PROJECT MANAGEMENT PRACTICES AND PERFORMANCE OF ROAD INFRASTRUCTURE PROJECTS DONE BY LOCAL FIRMS IN THE LAKE BASIN REGION, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university or any other award to the best of my knowledge.

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We confirm that the work presented in this thesis was carried out by the candidate under our supervision.

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DEDICATION

I dedicate this work to my entire family, my mother Rebecca Bochaberi and my late father Maendo Ochenge for their financial support and inculcating in me the spirit of hard work, resilience and patience. I am greatly indebted to them. I also dedicate this work to my wife Damaris Ochenge and our children Michelle Moraa and Ryan Maendo Junior for their love, understanding and support during the many days I was away in the course of this study. Indeed they are my source of inspiration to always work hard for their bright future.

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OPERATIONAL DEFINITION OF TERMS

Group Dynamics : Effect of roles and behavior of a project team that enhances teamwork and efficiency in undertaking a project.

Government Policy : A bundle of rules and regulations enacted by the government to facilitate development, management, rehabilitation and maintenance of road infrastructure.

Infrastructure Projects : Refers to all facilities considered important for a society economic welfare of a country and include roads, water and sanitation, power, ports, railways, ICT and such related facilities.

Lake Basin Region : Comprises of Siaya, Migori, Kisii, Kisumu, Nyamira and Homa Bay counties.

Local Firms Road construction firms established by Kenyan citizens.

Monitoring and Evaluation : Refers to routine collection and analysis of information to track the progress of a project frequently.

Project	**:**	A complex, non-routine, one-time effort limited by time, budget, resources and performance specifications design to meet customer needs.
Project Management	**:**	Planning, organizing, motivating and controlling resources in order to accomplish a road project within the required time, cost and meet the desired quality.
Project Management Practices	**:**	Refers to a bundle of systems and structures adopted by a firm that enables it to accomplish a project in an effective and efficient manner.
Project Performance	**:**	Accomplishment of a project within the required time, cost and achieving the quality standards.
Project control	**:**	Project control comprises tracking performance against agreed plan and taking corrective action required to meet the desired project.

Project Risk	**:**	A project risk is any factor that may potentially interfere negatively with successful completion of the project.
Project Risk Management	**:**	Systematic process of identifying project risks, analyzing them and taking preventive measures against the threats.
Resource Mobilization	**:**	Management process that involves identifying financial, human, physical and technical resources and organizing them so as to attain better project performance.
Road Infrastructure	**:**	Refers to road projects constructed by the local firms.

ABBREVIATIONS AND ACRONYMS

ADB	**:**	African Development Bank
ADF	**:**	African Development Fund
AICD	**:**	African Infrastructure Country Diagnostic
ANCS	**:**	Australian National Competency Standards
CCPM	**:**	Critical Chain Project Management
DFID	**:**	Department for International Development
ERSWEC	**:**	Economic Recovery Strategy for Wealth and Employment Creation
EU	**:**	Economic Union
DISS	**:**	Department of Infrastructure Services
FDI	**:**	Foreign Direct Investment
GDP	**:**	Gross Domestic Product
JIT	**:**	Just In Time
KeNHA	**:**	Kenya National Highways Authority
KeRRA	**:**	Kenya Rural Roads Authority
KRB	**:**	Kenya Roads Board
KURA	**:**	Kenya Urban Roads Authority
MDGs	**:**	Millennium Development Goals
MTID	**:**	Ministry of Transport and Infrastructure Development
NCA	**:**	National Construction Authority

NACOSTI	**:**	National Commission for Science, Technology and Innovation
NEPAD	**:**	New Partnership for Africa's Development
NPCI	**:**	National Policy on the Construction Industry
OBS	**:**	Organizational Breakdown Structure
OECD	**:**	Organization for Economic Cooperation and Development
PERT	**:**	Project Evaluation and Review Technique
PMBOK	**:**	Project Management Book of Knowledge
PMI	**:**	Project Management Institute
PMPG	**:**	Project Management Professional Guide
PPIAF	**:**	Public Private Infrastructure Advisory Facility
PRAM	**:**	Project Risk Analysis and Management
PRMP	**:**	Project Risk Management Plan
RBV	**:**	Resource Based View
PPP	**:**	Public Private Partnership
PSP	**:**	Private Sector Participation
RBM	**:**	Resource Based Management
SATPP	**:**	Sub-Saharan Africa Transport Policy Program

SGR	**:**	Standard Gauge Railway
STI	**:**	Science Technology and Innovation
TOC	**:**	Theory of Constraints
TQM	**:**	Total Quality Management
UNECA	**:**	United Nations Economic Commission for Africa
USD	**:**	United States Dollar
WBS	**:**	Work Breakdown Structure

ABSTRACT

Efficient performance of road infrastructure projects is essential for economic growth and development. Performance of road infrastructure projects in the Lake Basin Region constructed by local firms is poor in terms of completion of the projects within the budgeted cost, time schedule and attaining the desired quality. This study therefore, sought to establish the effects of project management practices on the performance of road infrastructure projects in the Lake Basin Region constructed by local firms. The study was guided by four specific objectives: determine the effects of project resource mobilization, project monitoring and evaluation, group dynamics management and project risks management on performance of road infrastructure projects. The study employed both the descriptive and explanatory research design based on a survey. The target population comprised of 41 road infrastructure projects in the Lake Basin Region constructed by local firms between 2011 and 2016. The study targeted 95 respondents who comprised of project managers, project contractors, monitoring and evaluation officials from the government and elected local leaders. A semi-structured questionnaire was used to collect primary data. Construct validity was achieved by ensuring that the relationship between the operationalized variables was in accordance to the represented theoretical construct. Reliability was assessed using Cronbach's alpha coefficient of internal consistency. Quantitative data was analyzed using both descriptive and inferential statistics. Multiple regression analysis was used to determine the effect of the project management practices on the performance of road projects constructed by local firms. Prior to multiple regression analysis, diagnostic tests were carried out. The findings were presented using statistical parameter estimates. The results indicated that project: resource mobilization, project monitoring and evaluation, group dynamics management and project risks management had significant effects on the performance of road infrastructure projects. The study also found out that government policy did not have a moderating effect on the relationship between independent and dependent variables. The results confirmed that organization structure had a mediating effect on the relationship between project management practices and performance of road infrastructure projects. The study recommends that government should consider setting aside a fund from which local firms can access cheap loans. The government should also consider putting in place a monitoring and evaluation policy framework.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Performance of road infrastructure projects is very crucial in the growth and development of any economy. They also play a critical role in the economy in terms of wealth creation and provision of employment opportunities. Infrastructure comprises of services such as power, telecommunications, water supply, sanitation and sewerage, solid waste collection and disposal, piped gas, roads, dams and canal works, railways, urban transport, ports, waterways and airports (World Bank, 2012).

Throughout the world, the business environment within which construction firms operate continues to change rapidly. Firms failing to adapt and respond to the complexity of the new environment tend to experience survival problems (Lee, 2009). With increasing users' requirements, environmental awareness and limited resources and high competition, contractors should continuously strive to improve their performance (Samson & Lema, 2011).

There are several factors that impact on performance of projects. They include: Shortage of skilled manpower, poor supervision and poor site management, unsuitable leadership, politics, corruption and shortage and breakdown of equipment (Faridi & El-Sayegh, 2010).Conflict, poor workmanship and

incompetence of contractors had also negative impact on project performance in sub-saharan Africa (Carter, 2012). Carter further noted that project managers should be given full authority to implement the projects. Harries and Reyman (2010) noted that on average 65 percent of road projects constructed by local firms in Africa were considered to have failed. These projects were suspended and later contracted to other firms. Therefore, performance of projects is a subject many scholars have discussed with the objective of ensuring that projects are undertaken within the stipulated cost, time schedule and meet the desired quality. However, little attention has been focused on road projects constructed by local firms and the above studies have neglected the area of management practices. There is need to understand therefore the effect of management practices on the performance of road infrastructure projects.

Kenya's economic growth rate was on average rate 5.3 percent from 2003 to 2007. However, road infrastructure proved to be a drag on the growth (Robert, 2013). Despite of this growth, the country did not meet the 7 percent growth per annum required to attain the Millennium Development Goals. As of 2015, the gap between the amount needed and the amount available was 1.1 billion dollars or 13 percent of GDP. That gap would reduce significantly by adopting appropriate technologies to improve performance of the road sector (Bjarne, 2013).

Under the Vision 2030, the Kenyan government aspires for a country firmly interconnected through a network of roads and other infrastructural facilities. It further proposes intensified application of science, technology and innovation to raise productivity and efficiency in the road infrastructure sector. The government indicated that investment in the nation's road infrastructure will be given the highest priority. Through Vision 2030, annual infrastructure investment requirements for road and other infrastructural facilities are likely to average around 3.5 percent of world gross domestic product (OECD, 2012). In fact, infrastructure sector financial requirements in Kenya were estimated at KES 486 billion in 2014/15 (AfDB, 2013). In developing countries, road infrastructure projects are more often not financed adequately. Governments are increasingly seeking financial and technical support from the private sector to aid construction and maintenance of road infrastructure (Matindi, 2010).

Evidence from KPMG report (2014) indicated that about 68 percent of the road projects in Africa constructed by local firms experienced cost and time overruns. In addition, most of the roads did not meet the expected quality standards and were full of pot holes in less than five years. A number of them were contracted to other firms to construct them again (Elias & Kagwathi, 2012). It was also noted by Harrison (2014) that financial constraints and lack of modern construction equipment to a great extent compromised the quality of infrastructure projects.

Harrison (2014) indicated that public private partnerships would help to mobilize the resources required to improve performance of infrastructure projects.

KPMG report (2014) noted that the quality of Kenyan road construction projects generally needed to be addressed. It indicated that local construction firms faced more challenges than foreign firms in delivering quality roads. Furthermore, weaknesses in supervising construction contracts and rampant corruption compromised the quality of the projects constructed. With the establishment of the new Kenya Roads Board, it was hoped that the quality of road projects by local construction firms would improve and match the standards of those constructed by most foreign construction firms (Gitenya & Ngugi, 2014).

According to Majanja, (2012) financial constraints hinder successful delivery of infrastructure projects in Kenya. Other factors such as project monitoring and evaluation, project risks management and management of group dynamics also affect the performance of road infrastructure projects (Skeggs, 2011; Ugwa & Heupt, 2013). Other factors that affect performance of road infrastructure projects are; environmental factors (increase in scope, inflation), client commitment to project financing requirements, project professionals' ability to generate accurate designs, political interference, corruption and poor cost estimates (Garrish, 2011).

1.1.1 Performance of Road Infrastructure Projects

A road project is said to have performed if it is accomplished within the required time, cost and quality. Measurement and evaluation of performance of projects was done using performance indicators such as time, cost, quality, client satisfaction, client changes, business performance, health and safety (Cheung, 2010). Time, cost and quality were however the three key performance indicators used. In Europe, Mabin and Baldrestone (2015) indicated that improved road construction technology and methodologies can help execute projects more efficiently and in lesser time. In China, construction technologies such as fabricated and modular construction and innovative construction materials further helped to execute road projects with reduced resources (Cheung, 2010).

KPMG-PMI (2014) report indicated that 25 percent of ongoing projects in India were delayed due to inadequate planning and inadequate use of modern technology. Furthermore, lack of adequate number of trained workforce and sufficient construction equipment contributed to road project delays. Soderland (2012) noted that although road infrastructure projects were doing fairly well in South Africa, most of the major road projects were being done by foreign construction firms. Soderland (2012) further argued that, local construction firms in South Africa had numerous challenges in completing infrastructure projects within the budgeted cost and time schedule.

Lu Shan (2014) stated that Chinese construction firms employed proper planning and control techniques, proper coordination between designers and contractors, technical and professional expertise which enabled the firms to complete their projects within the time schedule and budgeted cost. Management commitment, sufficient information and communication channels and competent staff was also significant in the delivery of success infrastructure projects (Boddy, 2009). Lavasseur (2010) noted that construction firms in Tanzania experienced lack of trained manpower, inefficient cost management and scope creep and these factors led to cost overruns and delays in the of infrastructure projects.

Mbaluka and Bwisa (2013) advocated for development of a public-private partnership framework to address the financing constraints of road infrastructure projects. To ensure that projects commenced at the stipulated time, a public private partnership framework would lead to timely clearence of regulatory approvals which could reduce the risk of cost and schedule overruns (Baziraake, 2014). Furthermore, a public private partnership project with government guarantee, would help firms secure lending from institutional lenders at a lower cost. For instance, the Public Private Partnership model in the road sector introduced in the Rajasthan government in India did result in large scale development of quality roads (Lavasseur, 2010).

The economic survey (2016) indicated that the output of Kenyan construction Industry rose from 5.8 percent in 2013 to 13.1 percent in 2014 (KNBS, 2015). This expansion was as a result of growth in the real estate sector and the ongoing major infrastructure projects. The survey indicated that the growth in earthworks construction for the Mombasa–Nairobi standard gauge railway project, expansion of major airports as well as the current construction of roads and energy infrastructure across the country contributed significantly to this growth. Mwandali (2013); Richard and Bullock (2010) indicated that construction industry contributed 4.5 percent of Kenya`s GDP. The GDP rose to sh. 5.36 trillion from sh. 4.73 trillion in 2013 representing a nominal growth of 13.3 percent. The study also indicated that more funds were allocated for constructing roads and railway and also for repair and maintenance of existing roads.

Kenya's road sub-sector accounts for over 80 percent of the country's total traffic and 76 percent of the freight leaving a small portion to water, rail and air transport (Nachu, 2011). This sector played a very significant role in the "Economic Recovery Strategy for Wealth and Employment Creation 2003- 2007". Simulations suggest that if Kenya's road infrastructure could be improved to the level of African leader; Mauritius, annual per capital growth rates would be 3.3 percent higher than they are at present (Anderson & Glen, 2013).

Kenya's road network consists of approximately 177,800 km of which 63,300 km is classified roads while 114,500 km is unclassified roads. About14. 4 percent of classified roads (9,100 km) and 2.2 percent (2,500 km) of unclassified roads are paved road network while the rest are either gravel or earth surface. It is estimated that about 18 percent of the classified road network is in good condition, 27 percent in fair condition, 49 percent in poor condition and 6 percent in very poor condition. Currently most of the repair and reconstruction is ongoing with about 55 percent of the roads still in poor condition (Mailu, 2015).

Escribano, Guarsch and Jorge (2010) found out that Kenya had many small companies that provided services in road construction. These small scale contractors failed to capture large scale infrastructure projects thus faced difficulties in training and retaining good quality staff and also ensuring a high standard quality control and business management system. Rosnes and Vennemo (2015) argued that one consequence of this was a vicious cycle in which a small scale contractor wins work, hires staff to do the work, loses them once the job is done and had again to hire other inexperienced personnel for the next job. This means that the staff did not gain the necessary skills to operate equipment properly which resulted in poor workmanship and slow contract delivery (Leung, Chan & Olomalaye, 2010). They asserted that, there was little to gain from a road sector built by small contractors operating inefficiently. Escribano et al. suggested that to increase the quality and size of a country's road network, Kenya needed to

create competent and professional medium sized construction companies able to undertake mega projects, retain skilled manpower and deliver projects of high quality.

1.1.2 Project Management Practices

Project management practices adopted by a firm enabled it to accomplish an activity or a project in an effective and efficient manner (Miller & Lessard, 2011). There are many factors and project management practices that determined the performance of projects. They include user involvement, executive management support, proper planning and mobilization of resources, realistic expectations, competent staff, clear vision and objectives, availability of resources, competence in technology, managing scope, managing issues that arise from project teams, monitoring and evaluating project progress, project risk management among others (Skeggs, 2011). However, based on Relative Importance index (RII), project resource mobilization, project monitoring and evaluation, management of group dynamics and project risk management were identified as critical management practices that determined performance of construction projects (Ugwa & Heupt, 2013;Skeggs, 2011).

Project resource mobilization involved identifying financial, human, physical and technical resources and organizing them in a way that led to successful completion of projects (Crivelli & Gupta, 2013). Financial resources were required by project contractors to buy the equipment and machinery needed in

undertaking the road projects and meet other expenses related to the project such as salaries and wages for the workers and cost of fuelling the vehicles (Miller & Lessard, 2011). These equipment and machinery included tippers, graders, escavators and rollers. However, most of these equipment are very costly.

According to Harrison (2008), project monitoring and evaluation involved routine collection and analysis of information to track the progress of a project. Monitoring and evaluation of infrastructure projects was recognized as an indispensable management function. It helped in tracking the progress of infrastructure projects. It also provided regular reports on the implementation of projects in terms of input delivery, work schedules and targeted outputs. Project evaluation was defined as an objective assessment of on-going or completed projects in terms of their design, implementation and results (Mambo & Chiragu, 2013).

When people are carrying out a given project, they often take certain roles. The effect of these roles in other members and on the group as a whole was described as group dynamics (Prackel, 2014). Lewis (2011) asserted that a group with a positive dynamic had trust in one another; they worked as team during implementation of a project and held one another accountable for the success of the project. Lewis (2011) argued further that when a team lacked a strong leader, members would focus on wrong priorities leading to poor group dynamics.

Yankelovick (2014) described a risk as a threat that would cause a project to go wrong or at least not produce the desired results. Project risk management therefore sought to identify, analyze and respond to risks by applying risk management principles and processes Smith & Jagger, 2010). Risk identification involved pinpointing the risks that would affect the project through brainstorming, industry benchmarking, scenario analysis and risk assessment workshops. Risk quantification involved assessment of the risks and how different risks were related to with each other while risk response development included taking preventive measures against the threats posed by the risks. Such measures included avoidance, mitigation or acceptance. Risks that would affect the performance of road infrastructure projects were identified and mitigated appropriately. They included legal risks, technological risks, economic risks, financial risks, social risks and political risks (Well- Stam, 2013). Project managers had a responsibility of identifying the risks and managing them effectively.

1.1.3 Road Infrastructure Projects in the Lake Basin Region

The state of road infrastructure projects in the Lake Basin Region was wanting in terms of quality (Public works, Nyamira, 2014). The region had many underdeveloped roads. For instance, in Kisumu county, 60 percent of roads that were constructed by local firms have been redone (Public works, Kisumu, 2014)

while in Kisii county 55 percent of the roads were redone. In Siaya, Migori and Nyamira counties the percentages were 58 percent, 66 percent and 64 percent respectively (County Public works, 2015). The contractors also spent almost twice the budgeted cost and construction took two to three years more than the time initially scheduled. However, the Kenyan government had initiated many roads in the region to bring equitable development (Public Works, County Hqs, 2013).

Eric, Debra and James (2012) noted that involving private sector in planning and monitoring of road projects must be enhanced. For instance, private organizations: SIDA and KFW in Nyanza and Rift Valley constructed road Projects with the support of local communities. The local community was also involved in the identification and prioritization of road projects being constructed.

The Lake Basin Region has unique characteristics in the sense that, it has both rural and urban set up. It has also many underdeveloped roads. For instance, over 65 percent of the road projects undertaken by local firms in Homa Bay county suffered from cost and time overruns and the quality of these projects was poor (Public Works, Homa Bay, 2014). World Bank report (2010) indicated that road infrastructure projects of small and medium scope are required to be completed between 3-4 years while those of large scope can take up to 5 or 6 years. However, information obtained from public works records of the counties under study indicated that about 20 percent of the road infrastructure projects

constructed by local firms experienced time overruns of 1-2 years while 60 percent of the road projects experienced time overruns of 2-4 years (Public Works, Kisii, 2013; Homabay, 2013; Kisumu, 2014; Siaya, 2014). The Lake Basin Region was therefore ideal because many of the road infrastructure projects constructed in the region by local firms suffered from cost and time overruns and the projects were of poor quality.

1.1.4 Government Policy

Government policy on road infrastructure projects refer to laws, policies, rules and regulations passed by the government or its agencies that may have a negative or positive impact on the performance of road infrastructure projects. For instance, the enactment of Kenya Roads Act 2007 provided the legal and institutional framework for the management of roads. The law was revised in 2012. This law also established three Roads Authorities namely: Kenya National Highways Authority (KENHA), the Kenya Urban Roads Authority (KURA) and Kenya Rural Roads Authority (KERRA). Kenya National Highways Authority is in charge of development, rehabilitation, maintenance and management of national roads.

In addition, the government passed a sessional paper No. 5 of 2006 on the development and management of the road sub-sector. The policy sought to

improve efficiency of road maintenance operation, increase funding for road maintenance and strengthening management and the institutional framework.

1.1.5 Organization Structure

An organization structure defines how activities such as task allocation, coordination and supervision are directed towards the achievement of organizational goals. Organization structure plays a significant role in the allocation of financial, physical and human resource that are required to facilitate the performance of road infrastructure projects. The organizational structure also determines how information flows from level to level within the organization (Mohammad, 2017).

There are three main types of organization structure. They are: functional, matrix and projectized (Montana & Chamov, 2013). In functional organization structure, people are grouped by areas of specialization such as marketing department and human resource department. Team members do both project work and departmental work. The functional manager has full control on the allocation of financial, physical, technical and human resource (Schnetler & steyn, 2016). In matrix organization structure, the authority to allocate resources and decision making process is shared between the functional manager and the project manager. In projectized organization structure, the project manager has full

control on the allocation of resources and decision making processes (Montana & Chamov, 2013).

1.2 Statement of the Problem

Efficient performance of road infrastructure projects is essential for economic growth and development. In cognizance of this, the Kenya government has put several measures to address performance of road infrastructure projects. The measures included: enactment of Kenya Roads act 2007, establishment of Kenya National Highways Authority (2007), Kenya Urban Roads Authority (2007) and Kenya Rural Roads Authority (2007). These measures were meant to provide a legal and institutional framework for construction, rehabilitation and maintenance of roads.

Despite the measures, road infrastructure projects constructed by local firms in Kenya continued to face several challenges that led to poor performance of the projects (Meyer & Tim, 2009, Musa, 2013, KPMG Report, 2014). KPMG report (2014) noted that on average only 39.4 percent of the road infrastructure projects constructed by local firms in Kenya were completed within the budgeted cost and scheduled time. The report also indicated that only 35 percent of the projects undertaken by local firms met the desired quality standards. Kenya attained an overall performance rating of only 36.9 percent on performance of road projects done by local firms during the period 2011 to 2014 as compared to Uganda's and

Tanzania's rating of 40.5 percent and 43.7 percent respectively. Beyond East Africa, Zambia had 45.6 percent, China 70.5 percent, India 65.8 percent and Europe 71.5 percent. This showed that among the countries rated by World Bank, Kenya scored the least in project performance. Poor performance of the projects had led to slow economic growth, increased poverty levels and unemployment (Mattas &Ashkenas, 2011).

Previous studies focused on performance of other infrastructure projects. They include: power projects, ports and railway projects (Lavasseur 2010; Hodge and Greeve, 2011). Also, most of the studies focused on developed countries and since no two countries are similar, there was need to conduct the study in Kenya. The study therefore, sought to establish the effect of project management practices on the performance of road infrastructure projects constructed by local firms in Kenya with a particular focus on the Lake Basin Region. In addition, the study sought to establish the moderating effect of government policy and mediating effect of organization structure on the performance of road infrastructure projects. The study focused on the Lake Basin Region because many of the roads in the region were constructed by local firms and they were rated as having poor performance (county public works, 2014).

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of the study was to establish the effect of project management practices on performance of road infrastructure projects by local firms in Kenya with a particular focus on the Lake Basin region.

1.3.2 Specific Objectives

The study sought to:

i. Determine the effect of project resource mobilization on performance of road infrastructure projects by local firms in the Lake Basin region, Kenya.
ii. Assess the effect of project monitoring and evaluation on performance of road infrastructure projects by local firms in the Lake Basin region, Kenya.
iii. Establish the extent to which project group dynamics management influence performance of road infrastructure projects by local firms in the Lake Basin region, Kenya.
iv. Examine the effect of project risks management on performance of road infrastructure projects by local firms in the Lake Basin region, Kenya.

v. Establish the moderating effect of Government policy on the relationship between project management practices and performance of road infrastructure projects by local firms in the Lake Basin region, Kenya.

vi. Determine the mediation effect of Organization Structure on the relationship between the project management practices and performance of road infrastructure projects by local firms in the Lake Basin region, Kenya.

1.4 Research Hypotheses

The study tested the following null hypothesis:

$H0_1$: Project resource mobilization has no significant effect on performance of road infrastructure projects by local firms in Lake Basin region, Kenya.

$H0_2$: Project monitoring and evaluation has no significant effect on performance of road infrastructure projects by local firms in Lake Basin region, Kenya.

$H0_3$: Management of Project group dynamics has no significant effect on performance of road infrastructure projects by local firms in Lake Basin region, Kenya.

$H0_4$: Project risks management has no significant effect on performance of road infrastructure projects by local firms in Lake Basin region, Kenya.

$H0_5$: Government policy has no moderating effect on the relationship between the project management practices and performance of road infrastructure projects by local firms in Lake Basin region, Kenya.

$H0_6$: Organization Structure has no mediating effect on the relationship between the project management practices and performance of road infrastructure projects by local firms in the Lake Basin, Kenya.

1.5 Significance of the Study

The study was of importance to project managers and contractors to understand the managerial practices that lead to efficient performance of road infrastructure projects. The research findings would also enable the government and other stakeholders to put in place policy framework that would promote the performance of road infrastructure projects. In particular, the study aimed to help the project contractors to construct the road projects that meet the desired standard. The study was also of significance for academicians and future researchers since it would provide crucial information about the effects of project management practices on road construction projects. The study report would also act as a reference and stimulate interest among academicians and that would encourage further research on the problem.

1.6 Scope of the Study

This study sought to establish the effects of project management practices on performance of road infrastructure projects by local firms in the Lake Basin Region, Kenya. The project management practices that were considered are: project resource mobilization, project monitoring and evaluation, management of project group dynamics and project risks management. The study was carried out in the Lake Basin Region that had a total of 41 road infrastructure projects constructed by local firms with 5 road projects in Nyamira, 8 road projects in Kisii, 6 road projects in Migori, 7 road projects in Siaya, 10 road projects in Kisumu and 5 road projects in Homa Bay County. The Lake Basin Region was chosen because many of the roads in the region were constructed by local firms. Many of those roads done by local firms were rated as having poor performance (KPMG, 2014). The study focused on road infrastructure projects financed by both the national and county government. Most road infrastructure projects took 3-6 years to complete hence the choice of 6 year period between 2011 and 2016.

1.7 Limitations of the Study

Limited access to public works documents at county headquarters prevented the researcher from obtaining some information on cost overruns needed in the study. However, after engaging the relevant authorities the researcher was able to access the required documents after promising the strict confidentiality. Also, some of

the project contractors did not keep up to date records on actual and budgeted cost and time taken to complete the project. The researcher used experts in road construction projects to help in estimating the cost in such circumstances. Other factors that affected performance of the road projects were held constant.

1.8 Organization of the Study

The study is organized into five chapters namely; introduction, literature review, research methodology, research findings and discussions and summary, conclusion and recommendations. Chapter one provides a background of the study which highlighted the historical information related to infrastructure projects and performance of road projects. Further the chapter gives the statement of the problem, objectives of the study, research hypothesis, significance, scope and limitations of the study.

Chapter two presents the literature review. It discusses the theories that anchor the study. Further, empirical work on project management practices and project performance was reviewed and critiqued. Finally, a summary of the reviewed literature, identification of the research gap and conceptual framework of the study is also presented in the chapter.

The third chapter outlines the research methodology employed in the study which includes the research philosophy and research design used. The chapter also presents the definition and measurement of variables, target population and

sampling techniques used in the study. In addition, the chapter explains the data collection procedure, validity and reliability and data analysis techniques that were used in the study.

The fourth chapter outlines research findings and discussions. The chapter covers response rate and demographic characteristics of the respondents by age, gender, education level and respondents' work experience. In addition, it covers descriptive statistics on performance of road projects and inferential statistics. The chapter also gives the findings of the study using tables and statistical parameter estimates.

Chapter five presents a summary of the study, conclusion and recommendations of the study. The chapter also outlines the study's contribution to knowledge and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter situates and articulates literature review. It describes the theories where the study was anchored. The chapter also reviews and critiques empirical work on project management practices. The chapter finally provides a summary of the reviewed literature and identifies the research gap. The chapter concludes with the conceptual framework of the study.

2.2 Theoretical Review

2.2.1 Resource Based View Theory (RBV)

This theory was initiated by Wernerfelt (1984) and Rumelt (1984). The theory lies in the applications of a bundle of valuable tangible and intangible resources at the firm`s disposal that gives the firm competitive advantage over other firms. It explains the role of valuable tangible and intangible resources that enables the firm to complete its projects within budgeted cost, time schedule and meet desired quality (Barney, 1986).

The RBV theory emphasizes that a firm with adequate resources is likely to have competitive advantage and superior performance over other firms. It argues that every project manager wants to continuously improve on the performance of

projects undertaken. However these firms experience limited resources and time available to invest in making the changes that are needed to improve the firm performance (William & Dettmer, 2010). Resources at the disposal of the firm can either be tangible such as machinery and equipment or intangible such as trade mark, intellectual property and processes. Adequate use of modern equipment such as escavators, tippers, rollers and graders can make a firm complete an infrastructure project within the stipulated time and also reduce the cost overruns (Gimeno, 2011).

Robert and Bradley (2013) asserted that for a firm to attain superior performance it must first look at what resources it possesses; then it assesses the value of these resources and how best they can be used so as to give a firm competitive advantage. Robert and Bradley further argued that resources such as: capital, equipment, skills of employees and patents can enable a firm to implement its projects in an efficient manner. Also such a firm can easily deliver projects that meet customer standards.

Barney and Smith (2010) used this theory in their study on comparing theory of constraints with MRP and JIT. They noted that for a project to be undertaken effectively and efficiently basic resources such as physical, human and technological resources need to be present. Otherwise it will quite difficult to undertake mega infrastructure projects without such resources. Heinrich and

Bofinger (2009) study on factors that influence proper management of a project also used the theory. Bofinger found out that the main source of comparative advantage is putting in place a team of resources to perform various project activities. The theory has also been used by Crivelli and Gupta (2013) study on Public-Private Initiatives in Resource Mobilization and Might and Fisher, (2011) study on Causes and Delays in Malaysian construction Industry.

The firm's resources enable it to have superior performance over other firms (Heinrich & Bofinger, 2009). They further argued that a firm that nurtures and develops its resources is able to sustain the firm's competitive advantage. Michael also noted that Porter's diamond model agrees with the resource based view theory in the sense that the only way to stay competitive is through upgrading the resource pool. Porter also considers innovation as a force that leads to the creation of competitive advantage (CA). It is therefore crucial to the management of a firm to be committed to the necessary investments in the acquisition of better technological innovations applicable in the implementation of road projects. Briceno, Karlis and Vivien (2010) in support of this theory said that the issue of firm competence has been central in strategy research for decades and it encompasses most other questions which have been raised in the field as for instance; why firms differ, how they behave, how they choose strategies and how they are managed. Peteraf and Berney (2012) further argued that the RBV theory create inter-firm competition based on their resources.

Project performance is influenced by the resources at a firm's disposal. This theory is therefore important in this study because it expresses the necessary financial, physical and technological resources required to enhance the performance of road projects. The project management context fits into this theory as envisaged by Rumelt (1984) and Wernerfelt (1984), the initiators of RBV theory. Since the intention of any construction firm is to have a successful project, performance becomes a critical issue. In this context therefore, the RBV theory is relevant to the study because it outlines the resources required by local firms to successfully construct road projects.

2.2.2 Theory of Constraints

The theory of constraints is an overall management philosophy introduced by Goldratt (1984). It aims at helping organizations continually achieve their goals; that is, improvement in performance of their projects. It outlines four main constraints that hinder the performance of projects. The constraints are; scope of the project, cost of the project, quality and time within which the project is to be completed.

The fundamental thesis of TOC is that constraints have negative effects on the performance of any firm. The theory of constraints advocates that project managers should focus on effectively managing these constraints. Klein, Debruine & Lehman, (2011) study indicated that about 40 percent of the road projects

constructed in Europe suffered from these constraints. The theory also challenges managers to be creative in finding strategies that will enable the firm to achieve quality infrastructure projects despite the presence of project constraints. Linhares (2010) argues that most of the constraints faced by firms originate from policies and inadequate physical resources. The theory of constraints emphasizes optimum performance within the existing constraints. It provides a framework of activities that managers should undertake in the course of managing projects.

The theory of constraints can be characterized as a set of concepts, principles and measurements that focus attention on the logistical tools that make project work to flow smoothly (William, 2013). Eric, Debra and James (2015) study on the effects of project management competencies in project performance noted that in order to improve efficiency and effectiveness in the performance of road infrastructure projects, the project manager should work on these constraints. Armit and Schoemaker (2011) study on performance of projects argued that Critical Chain Project Management (CCPM) is an application of theory of constraints to projects. It is a method of planning and managing project execution designed to deal with uncertainties inherent in managing projects while taking into consideration limited availability of resources. The resources could be physical, human skills as well as management and support capacity. The primary constraints to project management are: cost, time, and scope.

The scope constraint refers to what should be done to produce the project's end result. Bigger and complex projects with several tasks to be performed are more challenging compared to smaller projects. Martin described a project as a complex activity in terms of technology of equipment and materials, machinery and people. Bladderstone (2012) suggested that if the project is too big, some of the activities could be sub-contracted so as to reduce the complexity of the project. Sub-contracting is crucial since it enabled project managers to break complex projects into simple projects that can be easily coordinated and managed effectively. Steyn (2010) asserted that theory of constraints can be used together with other management techniques such as Just in Time (JIT) and Total Quality Management (TQM) to provide a comprehensive set of techniques that emphasize continuous improvement in project activities. This enhances timely delivery of project deliverables and creation of value to customers through quality, reduction in project cost and project completion within scheduled time.

Mabin (2012) believes that Goldratt's methodology seeks to identify a system's bottlenecks, assess the impact of these bottlenecks and help to suggest efficient solutions to the bottlenecks. The study also indicated that the theory of constraints provides a structured script that helps formulate strategies and design solutions to bottlenecks. The study further asserted that the theory is a tool that helps project managers identify constraints and adopt solutions to infrastructure systems.

This theory is relevant in this study as it brings into the surface the constraints that inhibit performance of road infrastructure projects. The constraints are scope of the project, project cost, quality and time within which the project should be completed. This theory was used by Gitenya and Ngugi (2014) study on "assessment of the determinants of implementation of housing projects in Kenya". It was also used by Guash (2012) study on From Management by Constraints to Management by Critical Activities.

2.2.3 Project Management Competency Theory

This theory was established by Mclelland and McBer in the 1980. The authors defined competency as the underlying characteristics of an individual that leads to attaining superior performance in a job or a situation. The project management competency development framework defines competency as a cluster of related skills, knowledge, attitudes, and other personal traits that influences the way an individual undertakes a given task. Competency correlates with project performance and can be improved by means of training and development of manpower (PMI, 2011).

The theory explains the role of project management competencies, monitoring and evaluation of development projects and effects of group dynamics in the performance of infrastructure projects. Gladder (2010) noted that technical project managers should be able to apply knowledge, skills, tools and techniques

effectively so as to deliver as expected and be able to achieve the project's goals and optimize the integrated cost, schedule and effort. The study found out that two of the most influential standards; the PMBOK address only the knowledge aspect of competence while a third, Australian's National competency standards focuses on demonstrable performance. The study also found out that some project managers do not have the required competence skills to implement the road infrastructure projects.

Garish and Huemann (2014) suggests that project managers should be able to select a wide range of management practices and tools that will improve the performance of infrastructure projects. The study further noted that highly skilled project managers can effectively apply different strategies to different projects to optimize project performance (Edum-Fotwe, 2011). Organizations are therefore increasingly managing infrastructure projects in a structured manner to ensure work pursued is consistent and is undertaken by workforce with the required competencies. The competencies of every team member should be assessed and included into a competency profile database which should be updated and reviewed frequently (Kometa, 2013).

Project managers in today's road construction industry are faced with a situation whereby the fundamental roles and functions they perform are witnessing a gradual shift in focus. To maintain their professional competency standards,

project managers in this industry need to adapt to the changing industry environment by relying on knowledge and skills acquired through training and experience. The extent to which such training enables project managers to effectively adapt to changing demands have considerable relevance for the training of future project managers (Francist & Ronald, 2010).

According to this theory, application of traditional management approaches to road infrastructure projects is counter-productive. Ryssel (2013) argues that traditional management focuses on precise work breakdown structure, control rules, long term planning and rigid structures that can cause road projects to fail. Soderland (2012) emphasizes that the project manager should possess project management competencies such as being able to; integrate various processes of the project, ability to meet the scope, time, cost and quality of the required project, manage and mitigate project risks and manage the physical and human resources involved in project implementation. The theory also focuses on the strategic approach used to deliver the road projects, contracting model employed, criteria of selecting the project manager, project contractor and project team and the tools assigned for delivering the project.

Hilson and Murray (2012) asserted that to be competent in any sphere of life, one needs to be knowledgeable, have ability to apply knowledge effectively to achieve an outcome and also be willing to act. Ruth and David (2011) also developed a

framework that outlined five essential elements that contributes to competence. They include: personal characteristics, experience, attitude, knowledge and skills. They also pointed out that managers are more likely to perform better if their personal characteristics meet the requirements of the position. They further argued that the developing of project manager's requisite competency is to ensure efficient performance that lead to a successful project.

Simmons (2014) showed that the unique structure of the road construction industry, regulatory requirements that change often and the challenges of world competitiveness have created a high demand of educated, skilled and competent road construction project managers. Triestch (2015) indicated that a competent project manager must possess technical competencies, behavioral competencies and contextual competencies. They identified technical competencies as including ability to: recognize and appreciate the criteria and conditions of project performance, ability to recognize and understand goals, requirements and conditions of the project, recognize and understand the risks of the project and managing them effectively, understand project structures, scope and deliverables and plan and organize resources required for the project.

According to Triestch (2015), behavioral competencies include; ability to stimulate and motivate team members, self-control, assertiveness, creativity, result oriented, efficient, reliable and appreciates the values of team members.

Contextual competencies include; project orientation, portfolio orientation, understanding complex relations between the project and its surroundings and ability to recruit, select, develop, appraise and reward team members in a way that stimulates effective behavior and successful team work.

This theory is significant to this study since it outlines technical, behavioural and contextual competencies required by local construction firms in the road construction industry in order to deliver road projects within the budget cost, time schedule and meet desired quality (Clist & Morrisey, 2011). The theory also explains the importance of supervising and enhancing team work and efficiency during construction of infrastructure projects. This theory has been used by Leyman (2013) study on Effects of competency skills in large Swedish organizations and Kometa and Jubb (2007) study on Leadership Competency Profiles of successful project managers.

2.3 Empirical Literature

The review covered articles obtained in peer-reviewed journals, documents and materials obtained from the internet sites, research repository websites and databases and other relevant publications on the subject area. The study discussed key constructs, variables and perspectives underlying the effects of project management practices which comprised resource mobilization, project monitoring and evaluation, group dynamics management and project risks management.

2.3.1 Resource Mobilization and Project Performance

Majanja (2012) conducted a study on financing constraints of infrastructure projects in Kenya. The study covered 87 construction firms. Two alternative variables to measure financing constraints were used. The first one was based on the degree of financing constraints that firms face and the other was on the use of bank credit by firms. To measure perceived financing constraint, respondents were asked to rate access to financing as a constraint of project performance. The study results revealed that financing constraints were a major obstacle faced by construction firms. It found out that the local construction firms faced critical issues and problems which affected financing of their projects. Majanja suggested that, government should foster Public-Private Partnerships in order to raise adequate funds for constructing road projects. Simmons, (2012) also noted that local firms had a problem of accessing credit facilities as they were viewed to lack collateral security. However, Majanja assumed that only finances lead to the success of a project. The current study included other important variables such as monitoring and evaluation and group dynamics management so as to improve the viability of the results.

Gitenya and Ngugi (2012) study on the assessment of determinants of performance of housing projects in Kenya pointed out that most of the local firms engaged in infrastructure projects are often hindered by lack of adequate financial

resources. There was always a budget for the project and this was a major constraint. The study further stated that while the overall resources available would be in theory sufficient to complete the project, there were difficulties arising out of the way in which the project had been scheduled. For example, there were a number of activities scheduled to take place at the same time and this could not be possible given the amount of resources available. The amount of resources available therefore, played a critical role in the success of a project undertaken. Project managers needed therefore to optimize the utilization of resources so as to ensure project completion within the budgeted cost (Allen, 2012).

Carter (2012) investigated the challenges facing road infrastructure firms in sub-saharan Africa in their effort to deliver of quality projects. The study analyzed impact of outsourcing technical human resource using 100 questionnaires issued to project managers and contractors. It showed that the local construction firms faced a number of challenges in comparison with the foreign ones especially in obtaining the technical staff with the required competency skills to undertake projects. The study also found out that every organization has a limited number of resources to perform tasks. A project manager's primary role therefore was to find a way to successfully execute a project within these resource constraints. Proper execution of road infrastructure projects required thorough resource planning which comprised of establishing a team that had the required skills to perform

project activities and scheduling other resources such as tools and equipment (Warner well, 2013).

Mcrael (2013) studied the role of managerial skills in managing infrastructure projects in Europe. The study asserted that the level and training in managerial skills would boost the performance of construction firms in terms of quality and time taken to complete the projects. Training would therefore empower people to make better decisions and provide better quality goods and services. The study also asserted that in developing the schedule and assigning road infrastructure resources, the project manager determined the suitability of workers to project activities. The study further emphasized that clear understanding and documentation project duration and duration of each major activity was part of the scheduling process. Ghura (2013) pointed out that adequate and timely planning of personnel would prevent cost overruns in road infrastructure projects. It was therefore important for the project manager to understand the number of team members required to perform the activities scheduled.

Leyman (2013) study sought to establish project management competency development in large Swedish organizations. The study noted that lack of staff with the skills required to perform a task in road infrastructure projects was another challenge in the construction of road projects. This was very critical to project success. The study also argued that matching the members' skills and the

work to be performed depended on the time it took to perform a given task. This aspect was found lacking in the local construction firms and led to projects being completed long after the time scheduled initially. The study therefore recommended that project managers should develop a list of skills required for the execution of the project which in turn determined the personnel for the project. In addition the study indicated that competent human resource led to the achievement of quality, productivity and efficiency in constructing road infrastructure projects.

David (2013) examined the secrets behind successful management of infrastructure projects in Columbia. The study outlined various ways in which technical resources could be applied in running various business projects to enhance management and improve productivity. To ensure that the standard of road infrastructure projects was not compromised, the Columbian government made changes in the funding of road infrastructure projects so that contracts could not be awarded bids made below the so called “lower brackets” but rather to those that were closer to the average value of bids. The former prevents bidders from unfairly lowering their bids to secure contracts. Additionally, the Columbian government had set out the public-private Act through which they regulated both the investors in the projects and the funds for its execution. However, the study failed to include the moderation effect and other key factors that influence the performance of infrastructure projects.

Fox (2013) examined the effect of using modern tools and techniques in the construction and management of road projects Chinese construction companies. The study asserted that modern tools and techniques would drastically improve the quality of the road infrastructure projects. The study further argued that technology led to completion of the projects within the specified time. Graham and Mohamed (2013) study's objective was to establish the level of awareness on uses of technology in the construction of agricultural projects in Central Europe. The study found out that agricultural projects in Europe were characterized by technology that was appropriate, high level technology and adequate institutional capacity to utilize modern technological skills. The study further asserted that use of modern technology in road infrastructure projects would result in mass high quality projects and also reduce time and cost overruns. The study did not incorporate the moderation effect.

Stephene (2013) conducted a study to determine the importance of technical resources in the performance of infrastructure projects in Kenya. The study revealed that no projects can succeed by applying ancient techniques. The study further advocated for the development of efficient and reliable information systems in managing road projects after they carried out a study on application of technology in project management. In addition, the study indicated that use of modern technology in business helped in efficient delivery of good roads that meet customer satisfaction. Ellaine and Harris (2014) study on the performance

of power infrastructure projects in Uganda noted that technology could lead to completion of projects within the time schedule and budgeted cost.

The UNESCO Report on Education (2014) also noted that there was need to provide more training opportunities for school leavers to equip them with skills for self-reliance. It also asked the government to provide practical education and training skills which were relevant to Kenya's agricultural, commercial, economic and industrial needs. The government was also required to provide the technical knowledge and vocational skills necessary to boost economic development. Among the strategies recommended by the report were; the government to increase institutional capacities of various training centers, to provide quality training and increase the training opportunities through expansion and maximize utilization of all technical and training institutions.

Odeyinka and Yusuf (2014) studied the causes and effects of delays in infrastructure projects in Nigeria. The study noted that infrastructure projects' performance could be improved significantly through use of modern equipment. The above studies however did not include other variables which also influence the performance of road infrastructure projects. Tony (2014) study on the effect of technology on performance in Europe asserted that some of the challenges that led to poor performance of road infrastructure projects could be addressed through use of technological solutions. This aspect also led to low morale of workers thus

affecting their efficiency. The study further indicated that use of modern techniques in the construction of infrastructure projects would result in high quality projects and a reduction in the time span for construction.

Lu Shan and Due Fei (2015) study on improving road quality worldwide found out that building of Ecoroads helped to increase the strength, density and durability of roads and road bases efficiently and inexpensively. Further, the study asserted that the construction Ecoroads reduced road building costs by 40 percent and road maintenance costs by 60 percent. The study was conducted in China.

Gitenya and Ngugi (2012); Graham and Mohamed (2013) focused on the assessment of determinants of housing projects and factors effecting performance of agricultural projects respectively and not performance of road projects. Carter (2012); Mcrael (2013);Leyman (2013), David (2013); Fox (2013) and Tony (2014) studies were done in other countries and since no two countries are similar, there is need to carry out this study in Kenya. They also used different variables and context has changed.

2.3.2 Project Monitoring and Evaluation and Project Performance

Project monitoring and evaluation plays a crucial role in project performance. Through M&E information is collected and analyzed that helps to track the progress of a project (Martin, 2012). Reyman and Harries (2008) conducted a study to establish the constraints and problems that hamper Monitoring and

evaluation of development projects in Egypt. In order to achieve the intended objectives, data on 37 projects was used. The study found out that monitoring and evaluation of projects was increasingly being recognized as an indispensable management function. The study results also showed the main constraints and problems that hampered monitoring and evaluation in development projects. They included; lack of commitment to conduct monitoring and evaluation, failure to carry out, discuss, share and incorporate the results of monitoring and evaluation activities. Other constraints found out from the study were: shortage of trained staff, insufficient technical resources, inadequate allocation of funds to monitoring and evaluation and limited training opportunities. These monitoring and evaluation constraints affected the construction firms in the delivery of successful road projects.

Harold (2013) study sought to examine the effect of monitoring closely infrastructure projects in Europe. The study found out that knowledge about monitoring and evaluation helped project contractors and managers to effectively monitor and evaluate the infrastructure projects and therefore improve the performance of the projects. The study also found out that project managers of road infrastructure projects needed to know the extent to which their projects are meeting the desired client standards. Furthermore, the study indicated that information generated through monitoring and evaluation enabled the project managers to make better decision that led to successful road infrastructure

projects. Harries and Benedict (2010) study sought to establish the role of the project manager in the M&E system. The study indicated that the project manager should be able to identify the purpose and scope of the M&E system, plan for information reporting and utilization, collection and management of data, analysis of data, monitoring and capacity building of human resource. Kabwegyere and Kiyega (2010);Kerzner (2011) study also outlined the key monitoring and evaluation activities in a project. They included; initial needs assessment, project design logical framework, M&E planning and base line study. The studies further argued that M&E system should focus on the usage of project inputs and the effectiveness of the project implementation process to ensure that the final road project attains the desired quality.

In China, Leung Xha (2014) study sought to establish the role of supervising project activities in the performance of infrastructure projects in China. The study noted that supervision of project activities enhances project performance. The study results further indicated that a well functioning supervisory system is a critical part of good project management. The results indicated that M&E systems are a critical part of Result Based Management (RBM). Result based management supports better performance of infrastructure projects as it forms the basis for clear and accurate reporting on the results achieved by a project. In addition, the study found out that timely, regular and reliable monitoring and evaluation system on infrastructure projects provides information to support

projects implementation and contribute to organizational learning and knowledge sharing, uphold accountability and compliance, provide opportunities for stakeholder feedback and contribute to resource mobilization.

Reyman and Harries (2008); Kerzner (2011) and Leung Xha (2014) studies were not only done in other countries more advanced than Kenya but also focused on other dimensions other than performance of road infrastructure projects. The studies also used explanatory research design while the current study used both explanatory and descriptive research designs which made the results more viable.

2.3.3 Group Dynamics Management and Project Performance

Prackel (2010) study to establish the effect of poor group dynamics on the performance of power projects in South Africa noted that when people are carrying out a given project, they often take certain roles. The effect of these roles in others and on a group as a whole is described as group dynamics. The study asserted that a positively dynamic group created trust in one another, made collective decisions and was accountable for making the performance project at hand. The study further noted that when a team did not have a strong leader, one member would take over and that affected the smooth undertaking of project activities, caused infighting or focus on the wrong direction. This led to poor group dynamics.

Lehman and Dubrene (2011) studied causes of poor group dynamics by issuing 105 questionnaires to project managers and contractors in the U.S. The results indicated that poor group dynamics in infrastructure projects may be caused by excessive difference to authority. This happens when people feared to express their views so as to be seen to agree with their leader. Blocking was another cause of poor group dynamics. Blocking occurs where members of a team behave in a manner that hinders the flow of information in a group either by disagreeing with others or being critical of others' ideas. It can also happen through a member withdrawing from participation or introducing humour at inappropriate times. The study also found out that free riding was another cause of poor group dynamics. Riding occurs when some members fail to cooperate and therefore leave other group members to do all the work while evaluation apprehension occurs when some members feel judged harshly by other group members. The study further emphasized on weak leadership and excessive difference as the main factors that can caused delays in road infrastructure project completion.

Burgess and Stern (2013) conducted a study with the objective of establishing efficient methods of managing of project teams Switzerland. The results showed that adequate and timely planning of personnel was significant in preventing cost overruns in infrastructure projects. The study also noted that the optimal size of a project team required in infrastructure projects was guided by two main factors, the number of project tasks to be performed and the effort needed in undertaking

these tasks. However, the study failed to outline ways of enhancing cohesion among project teams experiencing poor group dynamics.

Smith (2013) study sought to establish the causes and effect of poor group dynamics in the construction of infrastructure projects in Nigeria. The study found out that; knowing team members, defining roles and responsibilities for everyone, combating of black sheep effect, tackling problems quickly and paying attention to frequent unanimous decision enabled project managers to deliver a successful project within the stipulated parameters. The study further noted that those strategies enabled project managers to harness the different skills, talents and capability of team members so as to improve the performance of infrastructure projects. The study noted that many construction firms do not embrace the spirit of group dynamics and this had greatly affected the performance of road projects. Smith suggested that project managers should address the conflicts so that all the members could work as a team.

Saunders (2014) research on analyzing tools of team excellence in road infrastructure performance indicated that project teams were seen in road projects as the best solution for a firm to efficiently achieve the desired quality of the road project within the stated time schedule. The study was conducted in Central Europe. The study also indicated that flexibility and quick response of project teams made the teams more effective in constructing road infrastructure projects.

Katzenbach (2014) study on group dynamics found out that a project team experienced challenges in early stages of forming a team. The study asserted that every team started and developed gradually until it became a high performing team as the project progressed. The difficulties related to communication, collaboration and motivation especially in the forming and storming stage. However, according to Smith (2014), group dynamics theories did not apply to firms with highly experienced teams whose members had worked together for many years.

In contemporary organizational settings, groups have been emphasized as the key organizing unit because of a great pool of diverse knowledge and skills among members and sharing of new information and expertise. Baldwin (2014) established the impact of network relations on group performance of infrastructure projects. The study found out that communication played a significant role in fostering the effectiveness of the team in construction projects. This information and expertise was crucial in enhancing performance of projects as it led to speedy completion of projects and attainment of the desired quality.

Negative social interactions happens commonly with people who may be described by co-workers as irresponsible, unmotivated or indifferent because they do not offer valued information and insights (Arrow & McGrath, 2014). This can result to adversarial relationships. Such relationships sometimes are unavoidable

because task requirements are more likely to cause emotional distress, anger and indifference. This can lead to delays in project completion or failure to achieve the desired quality of the road projects. The major limitation of the study was its failure to consider other variables that determine performance of construction firms. The aforementioned studies focused on other areas other than performance of projects and were done in other countries hence a need to conduct the study in Kenya.

2.3.4 Project Risks Management and Project Performance

Might and Fisher (2011) conducted a study on Power Projects failure in Nigeria. The study found out that most power projects failed due to failure to manage project risks. They also asserted that risks can never be avoided, they can only be reduced. They further found out that some project managers ignore risks for fear of appearing incompetent in managing the project if the risks were to be uncovered. Further, resources will also be required to mitigate the risks. Nevertheless, unearthing of risks and managing them could contribute to infrastructure success.

Well-Stam (2012) conducted a study to establish the effect of project risks on the performance of railway projects in China. The study identified a number of risks which included legal risks, organizational risks, technical risks, financial risks, social risks and political risks. Legal risks included: lack of insufficient insight

into all of the legal requirements and possible modification in the area of safety environment. It also included claims from contractor as a result of performance errors or failure to comply with laws and regulations. In the road infrastructure context it involved obtaining all the relevant legal documents before embarking on the actual construction. The study also found out that organizational risks which involved modification in the programme of requirements, lack of project procedures, quality plan, necessary manpower, completion and acceptance procedures, late ordering of materials and inaccurate and incompleteness in the estimates contributed significantly to delay in project completion. Further, the study showed that these risks seriously affected the quality of the project and led to time and cost overruns. The major limitation of this study was that it did not consider other factors that are also significant in the performance of projects.

Prichad and Lymer (2013) study on technical risks in infrastructure projects identified some of the risks as; poor construction methods, substandard work done by sub-contractors, poor technologies used and wrong estimates of the required raw materials. The study was conducted in Europe. The study also indicated that financial risks were the main causes of infrastructure project delays. Financial project risks included: price increases for materials, interest rates adjustments, possibility of bankruptcy of supplier, increased taxes and deviation from assumed depreciation especially on capital equipment used for the project. The study further discussed social and political risks. Social risks such as strikes and failure

to involve the community would cause delay in completing the project. Political risks included political instability, change in laws, policies and regulations and failure to obtain permits required.

According to Noor (2014) study on mitigation of project management risks, project managers had a responsibility of identifying the risks and managing them effectively. The study noted that this could be done by recognizing preventive measures to minimize the risks, implementing contingency plans to counter risk, transfer of risk to another asset and setting contingencies in budget allocations. Further, United Kingdom association for project management Guide offers useful information about project risk analysis and management especially to new users. The method involves the study and organization of risks pertaining to specific projects. Proper execution of project analysis and management will lead to successful finishing of road infrastructure projects in terms of cost, time and expected performance. Therefore effective management of infrastructure project risks was a key determinant in infrastructure projects success (Riedel, 2014).

Might and Fisher (2011) study focused on why power projects failed and not performance of road projects. Prichad and Lymer (2013) sought to establish technical risks in infrastructure projects. Well- Stam (2012) explored the effect of project risks on the performance of railway projects. These studies were done in developed countries and since the environmental conditions between developed

and developing countries are different, it is important to examine the effect project risk management on the performance of road projects.

2.3.5 Government Policy and Road Infrastructure Performance

Kenya Roads Act 2007 and sessional paper No. 5 of 2006 on the development and management of road sub-sector for sustainable economic growth provided the legal and institutional framework for the management of roads. The Roads Act established three Roads Authorities namely: Kenya National Highways Authority (KENHA), the Kenya Urban Roads Authority (KURA) and Kenya Rural Roads Authority (KERRA). Kenya National Highways Authority is in charge of development, rehabilitation, maintenance and management of national roads. Kenya Urban Roads Authority is responsible for all public roads in the cities and municipalities. The Rural Roads Authority has responsibility for rural roads. In May, 2009 the Integrated National Transport Policy (NTP) was developed to clarify the roles of other players in the delivery and management of transport infrastructure.

Quality control is a major requirement of highway construction projects. With increasing costs and shrinking staff resources, the government through Kenya Roads Board (KRB) and Kenya Highways Authority (KENHA) addressed this issue of quality control. The contractors should also fulfill their quality control responsibility properly. According to (Gitenya and Ngugi, 2014) this approach

enabled the Kenyan government agencies to employ few staff hence reduced their operation costs. The contractors also minimized road project costs by controlling the use of materials and manpower. However, this cost savings reduced due to many people hired to control project quality activities.

The government agencies that manage and supervise the construction process are required to set standards to be satisfied by the construction firms. Morris, 2009; Odeyinka and Yusuf, 2010) studies in Nigeria noted that government representatives inspected some road projects to ensure that the projects met the set quality assurance standards. The studies further indicated that contractors were penalized if the road projects did not met the required standards. In addition, the study noted that incentives were given to those contractors who achieved significant results. Thomas and Greg, (2012) study on impact of laws on the performance of infrastructure projects concurred with the findings of Morris, 2009; Odeyinka and Yusuf, 2010).

2.3.6 Organization Structure and Road Infrastructure Performance

Lavasser (2010) examined the effect of organization structure in the management of power projects in Zambia. Lavasser issued 135 questionnaires to project managers and 79 to project contractors. The study found out that organization structure was significant in determining the duration it took to complete the projects. The study also found out that there were many levels of authority that

one had to pass through to obtain approvals of project tasks. Further, the study indicated that adaptation of projectized organization structure not only fostered collaboration but also sped up decision making. This led to project completion within the time scheduled. It also helped project managers to overcome organizational issues and thus improve the performance of projects. The study used cost and time taken to complete the projects as indicators for performance. However, the study did not cover extensively other variables such as project management practices.

Nkandu, Rodrigo, Cecilia and Alberto (2010) focused on the effect of functional organization structure in the construction of infrastructure projects in South Africa. The objective of the study was to establish its applicability in managing projects. The study examined two areas; first the power projects and secondly the railway projects. Data for the study came from 37 project managers and 20 contractors who were undertaking the projects. The study found out that the functional manager allocated and monitored the construction work and carried out tasks such as performance evaluation and setting payment levels. They also noted that in functional organizational structure, project managers and project contractors were always in conflict over resource allocation and control of workers since project managers had limited authority. However the study did not include other variables such as resource mobilization and project monitoring and evaluation.

Richard (2011) study examined functional, matrix and projectized organizational structures to establish the impact of allocating authority and responsibilities to project managers and if this had any effect in the performance of projects. The study was conducted in Eastern Europe. The study found out that both project managers and functional managers had authority in matrix organization structure and this led to having a stronger team culture. However, the potential for conflict between functional managers and project managers still exist because of resource conflict. Also, everyone who was in a project team still had two bosses; functional manager and project manager. However, the study failed to address other variables that influenced the performance of infrastructure projects and the model used for analysis was not disclosed by the researcher.

Kumar, Ajay and Fanny (2012) study on the effect of organization structure on the performance of infrastructure projects in the United Kingdom indicated that functional organizational structures were set up for ongoing operations and this organization structure was found in firms whose primary purpose was to produce standardized goods. Gulyani, Sumila, Debrata and Darby (2012) study on the role of organization structure on infrastructure performance in England noted that projects that belong to the same functional division do not generate many organizational issues. However, the study indicated that those projects that cut across functional divisions are really challenging to construct. Projects that cut across functional divisions are difficult to manage because they require the project

manager to obtain assistance and cooperation from other managers. The project manager in this case has no direct functional authority to undertake the project in order to meet project objectives. This made the process complicated and caused project delays. Mwangi (2012) study further asserted that projectized organization structure enabled team members to have a deep expertise and thus led to better performance of projects.

Bjarne (2012) study sought to establish whether a firm gained competitive advantage through adoption of a given organization structure in Central Europe. A sample of 65 respondents consisting of project managers and project contractors was used. The study results indicated that organizations that adopted projectized organization structure completed projects within the scheduled time and the quality of the projects was satisfactory over those that used functional or matrix organization structure. Graham and Mohamed (2013) study examined the role of project managers in the allocation and organization of work for the designated project teams in the U.S. The study noted that project managers needed full authority and responsibility in managing infrastructure projects. Daniels (2014) criticized this organization structure as having less specialization; team members are "jack of all trades".

In projectized organization structure, the project manager was solely responsible for the construction of the project (Lock, 2009). The project manager had

authority to allocate resources and direct team members to perform project tasks (Schaffer &Siegele, 2009). Hodge and Greeve (2011) investigated determinants of project success and found out that for the purpose of proper implementation of the project, an independent project team should be created with its own technical staff and management. Resources should also be assigned to the project team and the project manager given full authority to implement the project. All members of the team should report directly to the project manager. However, the study did not discuss the effect of other variables such as group dynamics management and project risks management on performance of infrastructure projects.

Guash (2012) study was on organization structure and its implications in managing infrastructure projects in Malaysia. The study covered 50 firms and found out that when projects were removed from functional divisions, the lines of communication were shortened. This enhanced the ability to make swift decisions. The study also noted that the establishment of project teams led to a high level of commitment from team members, hence effective and efficient performance of infrastructure projects. Further, project teams worked with strong power, more cohesion and individuals have clear responsibilities. In addition, projectized organizations also developed and maintained a pool of experienced staff due to their involvement in many similar projects. Bowman (2013) complemented the findings of the research done by Guash. Bowman indicated

that projectized organization structure model made it easier to manage projects because the whole structure focused on the projects.

2.4 Summary of Literature Review and Identification of Research Gap

Table 2.1 outlines various studies done by other scholars, their focus of study, key findings, research gap and the focus of the current study.

Table 2.1 Summary of Literature Review and Research Gap

Author(s)	Focus of the Study	Key Findings	Research Gap	Focus of the Current Study
Peter (2009)	To analyze the effects of delay of road infrastructure projects in Zambia.	-Management skills play a significant role in determining performance of road construction firms.	-Study failed to consider other variables like resource mobilization.	-Current study sought to incorporate moderation of government policy.
Lavasseur (2010)	-To examine the effects of organization structure in the management power projects Zambia.	-Adaptation of projectized structure fosters collaboration and speeds up decision making.	-Study did not consider other variables that determine performance of infrastructure projects.	-Current study sought to consider mediation effect of organization structure.
Nkandu, Rodrigo and Alberto (2010)	-To establish the effects of functional structure on implementation of infrastructure projects in South Africa.	Project managers and contractors are always in conflict over resource allocation and control of workers.	-Study assumed other variables that determine performance of infrastructure projects e.g project risks management.	-Current study sought to incorporate moderation by considering government policy.

Author(s)	Focus of the Study	Key Findings	Research Gap	Focus of the Current Study
Lehman and Dubrene (2011).	-To examine the factors that cause poor group dynamics in project teams in Washington D.C.	-Project managers to foster team spirit among project teams and discourage "black sheep effect".	-Study did not consider other variables that determine performance of Road projects.	-Current study sought to consider mediation effect on performance.
Richard (2011)	-To establish the impact of allocating authority and responsibility to project managers in Europe.	-Allocating full authority to project managers leads to delivery of successful projects.	-Study assumed other variables that determine performance of infrastructure projects e.g Group dynamics management.	-Current study sought to incorporate moderation by considering government policy.
Hodge and Greeve (2011)	To establish the determinants of infrastructure projects success in China.	-An independent project team should be created with its own technical staff. Resources are assigned to the project team.	-Study assumed other variables that determine performance of infrastructure projects e.g project risks management.	-Current study sought to incorporate moderation by considering government policy.
Graham and Mohamed (2012)	-To establish the role of technology in managing infrastructure projects in South Africa.	-Project success is majorly determined by the power and authority delegated to the project manager.	-Study did not consider other variables that determine performance of infrastructure projects.	-Current study sought to consider project management practices that affect performance of road projects.

Author(s)	Focus of the Study	Key Findings	Research Gap	Focus of the Current Study
Carter, (2012)	-To establish the factors leading towards realization of quality infrastructure in sub-saharan Africa.	-Financial and human resources are significant in determining the quality of infrastructure projects.	-Study failed to consider effect of monitoring and other variables that determine performance of infrastructure projects.	-Current study sought to consider project management practices that affect performance of road projects.
Bjarne, (2012)	-Organization structure and competitive advantage in Europe.	-Projectized structure has comparative advantage over functional and matrix structure	Study failed to consider effect of monitoring and other variables.	-Current study sought to incorporate moderation by considering government policy
Majanja (2012)	-To establish the financing constraints that hinder performance of construction firms in Kenya.	-Public-Private Partnerships was found to be statistically significant in funding infrastructure projects.	-Study failed to consider the effect of monitoring other variables that determine performance of infrastructure projects.	-Current study sought to consider project management practices that affect performance of road projects.
Mcrael (2013)	To determine the importance of managerial skills in managing infrastructure projects in Europe.	-Training in managerial skills was found to be significant in boosting the performance of infrastructure projects.	-Study failed to consider effect of monitoring other variables that determine performance of infrastructure projects.	-Current study sought to incorporate moderation by considering government policy.

Author(s)	Focus of the Study	Key Findings	Research Gap	Focus of the Current Study
David (2013)	-To determine secrets behind successful management of road projects in Columbia.	-Financial resources and technical expertise were found to be significant in determining project success.	-Study did not consider other variables that determine performance of road projects e.g project risks management.	-Current study sought to consider project management practices that affect performance of road projects.
Harries and Reyman (2013)	-To establish the constraints and problems that hamper Monitoring and evaluation of projects in Central Europe.	-weak culture of discussing and using the results of monitoring and evaluation and insufficient technical resources monitoring of projects.	-Study did not consider other variables that determine performance of infrastructure projects e.g management of group dynamics.	-Current study sought to incorporate project management practices and moderation by considering government policy.
Burges and stern(2013)	To establish the efficient methods of managing project teams in Egypt.	-Adequate and timely planning of personnel is significant in preventing cost overruns in road infrastructure projects.	-Study did not consider other variables that determine the performance of infrastructure projects e.g group dynamics.	-Current study sought to consider project management practices that affect performance of road projects.

Author (s)	Focus of the Study	Key Findings	Research Gap	Focus of the Current Study
Gitenya and Ngugi (2013)	-To establish the determinants of performance of housing projects in Nairobi, Kenya.	- Lack of financial resources was found as a key factor affecting performance of housing projects.	-Study did not consider other variables such as project risks management.	-Current study to incorporate moderation by government policy
Leyman (2013)	-To establish the effect of competency development in large Swedish organizations.	-Availability of staff with the skills required to perform a task in road infrastructure projects is significant.	-Study did not consider other variables that determine performance of road infrastructure projects e.g monitoring.	-Current study sought to consider project management practices that affect performance of road projects.
Fox (2013)	-To establish the implications of modern tools and techniques in the management of infrastructure projects in China.	- Use of modern machinery and technology can drastically improve the quality of the infrastructure projects.	-Study did not consider other variables such as management of group dynamics.	-Current study sought to incorporate moderation by considering government policy.

Author(s)	Focus of the Study	Key Findings	Research Gap	Focus of the Current Study
Daniels (2014)	- To establish the effectiveness of matrix organization structure on performance of projects India.	- Matrix structure caused tensions between the functional manager and project manager.	Study did not consider other variables e.g. monitoring.	-Current study to consider project management practices.
Zwikael (2014)	-To examine the relationship between matrix and projectized organization structure in Malaysia.	-Project manager must negotiate and consult with the departmental managers.	Study did not consider other variables such as project risks management.	-Current study to incorporate moderation by government policy

2.5 Conceptual Framework

Project resource mobilization, monitoring and evaluation, group dynamics management and project risks management are the key factors that were identified in determining the performance of infrastructure projects (Skeggs, 2011; Ugwa and Heupt, 2013). The study considered the above factors in establishing the extent to which each contributed to the performance of road infrastructure projects. The relationship between variables as envisaged by the study is shown in the figure 2.1.

Organization for Economic Cooperation and Development (2008) and Zhoe, (2013) indicated that composite measure is increasingly becoming a popular measure of performance of infrastructure projects. The study adopted this approach to measure performance of road infrastructure projects. Project resource mobilization was broken down into financial resources, modern machinery and equipment and training of staff. Financial resources enable a firm to acquire the physical and technical equipment and also meet the operating costs. Availability of trained staff will enable the firm to undertake project activities in a precise, efficient and effective manner. Thus, these factors are key in the performance of road infrastructure projects.

The indicators of M&E were identified as frequency of conducting M&E activities, M&E tools and skills of M&E officers. These factors play an important role in determining the performance of road infrastructure projects. The indicators of group dynamics management were; number of project teams, blocking behavior by some team members and black sheep effect behavior. These factors also determine whether the project will be indicated as having good performance on poor performance.

Under project risks management; organizational risks, political risks and technical risks were identified as factors that play a key role in the performance of road infrastructure projects. Political risks occur where a person gets a road contract

due to political connections and this can affect the performance of road infrastructure projects since the person may not have the technical expertise required in road construction. Also, failure to have technical experts to help in risk identification, risk analysis and taking appropriate steps to mitigate the risks can affect the performance of the road infrastructure projects.

Mediation effect of organization structure can also affect the performance of road infrastructure projects. The main organization structures that a firm can adopt are: functional organization structure, matrix organization structure and projectized organization structure. The study sought to establish the extent of effect of these structures on the performance of road infrastructure projects. Under moderation the study investigated the role of government policies, laws and regulations in determining the performance of road infrastructure projects.

Project performance is central to the success of any projects. This performance of infrastructure projects can be measured by factors such as completing a project within the budgeted cost, scheduled time and the extent to which the project meets the expected quality.

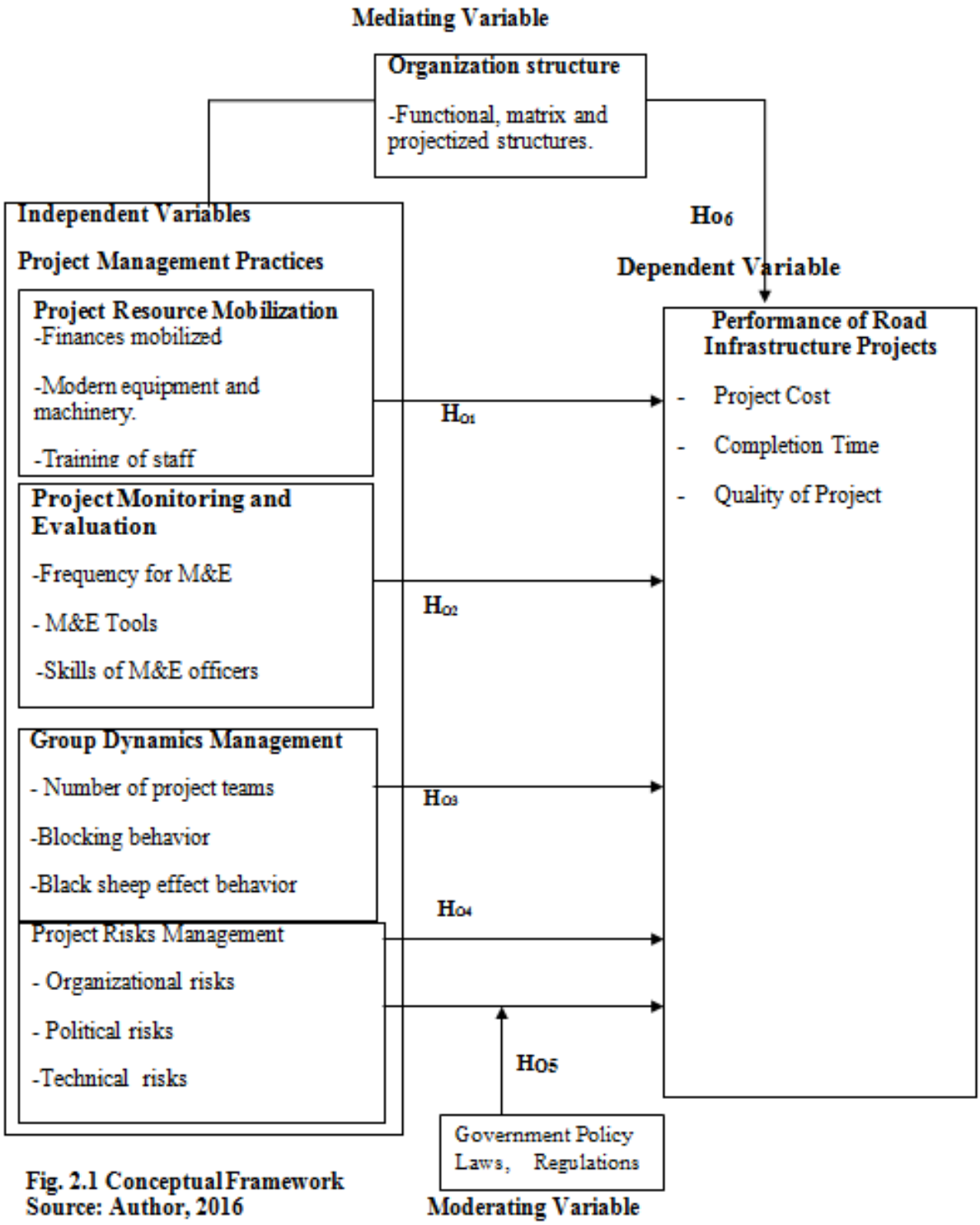


Fig. 2.1 Conceptual Framework
Source: Author, 2016

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the procedure that was followed to conduct the study. It begins with research philosophy, research design, target population, the sample size and sampling techniques and data collection instruments. It also presents validity and reliability of instruments, data collection procedure and data processing and analysis techniques and ethical considerations.

3.2 Research Philosophy

Research philosophy is described as a paradigm which involves a broad framework that comprises perceptions, beliefs and understanding of several theories and practices that are used to conduct research (Olive & Abel, 2014). Research philosophy was very important in the development of the research background and research knowledge (Saunders &Thornhill, 2007). Furthermore, research philosophy enabled the researcher to understand the assumptions behind the research tools used.

This study adopted a positivism framework where data was collected and analyzed to gain an understanding of the issues underlying performance of road infrastructure projects. Positivists assume that reality is fixed, directly measurable

and knowable (Ahmed, 2009). In the positivist paradigm, the researcher sees himself as a neutral recorder. Therefore, different researchers using the same instruments should reach the same conclusion. Positivists judge research in terms of its validity, that is, the extent to which their research tools do actually measure the underlying concept that they are supposed to measure (Miller &Lessard, 2011). Positivists design their work to test their hypothesis. They focus more on testing theories hence require thorough examination of prior literature.

This philosophy was complemented by deductive research approach. In deductive approach, a researcher begins with a theory and tests its implications with data. A researcher reviews existing theories and what has been done by other people and then tests the hypotheses that emerge from the theories (Tiwana, 2009).

3.3 Research Design

Mugenda and Mugenda (2008) and Saunders, *et al.*(2007) noted that optimal results of the study are achieved by using more than one approach. The study employed both the descriptive and explanatory research design based on a survey to establish the effect of project management practices on the performance of road projects constructed in the Lake Basin Region by local firms. Descriptive research design based on a survey was appropriate to this study because it uses quantitative approach to data collection, analyses and reporting of project management practices and project performance variables. It was also economical in the

collection of quantitative data from a sizeable population (Mugenda & Mugenda, 2008). In addition, as noted by Saunders, *et al.*(2007) survey method is perceived as authoritative by researchers since it allows use of both descriptive and inferential statistics in data analysis. Explanatory research enabled the researcher to establish causal relationships between project management practices and performance of road projects.

3.4 Empirical Model

The Multiple regression models was used in this study because it allowed the researcher to control for many other factors that affect the dependent variable simultaneously (Gujarati, 2007). This is both important for evaluating policy effects and testing economic theories when relying on non-experimental data. Multiple regression analysis was also used to build appropriate models to predict the dependent variable (Gujarati, 2007).

The model for the relationship between independent and dependent variables is expressed as follows:

$$PRI = \beta_0 + \beta_1 RM + \beta_2 ME + \beta_3 GD + \beta_4 PRM + \mu \quad \text{.....Model 3.1}$$

Where;

β_0 is the intercept; β_1, β_2, β_3 and β_4 are regression coefficients.

PRI is the Composite Index for the Indicators of Performance of Road Infrastructure projects.

RM is the composite index for Resource Mobilization

ME is the composite index for Monitoring and Evaluation

GD is the composite index for Group Dynamics

PRM is the composite index for Project Risks Management and

$\boldsymbol{\mu}$ is the error term.

Composite indices were computed by obtaining the mean aggregate for each of the variables.

3.4.1 Moderation Effect Model

The effect of the moderating variable on the independent and dependent variables is characterised statistically as an interaction (Baltagi, 2005). The study sought to determine the moderation effect of the government policy on the relationship that exist between project management practices and performance of road projects by local firms in Kenya by applying the Sobel-Goodman moderation test. This test was appropriate while testing for moderation and it was done by regressing road infrastructure performance on the composite index of project management practices. To determine the moderation effect of the government policy on the relationships between project management practices on the performance road projects in the Lake Basin Region, Kenya, the study specified the equation as follows:

$$PRI = \beta_0 + \beta_1 MP + \beta_2 GP + \beta_3 (MP \times GP) + \mu$$ ……Model 3.2

Where:

PRI is the composite index for Performance of Road Infrastructure projects,

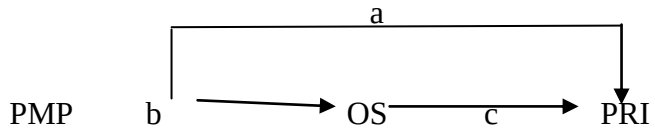
MP is the composite index for Project Management Practices and

GP is the composite index of indicators of Government Policy.

Decision criteria for the moderation: If β_3 is significant then government policy is a significant determinant of Performance of Road Infrastructure projects.

3.4.2 Mediating Effect Model

A mediator is a variable that explains the nature of the relationship between independent and dependent variables. The study sought to determine the mediation effect of organization structure on the relationship between project management practices and performance of road projects constructed by local firms by applying Baron and Kenny mediation test (1986). The test proposes four steps to be followed in which several regression analyses are conducted. At each step, significance of the coefficients was examined.



Step 1

A simple regression analysis with Project Management Practices predicting Performance of Road Infrastructure (PRI) was conducted to test whether PMP was a significant predictor of PRI as indicated by path a.

The model was:

$\boldsymbol{PRI} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}$ PMP.....Model 3.3

If $\boldsymbol{\beta_1}$ was significant then project management practices was a significant determinant of PRI.

Step 2

A simple regression analysis with Project Management Practices predicting Organization structure was conducted to test whether PMP was a significant predictor of OS as indicated in path b. The model was:

$\boldsymbol{OS} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}$ PMP.....Model 3.4

If $\boldsymbol{\beta_1}$ was significant in the model, then project management practices was a significant determinant of OS.

Step 3

A simple regression analysis with Organization structure predicting Performance of Road Infrastructure was conducted as indicated by path c.

$$\boldsymbol{PRI} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\text{OS} + \boldsymbol{e} \quad \text{.....Model 3.5}$$

If one of the $\boldsymbol{\beta_1}$ in the models 3.3, 3.4 and 3.5 was not significant, then mediation was not possible. If they were significant, we proceeded to step 4.

Step 4

Multiple regression with PMP and OS predicting PRI was conducted.

$$\boldsymbol{PRI} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\text{PMP} + \boldsymbol{\beta_2}\text{OS} + \boldsymbol{e} \quad \text{.....Model 3.6}$$

If the effect of OS remained significant when PMP was controlled, it indicated some form of mediation. If PMP was not significant when OS was controlled, then this indicated full mediation. If both PMP and OS significantly predicted PRI, then this would be a case of partial mediation.

3.5 Diagnostic Tests

Diagnostic checks and tests were done to test for statistical problems and to ensure compliance with the Classical Linear Regression Model (CLRM) assumptions. This was done to avoid parameter estimates being biased, inefficient and inconsistent (Gujarati, 2003). Diagnostic tests included: homoscedasticity, multi-collinearity and normality.

3.5.1 Homoscedasticity

Homoscedasticity assumes equal variance of μ_i for all the observations. Presence of heteroscedasticity would render the statistical inference based on variance biased and t statistic and F statistic would be inappropriate and could result in erroneous conclusions. This problem was tested using Modified Wald Test for group wise heteroscedsticity. The problem could be addressed by obtaining white's heteroscedsticity corrected standard errors of ordinary least squares estimators. Statistical inference could then be conducted based on these standard errors (Gujarati, 2004, Brooks, 2008).

3.5.2 Multicollinearity

Multicollinearity assumes that there exists a non- linear relationship among explanatory variables of a regression model. Multicollinearity makes it difficult to separate the effect of each of the explanatory variables. The magnitude of multicollinearity was analyzed by considering the size of Variance Inflation Factor (VIF). If the VIF of a variable was more than 10, that variable was said to be highly collinear. One could also use Tolerance (TOL) as a measure of multicollinearity. Multicollinearity can be solved by dropping the highly collinear variables which often makes the other variables statistically significant (Gujarati, 2004 & Brooks, 2008).

3.5.3 Normality

Normality is the assumption that the error term is normally distributed with a mean of zero and a constant variance. A test of significance can only be conducted when the data has a normal distribution. Test of normality of residuals was conducted based on Kolmogorov-Smirnov Test. Non-normality can be reduced by removing outliers, transforming the data so that its distribution is nearly normal, using other standard distributions to replace the normal distribution as models or using modern bootstrap methods and permutation tests that do not require normality or any other form of sampling distribution (Gujarati, 2004 & Brooks, 2008).

3.6 Operationalization and Measurement of Variables

The variables of the study were constructed as explained below:

Table 3.1 Operationalization and measurement of Variables

Category	Variable	Operationalization	Measurement	Measurement Level
Dependent Variable	Performance of Road Infrastructure Projects	Budgeted Cost Time Schedule Project Quality	Extent to which adherence to budgeted cost and time affect performance of road projects in a scale of 1-5.	Interval

Category	Variable	Operationalization	Measurement	Measurement Level
Independent Variables: Management Practices.	Resource Mobilization	- Financial, Physical, human and technological resources	-Extent to which financial, physical, human and technological resources affect performance of road infrastructure projects in a scale of 1-5.	Interval
	Project Monitoring and Evaluation	-Frequency of M&E - M&E Tools -Skills	-Extent to which frequency of M&E and M&E tools affect performance of road projects in a scale of 1-5.	Interval
	Project Group Dynamics	-Number of project teams -Blocking behavior -Black sheep behavior	-Extent to which team work and efficiency affect performance of Road projects in a scale of 1-5.	Interval
	Project Risks Management	-Political risks -Technical risks	-Extent to which financial, legal and technical risks affect performance of road projects in a scale of 1-5.	Interval
	Government Policy	-Laws -Policies and Regulations.	-Extent to which frequency of changes in laws, policies and regulations affect performance of road projects in a scale of 1-5.	Interval

Category	Variable	Operationalization	Measurement	Measurement Level
	Organization Structure	-Functional, Matrix and Projectized structures.	-Extent to which involvement of functional and project managers affect performance of road projects in a scale of 1-5.	Interval

Source: Researcher (2017)

3.7 Target Population

The target population comprised of 41 road infrastructure projects in the Lake Basin Region that were constructed by local construction firms between 2011 and 2016. Most road infrastructure projects take 3-6 years to complete hence the choice of 6 year period (RoK, 2010). According to information obtained from county public works headquarters, a total of 41 road projects were constructed by local firms during that period.

Table 3.2 Target population

COUNTY	NO. OF PROJECTS	CATEGORY OF RESPONDENTS	NO. OF RESPONDENTS
Siaya	7	Project managers Contractors Public works officers	4 4 4
Migori	6	Project managers Contractors Public works officers	4 4 3
Kisumu	10	Project managers Contractors Public works officers	5 5 5
Homa Bay	5	Project managers Contractors Public works officers	3 3 3
Kisii	8	Project managers Contractors Public works officers	5 5 4
Nyamira Government	5	Project managers Contractors Public works officers M&E officers from national government and local leaders	4 4 3 25
	41		95

County Public Works Hqs and KENHA(2017)

3.8 Sampling Design and Procedure

A census of the 41 road projects was carried out. The census technique was more appropriate to the road infrastructure projects under study because they were relatively few and therefore, it was possible to include all of them in the study (Saunders 2007). The technique was suitable for the study because if sampling was to be used and there was poor response, it would have greatly affected data analysis. Project managers, project contractors, one county public works officer from each county, one local leader from each county and five national government road engineers formed part of the respondents giving a total population size of 95 respondents. These respondents are considered to have a better understanding of the variables under study in their respective counties.

3.9 Data Collection Instruments

Primary data was collected through semi structured questionnaires administered to the respondents to provide information on the completed road projects. The questionnaires were used because they are easy to administer and the respondents would fill the required data in the absence of the researcher. Reyman and Harries (2008) and Leung Xha, (2014) suggest that it is appropriate to collect data from large samples using structured questionnaires. Lehman and Dubrene (2011) and Burges and Stern (2013) also noted that it is easier to analyze data collected using questionnaires.

3.9.1 Pilot Study

A pilot study was carried out prior to the actual data collection to establish the face validity and content validity of the main research tool, the questionnaire. Three project managers and three project contractors were selected at random from the Western region for pilot testing. The pilot study aimed at finding out whether the questions were understood by the respondents, questionnaire was arranged in a sequence that was logical and easy to follow and whether the questions were relevant.

3.9.2 Validity

In this study content validity was checked by using three project contractors and three project managers. They were each given a questionnaire and asked to rate each of the questions on the extent to which it measured what was intended. The identification of the experts was in line with the recommendations of Lynn (1986). Using the content validity index, the data collection instrument was found to measure what was intended. After the validity tests the research instrument was further reviewed and updated. To ensure face validity and criterion validity the questionnaire was constructed based on the recommendations other studies such as Becker (1997).

3.9.3 Reliability

Cronbach's alpha coefficient of internal consistency was used to test reliability of this study because it provides a unique quantitative estimate of the internal consistency of a scale (Mugenda & Mugenda, 2003). Cooper and Schindler (2003) argued that a Cronbach's alpha value of above 0.50 is regarded as a good indication of reliability of the research instruments and is considered acceptable in most social science research. The results of the pilot study achieved a Cronbach's alpha value of 0.72.According to Jackson (2009), an alpha value of greater than 0.70 indicates strong internal consistency of the research instrument. In this study, an alpha of 0.70 was the cut-off point.

3.9.4 Data Collection Procedure

A research approval letter was obtained from the Graduate School of Kenyatta University. This letter was forwarded to the National Commission for Science, Technology and Innovation (NACOSTI) which granted the research authorization and permit. Data was collected using semi-structured questionnaires. The researcher gave each respondent the questionnaire, introductory and a copy of the research authorization letter. The respondents were expected to voluntarily provide data and confidentiality of the information provided was guaranteed.

3.10 Data Analysis and Presentation

Diagnostics tests of heteroscedasticity, multicollinearity and normality were carried out first prior to data analysis. Qualitative data was analyzed through content analysis where common themes were grouped together as recommended by Coopers and Schindler (2007). Content analysis helps to bring issues into the fore that would not have otherwise been captured through the use of structured questions in the questionnaire. The results are reported in chapter four of this study. Quantitative data was analysed by using descriptive and inferential statistics. Under descriptive statistics frequencies, mean and standard deviation were used. Multiple regression analysis was done to determine the effect of each independent variable and its effect on the performance of road infrastructure projects (Gujarati, 2007). Confidence level was taken at 95 percent. The information was presented using tables and statistical parameter estimates.

3.11 Ethical consideration

Ethical requirements were considered before commencement of data collection. Permission was sought from the relevant authorities and respondents were informed that participation in the research was voluntary. Each participant filled and signed a consent form as an indication of agreeing to participate in the research. The participants were assured that the research was purely for academic purpose.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results, interpretation and discussions of the study. It covers the general background information on the respondents' gender, age bracket, educational level and years worked in the organization. The chapter explains the response rate and the descriptive statistics on performance of road infrastructure projects. Inferential statistics are also presented and discussed in relation to the literature reviewed.

4.2 Response Rate

Out of the 95 questionnaires distributed to the respondents, 85 were correctly filled and returned. This represented a response rate of 89.5percent. Bayman and Bell (2007) argued that a response rate of 50 percent is good for most academic studies while a response of 70 percent is very good. The response in this study was therefore considered sufficient for conducting data analysis and drawing conclusions and recommendations (Saunders et al, 2007).

4.3 Demographic Characteristics

4.3.1 Distribution of Respondents by Gender

The study sought to find out the distribution of respondents by gender. Results show that 68.2 percent of the respondents were male while 31.8 percent were female. This implies that majority of the people working in the road construction sector are males. Females were fewer than male because construction of road infrastructure projects is very tedious and requires a lot of energy. Table 4.1 presents the distribution of the respondents by gender.

Table 4.1 Distribution of Respondents by Gender

Gender	**Response**	**Percentage**
Male	58	68.2
Female	27	31.8
Total	**85**	**100**

Source: Survey, 2017

4.3.2 Age of Respondents

The study also sought to find out the age of the respondents that worked in the road infrastructure sector. Age of the respondents was an important factor in

determining the productivity of the workers. Table 4.2 presents the distribution of the respondents by age.

Table 4.2 Distribution of Respondents by Age

Age Bracket	**Response**	**Percentage**
Less than 24 years	8	9.4
25 to 29 years	11	12.9
30 to 39 years	39	45.9
40 to 49 years	17	20.0
Over 50 years	10	11.8
Total	**85**	**100**

Source: Survey, 2017

The results show that many of the respondents were aged between 30 years and 49 years (65.9 percent). It was also noted that 9.4 percent were less than 24 years, 12.9 percent were between 25 to 29 years, 45.9 percent were between 30 and 39 years, 20.0 percent were between 40 to 49 years and 11.8 percent were over 50 years. This implies that majority of the people who work in the road construction sector lie between 30 to 49 years old. This group comprises of energetic and experienced people and is therefore is expected to complete road projects within the time schedule and attain the desired quality standards.

4.3.3 Respondents' Education Level

The study sought to find out the respondents' education level. This factor was critical because it could determine not only the accuracy of the responses given by the respondents but also their ability to manage projects of high quality. The results are presented in Table 4.3.

Table 4.3 Respondents' Education Level

Education Level	Response	Percentage
Basic Education	14	16.5
Certificate	29	34.1
Diploma	25	29.4
First Degree	12	14.1
Masters and Above	5	5.9
Total	**85**	**100**

Source: Survey, 2017

Table 4.3 indicates that 16.5 percent of the respondents had basic education, 34.1percent were holders of certificate courses, 43.5percent attained Diploma and first degree and 5.9 percent of the respondents had masters degree and above. This shows that most of the respondents were well educated with 83.6 percent

having certificate courses and above. This implies that respondents were well informed on the performance of road infrastructure projects.

4.3.4 Respondents' Work Experience

The study sought to find out the respondents' work experience in the road infrastructure sector. Experience of the respondents in road infrastructure is crucial in determining completion time and quality of the projects. Table 4.4 presents the respondents' work experience.

Table 4.4 Respondents' Work Experience

Work Experience	**Response**	**Percentage**
5 years and Below	13	15.3
6 to 10 years	27	31.8
11 to 15 years	20	23.5
16 to 20 years	16	18.8
Over 20 years		10.6
Total	**85**	**100**

Source: Survey 2017

On work experience of the respondents, 52.9 percent had worked in the road construction industry for more than 10 years. This implies that most respondents

had wide knowledge on performance of road infrastructure projects and the challenges facing the sector. Respondents' work experience was useful in explaining the competence of the respondents in constructing road infrastructure projects.

4.4 Descriptive Analysis Results

4.4.1 Performance of Road Infrastructure Projects

Two questionnaires were designed to measure performance of road infrastructure projects and effect of project management practices on performance respectively. Two analyses were done for the two separate questionnaires of independent and dependent variables. In the case of performance of road infrastructure projects information was obtained on the scope of road infrastructure projects constructed by local firms. Road projects are classified as small scope if the budgeted cost is less than 5000 US dollars. Those projects whose budgeted cost is between 5000-10,000 US dollars are classified as medium road projects. Projects that cost over 10,000 US dollars are classified as large projects (World Bank, 2010). Table 4.5 shows the scope of road infrastructure projects constructed by local firms in the Lake Basin Region, Kenya.

Table 4.5: Scope of Road Projects

Name of County	Small Scope	Medium and Large	Percentage of Medium and Large Road Projects.
Siaya	5	2	28.6
Migori	4	2	33.3
Kisumu	6	4	40.0
Homa Bay	3	2	40.0
Kisii	5	3	37.5
Nyamira	3	2	40.0
Total	**26**	**15**	**36.6**

These results show that 36.6 percent of the road projects constructed by local firms were either of medium or large scope and 63.4 percent were small scope. This implies that many of the road infrastructure projects constructed by local firms were small in scope.

Completion of road infrastructure projects within the budgeted cost is used to measure the performance of road projects. Table 4.6 indicates the number of road

infrastructure projects that were completed within the budgeted cost, those that were not completed within the budgeted cost and the percentage of road projects completed within budgeted cost in the Lake Basin Region.

Table 4.6: Road Projects Completed within Cost

Name of County	**Within Cost**	**Exceeded Cost**	**Percentage of Road Projects Completed within Cost**
Siaya	2	5	28.6
Migori	2	4	33.3
Kisumu	3	7	30.0
Homa Bay	1	4	20.0
Kisii	2	6	25.0
Nyamira	2	3	20.0
Total	**12**	**29**	**29.3**

Source: Public Works, County Hqs (2017)

The results indicate that only 29.3 percent of the road projects constructed by local firms were completed within their budgeted cost. Completion of road projects within the scheduled time is important indicator of performance of road projects. Table 4.7 shows the number of road projects that were completed within the scheduled time and those that exceeded the scheduled time in the Lake region.

Table 4.7: Road Projects Completed within Time Limit

Name of County	**Within Scheduled Time**	**Exceeded Scheduled Time**	**Percentage of Road Projects Completed within time.**
Siaya	3	2	60.0
Migori	2	4	33.3
Kisumu	4	6	40.0
HomaBay	2	3	40.0
Kisii	3	5	37.5
Nyamira	2	3	40.0
Total	**16**	**25**	**39.02**

Source: Public Works, County Hqs. (2017)

The information shows that 16 road infrastructure projects were completed within the scheduled time while 25 road infrastructure projects suffered form time overruns. Thus only 39.02 percent of the road projects constructed by local firms were completed within the scheduled time.Table 4.8 shows the number of road infrastructure projects constructed by local firms in the Lake Basin Region that attained the desired quality and those that did not attain the desired quality. The results show that a total of 15 road infrastructure projects in the counties under study attained the desired quality standards while 26 road projects did not. This shows that only 36.6 percent of the road projects constructed by local firms met the desired quality implying that majority of the road infrastructure projects did not meet the expected standards.

Table 4.8 shows the number of road infrastructure projects constructed by local firms in the Lake Basin Region that attained the desired quality and those that did not attain the desired quality.

Table 4.8: Quality of Road Projects Constructed by Local Firms

Name of County	No. of High Quality Road Projects	No. of Low Quality Road Projects	Percentage of High Quality Road Projects.
Siaya	2	3	40.0
Migori	3	3	50.0
Kisumu	4	6	40.0
Homa Bay	2	3	40.0
Kisii	3	5	37.5
Nyamira	1	4	20.0
Total	**15**	**26**	**36.6**

The results show that a total of 15 road infrastructure projects in the counties under study attained the desired quality standards while 26 road projects did not. This shows that only 36.6 percent of the road projects constructed by local firms met the desired quality implying that majority of the road infrastructure projects did not meet the expected standards. The quality of road projects is an important indicator of performance. The study also sought to find out from respondents the

performance of road infrastructure projects in terms of completion within the budgeted cost, time schedule and whether the required standards were attained. The responses are shown in Table 4.9.

Table 4.9 Performance of Road Projects

Extent to which local firms were able to:	**V. Little Extent %**	**Little Extent %**	**Average Extent %**	**Great Extent %**	**V. Great Extent %**	**Mean**	**SD**
Complete projects within the budgeted cost.	42.9	21.4	14.3	14.3	7.1	1.979	1.280
Complete projects within the time limit.	21.4	50.0	7.1	14.3	7.1	2.375	1.214
Complete road projects that attain desired quality.	14.3	42.9	21.4	14.3	7.1	2.25	0.758
Aggregate Value for performance of road projects.	_	_	_	_	_	2.201	1.084

Source: Survey, 2017

The results indicates the results obtained from the respondents who were asked the extent to which road projects constructed by local firms were completed within the budgeted cost; 42.9 percent indicated to a very little extent, 21.4

percent said little extent, 14.3 percent indicated average extent, 14.3 percent indicated great extent and 7.1 percent said to a very great extent. The findings show that majority of the respondents (64.3 percent) indicated that road projects constructed by local firms were not completed within the budgeted cost to a great extent. Only 21.4 percent of the respondents indicated that road projects undertaken by local firms were completed within the budgeted cost to a large extent. The mean for this characteristic was 1.979 with a standard deviation of 1.28. This implies poor performance of road infrastructure projects that are constructed by local firms. Performance is said to be good if the mean of the variable is 5.0 and above. A mean of 7.0 and above indicates high performance of road infrastructure projects.

Table 4.9 also the results from respondents on the extent to which road projects were completed within the time limit. Their responses were; 21.4 percent of the respondents indicated very little extent, 50.0 percent little extent, 7.1 percent average extent, 14.3 percent great extent and 7.1 percent of the respondents indicated very great extent. From these findings, majority of the respondents (71.4 percent) indicated that road projects constructed by local firms are not completed within the scheduled time. The mean for this characteristic was 2.375 while the standard deviation was 1.214 which implied poor performance.The study also obtained information on the quality of road infrastructure projects.

Furthermore, the respondents were asked as to what extent road projects constructed by local firms met the desired quality standards, 21.4 percent of the respondents indicated very little extent, 42.9 percent little extent, 14.3 percent average extent, 14.3 percent great extent and 7.1 percent very great extent. From these findings, majority (64.3) of the respondents indicated that most road projects done by local firms did not meet the desired quality standards. Only 21.4 percent of the respondents felt that the constructed road projects met the desired quality standards. The mean for this characteristic was 2.25 and the standard deviation was 0.76. The implication of these findings is that most road infrastructure projects done by local firms do not meet clients' satisfaction. The aggregate value for performance of road infrastructure projects constructed by local firms was 2.201 and the standard deviation was 1.084. This implied poor performance of the road infrastructure projects.

Respondents were also asked to state other factors that hindered better performance of road projects undertaken by local firms. Majority of the respondents cited shortage of skilled labour locally, unsuitable leadership and incompetence of contractors. When asked on measures that can be put in place to improve performance of road projects undertaken by local firms, the respondents indicated; enhancing supervision, adequate funding and establishment of more equipped technical institutions that offer building and construction skills.

4.4.2: Resource Mobilization and Performance of Road Infrastructure Projects

The study sought to determine the effect of resource mobilization on performance of road infrastructure projects in the Lake Basin Region undertaken by local firms in Kenya. The responses are presented in Table 4.10which indicates that; 5.9 percent of the respondents reported that local firms mobilized financial resources to a very little extent, 37.8 percent a little extent, 31.1 percent average extent, 15.6 percent a great extent and 8.9 percent indicated very great extent. Cumulatively majority of the respondents (74.8 percent) indicated that local firms were unable to mobilize adequate financial resources for constructing road projects. The aggregate mean and standard deviation for this characteristic was 2.102 and 0.91 respectively. The implication of this was poor performance of road projects constructed by local firms. The study noted that; majority of the local firms were unable to mobilize the financial, physical and technical resources.

Table 4.10: Project Resource Mobilization and Performance

	V. Little Extent %	Little Extent %	Average Extent %	Great Extent %	V. Great Extent %	Mean	SD
Mobilization of financial resources	5.9	37.8	31.1	15.6	8.9	3.521	1.28
Acquisition of trained staff.	4.4	22.2	35.6	28.9	8.9	2.57	1.01
Acquisition of technical equipment	6.7	51.1	13.3	17.8	11.1	1.28	1.04
Acquisition of adequate machinery	2.2	44.4	28.9	17.6	6.7	1.04	0.97
Aggregate Value for resource mobilization.	–	–	–	–	–	2.102	0.91

Source: Survey (2017)

Acquisition of trained staff for constructing road projects is very crucial to the performance of road infrastructure projects. When respondents were asked

whether their respective firms were able to acquire trained staff with relevant skills, their responses were as follows; 4.4 percent indicated to a very little extent, 22.2 percent a little extent, 35.6 percent average extent, 28.9 percent a great extent and 8.9 percent reported a very great extent. The mean and standard deviation for this characteristic was 2.57 and 1.01 respectively. These findings show that majority of respondents (62.2 percent) reported that many local firms were unable to acquire the necessary trained manpower required in the construction of road projects. This aspect impacts negatively on the performance of road projects.

Respondents were also asked as to whether their respective firms were able to acquire the technical equipment required in constructing road projects. The responses were; 6.7 percent indicated to a very little extent, 51.1 percent indicated a little extent, 13.3 percent average extent, 17.8 percent a great extent and 11.1 indicated a very great extent. Cumulatively 71.1 percent of the respondents reported that local firms had no capacity to acquire the necessary technical equipment for constructing road projects. Only 28.9 percent of the respondents were of the view that local construction firms have the ability to acquire technical equipment required such as escavators, shovel, graders and other equipment. The mean and standard deviation for this characteristic was 1.28 and 1.04 respectively. This implies inability by local firms to access the necessary equipment for road

construction. This scenario has led to poor performance of road projects done by local firms.

When respondents were asked whether their firms had adequate number of machinery such as tippers to carry construction materials, their responses were; 2.2 percent indicated to a very little extent, 44.4 percent little extent, 28.9 average extent, 17.6 great extent and 6.7 percent of the respondents reported that local firms were able to acquire these machinery to a very great extent. From these findings, it can be noted that 75.5 percent of the respondents reported that local firms were unable to acquire adequate machinery and other equipment required in constructing road projects. Only 24.3 percent of the respondents were of the view that local firms were able to acquire adequate machinery. The mean and standard deviation for this characteristic was 1.04 and 0.97 respectively. This implies that road projects constructed by local firms are likely to experience delays due to inadequate machinery. In general, 73.3 percent of the respondents indicated that resource mobilization is crucial for better performance of road infrastructure projects. The mean for this characteristic was 3.979

The respondents were also asked to enumerate other challenges facing local firms when constructing road projects. 15.6 percent of the respondents cited incompetence of contractors, 11.1 percent indicated breakdown of equipment, 17.7 percent shortage of highly skilled labour, 35.6 percent proper planning and

utilization of resources and 20 percent of the respondents indicated incompetence in technology. The respondents suggested that construction firms should partner with the government and private sector so as to enhance resource mobilization.

On the question whether their firms applied technology in constructing road infrastructure projects, 37.9 percent of the respondents answered in affirmative while 52.1 percent indicated that technology was not applied. Ten percent of the respondents were uncertain. This implies that local firms are likely to experience challenges in completing road projects within the required time and attain the desired quality.

4.4.3 Project Monitoring and Evaluation and Performance of Road Infrastructure Projects

The study collected information on the effect of project monitoring and evaluation on performance of road projects constructed by local firms in the Lake Basin Region. The responses were as presented in Table 4.11.

Table 4:11 Monitoring and Evaluation and Performance

	V. Little Extent %	**Little Extent %**	**Average Extent %**	**Great Extent %**	**V. Great Extent %**	**Mean**	**SD**
Conducting M&E activities on regular basis.	2.2	33.3	42.2	8.9	13.3	2.69	1.014
Allocation of financial resources for M&E activities.	6.7	46.7	28.9	11.1	6.7	3.56	0.848
Acquisition of staff with relevant skills for M&E activities.	2.2	44.4	28.9	17.6	6.7	3.38	1.024
Aggregate Value of M&E.	_	_	_	_	_	3.210	0.964

Source (2017)

Cumulatively 77.6 percent of the respondents indicated that monitoring and evaluation activities on road projects were not conducted regularly while 22.2 percent indicated that it was conducted regularly. The mean and standard deviation for this characteristic was 2.69 and 1.01 respectively. The responses

show that majority of project managers and supervisors did not conduct M&E activities on the road projects. Some of the road projects where monitoring and evaluation was not conducted regularly include Matongo- Nyakaranga Road, Kijauri- Nyansiongo- Manga Road, Mariba- Nyagancha Road and Oyugis- Rangwe Road. Road projects where M&E activities were done regularly included Kisumu- Bondo Road and Kisii- Ahero Road. Harold (2013) indicated that M&E activities are important as they help project contractors and managers to improve the performance of their projects.

Regarding the question on whether local firms allocated sufficient resources for M&E of road projects, the responses were: 16.7 percent of the respondents indicated to a very little extent, 46.7 percent a little extent, 18.9 percent average extent, 11.1 percent great extent and 6.7 indicated a very great extent. The mean for this characteristic was 3.56. Examples of road projects where respondents indicated very little or little extent were: Magenche-Mariba and Ndori-Nyangoma. Examples of roads projects where respondents indicated that sufficient financial resources were provided for M&E activities were Kenyenya-Riokindo Road and Oyugis- Kindu Bay road. Cumulatively, 62.4 percent of the respondents indicated that there was no allocation of sufficient financial resources towards M&E of road activities. This implies that project contractors and managers were not able to monitor road projects during construction. Lawrence

(2014) noted that timely, regular and reliable monitoring and evaluation system on infrastructure projects is key in determining the performance of projects.

When asked whether local firms were able to acquire staff with relevant skills for M&E activities in road projects; 13.3 percent of the respondents indicated very little extent, 51.1 percent little extent, 24.4 percent average extent, 6.7 percent great extent and 4.4 percent of the respondents indicated very great extent. The mean and standard deviation for this characteristic was 3.38 and 1.024 respectively.These findings show that majority of the respondents (64.4.2 percent) indicated that local firms were not able to acquire the right staff to conduct M&E activities. The importance of having competent M&E officers is supported by Leung Xha (2014) study on effect of M&E on infrastructure projects.

Respondents were also required to state whether M&E activities can improve the quality of road projects and their responses were; 71.5 percent indicated that M&E activities can improve the quality of road projects, 20.3 percent reported it may not improve and 8.2 percent of the respondents were not sure. The mean and standard deviation for this characteristic was 4.42 and 0.964 respectively. These findings show that majority of the respondents understood the importance of M&E activities on infrastructure projects. The respondents also noted that financial resources allocated to M&E were insufficient and this contributed to poor performance of road infrastructure projects undertaken by local firms.

According to Reyman and Harries (2008), monitoring and evaluation system is a critical part of Result Based Management (RBM). Performance of road projects therefore depends on conducting M&E activities regularly.

4.4.4 Group Dynamics Management and Performance of Road Projects

The study was also sought to determine the effect of group dynamics management on performance of road infrastructure projects constructed by local firms. The results of the responses are shown in Table 4.8.

Table 4.12: Group Dynamics Management and Performance

	V. Little Extent %	**Little Extent %**	**Average Extent %**	**Great Extent %**	**V. Great Extent %**	**Mean**	**SD**
Team work and cohesiveness in constructing road projects.	8.8	17.8	53.3	8.8	11.1	1.67	1.025
Efficiency and effectiveness in constructing road projects.	11.1	28.9	37.8	17.8	4.4	2.45	0.765
Overall effect of group dynamics management on project performance.	2.1	4.2	8.3	18.7	66.8	4.42	0.964

Source: Survey, 2017

From Table 4.12 indicates that 8.8 percent of the respondents indicated that team work and cohesiveness is embraced to a very little extent, 17.8 percent indicated little extent, 53.3 percent average extent, 8.8 percent great extent and 11.1 percent very great extent. About 28.7 percent of the respondents indicated either very little extent or little extent. The findings show that majority of the respondents (53.3 percent) indicated that team work and cohesiveness was embraced to an average extent. Only 19.9 percent of the respondents fully embraced team work and cohesiveness in their firms.The mean and standard deviation for the overall effect of group dynamics management on performance was 4.42 and 0.964 respectively.

According to Prackel and Dubrene (2010), team work among project teams is critical in the performance of infrastructure projects. This is supported by Burgress and Stern (2013) who sought to establish methods of managing project teams. Some of the road projects cited by respondents where teamwork was a challenge were Kebirigo-Mosobeti- Keroka and Ndori- Luanda Kotieno road. This resulted in delay in the completion of road projects.

Road projects that experienced positive group dynamics to a great extent included Siaya- Rang'ala road and Rongo-Homa Bay road. Embracing positive synergy, individual and mutual accountability and complementary skills leads to better performance of infrastructure projects. When respondents were asked whether

there was efficiency and effectiveness in undertaking project activities, their responses were; 6.7 percent indicated to very little extent, 22.2 percent little extent, 28.9 percent average extent, 37.8 percent great extent and 4.4 percent a very great extent. Cumulatively, 42.2 percent of the respondents indicated that their firms emphasized on undertaking project activities in an efficient and effective manner. The mean and standard deviation for this characteristic was 2.45 and 0.765 respectively. The mean and standard deviation for this characteristic was 2.45 and 0.765 respectively. Since majority of the respondents indicated average and below, this implies that many local firms do not emphasize so much on efficiency and effectiveness in constructing road infrastructure projects. This has led to construction of projects that do not meet customer satisfaction (Badwin, 2014).

According to Karzenbach (2014) poor group dynamics among project members affect performance of infrastructure projects because it leads to low efficiency, low productivity and low retention of experienced staff. This was supported by respondents when asked to indicate the other negative effects of poor group dynamics on performance of road infrastructure projects undertaken by local firms. When respondents were asked to suggest ways of enhancing efficiency among project teams, majority of the respondents (79.2 percent) indicated; having regular meetings to build team work and enhance bonding among project teams, handling conflicts as soon as possible and addressing " black sheep effect".The

mean for the overall effect of group dynamics management on performance was 4.42.

4.4.5 Project Risks Management and Performance of Road Infrastructure Projects

The study collected information on the effects of project risks management on performance of road infrastructure projects in the Lake Basin Region undertaken by local firms. The responses are shown below in table 4.13.

Table 4.13: Project Risks Management

	V. Little Extent %	Little Extent %	Average Extent %	Great Extent %	V.Great Extent %	Mean	SD
Management of legal risks that may affect project completion within scheduled time.	6.7	40.0	24.4	13.3	15.6	2.63	0.989
Management of financial risks that may lead to cost overruns.	8.9	35.6	31.4	15.6	8.9	3.52	0.871
Management of technical risks in road infrastructure projects.	4.4	37.8	28.9	17.8	11.1	3.39	0.812
Project risk management and Performance of Road Projects.	4.2	2.1	10.4	56.2	27.1	3.98	0.911

Source: Survey, 2017

From Table 4.13, 46.7 of the respondents indicated that local firms managed to deal with legal risks to a little extent while 24.4 percent indicated average extent. 28.9 percent of the respondents reported that they were able to handle the legal

risks to a great extent. The mean and standard deviation for this characteristic was 2.63 and 0.989 respectively. The findings show that majority of local firms had difficult in managing legal risks. Some of the projects where the respondents indicated that they managed the legal risks well include Bondo- Usenge Road and Magenche –Mariba Road. Well Stam (2008) asserted that obtaining all relevant legal documents required in any construction was necessary before embarking on the actual construction.

When respondents were asked to indicate whether local firms were able to manage financial risks that may affect the cost of the road projects, their responses were, 8.9 percent indicated very little extent, 35.6 percent little extent, 31.4 percent average extent, 15.6 percent a great extent and 8.9 percent indicated very great extent. These findings show that majority of the respondents (75.9 percent) indicated average extent and below. The mean and standard deviation for this characteristic was 3.52 and 0,871 respectively. These findings show that many local firms were not able to manage the financial risks and this affected to a large extent the performance of road infrastructure projects undertaken by local firms. According to Hill (2013) study, financial risks could lead to infrastructure project delays. From the responses it can be concluded that proper management of financial risks is critical in ensuring performance of road infrastructure projects.

There was also need to establish whether local firms had the capacity to manage technical risks that could affect performance of projects. The responses were; 4.4 percent indicated very little extent, 37.8 percent little extent, 28.9 percent average extent, 17.8 percent a great extent and 11.1 percent of the respondents indicated very great extent. These findings show that majority of the respondents (71.1 percent) indicated average extent and below. The mean and standard deviation for this characteristic was 3.39 and 0.812 respectively. The implication of these findings is that majority of local firms lacked capacity to manage technical risks. The technical risks include correct assessment of technologies required, construction methods to be used and correct estimate of quantity of raw materials required. The mean for the overall effect of project risks management on project performance was 4.98. The significance of project risks management is supported by Prichad and Lymer (2013) on technical risks in infrastructure projects.

4.4.6 Government Policy and Performance of Road Infrastructure Projects

The government has enacted various laws, policies and regulations governing the construction of roads in Kenya. The laws enable relevant government agencies to monitor and supervise road construction industry. In order to find out the moderation effect of government policy on the performance of road infrastructure projects, respondents were asked to indicate the extent to which laws, policies and regulations affect performance of road infrastructure projects. The results are shown in Table 4.14.

Table 4.14: Government Policy

Extent to which:	V. Little Extent %	Little Extent %	Average Extent %	Great Extent %	V. Great Extent %	Mean	SD
Government laws affect performance	14.3	50.0	7.1	21.4	7.1	2.25	.758
Government policies and regulations affect performance	24.1	40.2	10.3	18.2	7.2	2.34	.650

The results show that 14.3 percent indicated very little extent, 50.0 percent little extent 7.1 percent average extent, 21.4 great extent and 7.1 percent a very great extent. These findings show 64.3 percent of the respondents felt strongly that government, policies and regulations did not affect performance of road projects. Only 28.5 percent of the respondents felt that government laws and regulations had effect on the performance of road infrastructure projects. The implication of this is that government laws and policies had no significant effect on the performance of road infrastructure projects.

4.4.7 Organization Structure and Performance of Road Infrastructure Projects

Respondents were also asked to indicate to what extent project managers were involved in the construction of road infrastructure projects. The responses are shown in Table 4.15.

Table 4.15: Organization Structure

Extent to which:	**V.Little Extent %**	**Little Extent %**	**Average Extent %**	**Great Extent %**	**V.Great Extent %**	**Mean**	**SD**
-Project managers were involved in the allocation of human resource.	9.7	37.8	22.3	20.4	9.8	2.71	0.854
-Project managers were involved in resource allocation.	15.6	39.8	22.7	22.2	4.4	3.98	0.911
-Aggregate Value of Organization Structure	–	–	–	–	–	3.345	0.883

Source: Survey (2017)

Respondents were asked to indicate to what extent project managers were involved in the allocation of human resources and decision making processes. The responses were; 9.7 percent indicated very little extent, 37.8 percent a little extent,

22.3 percent average extent, 20.4great extent and 9.8 percent very great extent. These responses show that majority of local firms (69.8 percent) did not involve project managers in the allocation of human resource and in decisions making processes on the road infrastructure projects. The mean and standard deviation for this characteristic was 3.98 and 0.911 respectively. The implication of these results is that majority of local firms (55.4 percent) did not employ projectized organization structure where the project manager has full authority in decision making and allocation of resources. The local firms employed functional organizational structure in undertaking road infrastructure projects which resulted in poor performance of the road infrastructure projects.

Regarding the question whether project managers were involved in the allocation of financial, technical and physical resources the responses were; 15.6 percent indicated very little extent, 39.8 percent little extent, 22.7 percent average extent, 22.2 percent great extent and 4.4 percent reported very great extent. The mean and standard deviation for this characteristic was 3.98 and 0.911 respectively. The implication of these results is that majority of local firms (55.4 percent) do not involve project managers in the allocation of financial, technical and physical resources.

Zwikael and Sudeh (2014) asserted that organizations that employ projectized organization structure in undertaking infrastructure projects attain better

performance in comparison to those that employ functional organization structure. This implies that adoption of functional organizational structure in constructing road infrastructure projects will lead to poor performance of such projects. Therefore, poor performance of road infrastructure projects undertaken by local firms can be attributed to some extent the use of functional organization structure.

4.5: Inferential Analysis Results

In order to establish the effects of independent variable on dependent variable, data was collected on each of the independent variables and thereafter regression analysis was done. However, diagnostic tests of heteroscedasticity, multicollinearity and normality were carried out before regression analysis.

4.5.1 Heteroscedasticity Test Results

Test statistic	Degree of freedom	P-value
7.4532	5	0.4321

The Modified Wald Test was used to test for homogeinity in a linear regression model. Presence of heteroscedasticity will render statistical inference on variance biased hence inappropriate to use in making conclusions. The result of the test is shown in Table 4.16.

Table 4.16: Test for heteroscedasticity

Table 4.16 shows that test statistic was 7.4532 (p-value=0.4321) with the degree of freedom. Since the test statistic is small and the p-value > 0.05, the null

hypothesis was not rejected and the conclusion is that there was homoscedasticity in the data hence the data was fit for conducting inferential statistics.

4.5.2 Multicollinearity Test Results

Collinearity test was conducted to establish whether the independent variables are correlated. Tolerance and variance inflation factor (VIF) were used to test multicollinearity. A Tolerance of <1.0 and a Variance inflation factor (VIF) of < 10 indicates that there was no multicollinearity among the independent variables. The results are shown in Table 4.17.

Table 4.17: Multicollinearity Test Results

Variables	**Tolerance**	**VIF**
Resource mobilization mean	0.796	1.257
Monitoring and Evaluation	0.886	1.129
Group Dynamics Management	0.960	1.042
Project Risks Management	0.918	1.09

Source: Survey, 2017

As shown in the Table 4.12, tolerance values for resource mobilization, monitoring and evaluation, group dynamics management and project risks

management were: 0.796, 0.886, 0.960 and 0.918 respectively. This was within the acceptable limits of not greater than 1.0. The variance inflation factors for the variables were 1.257, 1.2129, 1.042 and 1.09 respectively. This was also within the acceptable limits of variance inflation factor. Therefore, both Tolerance values and Variance inflation factor of the independent variables showed that there was no multicollinearity among the variables.

4.5.3: Normality Test Results

Test for normality of the residuals was conducted based on the Kolmogorov-Smirnov statistic. The results are shown in the Table 4.18.

Table 4.18: One-sample Kolmogorov-Smirnov Test

	Resource mobilization	**Monitoring and Evaluation**	**Group Dynamics Management**	**Project Risks Management**	**Performance of PRI**
N	54	54	54	54	31
Normal Mean	2.8889	2.7333	2.8667	3.2074	2.4677
Parameters: Std. Dev.	0.44132	0.4779	0.81464	0.77944	0.5113
Most Extreme Absolute	0.133	0.175	0.193	0.12	0.213
Differences Positive	0.122	0.175	0.185	0.089	0.213
Negative	-0.133	-0.136	-0.193	-0.193	-0.116
Kolmogorov-Smirnov Z	0.89	1.177	1.295	0.803	1.188
Asymp. Sig. (2 tailed)	0.406	0.125	0.07	0.539	0.119

The p-values for independent variables are: resource mobilization is 0.406; monitoring and evaluation, 0.125; group dynamics management, 0.07 and project risks management is 0.539. The results show that the p values are greater than 0.05. This implies that residuals of the independent variables were normally distributed.

4.5.4: Multiple Regression Analysis

This section presents the empirical investigation of the effect of project management practices on performance of road infrastructure projects undertaken by the local firms in the Lake Basin Region, Kenya. Multiple regression models was used to analyze the effect of each variable on performance of road infrastructure projects undertaken by local firms. Composite variables were computed for each of the key variables for the study. The composite variables were then regressed using multiple regression models to determine the effect of each project management practice on performance of road infrastructure projects undertaken by local firms. The model summary is shown in Table 4.19.

Table 4.19: Model Summary

Model	R	R Square	Adjusted R Square	Std Error of the Estimate
1	0.906[a]	0.821	0.804	0.41254

Predictors; (Constant), PRM, ME, GD, RM

Table 4.14 shows that adjusted R square is 0.804. This implies that 80.4 percent of the variation in the dependent variable (Performance of Road Infrastructure Projects) was explained by the independent variables: project resource mobilization, project monitoring and evaluation, group dynamics management and project risks management. The remaining19.4 percent of the variations can be accounted for by other variables other than those discussed in this study. Table 4.20 shows the results of ANOVA that was used to test the overall significance of the model.

Table 4.20: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.312	4	7.828	45.996	0.000[b]
	Residual	6.808	40	0.170		
	Total	38.119	44			

a. **Dependent Variable: PRI**

b. **Predictors: (Constant), PRM, ME, GD, RM**

Table 4.15 shows that F-statistic for the model was 45.996 with 4 degrees of freedom and its p-value was 0.000. This implies that the overall model is statistically significant**.**

Table 4.21 shows the regression results of each of the project management practices on performance of road infrastructure projects.

Table 4.21: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.299	.291		1.026	.311
	RM	.217	.100	.235	2.164	.036
	ME	.198	.090	.229	2.193	.034
	GD	.239	.113	.231	2.107	.041
	PRM	.296	.086	.345	3.427	.001

a. Dependent Variable: PRI

From Table 4.21, the regression coefficient for project resource mobilization was positive implying that mobilization of financial, adequate machinery and mobilization of technical equipment and acquisition of trained staff increases the performance of road infrastructure projects. The coefficient had a p-value of 0.036 which is less than 0.05 leading to the rejection of the null hypothesis and the conclusion is that project resource mobilization has a significant effect on performance of road infrastructure projects constructed in the Lake Basin Region by local firms. These findings are consistent with those of Majanja (2012) and Gitenya and Ngugi (2012) who asserted that adequate financial resources are key to performance of infrastructure projects.

The regression coefficient for project monitoring and evaluation was found to be positive. This implies that the more road infrastructure projects are monitored and

evaluated by trained M&E officers the higher the performance of the projects. The coefficient had a p-value of 0.034 which is less than 0.05. Thus, the null hypothesis was rejected and the conclusion is that conducting M&E on regular basis, allocating sufficient finances for M&E activities and employing of staff with required skills play a critical role in the performance of road infrastructure projects. These findings concurs with those of Reyman and Harries (2008) who asserted that close supervision of projects is increasingly being recognized as indispensable management function.

In the case of group dynamics management, the regression coefficient was also positive implying that performance of road infrastructure projects will improve by putting workers into project teams and having a supervisor for each project team and addressing the issue of black sheep effect, blocking and riding. The coefficient had a p-value of 0.041 which is less than 0.05 leading to the rejection of the null hypothesis. Thus, group dynamics management has a significant effect on performance of road infrastructure projects constructed by local firms in Kenya. The findings contradict those of Smith (2014) which found out that group dynamic theories do not apply to teams whose members have worked together for a long period. The difference in the findings of this study and that of Smith (2014) could have arisen due to differences in the study areas. However, the findings concur with that of Saunders (2014) who asserted that project teams are the best

solutions for a firm to efficiently achieve the desired quality of projects. Thus, embracing team work and ensuring efficiency and effectiveness in undertaking project activities has a significant effect on performance of road infrastructure projects constructed by local firms in Kenya.

The regression coefficient for project risks management was positive implying that performance of road infrastructure projects will change positively if financial risks, technical risks, political risks, technical risks and social risks that are likely to hinder successful completion of projects are identified, analyzed and mitigated. The coefficient had a p-value of 0.001 leading to the rejection of the null hypothesis and the conclusion is that project risks management has a significant effect on the performance of road infrastructure projects constructed by local firms. The findings of this study concur with those of Might and Fisher (2011) who asserted that unearthing of risks and managing them could contribute to better performance of infrastructure projects.

4.5.5 Moderation Effect Results

The result for the moderation effect of government policy is shown in Table 4.22

Table 4.22: Coefficients of Moderation Effect

Model	Unstandardized coefficients		Standardized Coefficients	T	Sig.
	β	Std Error	B		
Constant	3.339	0.529		6.307	0.000
PMP	0.004	0.002	0.698	2.264	0.029
GP	-0.217	0.156	-0.202	-1.385	0.174
PMP*GP	0.000	0.000	0.243	0.675	0.504

Table 4.22 shows that the p-value for moderation effect was 0.504. This was greater than 0.05 leading to rejection of the null hypothesis. This implies that the government policies, laws and regulations do not have any moderating effect on the relationship between project management practices and performance of road infrastructure projects undertaken by local firms. This was as a result of government ineffectiveness in the enforcement of the enacted laws and corruption in the government agencies.

This finding contradicts those of Odeyinka and Yusuf (2010) study which asserted that government policies and regulations play a critical role in the performance of infrastructure projects. The study indicated that the government should put in place a policy framework for setting standards that each construction firm must satisfy. Such policy framework ensures that projects constructed meet the required standards.

4.5.6 Mediation Effect Results

The results for mediation effect of organization structure on the relationship between project management practices and performance of road infrastructure projects are shown in Table 4.23.

Table 4.23: Mediation Effect Results

Step	**β_1**	**β_2**	**Sig.**	**Implication**
Step 1 PMP Depend. PRI	0.005		0.000	β_1 is significant since p-value is 0.000 hence PMP is a significant determinant of PRI.
Step 2 MP Depend. OS	0.005		0.000	β_1 is significant since p-value is 0.000 hence PMP is a significant determinant of OS.
Step 3 OS Depend. PRI	0.617		0.000	β_1 is significant since p-value is 0.000 hence OS is a significant determinant of PRI.
Step 4 PMP OS Depend. PRI	0.04	0.57	0.000 0.000	$\beta_1$and β_2 are significant since their p-values are 0.000. Since both PMP and OS are significant determinant of PRI, then there exists partial mediation.

The regression coefficients for β values in steps 1, 2 and 3 were 0.005, 0.005 and 0.617respectively. The p-values of project management practices and organization structure in step four are 0.000 leading to rejection of the null hypothesis. The conclusion therefore is that organization structure has a mediating effect on the relationship between project management practices and performance of road infrastructure projects undertaken by local firms. The β values in steps 1, 2,3 and 4 were positive implying that both project management practices and organization structure have significant effect on performance of road infrastructure constructed by local firms. This was a case of partial mediation.

The finding of this study concurs with that of Zwikael and Sudeh (2014) who asserted that construction firms that adopt projectized organization structure in undertaking infrastructure projects deliver quality projects and are able to reduce cost and time overruns significantly.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter presents a summary of the study, conclusions, contribution to knowledge, policy implications, recommendations and areas for further research.

5.2 Summary of the Study

The study focused on establishing the effects of project management practices on performance of road infrastructure projects in the Lake Basin Region undertaken by local firms in Kenya. These project management practices are: project resource mobilization, project monitoring and evaluation, group dynamics management and project risks management.

The study used explanatory and descriptive research design based on a survey to establish the effect of the relationship between project management practices and performance of road infrastructure projects. The study also, sought to determine the moderation effect of government policy and mediation effect of organization structure on the relationship between project management practices and performance of road infrastructure projects. Data was collected by use of a semi-structured questionnaire and analyzed by use of descriptive and inferential statistics. Multiple regression models was used to establish the effect of each of

the independent variables on performance of road infrastructure projects undertaken by local firms in Kenya.

The coefficient of project resource mobilization was found to be significant in this study. This implies that project resource mobilization has a significant effect on performance of road infrastructure projects undertaken by local firms in Kenya. It was also noted that local firms had challenges in obtaining adequate financial and technical equipment, complete road projects within the budgeted cost and lacked capacity to acquire technical human resource for constructing road projects. In addition, local firms were not able to acquire and use modern machinery.

The coefficient of project monitoring and evaluation was also significant in this study. It can thus be inferred that project monitoring and evaluation has a significant effect on performance of road infrastructure projects in the Lake Basin Region undertaken by local firms in Kenya. The study found out that conducting project monitoring and evaluation on road infrastructure projects, allocation of sufficient funds to M&E activities and recruitment of staff with relevant M&E skills had a significant effect on performance of road infrastructure projects in the Lake Basin Region undertaken by local firms in Kenya.

The coefficient of group dynamics management was also found to be significant. The study found out that local firms do not embrace team work in undertaking road infrastructure projects. There were conflicts among project members. It was also noted that local firms were inefficient and ineffective when undertaking project activities which resulted in poor performance of the projects. Lack of team work among project members can cause delays in completing the project within the required time and hence affect the performance of the project.

The coefficient of project risks management was also found to be significant. The study found out that management of financial, legal and technical risks was crucial in the performance of road infrastructure projects. Road projects constructed by firms that lacked capacity to manage project risks were rated poorly in terms of performance. Such projects experienced cost and time overruns.

5.3 Conclusion

Performance of the road infrastructure projects is crucial in the economic development of any country. Performance of the projects is viewed in terms of being completed within the budgeted cost and scheduled time. The quality of the projects should also meet client satisfaction. Kenya's Vision 2030aspires to have a country with a well developed network of roads and other infrastructure facilities. Performance of road infrastructure projects constructed by local firms is therefore an important ingredient towards realization of Vision 2030.

Furthermore, better performance of these local firms will contribute significantly to Kenya's economic growth and development.

The study concludes that project resource mobilization has a significant effect on performance of road infrastructure projects undertaken by local firms. Financial, physical and technical resources have a significant effect on performance of road infrastructure projects. To aid acquisition of financial and technical resources, Public-private partnership and government guarantee will play an important role. This will improve performance of road infrastructure projects undertaken by local firms.

The study also concludes that project monitoring and evaluation affects the performance of road infrastructure projects undertaken by local firms. Conducting M&E activities regularly has a positive impact on performance of road infrastructure projects undertaken by local firms. Hence, there was need to allocate adequate financial resources for M&E activities and recruitment of staff with relevant skills.

Project risks management has a significant effect on performance of road infrastructure projects undertaken by local firms especially those projects that are funded by the national government. This is because of the large scope of the projects, scope change in the middle of the project and political interference. Local firms experience challenges in addressing legal, financial and technical

risks. These risks lead to cost and time overruns which then cause poor performance of road infrastructure projects undertaken by local firms.

Group dynamics management is another factor that affects performance of road infrastructure projects constructed in the Lake Basin Region by local firms. Lack of team work and cohesiveness, low efficiency and ineffectiveness among project teams can lead to poor performance of road infrastructure projects.

5.4 Contribution to Knowledge

Road infrastructure projects constructed in developing countries by local construction firms have continued to perform poorly in terms of cost, time and quality. Kenya's overall performance was 36.9 percent for the period 2011 to 2014. Despite this poor performance, none of the previous studies have focused on the performance of road infrastructure projects constructed by local firms in Kenya. Most of the studies focused on performance of other infrastructure projects and focused other countries, hence there was need to conduct a study in Kenya.

Furthermore, no study has specifically focused the Lake Basin Region in spite of poor road infrastructure network. Many of the road projects in the region were constructed by local firms. The study therefore has shed light on the effect of project management practices on the performance of road infrastructure projects constructed by local firms in Kenya. In addition, none of the studies had

established the moderating and mediating effect on the relationship between project management practices and performance of road infrastructure projects.

This study found out that mobilization of financial, physical and technical resources were key factors in the performance of road infrastructure projects. Previous studies emphasized more on the funding of the road projects neglecting the role of physical and technical resources in performance. It was also found that M&E activities played a significant role in the performance of road infrastructure projects. In the previous studies, monitoring and evaluation was not considered to have a significant effect on performance of infrastructure projects.

It was also established that group dynamics management can indeed lead to better performance of road infrastructure projects. Most studies underscored the importance of managing group dynamics among project teams and its effect on performance of road infrastructure projects. The current study also found out that project risks management did affect the performance of road infrastructure projects although there was differential impact on road projects that were funded by the national government and county government.

The study therefore, presented insights into the effects of project management practices on performance of road infrastructure projects undertaken by local firms in Kenya. The study also contributes to the body of knowledge by testing the

regression model and its applicability in the performance of road infrastructure projects.

5.5 Recommendations

The results indicated that local firms experienced difficulties in mobilizing financial, physical and technical resources. The Government should consider fostering public-private partnerships in order to mobilize financial, physical and technical resources. This will ensure that the project outcome is satisfactory to the clients. The government should also consider putting in place a framework to guarantee contractors to access credit facilities from financial institutions. This is because the findings of this study indicated that financial, physical and technical resources have a significant effect on performance of road infrastructure projects.

The findings of this study also showed that M&E activities are crucial in the performance of road infrastructure projects. Hence the national and county governments should consider developing a monitoring and evaluation policy and regulatory framework. This will ensure that road infrastructure projects are monitored and evaluated on regular basis.

Under group dynamics management, the study noted that positive group dynamics has a significant effect on performance of road infrastructure projects. Project contractors and managers should consider putting in place project teams under supervision of a project team leader. This will ensure that project members not

only work as a team but also are efficient and effective in carrying out the assigned tasks.

This study also recommended that Project contractors and managers should consider putting in place a team of experts to identify, analyze and mitigate project risks. Further**,** the study recommends that government should consider putting in place a legal framework to ensure that contractors who do shoddy work are not paid until they deliver a quality project. In addition, the results of the study showed that the firm's organization structure has a significant effect on performance of road infrastructure projects. Thus, adoption of projectized organization structure where project managers are in control of allocation of resources and decision making can improve performance of road infrastructure projects.

5.6: Suggestions for further Research

Other than local firms, foreign firms have also undertaken road infrastructure projects in Kenya. A comparative analysis can be carried out to establish the performance rating among local firms and foreign firms. This may shed some light on mechanisms to be put in place by the government and contractors for effective performance of road infrastructure projects. Further research can also be carried out on other infrastructure projects that contribute significantly to the economic development of a country. In addition, research can be carried out on

infrastructure projects funded by donors such as World Bank, African Development Bank (AfBB), USaid and UKaid.

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Appendix I: Introduction Letter

Maendo Densford Ochenge

P.O Box 177

IKONGE.

Email: densfordmaendo@yahoo.com

Dear Respondent,

I am a PhD student at Kenyatta University. I am currently conducting a research on project management practices and performance of road infrastructure projects constructed by local firms.

Participating in this survey is voluntary and your job would not be affected in any way by whether you participate in this survey or not. Please be free to complete the questionnaire and make additional notes on the instruments where necessary. All information will be treated confidentially and the responses will only be treated as group data in the final research.

Thank you for sparing your time to complete this questionnaire. If you would like to get a copy of the final report of this study, please indicate on the top of the questionnaire.

Yours faithfully,

Maendo Densford Ochenge

D86/27617/2014

Appendix II: Questionnaire One

(To be filled by Project Managers and Contractors)

Dear Respondent,

The purpose of this study is to establish the effects of management practices on performance of road infrastructure projects construction by local firms in Kenya. It is an academic research conducted in partial fulfilment for the award of Doctor of Philosophy Degree in Business Administration of Kenyatta University. You are therefore kindly requested to fill this questionnaire to facilitate the study of the subject. The information obtained will be used strictly for academic purposes and will be treated with utmost confidentiality.

SECTION A: GENERAL INFORMATION

Please answer the following questions by marking the most appropriate answer with a tick in the small boxes provided.

1. Gender Male [ ] Female [ ]

2. Please indicate your age bracket in years.

(a) Less than 24 years [ ]

(b) 25-29 years [ ]

(c) 30-39 years [ ]

(d) 40-49 years [ ]

(e) Over 50 years [ ]

3. Highest level of education. (Please tick appropriately)

a) Basic Education [ ]

b) Certificate [ ]

c) Diploma [ ]

d) First Degree [ ]

e) Masters and above [ ]

4. Number of years worked in your current position.

(a) 5 years and below [ ](b) 6-10 years [ ] (c) 11-15 years [ ](d) 16-20 years [ ] (e) Over 20 years [ ]

SECTION B: PROJECT RESOURCE MOBILIZATION

To what extent is your construction firm able to:	Very little Extent	Little Extent	Moderate Extent	Large Extent	Very Large Extent
5. Mobilize financial resources required for constructing road projects?					
6. Acquire trained staff required for constructing road projects?					
7. Mobilize technical equipment required for constructing road projects?					
8. Acquire modern tools and equipment required in constructing road projects?					

9. What are the challenges facing your construction firm with regard to mobilization of resources required in undertaking road infrastructure projects?

……

……

10.What do you suggest should be done with regard to project resource mobilization in order to improve performance of local construction firms?

……

……

11.In your firm, have you fully embraced the application of technology in the implementation of road infrastructure projects?

……

……

12. If your answer is NO explain why?

……

……

SECTION C: PROJECT MONITORING AND EVALUATION

To what extent does your construction firm:	Very little Extent	Little Extent	Moderate Extent	Large Extent	Very Large Extent
13. Conduct M&E activities on road projects on regular basis?					

14. Allocate sufficient financial resources for conducting M&E activities on road projects?					
15. Employ staff with required skills to conduct M&E activities on road projects?					

16.In your opinion do you think monitoring and evaluation can help in improving the quality of road infrastructure projects?

……

……

17.What do you think can be done to improve monitoring and evaluation of road infrastructure projects?

……

……

SECTION D: MANAGEMENT OF PROJECT GROUP DYNAMICS

18. Does your firm involve project teams in undertaking road infrastructure projects?

YES ☐ NO ☐

If yes to what extent does your construction firm:	Very little extent	Little Extent	Moderate Extent	Large Extent	Very Large Extent
19. Address the issue of					

disagreement among project team members?					
20. Ensure that project team members view each other positively?					

21. What are the other effects of poor team work on performance of road projects undertaken by your construction firm?

……

……

22. In your construction firm, how do you enhance efficiency among project teams?

……

……

SECTION E: PROJECT RISKS MANAGEMENT

23. Does your construction firm encounter project risks in undertaking road infrastructure projects?

☐ YES

☐ NO

22. If your answer above is yes, state what kind of project risks does your construction firm encounters?

……

……

To what extent is your construction firm able to:	Very little extent	Little Extent	Moderate Extent	Large Extent	Very Large Extent
23. Manage political risks that affect completion of projects within scheduled time?					
24. Manage financial risks that may affect quality of road infrastructure projects?					
25. Manage technical risks that may affect successful completion of road infrastructure projects?					

26. How does your construction firm manage the above project risks?

……

……

27. To what extent are functional managers involved in decision making in your firm?

(a) Not at all (b) Little Extent (c) Moderate Extent (d) Large Extent (e) Very Large Extent

28. To what extent are project managers involved in the allocation of resources for undertaking projects in your firm?

(a) Not at all (b) Little Extent (c) Moderate Extent (d) Large Extent (e) Very Large Extent

END

APPENDIX III: Questionnaire Two

(To be filled by Government M&E Officials, County Public Works Officers and Local Leaders).

Dear Respondent,

The purpose of this study is to establish the effects of management practices on performance of road infrastructure projects constructed by local firms in Kenya. It is an academic research conducted in partial fulfilment for the award of Doctor of Philosophy Degree in Business Administration of Kenyatta University. You are therefore kindly requested to fill this questionnaire to facilitate the study of the subject. The information obtained will be used strictly for academic purposes and will be treated with utmost confidentiality.

SECTION A: GENERAL INFORMATION

Please answer the following questions by marking the most appropriate answer with a tick in the small boxes provided.

1. Gender Male [ ] Female [ ]

2. Please indicate your age bracket in years.

(a) Less than 24 years [ ]

(b) 25-29 years [ ]

(c) 30-39 years [ ]

(d) 40-49 years [ ]

(e) Over 50 years [ ]

3. Highest level of education. (Please tick appropriately)

a) Basic education [ ]

b) Certificate [ ]

c) Diploma [ ]

d) First Degree [ ]

e) Masters and above [ ]

4. Number of years worked in your current position.

(a) 5 years and below [ ](b) 6-10 years [ ] (c) 11-15 years [ ](d) 16-20 years [ ] (e) Over 20 years [ ]

SECTION B: PERFORMANCE OF ROAD INFRASTRUCTURE PROJECTS BY LOCAL CONSTRUCTION FIRMS.

5. How many road infrastructure projects constructed by local firms were completed within the budgeted cost in your county during the period 2011 - 2016?

……

6. How many road infrastructure projects constructed by local firms were completed within the scheduled time in your county during the period 2011 - 2016?

……

7. How many road infrastructure projects constructed by local firms met the desired quality standards in your county during the period 2011 - 2016?

……

To what extent do local construction firms:	V. Little Extent	Little Extent	Average Extent	Great Extent	V. Great Extent
5. Undertake medium and large road projects.					
6. Complete road projects within the budgeted cost.					
7. Complete road projects within the given time limit.					
8. Deliver road projects that meet clients' quality.					

12. In your opinion what do think affect local construction firms in undertaking road infrastructure projects?

……

……

13. What do you think can be done to improve performance of local construction firms in undertaking road infrastructure projects?

……

……

14. To what extent do laws enacted by government affect performance of road projects?

(a) very little extent (b) Little Extent (c) Moderate Extent (d) Large Extent (e) Very Large Extent

15. To what extent do policies and regulations enacted by government affect performance of road projects?

(a) very little extent (b) Little Extent (c) Moderate Extent (d) Large Extent (e) Very Large Extent

Appendix IV: Road Projects in the Lake Basin Region Constructed by Local Firms in Kenya between2011 and 2016.

Name of Road Project(s)	Name of Firm	Classification
1. Kendu-Bay- Homa-Bay Road 2. Magenche- Mariba Road	Dittman Construction co. Ltd	National
3. Homa-Bay- Mbita Road 4. Rongo- Homa Bay Road	Kithimb Construction co. Ltd	County
5. Ebegere- Daraja Road	Maki Construction co. Ltd	County
6. Nyamasaria- Kericho Road	Span Construction co. Ltd	National
7. Marani Road 8. Siaya- Rang'ala Road	Orina& Partners Construction co. Ltd	National
9. Kisumu- Busia Road	SynchroConsult Associates Ltd	National
10. Ahero- Kisii Road 11. Mariba- Nyagancha Road	Shako & Partners Construction co. Ltd	National County
12. Kisumu-Bondo Road 13. Bondo-Usenge Road	Mastow Construction co. Ltd	National
14. Mogonga-Kenyenya Road 15. Kenyenya- Riokindo Road	UniConsult Kenya Ltd	County
16. Chabera- Ikonge Road 17. Tombe- Gekano Road	Gedox Associates	National County
18. Ndori- Nyangoma Road	Armitech Construction co. Ltd	National
19. Oyugis- Kendu Bay Road 20. Oyugis- Rangwe Road	Maiteri Associates	National

Name of Road Project(s)	Name of Firm	Classification
21. Kijauri- Manga Road 22. Ikonge- Chebilat Road	Odongo & Partners Construction	National
23. Muhuru-Bay Migori Town	Metrix Construction co. Ltd	County
24. Ndori- Luanda Kotieno Road 25. Misori- Bondo Road	Max Engineering & Construction co. Ltd	County
26. Nyakaranga – Nasari Road	Varstech Construction co. Ltd	County
27. Awasi-Ahero Road 28. Sondu- Nyabondo Road	Wandua Consultants and Construction co. Ltd	National
29. Nyamasaria- Kisumu-Kisian Road	Wanjohi Construction co. Ltd	National
30. Ekerenyo- Nyamusi Road	Wavetech Construction co. Ltd	County
31. Matongo- NyakarangaRd 32. Nyamusi- Getaari Road	Machara and Partners Construction co. Ltd	National
33. Katitu- Kendu Bay Road 34. Magwagwa- Obwari Rd	R & B Consultants Ltd	National County
35. Kegati- Gachuba Road 36. Gachuba- Keumbu Road	Mastan Construction co. Ltd	County
37. Kebirigo- Keroka Road 38. Nyaramba- Kegogi Road	SteveGatesConstruction company	National County
39. Nyaramba- Nyamira Rd	S. R Manga and Associates	County
40. Ikonge- Itibo Road 41. Sironga- Marindi-Nyamira Road	ShabasEngeneering and Construction co. Ltd	National County

Source: County Public Works Hqs (2016)

Appendix V: Reliability Test Results

Summary of the Reliability Results

Variables	Cronbach's alpha	Number of Items	Comment
Project Resource Mobilization	0.796	4	Reliable
Project Monitoring And Evaluation	0.785	3	Reliable
Project Group Dynamics	0.786	2	Reliable
Project Risks Management	0.911	3	Reliable
Performance of Road Infrastructure Projects	0.790	4	Reliable

Items-Total Statistics per variables

Project Resource Mobilization

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Mobilize financial resources required for constructing road projects?	11.76	8.916	0.54	0.777
Acquire trained staff required for constructing road projects?	11.76	8.143	0.597	0.75
Mobilize technical equipment required for constructing road projects?	11.76	7.871	0.65	0.724
Acquire modern tools and equipment required in constructing road projects?	11.93	6.791	0.659	0.722

Project Monitoring and Evaluation

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Conduct M&E activities on road projects on regular basis?	8.02	4.34	0.512	0.82
Allocate sufficient financial resources for conducting M&E activities on road projects?	7.89	2.783	0.743	0.573
Employ staff with required skills to conduct M&E activities on road projects?	7.78	3.813	0.654	0.683

Project Group Dynamics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Embrace teamwork in constructing road projects?	4.27	1.018	0.653	.
Ensure effectiveness and efficiency in the construction of road projects?	4.11	0.783	0.653	.

Project Risks Management

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Manage legal risks that may affect completion of projects within scheduled time?	7.76	5.689	0.808	0.886
Manage financial risks that may affect quality of road infrastructure projects?	7.73	5.655	0.858	0.842
Manage technical risks that may affect successful completion of road infrastructure projects?	7.62	6.286	0.806	0.888

Performance of Road Infrastructure Projects

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Local construction firms undertake medium and large road projects	11.8	9.164	0.469	0.8
Local construction firms complete road projects within the budgeted cost	12.13	7.3	0.699	0.683
Local construction firms complete road projects within the given time limit	12.07	8.791	0.513	0.78
Local construction firms have ability to deliver road projects that meet clients' quality	12.13	8.118	0.74	0.673

Appendix VI: Research Approval

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School

DATE: 30th June, 2017

TO: Maendo Densford Ochenge
C/o Department of Management Sciences
KENYATTA UNIVERSITY

REF: D86/27617/14

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that the Graduate School Board at its meeting 21st June, 2017 approved your Ph.D. Research Proposal entitled **"Project Management Practices and Performance of Road Infrastructure Projects by Local Firms in Lake Basin Region, Kenya".**

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology & 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.

By copy of this letter, the Registrar (Academic) is hereby requested to grant you substantive registration for your Ph.D. studies.

Thank you.

REUBEN MURIUKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Registrar (Academic) Att; Mr Likam
Chairman, Department of Management Sciences

Supervisors:

1. Dr. Rosemary James
   C/o Department of Management Sciences
   KENYATTA UNIVERSITY
2. Dr. Lucy Ngugi
   C/o Department of Management Studies
   KENYATTA UNIVERSITY

RM/cao

Appendix VII: Research Authorization

NACOSTI

NATIONAL COMMISSION FORSCIENCE, TECHNOLOGY ANDINNOVATION

Telephone:+254-20-2213471, 2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/17/41391/18661**

Date: **17th August,2017**

Densford Ochenge Maendo
Kenyatta University
P.O. Box 43844-00100.
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Project management practices and performance of road infrastructure in The Lake Basin Region, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **The Selected Counties** for the period ending **17th August, 2018.**

You are advised to report to **the County Commissioners and the County Directors of Education, in the Selected Counties** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Homabay County.

The County Director of Education
Homabay County.

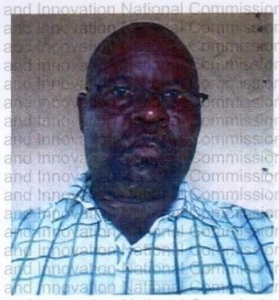
Appendix VIII: Research Permit

THIS IS TO CERTIFY THAT:
MR. DENSFORD OCHENGE MAENDO
of KENYATTA UNIVERSITY, 177-40501 IKONGE,has been permitted to conduct research in *Homabay , Kisii , Kisumu , Migori , Nyamira , Siaya Counties*

on the topic: *PROJECT MANAGEMENT PRACTICES AND PERFORMANCE OF ROAD INFRASTRUCTURE IN THE LAKE BASIN REGION, KENYA*

for the period ending:
17th August,2018

Permit No : NACOSTI/P/17/41391/18661
Date Of Issue : 17th August,2017
Fee Recieved :Ksh 2000



.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation