

**FACTORS INFLUENCING IMPLEMENTATION OF PERFORMANCE BASED
ROAD MAINTENANCE PROJECTS IN KENYA NATIONAL HIGHWAYS
AUTHORITY CENTRAL REGION, KENYA**

BY

ALICE GACERI M'ARIMI

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT FOR THE
REQUIREMENTS OF THE AWARD OF MASTER OF ARTS DEGREE IN
PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF
NAIROBI**

2019

DECLARATION

I declare that this is my original work and has not been submitted for the award of any degree of this university or any other institutions of higher learning.

Signature.....

Date

Alice Gaceri M'arimi

L50/ 5834/2017

This research project has been submitted for examination purposes with my approval as the university supervisor:

Signature.....

Date.....

Dr. Naomi Gikonyo

Senior Lecturer

University of Nairobi

DEDICATION

This research is dedicated to my Parents Mr. Elias M'arimi and Mrs. Esther Karimi. My brother Zakaria Kiriimi and sisters Lucy Nkirote, Jerusha Gatwiri, Stella Riara, Phenina Igoki and Elosy Ngugi.

ACKNOWLEDGEMENTS

I wish to thank the Management of the University of Nairobi in its entirety for offering me the chance to further my skills. In the same vein I wish to extend my sincere thanks to my supervisor Dr Naomi Gikonyo who has taken me through the course diligently, professionally and with a lot of sacrifice. I wish to reserve special thanks for all the lecturers and staff at School of Open and Distance Learning (SODL) Nyeri centre and more to Mr Kagiri and Mr Maurice Masinde for guidance and diligence in the course of the project report development.

I salute all my colleagues and friends at University of Nairobi (UoN) like Grace Ngechu, Boniface Wanga, and Millicent Wambugu for their ever endless encouragement, my beloved husband Pius Gitonga and children Doreen Wawira, Linet Muthoni and Augustine Mugane who have given me the much needed moral support. Above all may honour and glory be God.

TABLE OF CONTENTS

DECLARATION -----	ii
DEDICATION -----	iii
ACKNOWLEDGEMENTS -----	iv
LIST OF FIGURES -----	ix
LIST OF TABLES -----	x
ABBREVIATION AND ACRONYMS -----	xi
ABSTRACT -----	xii
CHAPTER ONE: INTRODUCTION -----	1
1.1 Background of the study-----	1
1.2 Statement of the Problem-----	3
1.3 Purpose of the Study -----	4
1.4 Objectives of the Study -----	4
1.5 Research questions -----	4
1.6 Significance of the Study-----	5
1.7 Limitations of the study-----	5
1.8 Delimitation of the study -----	5
1.9 Assumptions of the study-----	6
1.10 Definitions of Significant Terms-----	7
1.11 Organization of the study -----	8
CHAPTER TWO: LITERATURE REVIEW -----	9
2.1. Introduction -----	9
2.2 Performance based road maintenance Contracting (PBC)-----	9
2.3 Funding Methods and Implementation of PBC Projects-----	12
2.3.1 Kenya Roads Board Fund (KRBF) and Implementation of PBC Projects-----	13
2.4 Staff Competence and Implementation of PBC Projects-----	14

2.5 Public Participation and Implementation of PBC Projects -----	16
2.6 Government policies and implementation of PBC projects.-----	18
2.7 Organization Culture and implementation of PBC projects. -----	19
2.8 The Agency and Stake Holder Theories-----	20
2.9 Conceptual framework-----	22
2.10 Summary of Research Gaps -----	24
CHAPTER THREE: RESEARCH METHODOLOGY -----	26
3.1 Introduction-----	26
3.2 Research design-----	26
3.3 Target population -----	26
3.4 Sample Size and Sampling Procedures -----	27
3.5 Research Instruments-----	28
3.6 Pilot study-----	29
3.7 Validity of the Instruments -----	29
3.8 Reliability of the Instruments. -----	29
3.9 Data Collection Procedures -----	30
3.10 Data analysis Techniques -----	30
3.11 Ethical Considerations-----	31
3.12 Operationalization of variables. -----	32
CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION-----	34
4.1 Introduction-----	34
4.2 Questionnaire Return Rate -----	34
4.3 Respondents Bio-data -----	35

4.3.1 Gender of the respondents	35
4.3.2 Age of the respondents.	35
4.3.3 Education level of the respondents.....	36
4.3.4 Designation in project	37
4.4 Influence of Access to Finance on Implementation of PBC Projects	37
4.5 Indicators on Influence of Finance in Implementation of PBC Projects.....	38
4.6 Respondent’s Views on Access to Finance Influence on Implementation of PBC Projects	39
4.7 Staff Competence and its Influence on the Implementation of PBC Projects	40
4.8 Respondents regularity of trainings and development programmes.	41
4.9 Staff Competence and Implementation of PBC Projects.....	41
4.10 Staff competence indicators.....	42
4.11 Respondents Feedback on Ways to Improve Staff Competence in PBC Projects ---	43
4.12 Public Participation and Implementation of PBC Projects.....	44
4.13 Public Participation Indicators	44
4.14 Respondents Views on How to Improve Public Participation in PBC Projects.....	45
4.15 Inferential Analysis on Variables	47
4.15.1 Access to Finance and Implementation of PBC Projects	47
4.15.2 Staff Competence and Implementation of PBC Projects	48
4.15.3 Public Participation and Implementation of PBC Projects	48
4.16 Multiple Regression Analysis	49
4.17 Views of Road Users on Implementation of PBC Projects	50
4.18 Respondent’s Comments on the Challenges Facing PBC Projects	52

4.19 Respondents Views on ways in which PBC Projects Can Be Improved-----	53
CHAPTER FIVE: SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS-----	55
5.1 Introduction-----	55
5.2 Summary of the Findings-----	55
5.3 Discussions of the Findings-----	56
5.3.1 Gender of the Respondents-----	56
5.3.2 Age of the Respondents-----	56
5.3.4 Access to Finance and Influence on Implementation of PBC Projects-----	57
5.3.5 Staff Competence and Implementation of PBC Projects-----	57
5.3.6 Public Participation and Implementation of PBC Projects-----	58
54 Conclusion-----	59
5.5 Recommendations-----	59
5.6 Suggestions for Further Research-----	60
REFERENCES-----	61
APPENDICES-----	72
Appendix I: Letter Of Introduction-----	72
Appendix II: Questionnaire For Key Informants.-----	73
Appendix III: Interview Schedule For Road Users.-----	79
Appendix IV: Research Authoization-----	80
Appendix V: Research Clearance Permit-----	81
Appendix VI: Schedule Of Pbc Projects In Kenha Central Region-----	82

LIST OF FIGURES

Figure 2.1: Project Conceptual Framework -----	23
--	----

LIST OF TABLES

Table 3.1: Target Population -----	27
Table 3.2: Sampling Matrix-----	28
Table 3.3: Monthly road user customers on Class A & B roads in KeNHA central region.-----	28
Table 3.4: Operationalization of Variables -----	33
Table 4.1: Questionnaire return rate. -----	34
Table 4.2: Gender of the respondents -----	35
Table 4.3: Ages of the respondents -----	36
Table 4.4: Education level of the respondents -----	36
Table 4.5: Designation of Respondents in Projects -----	37
Table 4.6: The Influence of Finance on Projects Implementation -----	38
Table 4.7: Access to Finance Indicators and Influence on Implementation of PBC Projects -----	38
Table 4.8: Duration the Interviewees have worked in PBC Projects -----	40
Table 4.9: Frequency at which the Respondents Attend Trainings and Development Programmes -----	41
Table 4.10: Ratings on the influence of staff competence in implementation of PBC projects.-----	42
Table 4.11: Indicators of Staff Competence and Implementation of PBC Projects -----	42
Table 4.12: Public participation and implementation of PBC Projects-----	44
Table 4.13: Indicators on Public Participation and Implementation of PBC Projects-----	45
Table 4.14: Correlation between Access to Finance and Implementation of PBC Projects -----	47
Table 4.15: Correlation Analysis between Staff Competence and Implementation of PBC Projects -----	48
Table 4.16: Pearson Correlation between Public Participation and PBC Projects -----	49
Table 4.17: Multiple Regression Analysis -----	50
Table 4.18: Road User’s Response Rate-----	51

ABBREVIATION AND ACRONYMS

APRP	Annual Public Roads Programme
GOK	Government of Kenya
JICA	Japan International Cooperation Agency
KeNHA	Kenya National Highways Authority
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KRB	Kenya Roads Board
KeRRA	Kenya Rural Roads Authority
KURA	Kenya Urban Roads Authority
NACOSTI	National Commission for Science, Technology and Innovation
PBC	Performance based road maintenance project
RMLF	Road Maintenance Levy Fund
RoK	Republic of Kenya.

ABSTRACT

Factors affecting the implementation of performance based road maintenance projects in Kenya National Highways Authority (KeNHA) Central region, Kenya were determined in this study. The particular aims were to determine the level to which financing influence carrying out of performance based road maintenance projects in KeNHA central region Kenya, to establish impact of staff competences on performance based road maintenance works in KeNHA central region, Kenya and to assess the effect of public involvement on the implementation of performance based road maintenance projects in KeNHA central region, Kenya. Descriptive research design which encompasses qualitative and quantitative approaches was used to measure and analyzes data. The target population included all staff members working at KeNHA, it also incorporated construction company employees, relevant government agencies and road users. In order to acquire representative sample, 36 professionals were sampled purposively to include 2 road engineers, 3 Assistant Engineers, 6 Road Inspectors, 6 Assistant Surveyors, 15 site agents, 1 finance officer, 1 Kenya Roads Board (KRB) officer, 1 officer Ministry of Transport and Infrastructure (MoTI) and 46 road users were selected by stratified random sampling technique. Primary data was collected by means of questionnaires and an interview schedule. The questionnaire was both semi-structured, that is, open-ended questions to elicit qualitative responses, and closed-ended questions to collect quantitative data. Secondary data to supplement the primary data was collected from the KeNHA central region headquarters, Nyeri. The data included the information on the Governments road maintenance implementation contracts through performance based contracting in KeNHA Central Region, lists of roads and maintenance schedules in the area, the number of contractors and staff, and road users seeking various services in KeNHA central region offices. Quantitative data was entered in Statistical Package for Social Sciences Version 22 for analysis of descriptive statistics and inferential statistics. The data was summarized using tables and percentages before being summarized by descriptive statistics measures like mean, mode, median, frequencies and standard deviation. Inferential statistics (Pearson correlation coefficient and multiple regression analysis) were used to determine the relations between independent and dependent variable (implementation of PBC projects). Data analysis, presentation and interpretation of the research findings are presented in chapter four. The outcomes of the study indicates that access to finance, staff competence and public participation have a strong influence in implementation of performance based road maintenance projects. The respondents gave a variety of proposals on what need to be improved to make PBC projects a success. They proposed payment of road contractors on time, continuous staff training and engaging the public on daily basis would enhance the implementation of PBC projects greatly. The research supports that timely access to finance by the road contractors should be enhanced and diversified. Continuous training of project staff and road contractors should be carried out often. Public participation should be conducted often on all PBC projects. The study can assist the road agencies and government institutions on the best modes of financing PBC projects, best areas to train project staff and durations between trainings and how and when to engage the public in the projects. Future studies should be carried out on how road reserve encroachments, contractor's capacity and lack of road furniture affects implementation of PBC projects.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Roads are essential national assets that steer economic growth in a country. Provision of good health, employment creation, improvement of literacy levels, all depend on a good road network worldwide. Well maintained road network is vital in a country to fight poverty levels as people are able to access social and economic services (Data, 2011). The road infrastructure spur competitiveness and economic productivity above all other means of transport like air, water and rail. The World Bank since 2002 has rehabilitated or constructed over 260,000 kilometers of road through funding of various governments agencies mandated with road construction (Berg, 2015). Approximately 177,800 Kilometres accounts for the Kenya road network with 63,575 Kilometres being grouped and classified. The classified road network has grown from 41,800 Kilometres to 63,575 Kilometres an upgrade of about 600 km annually, since independence. Over the same time, there has been an increase of paved road length from 1,811 Km to 9,273 Km. Approximately 70% (44,100 Km) of the categorized and classified road network is well maintained. The remainder 30% (18,900 km) requires reconstruction and structural improvement. In the perennial rainy seasons in Kenya, most roads require rehabilitation and maintenance, an exercise which has not yielded positive results over the years. The road inventory and condition survey of 2016, has reported that 19%, 22% and 59% of the bitumen was considered good, fair and in poor condition respectively while the state of unpaved roads was rated as 12% good, 22% was rated as fair and 66% was rated as failed (KRB Annual report, 2016).

Wasike (2001), advances an account of road policy frame work in Kenya, which indicates that, during the first years after independence the road infrastructure was funded through CESS funds from sale of rural farm produce. In the second decade (1974-1984) the road policy in Kenya show minor roads and access roads in rural areas being constructed. From 1985 onwards, there has been several policy reforms for road infrastructure developments. The road policy advancements have led to creation of Kenya Roads Board, the formation and introduction of a road maintenance levy fund used in roadwork's repairs, axle-load

limits to curb overloading on roads, and increased public private participation in several areas of road infrastructure delivery.

Ikiara et al (1998) advanced that after the policy reforms witnessed in the fourth decades on road infrastructure development, road agencies with clear mandates and authority were founded during the fifth decade through an act of parliament to oversee road construction and maintenance of roads in Kenya. The Kenyan Government formed three road Agencies namely Kenya Rural Roads Authority (KeRRA) , Kenya National Highways Authority (KeNHA), Kenya Urban Roads Authority (KURA) to manage and implement development, construction and repair of road network in Kenya (Kenya Roads Act, 2007). Kenya National Highways Authority (KeNHA) is involved with construction, maintenance and management of Class S, A and B roads, and to oversee the collection and collation of any data necessary for smooth planning of road development activities of national trunk roads. The Kenya Rural Roads Authority has a mandate to manage class C, D and E roads while Kenya Urban Roads Authority (KURA) is responsible for construction and maintenance of the urban roads.

In Kenya and most countries in Africa, road network is the cornerstone of sustainable economic growth in every sector including health, transportation and agriculture. However, despite the importance of road network to economic growth in Kenya, road maintenance experiences a magnitude of obstacles. There is inequity between the money allocated for maintenance of the existing infrastructure and amount of work needed to be implemented. Construction of new roads is prioritized over maintenance of the existing road network. Further, lack of road maintenance culture curtails rehabilitation of road networks in Kenya. It is yet to be determined why these challenges remain unresolved despite the enormous benefits of maintaining road infrastructure (TurnBaugh, 2005).

Kenya has a fairly developed road network, however it has suffered over the years due to neglect, poor or delayed maintenance, repairs and rehabilitation (MR&R) occasioned by fragmentation of institutional framework for infrastructure management (Wasike, 2001). Roads in Kenya like anywhere else in the world, they have to compete for funds for their preservation against other countries sectors like internal and external security of a

country, the health, education, emergencies like drought and floods that disadvantages road maintenance funding in the annual budget debate. To gain greater mileage in performance improvement within the public sector and road maintenance in particular, New Public Management model stresses on the adoption of finest practices in the market through benchmarking with organizations carrying out similar business and be adopted in the public institutions (Balogun, 2003). This is in an effort to actualize public service reforms aimed at withdrawing back poor service delivery. New public Management (NPM) models have been incorporated among them the introduction of performance based contracting within public projects focused on faster and quality delivery of services to the satisfaction of the customer at minimal cost and on time (Ayee, 2008).

1.2 Statement of the Problem

According to (World Bank 1995; Kimuyu and Mugerwa, 1998) the Kenya road network deteriorated more in the 1980s due to inadequate funding for maintenance works or lack of it completely. Most of the funds were committed to road infrastructure development and little attention was given to maintenance of the road network. Poorly maintained roads eventually fell into an unrepairable state leading to increased costs for road users in vehicle repairs, time taken in travelling, and safety in the use of roads. Such roads also cost more to rehabilitate which drain financial resources that could be spent on deserving cases, such as education and health sectors. Deterioration went further and led to losses in economic growth due to increased cost in transportation of goods and services and the social benefits it confers.

Msafiri, (2015), states that poorly maintained roads not only impose a major constraint to a country's economic growth and poverty reduction potential but also impose what, in essence, is a hidden tax on civil society. The real problem is not whether the roads are maintained or not, in any case the cash cow for unscrupulous contractors and government agencies is "Road maintenance" The real problem is how the maintenance is carried out or has been previously carried out on roads within the county (Ikiara et al ,2000). The exercise of maintenance has resulted in shoddy work being carried out and by none qualified contractors who use substandard material, unqualified personnel and equipment not in good working conditions (Kenny, 2007). It was not uncommon to see a few individuals

with dilapidated wheelbarrows and spades masquerading as contractors filling the potholes with soil in the name of repair. Pursuant to this and other challenges associated with repairs and maintenance, it was suggested that performance based road maintenance contracting would provide a solution albeit not be the panacea to the problem of substandard maintenance and repair of roads in Kenya. These challenges informed the decision to critically look into the key factors influencing the implementation of performance based road maintenance projects.

1.3 Purpose of the Study

The purpose of this study is to investigate the factors influencing the implementation of performance based road maintenance projects in Kenya National Highways Authority (KeNHA), Central region, Kenya.

1.4 Objectives of the Study

- i. To determine the extent to which access to finance influences implementation of performance based road maintenance projects in KeNHA central region.
- ii. To establish how staff competence influences implementation of performance based road maintenance projects in KeNHA central region.
- iii. To establish how public participation influences implementation of performance based road maintenance projects in KeNHA central region.

1.5 Research questions

The study will strive to answer the following research questions:

- i. To what extent does access to finance influence the implementation of performance based road maintenance projects in KeNHA Central Region?
- ii. How does staff competence influence the implementation of performance based road maintenance projects in KeNHA Central Region?
- iii. How does public participation influence the implementation of performance based road maintenance projects in KeNHA Central Region?

1.6 Significance of the Study

This research will be valuable for three major reasons. First, it will show the level of maintenance and status of roads in KeNHA Central Region. Second, is to establish how maintenance is financed and the challenges hitherto, the kind of maintenance policies advanced by the two tier governments (county and national) and the level of performance based road contracting involved in maintenance of roads within KeNHA regions especially KeNHA Central Region. It will gauge how staff competence affects the implementation of the performance based road maintenance projects. Lastly, it will evaluate the role of public participation in road maintenance under performance based road maintenance contracting. The findings of this study are expected to benefit the national agencies charged with road maintenance for KeNHA, KeRRA, KURA, KWS and County Governments in management and implementation of their mandates on road infrastructure management.

1.7 Limitations of the Study

To overcome challenges in the study, the researcher had to determine the reliability of the questionnaire. One method was to use the internal consistency technique by applying the test re-tests method where a pilot group was used to determine the reliability of the instruments. Also the researcher increased the sample sizes and eliminated any barriers that would have decreased the return rate, such as by making the questionnaires easy to answer in one sitting. The researcher included contingencies in the budget to access projects that were far away from KeNHA offices in Nyeri.

1.8 Delimitation of the Study

Though road maintenance is a task carried out by various agencies depending on the class of the road and jurisdiction, this study restricted itself to the application of performance based road maintenance contracting in maintenance of class A and B roads within the central region under the jurisdiction of KeNHA. It also delimited itself to studying the influence of financing this task, the influence of staff competences, the role of public participation, the role of government policies and culture in implementing of performance based road maintenance projects in KeNHA Central Region. These restrictions were important first because the study became manageable. Secondly, each group has its own uniqueness and studying more than one would require better resourced means. Thirdly,

KeNHA staff are the biggest stakeholders in terms of technical, managerial and data input in road construction in Kenya.

1.9 Assumptions of the Study

The first assumption is that the selected sample closely represent the population. The second is that the instruments used to collect the data were be valid and reliable. The third assumption is that there was a certain service level of road maintenance under performance based road maintenance contracting which contractors were expected to meet.

1.10 Definitions of Significant Terms

Access to finance	Issues associated with the cost and funding of projects.
Class A Roads	Roads connecting international boundaries at identified immigration entry and exit points and international points such as air or sea ports.
Class B roads	Routes connecting national trading centres, county headquarters and important economic hubs to each other and to the national capital or to class A roads.
Class S roads	Trunk roads connecting two or more National or international cities meant to carry a large volume of traffic at the highest legal speed of operation (Kenya gazette supplement No 77, National Assembly Bills, 2015).
KeNHA Central Region	The region that covers all the class S, A & B roads traversing through Nyeri, Kirinyaga, Embu, Muranga, Tharaka Nithi, Meru ,Laikipia and Nyandarua Counties.
Level of Service	The greed performance criteria and targets that are to be achieved in a Performance based road maintenance project.
Public participation	Processes that involves the citizens in decision making and takes into account public input.
Performance based road maintenance project (PBC)	It's a model of contract where by a fixed lump-sum amount per km per month is paid for bringing the road to the agreed service levels and maintaining it for a specified period of time.
Road Maintenance	Regular activities done to keep the road carriageway, drainage facilities, road furniture's as near as possible to their constructed or rehabilitated conditions.
Staff competence	Essential skills and knowledge that aid in performance of a job.

1.11 Organization of the Study

This project is organized into five chapters. Chapter one comprises of the background of the study, statement of the problem, purpose of the study, research objectives, research questions, and significance of the study, limitations, basic assumptions and definition of significance terms. Chapter two comprises of literature review for the independent and dependent variables, conceptual framework is provided at the end to illustrate the linkage between the independent and dependent variables of the study. Chapter three comprises the research methodology, which is divided into research design, target population, sample and sampling procedure, research instrument, data collection procedure and data analysis techniques. Chapter four comprises of data presentation, interpretation, analysis and discussion of the results. Chapter five entails the findings, discussions, conclusions and recommendations of the research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter advances literature reviewed on management of roads maintenance with and without performance based road maintenance contracting, the theoretical review, empirical review and the conceptualization of the study.

2.2 Performance based road maintenance Contracting (PBC)

Performance contracting for road infrastructure maintenance commenced between 1980s and 1990s in the world. The sole purpose was to improve government efficiency in road service delivery which can improve cost savings between 30% and 50 %, this is based on evidence from Latin America and Australia which contracted his road works instead of using government employees to do the works (Zietlow, 2015). Heggie (1995), advances that performance based Contracts are fixed price contracts that can include programmes for emergency works that arise randomly. To achieve service levels in the contracts rehabilitation of dilapidated sections of the road are addressed first through the traditional model of road maintenance where the works are paid through items in the bill of quantities and unit prices specified in the contracts as in the cases of Chile, Colombia and Uruguay, or final design and specifications of the rehabilitation works can be left to the contractor and payment added in the lump sum contract amount (Gomez et al, 2000).

To ensure success of projects initial rehabilitation works in the Performance Contracts are included due to the following advantages first, it accords the contractor the morale to do proper and standard rehabilitation works to avoid untimely repairs which increases the maintenance cost leading to less profits, and second, it ensures that maintenance works are done immediately after the rehabilitation works to minimize cost on manpower inputs and other costs associated with road rehabilitation (Geddes, 2016).

Performance based contracting is described has a contract where payment is attached along attainment of clearly defined performance targets and indicators (Stankavish, et al, 2005). Payments are made on output based criteria upon meeting certain levels of service has opposed to classic model where payments are done on inputs based on the itemized bill

of quantities in the contract (Gericke et al, 2014). Roads in African countries are characterized by poor maintenance leading to delayed maintenance over the years. Bureaucratic governments have been managing the roads spending too little in the maintenance and rehabilitation of the same. Heggie, (1999) estimated that African countries need \$40 billion to reinstate dilapidated classified roads as poor through reconstruction and rehabilitation.

Due to lack of maintenance \$150 billion invested in roads has been wasted through poor maintenance. Dekker (1996), postulates that failure to maintain roads impacts road users negatively. The cost of road transport skyrockets and the net economy deteriorates. Each dollar omitted in road maintenance increases the cost of vehicle maintenance by \$3 dollars (Queiroz, et al 2008). In 1988 the British Columbia in Canada contracted its works without performance standards limiting the contractors in use of new technologies on road maintenance. Argentina followed thereafter and contracted a number of there national roads introducing end results of the works and penalties for works omitted or not carried out as agreed in the contracts.

In 1990s countries like Brazil, Chile, Uruguay Peru, United States of America started performance based road contracts. In Uruguay 359 kilometers of road were put underperformance contracts and within five years the programmes realized a lot of success in ensuring that sustainable transport was maintained and the government put 50% of the national network under performance based road maintenance contracts. In Australia performance contracting commenced in 1995 where urban roads in Sydney covering 459 kilometers were contracted (Zietlow, 2015).

To address the sustainability of road maintenance in Africa it was realized that the problem was not technical but rather multidimensional in nature comprising of governance, institutional funding, management of technical matters, policy formulation and contractual issues, to ensure road preservation, new management models had to be devised to avoid the vicious cycle of newly constructed roads deteriorating to unrepairable state (Pinard, 2012).

In Africa the new management model for roads started around the year 2000 (Sultana et al 2012). To attain extreme benefits from the road network infrastructure and guarantee longterm sustainability of the road asset, proper management of road infrastructure strategies and plans, must be put in place and implemented on time (Harral et al, 1988 ;ADB, 1999). In 1999 the government of Chad after realizing its people had sunk into poverty despite wealth from oil mining due to lack of good road network, to promote internal movement, they formulated National Transport Program, to ensure sustainable transport all year round, some roads were put under performance based road maintenance program, where 441 kilometres of road were constructed (Hartwig et al, 2005).

In Liberia it was started in the year 2010 with 80km of Diahambah - Gberzohn highway (Hart wig, et al 2005).In Uganda its road agency (Uganda National Roads Authority) contracts 90% of its road maintenance works while the remaining 10% is maintained through forced account (Van Ham, 2015).In Zambia, four contracts of rural roads between 160 and 450 km in poor condition were put under performance based contracts. Despite the lack of traffic data for project preparation, poor packaging, positive results were realized (Gericke et al, 2014) and in their study of Performance Based Contracts in 2008, Zietlow & Edmonds noted that there were 3445 km of rural roads under PBC in Zambia. An audit carried out by European Union in 2007 concluded that there was general lack of information and experience in the contracting government agencies and contractors/consultants on performance based road contracts however the outcome of the projects was positive (Zietlow ,2008).

Alila (1988) resolved that governments are constrained to provide efficient and effective services demanded by citizens on time within the limits of time, cost and quality. Ayee (2008) advances that to improve service delivery in road work the government agencies starting in the year 2010 started experimenting on performance based road maintenance method by putting some of the paved road network under this new management model to ensure road networks are maintained in good condition throughout their life time. Heggie (2003), it is on this premise that the government proposed the use of performance based road maintenance contracts to alleviate the challenges of road infrastructure maintenance on Kenyan roads by the main road agencies tasked with the responsibility of implementing

the projects. Close cooperation is needed between the road managers and contractors to understand the contract arrangement and risk involved in the new management model (Gunter Zietlow, 2004). Road asset rehabilitation by performance based maintenance contracts (PBC) began in Kenya in the year 2010 in Kenya Rural Roads Authority contracts, then, extended to the roads under Kenya Urban Roads Authority in 2012, and Kenya National Highways Authority in 2016, the total length of classified roads under performance based road maintenance contracts is currently 870km among the three road agencies (KeNHA, KURA and KeRRA) (Gok, 2016).

2.3 Funding Methods and Implementation of PBC Projects

Sands (2006), underscores that excellent transport system is good for sustained economic development of a country. If the transport is poor, a countries products become less competitive in the national and international markets. The cost of developing a good road network and maintaining it requires a strong and stable funding model. Timely rehabilitation and maintenance is less expensive than delayed maintenance. When roads receive maintenance continuously the overall burden of incurring huge cost to rehabilitate deteriorated sections are less costly compared to surface dressing or overlays of asphalt concrete (World bank 2008). Countries globally are experiencing shortage of funds to finance the growing roads sector due to expanded settlement as a result of population growth and other competing sectorial needs like security, education etc. The countries consolidated funds are unable to meet demands of all the public sectors and the road sector is not an exceptional as it competes for government revenues with other sectors of the economy (Howe, 1999).

Gavira (1990) states that roads need stable flow of income to meet their maintenance needs. Almost all countries globally have a deficit of funds to keep roads in good condition, budget allocation have been reduced on short notice to cater for other pressing issues in the country's economy as witnessed in Kenya during droughts or emergencies like El nino floods, as a result road conditions continue to deteriorate. According to Gwilliam et al (1989), to ensure continued sustainability in provision of road infrastructure, countries are trying to maximize on available funds, introduce toll stations on roads with large volumes of traffic per day and introducing concession agreements where private investors build and

operate roads for a period before reverting back to the governments. In Latin America it was proposed that the road users be charged a road maintenance tariff in return of road maintenance services (Zietlow et al, 1999).

Most countries in Africa (South Africa, Tanzania, Benin, and Zambia) have road funds which are managed through existing road agencies, authorities or respective ministries. The funds are generated through road user charges and government transfer of taxes which are always inadequate. To raise the much needed revenue most countries in Africa are commercializing the road sector creating a healthy competition among other sector players like rail (Heggie, 1995). The road funds are created with an aim to finance maintenance works although in countries like Tanzania, Kenya and Mozambique periodic, rehabilitation, spot improvement works are funded from this kitty. In South Africa the funds are used also for new road development (Heggie, 2003).

To finance the road infrastructure different countries raise revenue through various funding models for road maintenance, taxes, road service user charges, Government bonds, annual fee for vehicle registration, concessions, and credits from foreign government are among some of the methods used to raise revenue for road maintenance (Horvat et al, 2007).

In Kenya road maintenance is funded through fuel levy charges and fees raised in toll stations. The fuel levy fund is managed by Kenya Roads Board under the Kenya Roads Board Fund (KRBF), a legal body established by the Kenya Roads Board Act No. 7 of 1999 and in line with Chapter 446 of the State Corporations Act. KRB disperses funds to all road agencies according to rules set out in the Kenya Roads Board Act of 1999 (KRB, 2016) where KeNHA receives 40% of the funds collected for the maintenance of national trunk roads.

2.3.1 Kenya Roads Board Fund (KRBF) and Implementation of PBC Projects

Government operations were changed in the way they operate by the Kenyan constitution enacted in the year 2010, by creating the national and county governments. The decentralization of the central government functions also witnessed the decentralization of road funds to ensure effective faster and efficient service delivery. The board dispenses the

money for maintenance through the Kenya Roads Board Fund to all agencies. Each agency prepares its annual roads work programme detailing the amount each will spend. The national trunk roads are preserved by the three road agencies on behalf of the national government and the feeder roads to the trunk roads are maintained by the devolved governments.

The entire road network by 2016 was estimated to be 161451.3 Kilometres out of which 39,995.1 Kilometres were national trunk roads and 121456 Kilometres were county roads. KeNHA is in charge of 18,101.9 Km, KeRRA 19,524.2 Km and KURA 2,364.5 Km (KRB, 2018). Every year the Kenya roads board disburses funds for road network maintenance via Kenya Roads Board Fund (KRBF). The Funds are dispersed to the road agencies tasked with road network repairs in Kenya to KeNHA, KURA, KeRRA, Kenya Wildlife Services (KWS) and the County Governments. According to Section 19 (4) of the KRB Act, it is supposed to review Annual Road Works Programmes (ARWPs) presented by every road agency and consolidated into an Annual Public Roads Programme (APRP). In the financial year (2018/2019) the Annual Public Roads Programme planned to ensure 7,099km of road network is put under performance based road maintenance contracts (KRB, 2018).

Over the years fuel levy has been the major source of funds for road maintenance in Kenya prompting the government to increase the charges from Ksh12 to Ksh18 per litre of fuel. Due to inadequate funds to cater for all road maintenance activities the government is opting to generate more revenue for road maintenance through introduction of long term infrastructure bonds, charges on outdoor advertising, charges on motor vehicle insurance, public private partnerships besides fuel levy and charges at toll stations (KRB, 2018).

2.4 Staff Competence and Implementation of PBC Projects

The Business dictionary expresses competency as the constitution of evident and measurable knowledge, talents, capacities and personal characteristics that contribute to enhanced employee performance and ultimately result in organizational success. (McClelland, 1973), advances that competencies are characteristics which enables a person to perform tasks. Boyatzis (2008), suggested that competences are characteristics in a person which he/she uses to perform tasks. These can be motives, skills, knowledge and

traits which can be observed and noted as one performs the tasks. Dingle (1995), notes that competence is the awareness of knowledge to perform the job as per the outlined standards. One must be aware of the fundamental principles needed to complete the tasks to their logical conclusion.

Projects do not plan and implement themselves. Human resource with the necessary skills and competencies are required to accomplish the task (Al momani, 2010). Edmonds (1980) and Estache (1999), advances that to achieve the ultimate goals of the project, all staff involved in the project must be aware of what is expected of them. Project managers must recruit and assign people with the right competencies, technical skills and knowledge to the relevant sections to steer various stages of the project implementation. Underperformance and mismanagement can occur in a project when it lacks the prerequisite skills and management (Kasvi, et al, 2003). The project management is required to monitor progress and report on monthly basis on the achievements. They are required to identify the gaps in skills needed to execute the project works and recruit the staff with the skills needed (Arditi et al, 2011). The ability of an agency to render its mandate effectively in a society depends on the staff competencies it employs (Graveter et al, 2007). Projects that are well implemented and achieve their objective have been associated with good managerial skills and a lean staff who possess the prerequisite technical skills (Iyer and Jha 2015).

Since the staff at KeNHA and in the projects plays the key roles of dissemination and coordination in the agency relationship between the government and the contractors, it's of paramount importance to establish their competency in implementation of performance based road maintenance projects. The capability of contractors both in technical and human resource should be evaluated if the project has to achieve its objectives (Greiling, 2006). A number of ways can be employed in KeNHA to gauge staff competencies. These include: Annual appraisal of employee performance could be conducted to provide a report on the employee for the last 12 months and get feedback from the employee. A feedback questionnaire can be used to give information on how an employee performs their colleagues, peers, customers and managers perspectives, giving individuals an opportunity to be honest about their interactions and experience of working with the employee in

question. An account of Key Performance Indicators (KPIs) can be carried out to identify key targets for the employee to work towards. Regular staff meetings with the staff engaged in implementation of projects with the Regional Director should serve as a supportive tool to identify and discuss positive points and any areas for improvement. The meetings should be documented, to highlight any issues should the employee require any training programme to improve is skills.

2.5 Public Participation and Implementation of PBC Projects

Public participation is a series of actions an individual undertakes to participate in the affairs of a government or community. The activities can comprise voting, attending public gatherings, involving oneself in public or private political discussion or debates, appending a signature to petition on a desired government action or policy, volunteering in community activities and other similar activities (Uraia Trust, 2012). Public participation is any activity that directly engages the public in decision-making and offers total consideration of the public input in making a decision on a particular issue (public participation guide, 2006; Oakley 2013).

Public participation is a process, not a one off event. It consists of a chain of activities and actions by a sponsoring agency over the full lifespan of a project to both inform and educate the public and obtain input and feedbacks from them. Daily et al (2003), postulates that Public participation extends to stakeholders (those that have an interest or stake in an issue, such as individuals, interest groups, and communities) an opportunity to authoritatively influence decisions that affects their livelihoods. According to (Pate 2003; PMBOK, 2000), when done in an organized way, public participation results in significant benefits has Sponsor agencies make better and more easily implementable decisions that reflect public interests and values that are better understood by the public or affected communities. The societies develop enduring capacity to solve and manage challenging issues that affect them, often overcoming challenges and misunderstandings in the process of the project implementation. The main aim of engaging the public is to share and gather information from the public about their interest in the project. The Constitution of Kenya 2010 accords its citizen the right to participate in activities that have a direct effect on their lives (Mbaabu, 2012). It has several articles expounding the importance of public participation

in all government processes. Article 10 of the constitution acknowledges the importance of public participation has one of the national values the citizens should embrace (GOK, 2010).

Transparency in all government process, and access to information demands that public forums and civic education forums be conducted to sensitize the public on government plans /policies. When people are involved in public projects, they feel part and parcel of the processes and will provide the needed support in form of labour, materials and expertise required in the projects (Ondieki, 2011). The public has a tendency to disown ideas and projects imposed on them. According to (Anwar 2007; Mile, 2012) Governments globally have realized the importance of public participatory processes in planning and implementing projects without much resistance resulting in wasted time and resources. Faustina (2016) in his studies indicated that public participation creates an oversight role in the management of resources. The public can raise concerns when they feel the services being rendered are not up to standards. Studies carried out on public participation, Onchoke (2013), Ondieki (2011) underpins the importance of stakeholder participation in the success of any public project.

Performance based Road maintenance projects success depend largely on the communities where they are physically located. The Roads Act 2007 section 49, says that no person is supposed to carry out any unauthorized activities on the road reserve without the written permission from the respective agency managing the road. Contrary to this law Kenyan roads are characterized by kiosks, open market businesses, farming, grazing, blocking of drainage channels, vandalism of road furniture etc. on the road reserves. The various agencies responsible are required to carry out public participation processes to educate the public on their misdoings which affect the service levels the road contractors are supposed to meet (Pearce, 2010).

Different stakeholders have varied influence on projects which can derail the implementation process. The ability to formulate, implement and monitor projects require the full support of all stakeholders to play their respective roles. A weak link in the project can render the whole project unsuccessful. (Bernard, 2014) compared the success of a

project to the strength of the relationship between the stakeholders and the project. Public involvement ensures that citizens have a voice in public choices.

2.6 Government Policies and Implementation of PBC Projects

Many institutions have been created by the government to ensure registration and regulation of the construction industry. According to the United Nations Economic and Social Council, Economic Commission for Africa (2005), suitable regulatory frameworks and bodies at national level to manage road asset construction projects are necessary in operationalizing national policies, protect property rights, and engender equitable returns on private investments through proper and efficient tariff structures, and quality service standards. The construction industry impacts enormously on the economics of this country (GOK, 2010). 90% of the freight traffic is carried through the road transport. Kenya vision 2030 has singled out construction as a major enabler of the country's economy. Without roads people cannot move or transport goods efficiently (Ezekiel, 2017).

To regulate the construction industry the Kenyan government through National Construction Authority requires all road contractors to be registered with the Authority. This ensures the contractors who are given the responsibility to maintain the roads are tested, qualified and possess the necessary equipment's and legislation's to perform the tasks has outlined in the Government contracts. To ensure success in road projects implementation, the Kenyan government has a Road Sector Investment Plan that ensures prioritization of the road network development with maintenance as a priority. This ensures the road infrastructure is maintained to reap maximum benefits from the investment (Jacob, 2016).

National government provides guidelines on performance based road maintenance contracting and regulates the projects under performance contracting through its designated government agencies. Studies carried out in Austraria by Hensher and Stanely in 2007, indicated that contractors who carryout works under performance based contracts adds value to the projects to deter regular maintenance works which are costly. The prioritization of maintenance, the timing when it is supposed to be executed should form part of the road agencies asset protection master plan. Organized maintenance ensures that the road asset

creates value for the road users through reduced maintenance cost of vehicles and faster mobility of goods and the economy at large (Pinard, 2016). All contractors given responsibilities to maintain roads are required to meet and observe the policies and regulations with the respective institutional bodies (Sarriot, 2004). KeNHA is not an exceptional, all contractors are supposed to have registered with the national construction authority and get the relevant working documents from government institutions.

2.7 Organization Culture and Implementation of PBC Projects

Barthorpe et al. (2000) defined culture as “what we are and what we do as a society. For business to succeed the managers need to understand the environment and cultures of the people they trade with (Walker et al. 2003). Fletcher (1999) found that due to a mix of people from different races and backgrounds there were misunderstandings in construction projects in Limpopo, South Africa. People understand they are unique and it is upon the project manager to direct people on what role he expects them to play in ensuring the project succeeds (Fernald, 1999). Listening skills is a vital trait, project managers are entailed to understand different people and their cultures to create motivated teams in projects (Karl, 2000).

Construction industries involve different people from different backgrounds. Hence a proper understanding and management of this cultural background is essential in the construction industry to ensure proper planning and an interrupted work implementation schedule. Serkan et al (2008), in their study on cultural differences states that, there is a close correlation between cultural differences and success in a project. Respect and acceptance of different cultures are pertinent in managing projects fruitfully when conducting business with people from different cultural backgrounds.

Working with different personalities has an advantage due to knowledge sharing and exposure to a variety of information on best practices in project management. Mismanagement of cultural differences and miscommunication are a recipe for project failure (Karl, 2000). PMBOK (2000) postulates that project management involves use of knowledge, skills, tools and techniques to project activities, the traits can be acquired by observing, learning, apprenticing and practicing that which works better for the benefit of

the project. The contractor may encounter different people from different cultural background, and this cultural difference may influence the implementation of the performance based road maintenance projects. Rising awareness among the contracting parties avert misunderstandings on the contract requirements and ensure a culture of team work to achieve the project goals within the set time frame (Sambasivan and Soon, 2007).

International projects are a source of diversity in all human aspects. Creativity, pools of knowledge base can be tapped from people of different origins and blended with local cultures to ensure smooth running of projects, this curbs any challenges or difficulties in miscommunication for better contract management. Smooth running of Projects and their management in their lifespan of implementation succeeds in a cross-cultural environment through effective leadership, use of most common understood language, respect, regular consultations and meetings (Kasvi et al, 2003). Project managers need to organise meetings regularly to check on any misunderstandings in the project environment.

2.8 The Agency and Stake Holder Theories

The theoretical framework for this study will be derived by a combination of agency and stakeholder theories in its application to performance based road maintenance contracts. The Agency theory sufficiently explains the relationship between two parties (principals and agents of a firm) and the solution to the problem that arise due to the unshared mutual interest (Jensen & Meckling, 1976; Ross, 1973). The aim of the principles is to have quality work done at minimal monitoring cost while the aim of the agents is to maximize interest out of the works done.

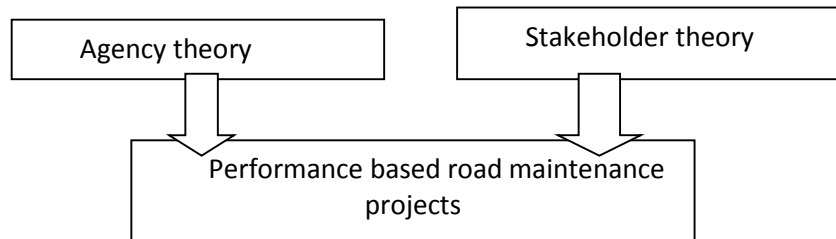
In this study the concept of agency exists between the Ministry of transport and infrastructure, and KeNHA as an agent charged with the responsibility of overseeing maintenance on all class S, A and B roads in Kenya. The authority has to be aware and have information on risk involved in the projects. The agency relationship further exists between KeNHA and the various road contractors engaged by KeNHA to carry out specific projects in maintenance of roads in various counties and on roads under the jurisdiction of KeNHA. While KeNHA aims to achieve the goal of excellent quality in road maintenance, on the other hand the contractors aim to maximize profits out of the contracted projects,

which lead them to a tendency of doing less quality work through minimizing road construction/maintenance inputs to maximize their profits.

According to Lician and Jesse (2004), the agency theory occurs when the contracted entity (agent) in this case road contractors are in a position to make decisions on behalf of the principal, in this case KeNHA. The Authority must have information on the road contractors to avert risks which can lead to project failure and poor implementation hence not meeting the contract terms like paying for undone works. It should have a strong monitoring mechanism which is an avoidable cost in the agency theory. Eisenhardt (1989), underscored that an excellent governance system can transfer the agency conflict. His recommendations to minimize the agency problem were, one ought to formulate outcome-based contracts where the performance of the agent can be measured and monitored, and the principal must have a strong information database at his disposal, and be aware of the agent's information to avoid manipulation or misrepresentation of the principal's interests. Hence to avoid this agency conflict KeNHA adopted PBC projects has a new management model where works are paid on agreed service levels which is output based method which ensures KeNHA gets value for money invested (Eisenhardt, 1989).

The stake holder theory revolves around management of organizations, the morals and ethics that managers have to deal with in running the institutions. The stakeholders of a firm or a project must be well known to ensure smooth operations of the firm (Friedman et al, 2006)

Madsen, (2011), advances that institutions should find a way of integrating stakeholders of a project in its management. KeNHA must know and deal with the expectations of its customers, such as paying suppliers on time, conducting corporate social responsibilities and offering employment to the communities where the projects are being implemented. Pepper et al, (2012), postulates that the principals may want to expand the business while the shareholders of the firm want to be paid the dividends. Hence it is vital for the management to devise ways of controlling the interest of the stakeholders in an amicable way to ensure projects success (Phillips, 2003).



2.9 Conceptual Framework

Conceptual framework is a diagrammatic design of concepts that offers a bearing to a study and allows the interaction between the dependent and the independent variables to be described (Kothari, 2004). In this research study, the dependent variable is performance based road maintenance project while independent variables are those factors that influence the realization of the dependent variable that is; financing of road maintenance projects, staff competence and public participation influences on implementation of performance based road maintenance projects. However the influence may be moderated by government policies and regulations and the influence of culture.

Independent Variables

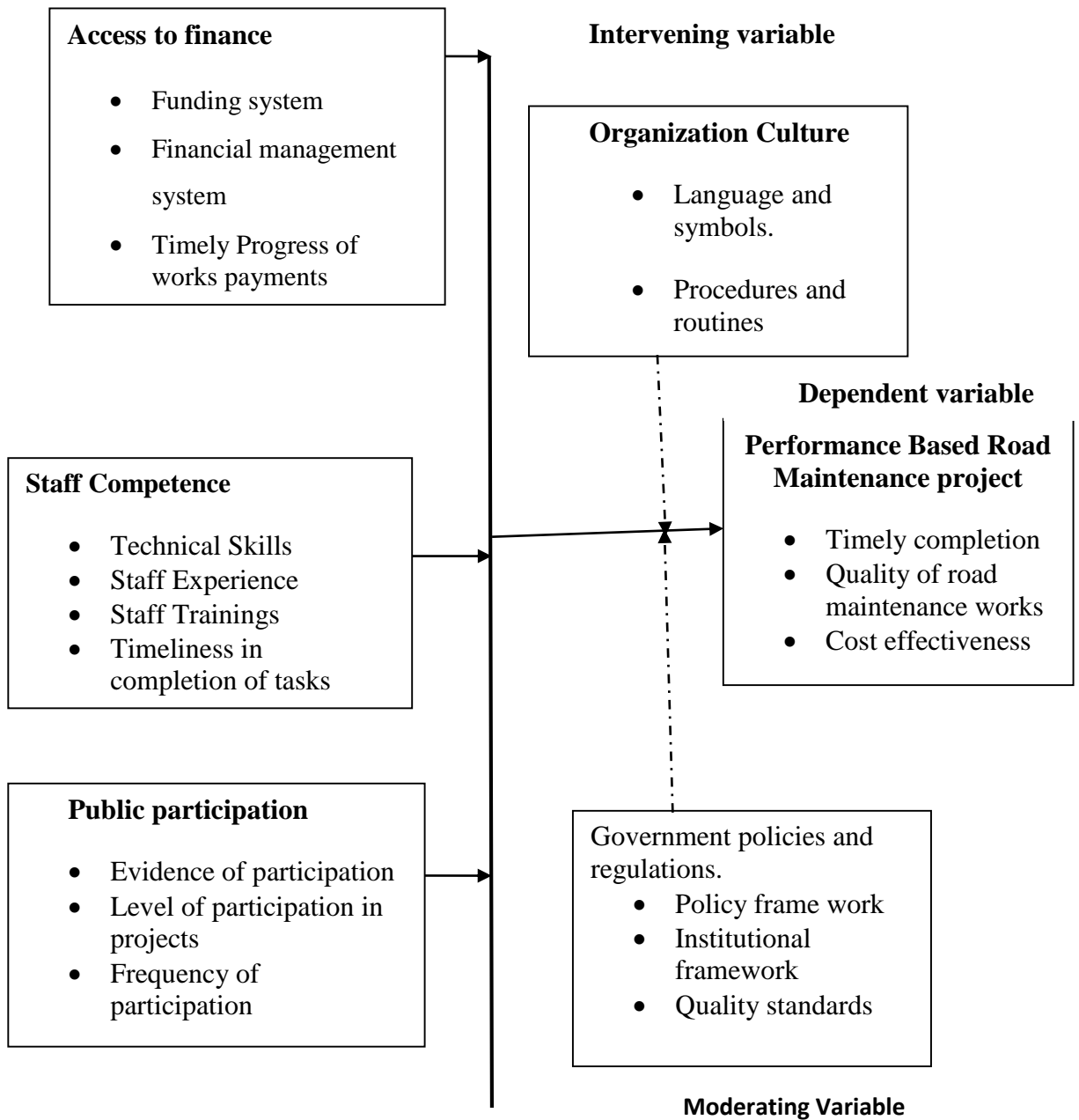


Figure 2.1: Project Conceptual Framework

2.10 Summary of Research Gaps

Author	Research	Findings	Knowledge Gaps
Sweiz (2013)	Critical factors that affect time overrun in state construction projects a case of Jordan	The findings of the study showed the main causes of delays were, inadequate planning, ambiguities in designs and specifications ,haphazard decision making, lack of qualified and experienced employees	The study limited its self to construction projects.
Gunter Zietlow (2004)	Implementing Performance-based Road Management and Maintenance Contracts in Developing Countries	The study found that staffing, quality control, qualification of contractors are critical factors in project implementation	The study had a wide coverage and generalized the finding to all countries in the research
Bernard Esaba (2014)	Factors influencing maintenance of roads in Kenya Rural Roads Authority (KeRRA) in Busia county.	The research found that political interference an inadequate finances affect road maintenance activities in KeRRA.	The project was not cross cutting among road agencies in Kenya.
Virginia Wairimu (2016)	Factors influencing completion of road construction projects in Embakasi, Nairobi County	The study found that lack of finances, construction materials and lack of skilled staff, lack of equipment's affected the completion of the projects.	The project limited it to construction in general and in Embakasi, Nairobi.
Ezekiel Wafula (2017)	Factors influencing road projects performance in Kenya case of Machakos county.	The study found that availability of capital, management skills, organization culture and technical skills influence performance of road projects.	The study dwelt in road construction in general and not performance based road maintenance projects.

Globally countries spend huge sums of money in an effort to develop motorable highways (Kenny, 2007). Projects that are completed on time indicates the efficiency of the project cycle activities (Al-Momani H, 2010). Construction projects have a tendency not to complete on time, Contractors will always ask for a review of project completion period and scope of the project (Virginia, 2016). From literature review in developed countries and developing countries funding, lack of expertise and the organization structure have been identified as the major bottlenecks in implementation of road projects.

Studies carried on factors affecting implementation and completion of road construction projects in Kenya identified inadequate financing, inadequate expertise, lack of stake holder participation as some of the hindrances to successful implementation of projects, Virginia (2016), Msafiri Atebu (2015), Ezekiel Fukwo (2017), Ebasaba (2014). These studies dwelt in road construction and maintenance in general. The country lacks studies on factors influencing implementation of Performance Based Road Maintenance Projects. This study seeks to bridge this gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was used in the study. It explains the research design, the target population, sample size and sampling technique, research instruments, validity of the instruments, reliability of the instruments, data collection procedures, data analysis methods and ethical considerations during the research period.

3.2 Research Design

Research design is the ultimate strategy, plan used to conduct the study, to answer the research questions, and achieve the stated objectives of the study (Creswell, 2014). This study used mixed method approach, where the researcher used qualitative and quantitative research approaches to garner information on the subject under study (Muaz, 2013). Descriptive survey design was employed to describe, record, analyze and report circumstances as they happen (Kothari 2009). The study used descriptive survey design which involved data collection, description of the data and determination of the existing relationships among the research variables.

3.3 Target Population

The target population is that population to which a researcher wants to generalize the results of a study (Mugenda and Mugenda, 2003). The target population of this study was 103 respondents distributed as, 18 KeNHA central region project management employees, 15 Contractors (Site agents of the projects), 1 KRB representative, 1 MOTI representative and 68 road users. Mugenda & Mugenda (2003) express that the accessible population and the target population must have several similar characteristics to which the study intends to generalize the results. The target population is has illustrated in Table 3.1

Table 3.1: Target Population

Group	Frequency	Percentage
Regional Director	1	1
Assistant Regional Director	1	1
Assistant Engineers	3	3
Roads Inspectors	6	3
Assistant Surveyors	6	3
Finance Officer KeNHA	1	1
Contractors Representatives (Site Agents)	15	9
KRB Representative	1	1
MoTI Representative	1	1
Road Users (Table 3.2)	68	71
Total	103	100

3.4 Sample Size and Sampling Procedures

The sampling procedure defines the list of all population units from which the sample is selected (Graveter & Willnau, 2007). The study employed the census method to select the management staff at KeNHA central region office and contractor representatives. Purposive sampling was used to sample Kenya Roads Board and Ministry of Transport and Infrastructure representatives while stratified random samplings was used to sample the road users. The sample size of 82 respondents was arrived at by calculations using the Yamane formula (Yamane, 1967) and computed as shown in the sampling matrix (Table 3.2)

Yamane formula

$$n = \frac{N}{1 + N(e)^2}$$

Where : n = sample size

N = population

e = margin of error

$$n = \frac{103}{1 + 103(0.05)^2} = 82$$

Table 3.2: Sampling Matrix

Category	Population	Sample Size	Percentage
Regional Director	1	1	1
Assistant Regional Director	1	1	1
Assistant Engineers	3	3	4
Roads Inspectors	6	6	8
Assistant Surveyors	6	6	5
Finance Officer KeNHA	1	1	1
Contractors Representatives (Site Agents)	15	15	19
KRB Representative	1	1	1
MoTI Representative	1	1	1
Road Users (Table 3.3)	68	47	59
Total	103	82	100

Table 3.3: Monthly road user customers on Class A & B roads in KeNHA central region.

S. No	Type	Number	Description
1	MC	4	Motorcycles
2	C	14	Saloon cars
3	LC/4WD	9	Large cars
4	P/VAN	7	Pickups
5	B	12	Buses (large and Small)
6	MT	11	Medium trucks
7	HT	6	Heavy trucks
8	Carts, bicycles	5	Carts, bicycles
	Total	68	

Source: KeNHA central customer register.

3.5 Research Instruments

The study used a questionnaire and an interview schedule as tools of data collection. The questionnaires were self-administered while the interview schedule was administered by the researcher who was a qualified roads engineer at KeNHA central region and trained research assistants. The research questionnaire assessed the perceptions of respondents on the various factors identified by the researcher and the factors comparative importance. The questionnaire consisted of structured and unstructured questions. The questionnaire

comprised of 3 parts. General information of the respondents was captured in part A and part B comprised of close-ended questions to collect quantitative data and open-ended questions to garner broad information on independent variables influencing implementation of performance based road maintenance projects. The section allowed each respondent to identify variables that they perceived to have influence on maintenance by responding on to a Likert scale from five (5) (to a very great extent) to one (1) (to no extent), hence providing their opinions, comments and recommendations

3.6 Pilot study

The questionnaire was piloted to test, if it collects the right information. The pilot study was conducted in Isiolo, Kenya National Highways Authority (KeNHA) Upper eastern region which neighbors KeNHA central region. 30 respondents with comparable characteristics as the target population were selected. The respondents were requested to react on any ambiguities and comment on the structure and wording of the questionnaire to help in redefining the questions in order to achieve reliable and accurate survey data.

3.7 Validity of the Instruments

Validity of a questionnaire is how true the data collected using the instrument purports to represent the variables of the study. It is to the level the results are obtained from the analysis of the data epitomizes the phenomena under study (Mugenda & Mugenda, 2003). Instruments were reviewed by research experts mainly my supervisor at the University of Nairobi to ensure content validity. This ensured that all respondents understood the questionnaire equally to avoid misinterpretation of any kind in the questionnaire. Questions had response options to generate answers for the questions asked. To test validity, the instrument were pilot-tested among road maintenance projects in KeNHA Upper eastern Region Isiolo, County before being distributed to the selected respondents. My supervisor and superiors at work were given the instruments for further ascertainment.

3.8 Reliability of the Instruments.

Mugenda & Mugenda (2003) defines reliability as an extent to which a research instrument yields consistent results after several repeated trials. Berg (2009) clarifies that use of consistent and logical questions for even the most anticipated areas is of paramount

importance in reliability and possible replication of the study. The researcher employed consistent and logical questions related to the subject of the study. The reliability of the instruments was tested through split half technique. The questionnaire was administered to the respondents who were different from those that participated in the research. The responses were grouped into two and a correlation established. Cronbach's alpha will be used to derive the coefficient that measures the consistency of the results across the items confirming the internal consistency or reliability in measuring what it is supposed to measure (Thanasegaran G.2009). A coefficient of 0.8 was acceptable.

Cronbach's alpha

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

Where:

N = the number of items.

\bar{c} = average covariance between item-pairs.

\bar{v} = average variance.

3.9 Data Collection Procedures

The researcher proceeded for data collection upon approval of the proposal at a defense session presided over by the University of Nairobi panel of experts, she sought Authority from NACOSTI to collect data as per the proposal. The study engaged 3 research assistants who assisted in data collection after a short term training to clearly understand the research instruments, purpose of the study and ethics of research which were very important during data collection in this study. The questionnaires were then administered to the respondents using drop and pick method.

3.10 Data analysis Techniques

Data analysis involved data coding, data entry into the computer and analysis using Statistical Package for Social Scientist (SPSS) Version 22 in order to attain statistics that facilitate interpretation. Data analysis deals with the statistics used in the data, organization, interpretation and presentation of collected data (Oson and Onen, 2005). Through the research instruments the study generated qualitative and quantitative data. Quantitative

data was coded using statistical package for social scientist (SPSS). Interpretation was done by use of descriptive statistics, frequency and percentages, measures of central tendency (mean, mode and median) and measures of dispersion (range variance and standard deviation). Qualitative data responses were grouped into themes and categorized as per the responses given. Multiple regression analysis was used to establish the relationship and the strength between the dependent and independent variables.

$$Y=B_0+B_1X_1+B_2X_2+B_3X_3$$

Where's,

Y equals the dependent variable (Implementation of performance based road maintenance projects)

B_0 is the regression coefficient/constant/y-intercept

B_1 , B_2 , B_3 are the slopes of the regression equation.

X_1 is access to finance

X_2 is staff competence

X_3 is public participation

3.11 Ethical Considerations

Researchers whose subjects are people or animals consider their research and give attention to ethical considerations (Kombo et al 2006). The researcher assured the respondents of their privacy protection and treated the collected information with strict confidentiality. The respondents were also briefed and assured that the data collected will be used for academic purposes only. Names of the respondents were not reviewed neither unwilling respondents were forced to fill the questionnaires.

3.12 Operationalization of Variables

Table 3.4 is a summary of the systematic process of operationalization of the independent and dependent variables that were undertaken; from the research objectives, indicators, measures and measurements. It also indicates data collection methods, measurement scale and tools of analysis.

Table 3.4: Operationalization of Variables

	Research Objectives	Type of variable	Indicators	Measurement Scale	Method of analysis	Tools of analysis
1	To determine the extent to which access to funding influences implementation of performance based road maintenance in KeNHA central region	Independent :Access to funding	<ul style="list-style-type: none"> • The level of accessibility of funds from financial institutions. • The time limits in payment of progress work certificates • The level of availability of savings for road projects 	Ratio Ratio Ratio	Descriptive statistics Inferential statistics	Mean and standard deviation, percentages Pearson correlation coefficient
2	To establish how staff competence influences implementation of performance based road maintenance in central region	Independent: Competence of KeNHA Staff.	<ul style="list-style-type: none"> • Accuracy levels • Staff experience • Frequency of employee training 	Nominal Norminal Nominal	Descriptive statistics Inferential statistics	Frequency distribution tables,tabulations,percentages, Pearson correlation coefficient
3	To assess the influence of public participation on the implementation of performance based road maintenance in KeNHA central region	Independent : Public participation	<ul style="list-style-type: none"> • Evidence of participation • Level of participation project • Frequency of participation 	Nominal nominal Ordinal	Descriptive statistics, Inferential statistics	Frequency distribution tables,tabulations,percentages, Pearson correlation coefficient
4	Implementation of performance based road maintenance projects	Dependent	<ul style="list-style-type: none"> • Time • cost • quality 	Ratio Ratio nominal	Descriptive statistics.	Mean and standard deviations, percentages, Pearson correlation coefficient

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The chapter outlines data presentation, analysis, and interpretation on the findings in the information gathered. Subtitles are outlined in accordance to the objectives of the study. Data was collected from key informants who included Site Agents, Engineers, Surveyors and Road Inspectors using questionnaires and from road users and opinion leaders from communities through which the highways traversed using interview schedules based on factors influencing implementation of performance based road maintenance projects in KeNHA, central region. Data collected was interpreted as per the research questions. Frequencies and percentages, Pearson correlation and multiple regression were used for data presentation and were guided by the study questionnaires.

4.2 Questionnaire Return Rate

The respondents were given Questionnaires with the help of the research assistants and then collected upon completion and results are as tabulated in Table 4.1.

Table 4.1: Questionnaire return rate.

Return rate	Frequency	Percentage
Responded	33	92
None response	3	8
Total	36	100

The study targeted 36 respondents; however, only 33 questionnaires were returned and checked for completeness. This translated to 92% response rate. Mugenda and Mugenda (2003) states that a response rate of 50% is acceptable for the study therefore this response rate was considered to be fit for the study.

4.3 Respondents Bio-data

Data was collected from respondents regarding their personal profile based on the gender, age, level of education, and the role played in implementation of performance based road maintenance projects in KeNHA central region of Kenya.

4.3.1 Gender of the respondents

The study purposed to identify the gender of the interviewees in order to establish its influence on the implementation of performance based road maintenance projects. Data was tabulated in the Table 4.2.

Table 4.2: Gender of the respondents

Category	Frequency	Percentage	Cumulative Percentage
Male	25	76	76
Female	8	24	100
Total	33	100	

Majority of the respondents involved in the projects are male at 25 (76%) as indicated in table 4.2 while 8 (24%) are female. Results indicate that there are more men than women working in performance based road maintenance projects in KeNHA central region of Kenya. This means gender was considered in the recruitment of the project staff.

4.3.2 Age of the Respondents

The study purposed to find out the age of the respondents with a view of assessing if it had influence on the implementation of performance based road maintenance projects in KeNHA central region, Kenya. Results obtained are as illustrated in Table 4.3.

Table 4.3: Ages of the Respondents

Age	Frequency	Percentage	Cumulative percentage
Below 25	3	9	9
25 -30	11	33	42
31- 35	9	28	70
36 – 45	6	18	88
46 – 55	2	6	94
55 and above	2	6	100

Results obtained in table 4.3 indicates that the majority of the respondents 20 (61%) are of ages between 25-35years, 6 (18.18 %) of the respondents are between 36 – 45 years, (6.6 %) of the respondents are between 46-55 years while those ones at 55 and above are (6.6 %). The number of respondents below 30 years (42%) is smaller compared to the number above 30 years (58%).The results indicate that all EMPLOYABLE age blackets were considered in project supervision activities.

4.3.3 Education level of the respondents

The study sought to know the highest level of education of the respondent in order to know its influence on implementation of performance based road maintenance projects. Data was obtained and presented in the Table 4.4

Table 4.4: Education Level of the Respondents

Level	Frequency	Percent	Cumulative Percent
Secondary	1	3	3
Certificate	2	6	9
Diploma	17	52	61
Graduate	12	36	97
Post graduate	1	3	100
Others	0	0	
Total	33	100.0	

Findings in Table 4.4, Majority 17 (51.15%) of the respondents indicated that they had reached diploma level, 2 (6.06%) of the respondents had attained certificate level, 12 (36.36%) had reached Graduate level, while 1 (3.3%) of the respondents had reached post graduate level. From the finding it was clear that most of the respondents had at least diploma qualification which is an ideal qualification for implementation of PBC project.

4.3.4 Designation in project

The study sought to know the designation or position the respondents held in the various projects and verify whether it had any influence on performance in performance based road maintenance projects. Results obtained were tabulated in Table 4.5

Table 4.5 Designation of Respondents in Projects

Designation	Frequency	Percentage	Cumulative percentage
Site agent	15	45	45
Engineer	5	15	60
Surveyor	4	12	72
Inspector	6	18	90
Other	3	10	100

Findings in Table 4.5 indicate that there are 15 (45.45%) site agents, 5 engineers (15.15%), 4 surveyors (12.12%), 6 Road inspectors (18.18%) and 3 (9.09%) workers performing general duties all involved in the implementation of PBC projects. The results indicates that the projects have the required personnel needed in the supervision of project works.

4.4 Influence of Access to Finance on Implementation of PBC Projects

Access to finance is one of the major challenges facing the construction industry (Albert, 2018). The study sought to establish the views of the respondents on the influence of access to finance on implementation of Performance Based Road Maintenance Projects. The tabulation is presented in table 4.6.

Table 4.6: The Influence of Finance on Projects Implementation

Extent	Frequency	Percentage	Cumulative percentage
No extent	0	0	0
Low extent	1	3	3
Moderate extent	5	15	18
Great extent	11	33	51
Very great extent	16	49	100
	33	100	

The above results indicate that 49% of the respondents agreed that access to finance influences implementation of PBC projects to a very great extent, 33% to a great extent, 15% to a moderate extent, and 3% to a low extent. The interviewees revealed that access to finance is a great catalyst in implementing PBC projects.

4.5 Indicators on Influence of Finance in Implementation of PBC Projects

The research strove to find out the influence of various indicators on access to finance and implementation of PBC projects. The outcomes are as indicated in Table 4.7

Table 4.7: Access to Finance Indicators and Influence on Implementation of PBC

Projects

Indicators	Mean	Standard Deviation
Availability of funds for road maintenance.	4.242	1.882
The financing system of road maintenance works through fuel levy, toll stations is adequate.	3.909	1.681
There is prudent financial management of road maintenance funds by the Authority and contractors (funds are fully utilized on road maintenance works)	4.181	1.681
Contractors submit and receive progress of works payments on time.	4.303	1.681

From the analysis, the interviewees indicated that a mean of 4.242 that availability of funds influenced the implementation of PBC projects to a great extent. On adequacy of the financing systems, the respondent's mean of 3.909 indicated that they agree with the statement to a great extent, on prudent financial management of road maintenance funds by the Authority and contractors, a mean of 4.181 indicated that the respondents agreed to a great extent and on Contractors submit and receive progress of works payments on time had a mean of 4.303, indicating the respondents agreed to a great extent that it influences implementation of PBC projects.

4.6 Respondent's Views on Access to Finance Influence on Implementation of PBC Projects

Access to finance ensures all projects are completed on time. The contractors should always be paid on time for them to complete their works effectively. Buses are paid on time, potholes are repaired well and workers are paid on time creating public satisfaction of taxpayer's money. Delays of finance access cause delays in repair and maintenance works and this causes deterioration of failures. Project activities are carried out on time and staffs are motivated. It ensures works are completed on time and proper mobilization on all projects activated. Justice from the government. By supporting community and educating them more about maintaining our roads. Facilitation of day to day execution of works on site. Lack of consistency in payment hence delay of payment by the contractor. High quality works produced. Payments paid on time ensures that no delay for execution of works on site. The contractors are able to mobilize for the works on time and ensure completion of tasks on time. Availability of finance ensures that the contractor is paid on time and thus there are no work delays. Aids in timeliness completion of projects tasks and machines maintenance for the works. Materials for construction are bought on time. All project tasks, materials, machines and labour are well balanced to complete tasks without delays. Timely execution of PBC works. Contractors are able to purchase machines for road works, necessary materials are availed for road works and workers are paid on time. The availability of finance enhances smooth operations of PBC and this makes everything

efficient for both contractor and road Authority. Ensure smooth operations of PBC thus making everything possible for road users. Increase funding.

The road users apprehend and appreciate when road works are being carried out. Low allocations of funds due to budget constraints. Contractors having no access of money and when financial interests becomes very high. The site is always clear hence improved road safety. Delayed access to finance is equal to delayed implementation and also affects the programme depending for example on weather conditions. The contractor requires finance in attending to emergencies and without reliable payment it would slow down operations. There is improved road furniture and carriage way smoothness for safe driving. The provision of facilitating of everyday activities to be done by the staff for example lunches and breakfast. Projects are completed in time.

The findings shows that access to finance is a great prerequisite for implementation of PBC projects

4.7 Staff Competence and its Influence on the Implementation of PBC Projects

The study tried to found out the number of years the respondents have worked in PBC projects. The results are tabulated Table 4.8

Table 4.8: Duration the Interviewees have worked in PBC Projects

Years worked in PBC projects	No of respondents	Percentage	Cumulative percentage
Less than three years	22	67	67
Between 4-6 years	8	24	91
Between 7-9 years	2	6	97
Over 10 years	1	3	100
Total	33	100	

From the interpretation of the data obtained, 67% indicated that they had worked for less than three years in PBC projects, 24 % had worked between 4-6 years, 6% had worked between 7-9 years and 3% had worked for over 10 years in PBC projects.

4.8 Respondents Regularity of Trainings and Development Programmes

The study tried to know the intervals at which the respondents attended training to improve their competencies and skills in implementation of PBC projects. The results are has indicated in Table 4.9.

Table 4.9: Frequency at which the Respondents Attend Trainings and Development Programmes

Frequency	Rate	Percentage	Cumulative percentage
Monthly	2	6	6
Quarterly	5	15	21
Semi-annually	4	12	33
Annually	20	61	94
others	2	6	100
Total	33	100	

From the analysis above 6% of the respondents attended trainings on monthly basis, 15% quarterly, 12% semi- annually, 61% annually and 6% others.

4.9 Staff Competence and Implementation of PBC Projects

Staff engaged in performance based road maintenance projects require experience and skills at different scales depending on tasks assigned. Hence the study sought to establish how staff competence influenced the implementation of PBC projects. The findings are illustrated in table 4.10.

Table 4.10: Ratings on the Influence of Staff Competence in Implementation of PBC Projects

Extent	Frequency	Percentage	Cumulative Percentage
No extent	1	3	3
Low extent	0	0	0
Moderate extent	1	3	6
Great extent	7	21	27
Very great extent	24	73	100
Total	33	100	

The study indicates that 3% of the respondents had a view that staff competence had no influence on implementation of PBC projects, 3% had a view that staff competence had a moderate influence, 21% thought staff competence had a great influence and 73% had a stand that staff competence had a very great influence on implementation of PBC projects. The findings indicate that staff competence is of great importance in the success of PBC projects.

4.10 Staff competence indicators.

The study sought to unravel the various views on staff competence and implementation of PBC Projects. The results are shown in Table 4.11.

Table 4.11: Indicators of Staff Competence and Implementation of PBC Projects

Indicators	Mean	Standard Deviation
Technical skills (availability of Engineers, Inspectors, surveyors)	4.363	1.964
Staff experience on road works.	4.394	1.468
Staff trainings on performance based road maintenance works	4.212	1.862
Timeliness in completion of performance based road maintenance tasks.	4.212	1.862

From the analysis the respondents indicated technical skills influence implementation of PBC projects to a great extent with a mean of 4.363, Staff experience on road works, Staff trainings on performance based road maintenance works and Timeliness in completion of performance based road maintenance tasks influences implementation of PBC projects with a mean of 4.394, 4.212 and 4.212 respectively. The analysis on the indicators above implies they influence on a great extent the implementation of PBC projects.

4.11 Respondents Feedback on Ways to Improve Staff Competence in PBC Projects

Train contactors more on PBC projects. Staff should be given enough training in order to acquire competent skills. To provide continuous training. Timely and better pays in addition to frequent trainings and seminars. Continuous trainings. Proper training and timely payment of salaries, allowances to supervision staff. Taking more seminars. By providing all working equipment's. Staff training on annual basis. Regular attendance for training sessions and refreshments after training concerning performance based road maintenance works. To attend training programmes on annual basis. Continuous training on new technologies to manage road projects. More trainings and additional seminars. Equipping young engineers with technical skills for PBC while still in school. Regular trainings. Performance appraisal should be conducted. Annual trainings on PBC projects. Mix the experienced staff with the fresh from colleges or universities so that they can share the experience together. The road engineers should organize trainings which includes even staff on contract basis. Moreover, the training and seminars should be maintained on quarterly basis. All staff should participate regular trainings. Periodic training. Frequent trainings, research and innovation of new methods. Monthly training to be done to all staffs, including contactors staff. Be very strict to contactors on their output. The staff should be motivated and also equipment's should be at their disposal to improve their competence. Regular trainings, availability of transport for regular and routine inspections and monitoring. Timely Payment of allowances to the supervision teams. Regular training in PBC contractions.by frequent trainings. The project staff to be involved in the trainings of PBC. Issuing staff with relevant project documents such as drawings and specifications to enable their efficient use on site (contractors should also include the contractors

programme of works). This will ensure efficient execution of works and timeliness in completion of PBC tasks. Offer more staff trainings. The findings revealed that continuous training, should be considered by the road contractors and KeNHA for its staff in the projects.

4.12 Public Participation and Implementation of PBC Projects

The study sought to find out the views of the respondents on how public participation affected implementation of PBC projects. The results are indicated in table 4.12

Table 4.12: Public participation and implementation of PBC Projects

Extent	Frequency	Percentage
No extent	0	0
Low extent	1	3
Moderate extent	9	28
Great extent	13	39
Very great extent	10	30
Total	33	100

From the interpretation of the data obtained, 3% indicated public involvement in projects had a low extent in influence, 28% had a moderate extent, 39% believed public participation had a great extent and 30% of the respondents believed public participation had a very great extent in influencing implementation of PBC projects. The results indicate that the public was being involved in project activities.

4.13 Public Participation Indicators

The study tried to find out the influence of public participation activities on implementation of PBC projects. The results are indicated in table 4.13.

Table 4.13: Indicators on Public Participation and Implementation of PBC Projects

Indicators on public participation	Mean	
Public opinions are minuted and taken into account during implementation of performance based road maintenance works.	3.515	1.505
The public is given tasks to accomplish during implementation of the projects and documented (provision of materials sites, provision of labour on site clearance, plant operators, supervision of road works)	3.818	1.634
The Project staff engages the public often on issues affecting project implementation (encroachments, environmental conservation, road side development activities).	4.1515	1.823

The interviewees indicated that Public opinions are minuted and taken into account during implementation of performance based road maintenance works influenced implementation of PBC projects to a great extent, The public is accorded tasks to accomplish during implementation of the projects and documented influenced the implementation of projects to a great extent and also the Project staff engages the public often on issues affecting project implementation influenced implementation of PBC projects to a great extent. From the above analysis it shows the indicators are pertinent in project execution.

4.14 Respondents Views on How to Improve Public Participation in PBC Projects

Involve all road users to give their views on what to be improved to ensure effective completion of PBC projects. The public should always be put in consideration in road maintenance. Sensitization, educating them about PBC projects. The public should be involved and be made part and parcel of maintenance works. Engage then locals an all project activities, site clearance and environmental safeguard against littering. Public

baraza to educate the public on the benefits of the implementation of PBC projects. To employ people living in the vicinity of the road to carry out tasks of manual nature so that they own the road. Conducting meeting to gather more issue for improvement. By listening to the public even in the field. Engage the authorities like chiefs in order for the public to understand the goal of PBC. Engage the public to gather the history of the area, public to be given task to accomplish during implementation. Consultation on daily basis. Payments to be made within the agreed time frame to facilitate the work. The public participation should be involved during the very first meeting on implementation of PBC projects. Public opinion should be incorporated in the implementation and throughout PBC period. Briefing of the public often on radios other Medias often and through public awareness meeting. Employ the area public in the projects. Adverts, road shows, engagement with local administrative program of giving back to the society. To be educated the importance of performance based road maintenance what it means and how it works for their benefits. The contractors on site need to pay the casual laborers on site. They should have free flow of cash in order to complete their work as schedules. Increased public sensitization. Continuous engagement of public by forming part of the project.

Frequent meetings to be held on various centers along the road under PBC maintenance works. Pin pointing anything they see being done poorly. They should be engaged regularly and their opinions should be considered. Engage people on monthly basis to public participation together with the local administration. Use of posters and brochure's (in public areas, churches, schools, bus parks etc.). Hold regular meetings with the local community through the local administration. Public sensitization, use of posters and brochures. The public should be well informed on the purposes and importance of the PBC through public announcement of the projects. Public participation influences implementation of PBC projects only to a moderate extent because the majority are unaware of the technicality of engineering projects. Sensitization of the publics. The results indicates that public awareness is pertinent in improving the rate at which projects are implemented.

4.15 Inferential Analysis on Variables

4.15.1 Access to Finance and Implementation of PBC Projects

In this section a spearman's correlation analysis between access to finance and implementation of performance based road maintenance projects was done and data tabulated in Table 4.14.

Table 4.14: Correlation between Access to Finance and Implementation of PBC Projects

		Access to finance	Implementation of performance based road maintenance project
Access to Finance	Pearson Correlation	1	0.748
	Sig. (2-tailed)		0.000
	N	36	36
Implementation of performance based road maintenance project	Pearson Correlation	0.748	1
	Sig. (2-tailed)	0.000	
	N	36	36

Findings in Table 4.6 indicate that there is a strong positive correlation coefficient between Access to finance and Implementation of performance based road maintenance project as indicated by correlation factor of 0.748. It was significant at 95% and was found to be statistically significant since the significant value was less than 0.05. This agreed with the expectation that adequate and timely financing plays a key role in the implementation of performance based road maintenance projects.

4.15.2 Staff Competence and Implementation of PBC Projects

In this section spearman's correlation analysis between Staff competence and implementation of performance based road Maintenance contracts was done and data tabulated in Table 4.15.

Table 4.15: Correlation Analysis between Staff Competence and Implementation of PBC Projects

		Staff competence	Implementation of performance based road Maintenance contract
Staff competence	Pearson Correlation	1	0.562*
	Sig. (2-tailed)		0.002
	N	36	36
implementation of performance contract based road Maintenance	Pearson Correlation	0.562*	1
	Sig. (2-tailed)	0.002	
	N	36	36

Results in Table 4.7 shows that there was a moderate positive correlation coefficient between staff competence and implementation of performance based road maintenance projects as indicated by correlation factor of 0.562. It was significant at 95% and was found to be statistically significant since the significant value was 0.002, which was less than 0.05. This agreed with the probability that staff charged with fulfilling project tasks need to be competent in their areas as performance contracting is specific on what needs to be done.

4.15.3 Public Participation and Implementation of PBC Projects

In this section correlation analysis between Public participation and implementation of Performance contract Based Road Maintenance Projects Customer retention was done and data tabulated in Table 4.16.

Table 4.16: Pearson Correlation between Public Participation and PBC Projects

		Public participation	Implementation of performance contract based road maintenance projects
Public participation	Pearson Correlation	1	0.654
	Sig. (2-tailed)		0.000
	N	36	36
implementation of performance contract based road maintenance projects	Pearson Correlation	0.654	1
	Sig. (2-tailed)	0.000	
	N	36	36

Findings in Table 4.8 indicate a positive correlation coefficient between public participation and implementation of performance based road maintenance projects as indicated by correlation factor of 0.654. It was significant at 95% and was found to be statistically significant since the significant value was 0.000, which was less than 0.05. This agreed with the expectation that once involved in a project the public gives positive contributions which lead to successful implementation of projects.

4.16 Multiple Regression Analysis

Data obtained was regressed using SPSS 21 statistical application, and inferences made on the findings as shown in Table 4.17

Table 4.17: Multiple Regression Analysis

Model	Unstandardized		Standardized		
	Coefficients		Coefficients		
1	B	SE	B	t	P
(Constant)	1.132	0.178		6.074	0.005
Access to finance	0.748	0.109	0.702	4.673	0.013
Staff competence	0.562	0.089	0.509	7.292	0.000
Public participation	0.513	0.091	0.489	5.637	0.004

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

Where:

Y is the dependent variable; implementation of performance based road maintenance projects, β_0 is a Constant, $\beta_1 X_1$ is the first variable; access to finance, $\beta_2 X_2$ is the second variable; staff competence, $\beta_3 X_3$ is the third variable; public participation.

$$\text{Therefore, } Y = 1.132 + 0.748X_1 + 0.562X_2 + 0.654X_3 + \varepsilon.$$

As exhibited by the regression model employed, it was established that holding staff competence and public participation to constant, access to finance would be at 1.132. An increase in a unit in access to finance would lead to an increase in implementation by 0.748, an increase in unit in staff competence would lead to an increase in implementation by 0.562, unit increase in public participation would lead to an increase in implementation by 0.654, This confirms that there was a positive relationship between access to finance, staff competence, public participation and implementation of performance contract based road maintenance projects.

4.17 Views of Road Users on Implementation of PBC Projects

The study sampled 47 road users to get their views on implementation of PBC projects in KeNHA central region. The questions were structured in a way that the researcher could derive information on variables of the study, access to finance, staff competence and public

participation and their influence on implementation of PBC projects. The questionnaire response rate was as shown in Table 4.18

Table 4.18: Road User’s Response Rate

Questions	Response Frequency		Percentage	
	Agree	Disagree	Agree	Disagree
Are road repairs done on time to make motorists and other road users comfortable when driving on the highways?	31	16	66	34
In your opinion do you think road repairs/maintenance are done professionally on the highways in central region?	38	9	81	19
Are you comfortable driving on the highways at night and day time in central region?	30	17	64	36
Does the community play any role on road maintenance in Kenya National Highways Authority, central region?	39	8	83	17

From the study 66% agreed that road repairs done on time to make motorists and other road users comfortable when driving on the highways and 34% disagreed.81% agreed with the statement that road repairs/maintenance are done professionally on the highways in central region and 19% disagreed.64% agreed with the statement that they comfortable driving on the highways at night and day time in central region while 36 disagreed.83% agreed with the statement that the community play roles on road maintenance in Kenya

National Highways Authority, central region and 17% disagreed. The response rate indicated the variables have a positive influence on implementation of PBC projects.

4.18 Respondent's Comments on the Challenges Facing PBC Projects

No Clear road signs. Bushy and traffic jams. High maintenance costs especially on hilly areas with prolonged rainfall, landslide and drainage problems. Heavy traffic, weather: Central region in Kenya is an area that receives a lot of rainfall thus making maintenance works to move in a slow pace. Improper use of road by the road users, less corporation from the community. Breeding on the road. Lack of proper sign posts. Delay in repairs, encroachments by the residents. Delay in repairs, lack of enough supervision while executing the work, encroachments by the residents. Encroaching the road reserve. Landslides in most parts of central Kenya. People encroaching on the road. Delay in repair, poor workmanship and materials used lack of supervision while doing the work. Encroachment on road reserves, climatic conditions at different times. Community refusing to remove either structures or crops on time within the road reserve. Lack of finances. No signs, No bumps. Resisting to move, putting illegal structures, and no signs. In some areas materials take long to get there. Lack Road marks on bumps, Road signs. Missing Road marks culverts and bumps. Road reserve encroachments. Encroachments.

Unqualified contractors are on the ground. Overweight Lorries. Poor workmanship, untimely repair. Lack of surveillance by the authorities. Lack of finance. Lack of enough finances to maintain all roads on time. Landslides, we experience huge landslides causing the loosening of soil and huge mass movement of earth, drainage problems, some roads lack catch water drains to drain and retain the water, floods some roads are prone to the floods because they move parallel to the rivers. Lack of road furniture's, presence of road failures e.g. potholes, narrow roads. Most roads are not marked, and narrow roads. Untimely repairs and lack of safety measures to road users. Unfavorable weather conditions e.g. rain. Negligence/ignorance, incompetent contractors. Funding, Management. Lack of cooperation from the community. Incompetent contractors. Heavy trucks e.g. those carrying logs and construction materials misuse the roads. Contractors not completing the

work in time. Poor performing contractors, lack of finances on some projects. Structures and business are too close to the roads. Slow work progress by contractors. Failure to maintain some roads due to lack of financing. Road signs, bus bays, bumps, road marks.

The views of the respondent's shows that the success of PBC projects depends on quality of, materials used in road works, installation of necessary road furniture, frequency and rate of road repairs.

4.19 Respondents Views on ways in which PBC Projects Can Be Improved

Timely repair of pot holes, Proper installation of road signs. Repair the potholes, clear the bushes, and consult the public when putting bumps. Immediate repair on potholes and cracks that may develop due to prolonged rainfall, For better drainage, drains can be cut off and stone pitching done on areas with steep slopes. Road maintenance should mostly be done during dry season; the contractors on site should erect warning signs in areas where maintenance is being carried out. Educate road users on how to use road properly, installing signage's that can be understood by everyone, have a different team to patrol the roads and engage the community so as to take down any complaints/compliments they could have pertaining the exercise. We can improve our road maintenance by having patrol team, day and night and they will help when problem rises. Using materials that have been tested and are up to standards. Road marks, posts to define road boundary. Control of quality material to ensure high quality work, use road mark posts to define the road reserve. Widening the road, more regular survey to know the extent of the way leave. Having a defined road shoulder to avoid chipping off of the road.

Daily checks on and under the road and widening the road. Test the base before cutting, establish why the base keeps failing, and test materials before applying on the road. Put road mark posts for all roads to avoid encroachments, to ensure the loading along certain road is the designed one, regular training programs to the staff. By adding more manpower. By responding to damaged areas more quickly. Bumps, signs. Avoid overloading Lorries. Road signs, ensuring the contractor finishes the work on time, ensure material used is of

good quality. Ensuring good drainage. Putting marks line, putting signs. Putting bumps and culverts. Local residents to stop encroaching on road reserves, adequate funding. Work on overloading. Giving the right contractors to maintain the road. Use of high quality materials. By placing road signs where necessary. Timely repair when a pothole appears, supervision by other bodies other than road and transport ministry, use of high quality materials, strict adherence to axle weight. To involve road users not to overload in order to keep our roads in good condition, to sensitize the public on how to use/not to use road reserves. Involve all stakeholders especially road users not to overload to keep our roads in good conditions. The construction of toe wall and gabions can be used to prevent landslides from entering the road that may damage road pavement and drainage. Installing of road furniture, Timely road maintenance, expanding the roads. Roads should be marked and properly marked, roads should be expanded. Timely repairs that should be done professionally, ensure the safety measures are put in place g signage's and markings. Frequent and timely road repairs and maintenance. Proper bidding process, proper supervision. Good management, timely funding. Educating the community on importance of road maintenance. Tenders to be awarded to the competent contractor's only. A weighing bridge should be introduced at many points to prevent overloading. The contractors should be supervised and instructed to complete the works in time. Strict measures taken on poor performance by contractors, enough finances for projects. Road encroachments should be discouraged. Maintenance should be done in good time. The government should pump in some more or enough funds to finance road maintenance. Widening of the road, putting climbing lane, Maintaining every year, putting culverts in every town. Police harassment, Police to be removed, Enlarge the roads.

The findings revealed that the respondents had knowledge in what causes project failures like timely repairs, quality material, overloading etc.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter comprises of the summary of the findings, discussions on the analysis of the results, conclusions arising from the study, recommendations arising from the challenges raised by the respondents in the research. The study objectives were used to collect the data needed in the research while literature reviewed was further used addition to the data collected in the study to make informed conclusions.

5.2 Summary of the Findings

The research strived to find out the factors influencing implementation of performance based road maintenance projects. The study revealed that access to finance influenced implementation of performance based road maintenance projects in KeNHA central region to a very great extent. The study also revealed that the availability of funds for road maintenance, the financing system of road maintenance works through fuel levy, toll stations, prudential financial management of road maintenance funds by the Authority and contractors, and Contractors submit and receive progress of works payments on time also influence implementation of performance based road maintenance projects to a great extent.

The research established that there was a great impact of staff competence in implementation of PBC projects in KeNHA central region. The research also established that staff competence influences the implementation of performance based road maintenance projects to a great extent. The study found that technical skills (availability of Engineers, Inspectors, and surveyors) affected project implementation to a very great extent. Staff experience on road works to a very great extent, Staff trainings on performance based road maintenance works, a very great extent and timeliness in completion of performance based road maintenance tasks, to a very great extent. The research established that public participation influenced implementation of PBC projects in KeNHA central region to a great extent.

Public opinions are minuted and taken into account during implementation of performance based road maintenance works influenced the implementation of PBC projects to a great extent. On if the public is given tasks to accomplish during implementation of the projects and documented (provision of materials sites, provision of labour on site clearance, plant operators, supervision of road works). The research found that it influenced the implementation on very great extent. On if The Project staff engages the public often on issues affecting project implementation (encroachments, environmental conservation, road side development activities), the study concluded that the majority of the respondents felt it had an influence on implementation of PBC projects on a great extent.

5.3 Discussions of the Findings

The research found the following on the findings.

5.3.1 Gender of the Respondents

The research found that majority of the respondents were male (76%) and 24% female. This shows the project activities are dominated by men .there is a need to find out why there low returns in women engagement in the PBC projects to achieve the gender balance and fulfill the government policy of 30% employment of women in government projects.

5.3.2 Age of the Respondents

The majority of the respondents age (88%) are between 18 and 45 years. This is a clear indicator that energetic and resourceful people are being involved in the PBC projects. The study revealed that the respondents below 30 years are 46% and above 30 years are 54%.There is need to increase the young people below 30 years to ensure transfer of knowledge and skills learn on the job for successful implementation of the projects.

5.3.3 Education Level of the Respondents

Majority of the respondents (88%) have a diploma certificate and above. There is a need to train the remaining 12% of the respondents to achieve the minimum requirements of a diploma certificate the lowest level of qualification for KeNHA technical staff engaged in PBC projects.

5.3.4 Access to Finance and Influence on Implementation of PBC Projects

Concerning the influence of access to finance and implementation of PBC projects the research showed that access to finance had a great influence in implementation of PBC projects. Availability of funds, the mode of financing, prudent funds management and payment of contractors on time had an upper hand in implementation of the PBC projects. Howe (1999) reiterates the importance of proper planning and funding for the road infrastructure since all government sectors are competing for the scarce resources. Zietlow and Bull (1999) even goes further to suggest that motorists be charged a fee to ensure the road infrastructure generates funds for the road maintenance activities. Most road maintenance projects lack enough funding for their planned activities. Therefore, it is important to ensure enough funds are allocated to a project to ensure its logical conclusion for proper road preservation and development (Heggie, 2003). The timely access to finance should be highly put into consideration to ensure projects started are continuously funded up to the end of the contract period to avert any delays in their implementation.

5.3.5 Staff Competence and Implementation of PBC Projects

Concerning objective number two which sought to find out how staff competence influences implementation of PBC projects in KeNHA central region, the study showed that staff competence had a great influence on the implementation of PBC projects. The Authorities given the mandate to ensure road preservation depend on a large extent the staff competence capacity and experience on a mix of skills to perform various tasks in the projects. Implementation of PBC projects requires sustainable management throughout the contract period, staff competence in terms of experience, relevant skills and trainings on best practices on how to manage the projects are vital.

The research also established that Technical skills, Staff experience on road works, Staff trainings on performance based road maintenance works, and Timeliness in completion of performance based road maintenance tasks had a great impact in implementation of PBC projects. Al momani, (2010), postulates that human resources with necessary skills and competencies are vital in completion of tasks. Technical jobs in the construction industry

requires technical skills and relevant technical experience which is needed to perform specialized task. Underperformance and mismanagement can occur in a project when it lacks the prerequisite skills and management (Kasvi, et al, 2003). From the findings we can infer that PBC projects requires personnel with the relevant skills ,experience and are time conscious in executing the assigned tasks. Projects that are well implemented and achieve their objective have been associated with good managerial skills and competent staff who possess the prerequisite technical skills (Iyer and Jha 2015) as indicated by the respondents in their responses.

5.3.6 Public Participation and Implementation of PBC Projects

Bernard, (2014) compared the success of a project to the strength of the relationship between the stakeholders and the project. Public involvement means ensuring that stakeholders in an undertaking have a greater direct voice in public decisions. The influence of public participation on implementation of PBC projects is great on their completion. The extent to which the public is involved in the projects ensures that there decisions are taken into account when the projects are being implemented. Taking into account public opinions, giving the communities tasks to perform in the duration of project period and engaging the public on day to day running of the projects has a positive impact in implementation of PBC projects. Most respondents felt that public participation had a great influence on project activities. Unauthorized Road side activities, encroachment on road reserves and conservation of the environment are well managed when the public is fully engaged in the projects.

Daily et al (2003), argues that Public awareness gatherings provides the stakeholders (those that have interests on issues at stake) the opportunity to influence decisions that affect their lives. For PBC projects to succeed the public is supposed to provide resources needed in terms of labour, material sites and public good will for projects to prosper uninterrupted.

54 Conclusion

In objective one the research resolved that access to finance has a very great influence in implementation of PBC projects. The study exposed that timely access to funds and proper management are vital for proper implementation of projects. The funds also enable project resources to be procured on time enabling execution of daily works.

Objective two revealed that staff competences greatly influences implementation of PBC projects. This infers that Authorities given the mandate of maintaining the road infrastructure have to build the staff capacity through trainings and selective engagement of the relevant skills in the project staff recruited.

Concerning objective three the study revealed that public participation is paramount in implementation of PBC projects. The communities around the project needs of be sensitized and engaged directly in the project activities. This means the public decisions are taken into account to ensure ownership of the projects by the communities and interested stakeholders in the projects outcomes.

5.5 Recommendations

Considering the findings of this research, the study advances the following recommendations.

1. The research recommends that adequate funds should be set aside by the road agencies and government departments charged with the mandate of road asset maintenance to ensure projects started are implemented fully as per the contract terms. More financing methods should be explored to increase the capacity of the exchequer.
2. Best practices in road maintenance should be adopted through benchmarking and comparing with successful road management authorities in various countries.
3. The study recommends continuous trainings in the upcoming technologies in road maintenance to ensure sustainable preservation of our road infrastructure at minimal cost.

4. The study recommends that public participation should be incorporated in all maintenance projects to ensure project ownership and minimize the cost of clearing bushes and maintaining drainage channels in their road reserve frontage and within their farms for the outfall channels which are a great component of PBC project activities.

5.6 Suggestions for Further Research

There are a number of factors that influence implementation of PBC projects, hence there is need for more research on other factors that could be affecting PBC projects. The study suggests

- i. To establish the influence of road reserve encroachments on implementation of PBC projects.
- ii. To assess how contractors capacity influence implementation of PBC projects.
- iii. To establish how road furniture affects completion of PBC projects.

REFERENCES

- African Development Bank. (1999). *African Development Report 1999: Infrastructure Development in Africa*. Oxford University Press.
- Albert, B. Dzombo (2018). Effect of capital structure on financial performance of construction and allied firms listed at the Nairobi securities exchange.
- Alila, P.O. (1988). 'Rural development in Kenya: A review of past experience.' *Regional Development Change* 9(2):152–165.
- Al-Momani H., (2010), *Examining service quality within construction Processes*, Tecnovation, 20, 643.651.
- Anwar, S. (2007). *Participatory Budgeting*. Washington, DC: The World Bank.
- Arditi, D. & Mochtar, K. (2011). Trends in productivity improvement in the US construction industry. *Construction management and economics*, 18 (1), 15-27
- Ayee, J. (2008). Reforming the African public sector: Retrospect and prospect. *Council for the development of social science research*. ISBN: 2-86976-186-5.
- Balogun, M. J. (2003). *Performance management and agency governance for Africa development::the search for common cause on excellence public service*. UNCEA, Addis Ababa.
- Barthorpe, S, Duncan, R and Miller, C. (2000). The pluralistic facets of culture and its impact on construction. *"Property Management"*, 18(5) 335-351.
- Berg, B. (2009). *Qualitative Research Methods for the Social Sciences*. Boston: Allyn & Bacon, pp.101-157.
- Ebasaba, B. (2014). Factors influencing maintenance of roads in Kenya Rural Roads Authority.

- Boyatzis, R.,E. (2008) "Competencies in the 21st century", *Journal of Management Development*, Vol. 27 Issue.
- Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches (4th Ed.)*
- Daily, C. M., Dalton, D. R., & Rajagopalan, N. (2003). Governance through ownership: Centuries of practice, decades of research. *Academy of Management Journal*, 46(2), 151–15.
- Data, S. (2011). The Impact of Improved Highways on Indian Firms -*Journal of Development Economics*.
- Dekker, R. (1996). *Application of maintenance optimization: a review and analysis*. Reliability Engineering and System Safety. Vol. 51, pp. 229-240.
- Dingle, J. (1995). "Analyzing the competence requirements of managers", *Management Development Review*, Vol. 8 Issue: 2, pp.30-36.
- Edmonds, G.A. (1980). 'The "Roads and Labour" programme, Mexico.' In: G.A. Edmonds and J.D.F.G. Howe, eds. *Roads and Resources: Appropriate Technology in Road Construction in Developing Countries*. London: Intermediate Technology Development Group for ILO. p. 123–134.
- Eisenhardt, K. M (1989). Agency Theory An assessment and review. *Academy of Management Review*; 14(1)57-74
- Estache, A. (1999). 'Privatization and regulation of transport infrastructure in the 1990s: Successes and bugs to fix for the next millennium.' *Working Paper No. 2248*. Washington, DC: World Bank.
- Ezekiel, F. (2017). Factors influencing projects performance in Kenya, A case of Machakos County.

- Faustin, O. O. (2016). Influence of stakeholder participation on sustainability of community development projects implemented by plan international in Homa bay town sub-county.
- Fernald, J.G. (1999). 'Roads to prosperity? Assessing the link between public capital and productivity.' *American Economic Review* 89(3):619–638.
- Fletcher, E. (1999). 'Road transport, environment and social equity in Israel in the new millennium.' *World Transport Policy and Practice* 5(4):8-17. No. 2249. Washington, DC: World Bank.
- Gavira, J. (1990). 'A regional analysis of institutional and financial constraints to rural transport: the case of Tanzania.' SSATP/MADIA Discussion Paper. Washington, DC: World Bank.
- Geddes, R. and Gongera, K. (2016). Economic Growth through Effective Road Asset Management. International conference on transport and road research, 15th –17th March 2016, Mombasa, Kenya.
- Gericke, B., Henning, T., & Greenwood, I. (2014). *A Guide to Delivering Good Asset Management in the Road Sector through Performance Based Contracting*. Washington DC: The World Bank.
- Gómez-Lobo, A., and S. Hinojosa. (2000). 'Broad roads in a thin country: Infrastructure concessions in Chile.' *Working Paper* No. 2279. Washington, DC: World Bank.
- Government of Kenya. (2010). the constitution of Kenya 2010.
- Government of Kenya. (2016). Performance Based road maintenance contract (PBC) guideline. Edition 1.1

- Graveter, J. & Wallnau, B. (2007). *Statistics for behavioral sciences*. Austraria: Thomson/wadsworth.
- Greiling, D. (2006). Performance Measurement: a remedy for increasing efficiency in Public Services. *International Journal of Productivity and Performance Management*. Vol.55 No.6 Page 448-465.
- Gwilliam, K. and Z. Shalizi. (1999). 'Road Funds, User Charges, and Taxes.' *World Bank Research Observer* 14(2):159-85.
- Harral, Clell; Faiz, Asif. (1988). Road deterioration in developing countries: causes and remedies (English). *A World Bank policy study*. Washington DC.
- Hartwig T., Mumssen, Y., and Schliessler, A. (2005). Output-based Aid in Chad. Using Performance-Based Contracts to Improve Roads. Global Partnership on Output Based Aid, The World Bank, and USA.
- Heggie, I.G., (2003). Commercializing road management and financing of roads in developing and transition countries. *Transport reviews* 2003, Vol 23 No 2, 139-160
- Heggie, I.G. (1995). 'Management and financing of roads: an agenda for reform.' *World Bank Technical Paper* No. 275. Washington DC: World Bank.
- Heggie, I.G. (1999). 'Commercially managed road funds: managing roads like a business, not like a bureaucracy.' *Transportation Research* 26(1):87–111.
- Holvert, R, J. Vurdeljia, M. Amidzic (2007). Road infrastructure financing models.
- Howe, J. (1999). 'Sustaining Africa's rural road networks: the asset management approach.' *World Transport Policy and Practice* 5(1).
- Ikiara, G.K., M.I. Muriira, and W.N. Nyangena, (2000). 'Kenya's trade in services: should the country fully liberalize?' Paper presented to the AERC-KIPPRA

Workshop on World Trade Organization (WTO) Agreements, held 11–12 September 2000, Nairobi.

Iyer, K.C. and Jha, K.N. (2015) Factors Affecting Cost Performance: Evidence from the Indian Construction Projects. *International Journal of Project Management*, 23, 283-295

Jacob, R. (2016). Roads board's programme. *A big engine behind economic progress*.

Japan International Corporation Agency (2016), Performance based road maintenance contract (PBC) guideline edition 1.1, Government of Kenya.

Jensen & Meckling, (1976). *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*.

Karl, M. (2000). *M&E Stakeholder Participation in Agriculture & Rural Development Projects: A Literature Review*. Rome: FAO, SD Dimensions.

Kasvi, J. J., Vartiainen, M. and Hailikari, M. (2003), "Managing knowledge and knowledge competences in projects and project organisations", *International Journal of Project Management*, Vol. 21 No. 2003, pp. 571-82.

Kenny, C. (2007). Construction, Corruption, and Developing Countries, World Bank

Kenya gazette supplement No 77, National Assembly Bills, 2015.

Kenya Road Act, 2007

Kimuyu, P.K. & Kayizzi-Mugerwa, (1998). Enterprise Response to Deficient Infrastructure Discussion Paper No. DP/011/98, *Institute of Policy Analysis and Research*, Nairobi, Kenya.

- KIPPRA working paper no. 1 (2001). *Road infrastructure policies in Kenya*. Historical trends and current challenges.
- Kivisto, J. (2005). The government higher education institution relationship: Theoretical considerations from the perspective of agency theory. *Tertiary education and management*, 11, 1-17
- Kombo, D. K., & Tromp, D. L. (2006). *Proposal and thesis writing: An introduction*. Nairobi: Paulines Publications Africa.
- Kothari, C. R. (2009), *Research Methodology: Methods and Techniques*, New Age International Publishers.
- KRB (2016). Annual report and financial statements. <https://www.krb.go.ke/our-downloads/KRB/Annua/Report/2016>.
- KRB, (2018). Annual public works programmes 2018/2019
- KRB, (2018). First quarter allocations report FY 2017/2018.
- Lician and Jesse (2004). *Pay without Performance, The Unfulfilled Promise of Executive Compensation, Part II: Power and Pay*.
- Madsen, H. and Ulhoi, J.P. (2011). Integrating Environmental and Stakeholder Management. *Business Strategy and the Environment*, 10(2):77-88.
- Mbaabu, (2012). Factors influencing implementation of road construction projects in Kenya. Case of Isiolo County.
- McClelland, D.C. (1973). Testing for competence rather than for "intelligence." *American Psychologist*, 28, 1-14.
- Miles, Samantha (2012). "Stakeholders: essentially contested or just confused?" *Journal of Business Ethics*. 108 (3): 285–298.

- Msafiri, A. S. (2015). An Investigation into Factors Causing Delays in Road Construction Projects in Kenya. *American Journal of Civil Engineering*, Vol. 3(3), 51-63.
- Muaz, Jalil Mohammad (2013). Practical Guidelines for conducting research. Summarizing good research practice in line with the DCED Standard.
- Mugenda. O. and Mugenda, A. (2003). *Research methods: quantitative and qualitative approaches*. Nairobi Kenya: revised, ACTS press.
- Mumssen, Y., Johannes, L., & Kumar, G. (2010). *Output-Based Aid Lessons Learned and Best Practices*. World Bank. 2010: The World Bank.
- Nunnally, S. W. (2004). *Construction Methods and Management*, 6th edition, Upper Saddle River, New Jersey: Prentice-Hall.
- Nyandika, O.F, & Ngugi, K . (2014). Influence of Stakeholders' Participation on Performance of Road Projects at Kenya National Highways Authority. *European Journal of Business Management*, 1 (11), 384-404.
- Oakley, P. (2013). *Projects with people: The practice of participation in rural development*. Geneva: International Labour Office
- Obongo, S. O. (2009). Implementation of Performance Contracting in Kenya–International *Public Management Review*. Vo. 10 No. 2 Page 66-84.
- Onchoke, K. (2013). Factors influencing stakeholders' participation in monitoring and evaluation of Local Authority transfer fund projects in Kisii municipality, Kenya.<http://irelibrary.ku.ac.ke/handle/123456789/6205>
- Ondieki, William M (2011) Factors influencing stakeholders' participation in monitoring and evaluation of Local Authority transfer fund projects in Kisii municipality, Kenya.

- Oso W.Y, Onen D (2005). A General Guide to Writing Research Proposal and Report: A Handbook for Beginning Researchers. Kisumu, Kenya: Option Press and Publishers
- Pate, C. (2003). Effects of project team competencies on performance of development projects in Rwanda. A case of world vision village savings loan association project in Gasabo district.
- Pearce, J. (2010). *Participation and democracy in the twenty-first century city*. Basingstoke: Palgrave Macmillan.
- Pepper, A., & Gore, J. (2012). Behavioral agency theory new foundations for theorizing about executive compensation. *Journal of Management*, 41(4), 1045–1068.
- Perrow, C. (1986).
- Phillips, R. (2003). *Stakeholder Theory and Organizational Ethics*. p. 66. ISBN 978-1576752685
- Pinard, M. I. (2012). Progress on Commercialized Road Management. The International Bank for Reconstruction and Development. The World Bank 2012.
- Pinard, M.I., Newport, S.J. and J.Van Rijn, J. (2016). Addressing the Road Maintenance Challenge in Africa: What can we do to solve this continuing problem? *International conference on transport and road research, 15th –17th March 2016, Mombasa, Kenya*.
- PMBOK (2000). *A guide to the project body of knowledge*. Project Management Institute, Unite States of America.
- Queiroz, Cesar; Rdzanowska, Barbara; Garbarczyk, Robert; Audige, Michel (2008). Road User Charges: Current Practice and Perspectives in Central and Eastern Europe. *Transport paper series; no. TP-23*. World Bank.

- Rashid, A. (2013). CEO duality and agency cost: Evidence from Bangladesh. *Journal of Management and Governance*, 17(4), 989–1008. (2015).
- Ross, A. (1973). The Economic Theory of Agency: The Principal's Problem. in *American Economic Review* 63(2):134-39
- Sambasivan, M. and Soon, Y. (2007). 'Causes and effects of delays in Malaysian construction industry', *International Journal of Project Management*, 25 (5), 517-526
- Sanders, G., & Carpenter, M. (2003). The economic theory of agency: The principal's problem. *American Economic Review*, 63(2), 134–139.
- Sands, V. (2006). The right to know and obligation to provide. *The University of South Wales law journal* Vol 29(3) Sydney Austraria
- Sanjaya, P & Christianti, I. (2012). A behavioral agency theory perspective on stock repurchase program announcements. *Academy of Management Journal*, 46(3), 160–178.
- Sarriot, E. G., Lafond A., Kouletio M. (2005). Built to last: mapping and assessment strategies for sustaining capacity. Panel. Global Health Council Conference 2005, Washington, DC, June 3, 2005
- Ssengooba, F. (2010). Performance based contracting; A case study for non-profit hospitals in Uganda. London school of hygiene and tropical medicine.
- Stankavich, N., Qureshi, N., & Queiroz, C. (2005). *Performance-based Contracting for Preservation and Improvement of Road Assets*. Washington: World Bank.
- Stephen, A. R. (1973). *The economic theory of agency: the principal's problem*.
- Sultana, M. A. Rahman, S, Chowdhury (2012). An overview of the things to consider before introducing performance based road maintenance projects.

- Thenasegaran, G. (2009). Reliability and validity issues in research.univ.putra Malaysia.retrieved:<http://econ.upm.edu.my/researchbulletin/arlike/vol%204%202009/35-40%20Ganesh.pdf>
- Turnbaugh, L. (2005). Risk management on large capital projects. *Journal on professional issues in engineering education and practice*. ASCE.
- Uraia trust 2012.*The citizens hand book*. Empowering citizens through civic education.
- Van, Slyke, D.M (2006). Agents or stewards: Using theory to understand the government nonprofit social service contract relationship. *Journal of public administration research and theory*, 17,157-187.
- VanHam, J. P. (2015). *Outsourcing maintenance of road infrastructure in Uganda*. Delft University of Technology. Delft: Delft University of Technology
- Virginia, M. (2016). Factors influencing completion of road construction projects in Embakasi, Nairobi, Kenya.
- Walker, D.M., Walker, T., and Schmitz, J. (2003). *Doing Business Internationally*. The Guide to Cross-Cultural Success, New York, McGraw-Hill.
- Wasike, S.K. (2001). KIPPRA working paper No 1: Road Infrastructure Policies in Kenya: Historical Trends and Current Challenges.
- World Bank (1995). Management and financing of roads.Technical Paper No 275.
- World Bank (2008) “safe clean and affordable transport for development”. The World Bank group transport business strategy 2008-2012
- World Bank. (2002). Procurement of Performance-Based Management and Maintenance of Roads (Out-put-based Service Contracts). Sample Bidding Document. World Bank, Washington DC, February 2002.

- Yamane, T. (1967). *Statistics: An introduction analysis* (2nd edition). New York: Harper and Row.
- Zietlow, G. (2004). Implementing Performance-based Road Management and Maintenance Contracts in Developing Countries - An Instrument of German Technical Cooperation.
- Zietlow, G. (2015). “*Road Funds in Latin America.*” Presentation at the University of Birmingham, Senior Roads Executive Programme, 26-30 April.
- Zietlow, G. and Bull, A. (1999). *Reform of Financing and Management of Road Maintenance – A New Generation of Road Funds in Latin America.* Paper prepared for the XXIst World Road Congress, Kuala Lumpur, and October 3-9, 1999.
- Zietlow, G. J. (1996). *Public Private Partnerships to Finance and Manage Road Maintenance.* Paper prepared for presentation at the Road Construction Rehabilitation and Maintenance Session of the 1997 XIIIth IRF World Meeting, Toronto, Ontario, Canada.

APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

Alice G.M' Arimi

P.O Box 372-10100

NYERI

Dear Respondent,

RE: DATA COLLECTION

I am a Master of Arts degree student in Project Planning and Management at the University of Nairobi conducting a research study on “**Factors influencing the implementation of performance based road maintenance projects in Kenya National Highways Authority (KeNHA) Central Region, Kenya**”.

You have been scientifically selected as one of the respondents to assist in providing the requisite data and pertinent information for this research. I kindly request you to spare a few minutes and answer the attached questionnaire. The information you shall provide will be used for academic purposes only. Your identity will be kept in utmost confidence. Kindly do not append your name anywhere on this questionnaire. I request you to respond to questions asked with utmost honesty.

Thank you.

Yours faithfully,

Alice Gaceri M'arimi

L50/5834/2017

APPENDIX II: QUESTIONNAIRE FOR KEY INFORMANTS.

Instructions

The questionnaire is specifically designed to collect data on the “**Factors influencing implementation of Performance Based Road Maintenance Projects in Kenya National Highways Authority, Central region, Kenya**”. Data collected will be treated with a high degree of confidentiality, it is meant for academic use only. Kindly respond by ticking or giving comments where appropriate.

Section A: Demographic Information

1. State your Gender

- i. Male
- ii. Female

2. **State your age**

- i. Below 25 years.
- ii. 30 to 35 years
- iii. 36 to 45 years
- iv. 46 to 55 years
- v. 55 years and above

Section B: Funds and implementation of Performance Based Road Maintenance Projects.

3. To what extent does the availability of funds contribute to the success of any project? Please tick next to the appropriate column in the table below. (Use a scale of 1-5 where 1 = No extent; 2 = Low extent; 3 = Moderate extent; 4 = Great extent and 5 = Very great extent)

No extent	
Low extent	
Moderate extent	
Great extent	
Very great extent	

4. To what extent do the following factors influence implementation of Performance Based Road Maintenance Projects?

Factors	No extent	Low extent	Moderate extent	Great extent	Very great extent
Contractors have access to loans and capital from financial institutions					
The mode of financing road maintenance works through fuel levy is adequate.					
There is prudent financial management of road maintenance funds					
Contractors submit and receive progress payments on time					

5. In what other ways does access to funds influence implementation of performance based road maintenance projects?

Section D: Competence of staff and implementation of performance based road maintenance contracts.

6. How long have you worked in performance based road maintenance contracts?

- i. Less than three years []
- ii. Between 4-6 years []
- iii. Between 7-9 years []
- iv. Over 10 years []

7. How often do you attend training and development programmes?

- v. Monthly []
- vi. Quarterly []
- vii. Semi-annually []
- viii. Annually []

8. To what extent does competency of staff influence implementation of performance based road maintenance projects? Use a scale of 1-5 where 1 = No extent; 2 = Low extent; 3 = Moderate extent; 4 = Great extent and 5 = Very great extent) (Tick in the appropriate column)

	1	2	3	4	5
No extent					
Low extent					
Moderate extent					
Great extent					
Very great extent					

9. What is the extent to which the following factors influence implementation of performance based road maintenance projects?

Factors	No extent	Low extent	Moderate extent	Great extent	Very great extent
Academic qualifications					
Technical Experience on the job					
Timeliness in completion of tasks					
Accuracy levels in execution of tasks.					
Training On and Off the job					

10. What would you suggest in order to improve staff competence in implementation Of Performance Based Road Maintenance Projects?

Section E: Public participation and implementation of Performance Based Road Maintenance Projects.

11. To what extent do you agree with the following on public Participation? Use a scale of 1-5 where 1 = No extent; 2 = Low extent; 3 = Moderate extent; 4 = Great extent and 5 = Very great extent) (Tick in the appropriate column)

Factors	No extent	Low extent	Moderate extent	Great extent	very great extent
The contractor holds frequent meetings with the public.					
Public opinions are often taken into account and implemented during road works					
The public is given tasks to accomplish during implementation of the projects.					
Communications methods to the public are effective.					

12. What would you recommend to be done in order to improve public participation in performance based road maintenance projects in order to ensure their effective completion?

12. To what extent does stakeholder participation in the following project activities influence completion of urban road infrastructure projects? Use a scale of 1-5 where 1 = No extent; 2 = Low extent; 3 = Moderate extent; 4 = Great extent and 5 = Very great extent) (Tick in the appropriate column).

Project activities	No extent	Low extent	Moderate extent	Great extent	Very great extent
Identification of road maintenance activities and scope.					
Data collection, processing and management					
Supervision of field activities					

Section F. Implementation of Performance Based Road Maintenance Projects.

14. Please indicate your level of agreement in relation to Implementation of Performance Based Road Maintenance Projects in KeNHA central region. Tick appropriately. 1-Not at all 2- Little extent 3- Moderate extent 4- Large extent 5-Very large extent

Parameter	1	2	3	4	5
The quality of the performance based road maintenance works ensure that the road corridors aid transportation effectively and efficiently					
Road contactors have appropriate resources to do maintenance works.					
The service levels are always adhered to as set out in the contract.					
Funds are appropriately utilized for the road works					

THANK YOU FOR PARTICIPATING

APPENDIX III: INTERVIEW SCHEDULE FOR ROAD USERS.

This questionnaire is intended to gather data geared towards assisting Alice Gaceri M’arimi, a Master of Arts degree in project planning and management student in the School of open and distance learning, University of Nairobi for her Research titled “**Factors influencing the implementation of performance based road maintenance projects in Kenya national highways authority (KeNHA) Central Region, Kenya.**”

Declaration: Information supplied herein will be used only for academic purposes and will be treated with utmost confidentiality.

Name/Title of Respondent.....

Date of Interview.....

Q1.Are road repairs done on time to make motorists and other road users comfortable when driving on the highways?

Q2.In your opinion do you think road repairs/maintenance are done professionally on the highways in central region?

Q 3. Are you comfortable driving on the highways at night and day time in central region?

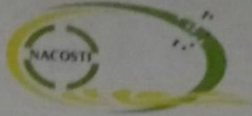
Q 4. Does the community play any role on road maintenance in Kenya national highways Authority, central region?

Q5. What are the challenges facing road maintenance on the highways in central region of Kenya?

Q6. Suggest ways in which road maintenance could be improved?

Thank You for participating.

APPENDIX IV: RESEARCH AUTHORIZATION



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

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

NACOSTI, Upper Kabete
Off Wanyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No **NACOSTI/P/19/53807/27534** Date: **14th January, 2019**

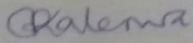
Alice Gaceri Marimi
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Factors influencing implementation of performance-based road maintenance projects in Kenya National Highways Authority Central Region Kenya*" I am pleased to inform you that you have been authorized to undertake research in **Nyeri County** for the period ending **14th January, 2020.**

You are advised to report to **the County Commissioner and the County Director of Education, Nyeri County** 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
Nyeri County.

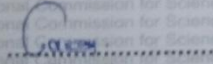
The County Director of Education
Nyeri County.

APPENDIX V: RESEARCH CLEARANCE PERMIT


THIS IS TO CERTIFY THAT:
MISS. ALICE GACERI MARIMI
of UNIVERSITY OF NAIROBI, 0-10100
NYERI, has been permitted to conduct
research in Nyeri County

on the topic: FACTORS INFLUENCING
IMPLEMENTATION OF
PERFORMANCE-BASED ROAD
MAINTENANCE PROJECTS IN KENYA
NATIONAL HIGHWAYS AUTHORITY
CENTRAL REGION KENYA

for the period ending:
14th January, 2020


Applicant's
Signature

Permit No : NACOSTI/P/19/53807/27534
Date Of Issue : 14th January, 2019
Fee Received : Ksh 1000


Director General
National Commission for Science,
Technology & Innovation


THE SCIENCE, TECHNOLOGY AND
INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science,
Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

REPUBLIC OF KENYA


National Commission for Science,
Technology and Innovation
RESEARCH LICENSE

Serial No.A 22598
CONDITIONS: see back page

National Commission for Science, Technology and innovation
P.O. Box 30623 - 00100, Nairobi, Kenya
TEL: 020 400 7000, 0713 788787, 0735 404245
Email: dg@nacosti.go.ke, registry@nacosti.go.ke
Website: www.nacosti.go.ke

APPENDIX VI: SCHEDULE OF PBC PROJECTS IN KENHA CENTRAL REGION

	County Traversed	Project description	Length (Km)	Contractor	Contract No.	Contract period	Completion date	Status
1	Kirinyaga	Performance Based Maintenance of Makutano - Embu (B24) Road (formerly B6 Road)	42	Select Builders & Contractors Ltd.	KeNHA/RD/M/2152/2017	24 months	14-March-2019	Ongoing
2	Murang'a	Performance Based Maintenance of Thika - Gacharage (B23) Road (formerly C70 Road)	24	Interwood General Construction	KeNHA/RD/M/2131/2017	24 months	8-March-2019	Ongoing
3	Embu/ Tharaka Nithii/ Meru	Performance Based Maintenance of Embu - Meru (A9) Road (formerly B6 Road)	97	Samste Company Ltd.	KeNHA/RD/M/2172/2017	24 months	11-April-2019	Ongoing
4	Murang'a/ Kirinyaga	Performance Based Maintenance of Murang'a - Sagana (B25) Road (formerly C73 Road)	12	Roacon Jimbiri Ltd.	KeNHA/RD/M/2176/2017	24 months	14-March-2019	Ongoing
5	Nyandarua	Performance Based Maintenance of Olkalou - Nyahururu (A4) Road (formerly C77 Road)	35	Mutech Motors & Civil Engineering Contractors Ltd.	KeNHA/RD/M/2164/2017	24 months	14-March-2019	Ongoing
6	Nakuru/ Nyandarua	Performance Based Maintenance of Gilgil - Olkalou (A4) Road (formerly C77 Road)	32	Erryford Company Ltd	KeNHA/RD/M/2226/2017	24 months	18-May-2019	Ongoing

7	Murang'a	Performance Based Contract for Maintenance of Jn C544 Kangema - Jn C550 Gacharage (B23) Road	34	Kinwan General Contractors Ltd	KeNHA/RD/M/2350/2017	36 months	25-Oct-2020	Ongoing
8	Murang'a	Performance Based Contract for Maintenance of Jn A2 Kenol - Jn C544 Murang'a (B25) Road	29	Global Link East Africa Ltd.	KeNHA/RD/M/2359/2017	36 months	12-Oct-2020	Ongoing
9	Nyeri/ Kirinyaga	Performance Based Contract for Maintenance of Jn A2 Karatina - Kagumo - Jn B25 Kutus (B27) Road	28	H.K. Builders & General Contractors Ltd	KeNHA/RD/M/2410/2017	36 months	31-Oct-2020	Ongoing
10	Nyeri/ Murang'a	Performance Based Contract for Maintenance of Jn B21 Nyeri - Othaya - Jn C544 Kangema (B23) Road	43	Wak Construction Ltd	KeNHA/RD/M/2420/2017	36 months	17-Nov-2020	Ongoing
11	Nyeri	Performance Based Contract for Maintenance of Nyeri - Jn A2 Marua (B21) Road	13.6	Njofa Ventures Ltd	KeNHA/RD/M/2508/2017	36 months	21-Feb-2021	Ongoing
12	Laikipia/ Nyeri	Performance Based Contract for Maintenance of Wiyumiririe - Nyeri (B21) Road	60	Translee Kenya Ltd	KeNHA/RD/M/2506/2017	36 months	12-Feb-2021	Ongoing
13	Laikipia/ Nyandarua	Performance Based Contract for Maintenance of Jn A4 Nyahururu -	40	Territorial Works (K) Ltd	KeNHA/RD/M/2550/2017	36 months	12-Feb-2021	Ongoing

		Wiyumiririe (B21) Road						
14	MURANGA	Performance Based Contract for Maintenance of Kenol – Sagana (A2)	40	M/s. Keddy Enterprises Ltd	KeNHA/1686/2017	36 months	27th, October 2020	Ongoing
15	MURANGA	Performance Based Road Contract For The Maintenance Of Thika- Kenol (A2) Road	15	M/s Equipped Trading (K) Ltd	KeNHA/1464/2016	24 months	2nd, April 2019	Ongoing