAIRE

Date

Part A: General Information

1. What is your age?

Below 30 years

31-40 years

41-50 years

Above 50 Years

2. What is your gender?

Male

Female

3. What is your level of education?

Diploma

Undergraduate Degree

Postgraduate Degree/ Diploma

4. What is your involvement in the road construction project?

Contractor

User

Ministry Officer

Project Auditor

County Officer

5. What position do you hold?

6. What is your work experience in years in the construction project work?

Less than one (1) year

Between one (1) and three (3) years

Between three (3) and five (5) years

Beyond six (6) years

Part B: PROJECT PERFORMANCE

7. What do you consider as being the overall performance of the project (how do you rate the completion of the project when measured against the planned time, allocated budget and against the expected technical quality standard)?

Very poor

Poor

Average

Good

Excellent

8. Rate your opinion against statements below by ticking [√] in the respective column.

Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

Performance Factor	1	2	3	4	5
Completion of the road projects was within allocated budgets					
Explain the reason why you have chosen the score above					
Completion of the road projects was within planned time					
Why do you have the above scored opinion?					
The road construction projects were completed to acceptable quality standards					
Mention the issues that make you select the score above					
The road construction projects are serving the purpose of why they were initiated					
Explain why you have selected the score above					

Part C: PROJECT PLANNING AND PROJECT PERFORMANCE

- In your own opinion, do you consider that project planning has an impact on the overall success of the road construction projects?

Yes

No

10. Briefly explain why you have selected Yes or No

.....
.....
.....

11. Does the county of Machakos have a project plan for the road construction projects?

Yes

No

12. Briefly explain why you have selected Yes or No

.....
.....
.....

13. Rate your opinion against statements below by ticking [√] in the respective column.

Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

Project Planning Factor	1	2	3	4	5
County government involved all stakeholders during the project planning phase					
Project plans had clear objectives and goals.					
The project plan identified risks and measures to reduce impact of risks					
There were work plans detailing a responsibility matrix for project team members					
The road construction projects utilized Gantt charts and time-plans					

Part D: PROJECT EXECUTION AND PROJECT PERFORMANCE

14. In your own opinion, do you consider that project execution has an effect on the overall success of the road construction projects?

Yes

No

15. Briefly explain why you have selected Yes or No

.....

16. Does the county of Machakos have a project execution plan for the road construction projects?

Yes

No

17. Briefly explain why you have selected Yes or No

.....

18. Rate your opinion against statements below by ticking [√] in the respective column.

Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

Project Execution Factor	1	2	3	4	5
The projects had a work breakdown structure with activities clearly broken down daily					
The work was allocated manpower resources according to the skills and experiences of the team members					

The resources needed to execute the project were availed on schedule and in required quantities					
---	--	--	--	--	--

Part E: PROJECT MONITORING AND CONTROL AND PROJECT PERFORMANCE

19. In your own opinion, do you consider that project monitoring and control affects the overall success of the road construction projects?

Yes

No

20. Briefly state the reasons for choosing Yes or No

.....

.....

.....

21. Rate your opinion against statements below by ticking [√] in the respective column.

Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

Project Monitoring and Control Factor	1	2	3	4	5
Project monitoring and control is important when carrying out projects					
There was a mechanism for tracking the road construction projects' progress					
Corrections were made on the project based on feedback from the tracking process					

APPENDIX III: ROAD CONSTRUCTION PROJECTS IN MACHAKOS COUNTY

1	Makutano Ma Mwala to Kithimani road - Machakos County Govt	Complete
2	Kathiani via Kakuyuni to Kangundo road - Machakos County Govt	Complete
3	Tala-Ol Donyo Sabuk - national government - launched by President Uhuru	Ongoing
4	Konza to Machakos - Nairobi Metropolitan project - Supervised by Machakos County Government - funded by the World Bank	Ongoing
5	Machakos to Kenol - Nairobi Metropolitan project - Supervised by Machakos County Government - funded by the World Bank	Ongoing
	Machakos to Kenol	
6	Koma to Kenol to Kangundo - Nairobi Metropolitan project - Supervised by Machakos County Government - funded by the World Bank	Ongoing
7	Machakos to Kenol - Nairobi Metropolitan project - Supervised by Machakos County Government - funded by the World Bank	Ongoing
	Machakos to Kenol	
8	Kivandini to Masinga road - Machakos County Govt	Final stages
9	Katangi to Matuu road - Machakos County Govt - early stages	Ongoing
10	Seveni to Muthethini and Kibaoni - Machakos County Govt - early stages	Ongoing
11	Katani Road - KERRA and Machakos County Govt	Ongoing
12	Mananja to Ndithini to Muthesya road - Machakos County Govt - early stages	Ongoing
13	Syokimau roads - Machakos County Govt	Ongoing
14	Ten town tarmacking: Mitaboni, Mwala, Muthetheni etc. - to be completed by end of May, 2017 - Machakos County Govt	Final stages starting in March
15	Mombasa road - Mua - Kaloleni road - National Government	Ongoing
16	Dual carriageway - super highway from Athi River to Machakos turnoff and later to Machakos town - Launched by President Uhuru Kenyatta on Mashujaa Day -	Starting
17	Machakos New City road - Machakos County Govt - early stages	Ongoing
18	Devki to Namanga, Pepe - Mzee Puranha, Pepe - Shell Roads in Athi River - Machakos County Govt	Complete

APPENDIX IV – RESEARCH APPROVAL LETTER



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 17th July, 2019

TO: Mayende Wandiri Cornelius
C/o Management Science Dept.
Kenyatta University

REF: D53/OL/23477/2013

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 22nd May, 2019 entitled "Project management and performance of rural road construction projects in Machakos County, Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

JULIA GITU
FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Department of Management Science

Supervisors:

1. Dr. Rosemary James
C/o Department of Management Science
Kenyatta University

JG/zk

