FACTORS INFLUENCING MAINTENANCE OF ROADS IN KENYA: A CASE OF THE NAIROBI THIKA HIGHWAY IMPROVEMENT PROJECT

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A Research Project Submitted in Partial Fulfilment of the Requirements for the Award of Degree of Master of Arts in Project Planning and Management from the University of Nairobi

2019

DECLARATION

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

Sign…..... Date.....

Maina Teresia Wangare

L50/5609/2017

This research project has been submitted for examination with my approval as University supervisor.

Sign…..... Date.....

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University of Nairobi.

DEDICATION

This research project is dedicated to my mum Wambui, to my children Ngai, Ireri, Wambui and Maina, and to my husband Kivuti, who have offered me immeasurable support all throughout the project.

ACKNOWLEDGEMENT

I wish to appreciate my supervisor Dr. John Mbugua for his invaluable guidance and direction, the University of Nairobi, Department of Open Learning, for its facilitating environment, and constant support from the departmental lecturers, that warranted smooth progress of this research study. I also wish to appreciate Mr Masinde and Professor Rambo for their invaluable contribution. I also wish to acknowledge the support, input and invaluable contributions made by my classmates, in particular Evans, William, Bridget and Asha.

Much gratitude goes to the Kenya National Highways Authority staff, and to members of the Kenya Alliance of Resident Associations, who willingly participated in providing data for the study.

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ADF	African Development Fund
AfDB	African Development Bank
AIDS	Acquired Immunodeficiency Syndrome
APA	Advance Procurement Action
APEC	Asia-Pacific Economic Cooperation
ASCE	American Society of Civil Engineers
BPM	Building Project Management
CES	Consulting Engineering Services
CSUD	Centre for Sustainable Urban Development
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EU	European Union
GDP	Gross Domestic Product
GOK	Government of Kenya
GPN	Global Production Networks
HIV	Human Immunodeficiency Virus
ICB	Information Collection Budget
ICT	Information, Communications and Technology
IMF	International Monetary Fund
IRF	International Road Federation,
JICA	Japan International Cooperation Agency
KARA	Kenya Alliance of Resident Association
KeNHA	Kenya National Highways Authority
KEPSA	Kenya Private Sector Alliance
KeRRA	Kenya Rural Roads Authority
KIHBT	Kenya Institute of Highways & Building Technology
KM	Kilo Metres
KMDP	Kenya Market Development Programme
KRB	Kenya Roads Board
KURA	Kenya Urban Roads Authority
KWS	Kenya Wildlife Service
M & E	Monitoring and Evaluation

MoRPW	Ministry of Public Works
MOT	Ministry of Transport
MTP	Medium Term Plan
NEPAD	The New Partnership for Africa's Development
NMR	Nairobi Metropolitan Region
NRA	National Roads Authority
PBMC	Performance-Based Maintenance by Contracting
PBRMC	Performance-Based Road Maintenance by Contracting
PIC	Plan Implementation Committee
PIT	Project Implementation Team
PPMS	Project Performance Monitoring System
PS	Permanent Secretary
RD	Roads Department
RICS	Road Inventory and Condition Survey
RMI	Road Management Initiative
RMLF	Road Maintenance Levy Fund
SAGA	Semi-Autonomous Government Agency
SANRAL	The South African National Road Agency Ltd
SD	Standard Deviation
SIT	Study Implementation Team
SPRP	Special Purpose Roads Programme
STI	Sexually Transmitted Infections
UA	Unit of Account
UK	United Kingdom
UNEP	United Nations Environment Programme
USD	US Dollars
VOCs	Vehicle Operating Costs
WB	World Bank

ABSTRACT

Road transportation remains the central method of transport all across the world. For this reason, roads remain vital for economic growth, in addition to poverty eradication. Road decline owing to absence of maintenance has grown into a major cause for concern in several third world countries. During implementation of the Nairobi Thika Super Highway Upgrading Project, inadequate provisions for availability of funds, community participation, procurement procedures of contractors and project manager competency impacted project progress. The purpose of this research study is to probe how these factors influence maintenance of roads in Kenya, with a case in point of the Nairobi Thika Highway Improvement Project. The objectives of the research is to investigate how availability of funds, community participation, procurement procedures of contractors and, project manager competency influence maintenance of roads in Kenya. The study employed descriptive survey in its research design. The target population of this study was 110 respondents from the Kenya National Highway Authority and representatives from the Kenya Alliance of Resident Associations. The study deduced a sample size of 86 respondents from the target population using the Krejcie and Morgan Table, after which proportionate stratified sampling was engaged to attain a sample for the individual strata.The study incorporated primary and secondary data collection methods. Primary data was amassed by means of questionnaires. Secondary data was acquired from the organization archives .Pilot testing was done at KENHA Thika and KARA along the Eastern bypass, which bear comparable features to the study locale. Descriptive statistics, case in point, frequency, percentage, mean and standard deviation was engaged to evaluate quantitative data. After analysis data was presented in table form. The study disclosed that: availability of funds influences maintenance of roads as depicted by a mean value of 4.24; community participation influences maintenance of roads as depicted by a mean value of 4.11; procurement procedures of contractors influences maintenance of roads as depicted by a mean value of 4.10; project managers competency influences maintenance of roads as depicted by a mean value of 4.34. The research concluded that project managers competency had the most influence on maintenance of roads, followed by availability of funds, then community participation. Procurement procedures of contractors had the least influence on maintenance of roads. The study recommends to the government that funding to road agencies be made sufficient, community engagement be all-encompassing throughout road maintenance exercises, clear and precise procurement procedures of contractors be effected, the appointment of only highly competent project managers to spearhead road maintenance, so as to ensure effective, efficient maintenance of roads in Kenya. The study suggests that research be done on other factors influencing maintenance of roads in Kenya.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Road transportation remains the central method of transport all across the world, whereby usually, more than eighty per cent of commuters and over seventy five per cent of goods in transit are conveyed via roads. For this reason, roads remain vital for economic growth, in addition to poverty eradication worldwide (Abedi, 2007). Road decline owing to absence of maintenance has grown into a major cause for concern in several third world countries (Kocher, 2012). Road maintenance is undertaken to make certain that roads are preserved in their original state, though roads must eventually decline as a result of aspects of weather and usage over time. Maintenance is meant to slow this decline, hence should commence subsequent to road construction (ILO, 2011).

Despite their significance in sub-Saharan Africa, roads management is abysmal with insufficient funding apportioned for maintenance, thus leaving much of road networks in the region in a declined state. The resultant high transportation costs due to high vehicle operating costs, have subdued socio-economic growth. In most African nations tarmac roads consist of only 30% to 40% of the aggregate road set up. South Africa's road set up consists of 746,978 Km yet just 20.6% is concrete (Mamabolo, 2013) .This is the case in many other countries in Africa (Asif, 2012), where road maintenance is absent resulting into dire consequences.

Sub Saharan countries have need of a key road setup capable of sustaining approximately eighty percent of nation-wide traffic, as well as core roads in metropolitan expanses, and roads that satisfactorily affords entrance to country side regions. A ration of the total roads financial plan consequently ought to be apportioned towards roads construction, whereas the other quota towards maintaining the core roads network. Lots of these countries nonetheless incline to have a preference for fresh construction, restoration, or rebuilding of roads in place of maintenance (NSRA, 2003). This trend has occasioned a sturdy growth in the build-up of road maintenances and the forfeiture of development effect.

According to a report (World Bank, 2003), for every one kilometre of road reformed in Sub-Saharan Africa, a projected three kilometres of road plunge into poor condition, thus causing a net decline in the aggregate road system. This state of affairs is equivalent in numerous

third world countries. A copious sum of the investment necessary for road building is bankrolled by benefactor funding, which come attached with little apparent expense to the receiver country, but great actual overheads. Since roads maintenance is financed locally, it necessitates grim and detested tax mobilization.

In Kenya, road maintenance projects experience hindrances of late completion plus non-completion as a result of issues such as insufficient funding, inefficient procurement procedures of contractors as well as absence of project managers competency .According to a report submitted by the Kenya Urban Road Authority, (2013) most road maintenance projects failed owing to interference by consumers, insufficient funds, poor infrastructure, as well as absence of project managers competency.

The Nairobi-Thika Corridor (termed Thika Road) is situated northeast of the Nairobi Metropolitan Region (NMR), and spreads out from the Nairobi City Centre to Thika District (ADF, 2007). The road at this time functions as a chief freight route and a central cosmopolitan, local and transnational transportation connection, and is a section of the categorised transnational trunk road A2, that initiates from the Nairobi City Centre then spreads out to Moyale near the Ethiopian border.

Thika road moreover is the chief route for a number of settlement townships and commercial centres which are situated proximate to the highway, comprising of Ruaraka, Githurai Kasarani, Ruiru, Kiambu Town, Juja and Thika. Lots of commercial bustle transpires around these areas, which consist of manufacturing, entrepreneurial endeavours, real estate, tea, horticultural, coffee and flower farming (ADF, 2007).Furthermore there is a greatly pulsating informal segment; a perfect case in point that of Githurai where everything, ranging from shoes, charcoal to bananas, is trafficked. The Nairobi Thika Highway is among the most journeyed highways in the NMR. Owing to the inadequate accommodation alternatives within Nairobi, lots of dwellers fancy living in more reasonably priced houses in those peri-urban and minor urban regions and travel back and forth to access amenities and employment in the city. The Nairobi Thika Highway facilitates the access to education, employment, and additional amenities in Nairobi's central business district, Westlands and Parklands. According to a 2006 commuter traffic tally, the Nairobi-Thika Highway transports nearly sixty thousand vehicles on a daily basis (JICA, 2006).

Dense overcrowding, run-down infrastructure, dreadful air pollution, and escalated accident mortality rates are among the problems that were afflicting commuters, inhabitants and business proprietors alongside Thika Road. These predicaments exemplify the far-reaching metropolitan transport challenges that characterize urban cities in general. Nairobi has been projected to have an average urban growth rate of 4%, whereas that for the settlement towns such as Ruiru was appraised to be even greater. Speedy suburbanization combined with insufficient transportation infrastructure, transport guidelines and maintenance have given rise to a major breach in obliging travel necessities of public transportation consumers, foot-travelers, as well as cyclists. Motor and non-motor escalated rates of commuter traffic and transit demands, coupled with dreadful road conditions, have occasioned stifled mobility and city access, as well as diminished security in the metropolitan region, resultant from escalated road accidents often involving pedestrians (UNEP, 2009).

1.2 Statement of the problem

In the course of the Nairobi Thika Highway Improvement Project lifecycle, inadequate funding was among the major emergent reasons for concern. This maintenance project was conjointly funded through a loan from the ADF plus a grant, and the Kenyan government. The loan from the ADF financed seventy percent of the civil jobs, associated administration and inspection services, whereas the Kenyan government accommodated the residual thirty percent in that classification (ADF, 2007). Insufficient funding may often give rise to half-finished and deserted road maintenance projects. It may also lead to substandard maintenance of roads.

Community participation was likewise detected to be unsatisfactory in that, despite the fact that the media covered the Nairobi Thika Highway project to some degree and blogs kept track of its progress, it remained ambiguous if the public who were directly and indirectly impacted, got ample opportunities to deliberate with the project designers and pertinent government establishments, on the project's design, implementation and tangible impacts ,with accordance to the noble conduct of context sensitive road construction (KARA, 2007). Insufficient community participation may undermine project success as the community may not feel a sense of ownership for the road maintenance project, consequently they may not go out of their way to contribute towards efficient road maintenance.

The consulting services for the administration of the Thika Road improvement project was procured by the Kenyan government via international competition. Nonetheless a certain degree of ambiguity and inefficiency in the procurement process was observed (Oumarou, 2007). Inefficiency in these procurement procedures of contractors may result to contracts being awarded to incompetent, undeserving second-rate consultants, which may result to poor road maintenance.

The Nairobi Thika Highway Improvement project, was executed by the department of roads in the Ministry of Roads & Public Works (MORPW) (ADF, 2007).In the course of the Thika road improvement project lifecycle, the management by MORPW was found to be wanting and characterised by notable extents of incompetency (Oumarou, 2007). These incompetency in project managers may adversely affect road maintenance projects outcome, as competent project managers are essential for project success. This research strived to investigate how these factors influence maintenance of roads in Kenya.

1.3 Purpose of the study

The purpose of the study was to scrutinize factors influencing the maintenance of roads in Kenya: a case of the Nairobi Thika Highway Improvement Project.

1.4 Objectives of the study

i. To examine how availability of funds influences the maintenance of roads in Kenya.
ii. To assess how community participation influences the maintenance of roads in Kenya.
iii. To establish how procurement procedures of contractors influences the maintenance of roads in Kenya.
iv. To determine how project managers competency influences the maintenance of roads in Kenya.

1.5 Research Questions

i. How does availability of funds influence the maintenance of roads in Kenya?
ii. How does community participation influence the maintenance of roads in Kenya?
iii. How do procurement procedures of contractors influence the maintenance of roads in Kenya?

iv. How does project managers competency influence the maintenance of roads in Kenya?

1.6 Significance of the study

The aim of the study was to establish factors influencing maintenance of roads in Kenya. The information amassed in this study was targeted to assist the Kenya National Highway Authority Board of Directors, in the management and close monitoring and evaluation of the alterations in the road network. This may subsequently aid them to brainstorm on the fitting measures to counter the challenges presently being encountered by roads users in relation to the area under study.

Academicians and researchers, may be able to do an in-depth analysis, on the effectiveness of the Kenya National Highways Authority in their management of roads maintenance. By studying the degree or the quantitative measurements of their challenges, the study may facilitate academicians and researchers to perform further research as they make headway towards advancing their education qualifications.

Findings of this study may aid to demonstrate an in-depth comprehension of the regulatory structure and the proposals on the appropriate protocols that will be necessary for the road network. The outcomes of this process may inform the explicit measures that either may be developed or may address the explicit challenges that influence either the rise or decline of the effectiveness of managing roads maintenance in Kenya.

1.7 Delimitation of the Study

The study was undertaken at Kenya National Highway Authority (KeNHA) and at the Kenya Alliance of Resident Associations (KARA). The study was delimited to the KeNHA at the Nairobi Office and KARA members situated alongside the Nairobi Thika superhighway. The study explicitly collected information on factors influencing maintenance of roads in Kenya: A case of the Nairobi Thika Highway Improvement Project. Questionnaires were the key instruments used for data collection in this research project.

1.8 Limitations of the Study

Whilst conducting field research, the researcher was confronted with some limitations. The researcher encountered unreceptive and hostile respondents. This was countered through motivating the respondents and by following up on the questionnaires. The additional

challenge was that of unresponsive respondents whereby some filled ambiguous answers, while others left questions unanswered (that is, failed to write their response to some questions) in the questionnaires. This was remedied by revisiting the same departments whose respondents the researcher discerned to have filled ambiguous answers in their questionnaires or had left questions blank.

1.9 Basic Assumptions of the Study

The researcher functioned on the supposition that the respondents remain candid, willing, genuine, unbiased and trustworthy as they respond to the research study instruments. Additionally that they would avail themselves in good time to respond to the research instruments. It was likewise the researcher's assumption that the pertinent powers that be in the respective firms would offer the necessary go-ahead to expedite data collection from staff. Additionally the research study presumed the absence of any major alterations in the target population's composition which would otherwise impact the efficacy of its research sample.

1.10 Definition of Key Significant Terms

Availability of Funds- Within the context of roads maintenance, funding denotes the deed of giving monetary capitals and valuables for instance time, effort, to sponsor road maintenance projects, typically by an organization, a company, the government or donors via grants or loans.

Community Participation-Community engagement is the practice through which the government involves the general public in the community, that may possibly get affected by the resolutions passed or may sway the implementation of the road maintenance exercise. They may support or be in conflict with the decisions, be influential within the community in which they operate, hold pertinent official posts or be affected in the long term.

Nairobi Thika Highway - The Nairobi Thika superhighway is a two way carriage highway of approximately forty five kilometres. The road forms a fragment of the categorized transnational trunk lane A2 that initiates from Nairobi business district and stretches up to Moyale near the Kenya Ethiopia border. It is as well a major connection in the Great North Trans-African Highway that stretches to Cairo from Cape Town that is among the uppermost priorities in the NEPAD interim accomplishment strategy.

Procurement Procedures of Contractors-Procurement is the practice of identifying, assenting terms & conditions, and securing services, goods, rendered by an outside source, frequently by way of a competitive bidding process or tendering. Procurement in the maintenance of roads is employed to make certain the government obtains works, services, goods, at the finest conceivable rate, when facets such as location, time, quantity and quality, are compared.

Project Managers Competency-Competency in the management of road maintenance projects can be accredited to discernible features, and referred to as the capability to accomplish organization goals, utilise obtainable assets resourcefully, uphold extraordinary echelons of staff performance and proficiency, in addition deliver first-rate services to road users, throughout the lifecycle of the road maintenance project.

Road Maintenance – refers to appropriate, systematic and intermittent activities to preserve road pavements, shoulders, slopes, drainage facilities ,slopes, shoulders plus other erections and assets margins, as close as is conceivable to their originally erected or rehabilitated conditions. It consists of minor repairs, enhancements, to do away with the source of defects in addition to circumventing unnecessary replications of maintenance efforts.

1.11 Organization of the Study

The study is ordered in five chapters plus appendices. The first chapter of this study introduces the background of the study, problem statement which defines the particular problem addressed in the study, the purpose of the study, research objectives and questions, significance of the study, delimitation and limitations of the study, basic assumptions and definition of key terms. The second chapter concentrates on relevant literature review, the study theoretical framework, conceptual framework ,empirical review to detect knowledge gap as well as a summary of literature review .Chapter three illustrates the research design, target population, sample size, sampling procedure, research instrument, data collection procedure, data analysis techniques ,ethical considerations and operationalization of variables. The fourth chapter comprises of data analysis, presentation and interpretation. Chapter five offers summary of findings, discussion of findings, conclusions, recommendations, as well as suggestions for further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Chapter two covers applicable literature on factors influencing maintenance of roads in Kenya. It scrutinises, availability of funds, community participation, procurement procedures of contractors, project managers competency and their influence on maintenance of roads. This chapter offers theoretical as well as empirical review on the variables being studied so as to detect knowledge gaps from earlier studies. Chapter two ends with a conceptual framework as well as a summary of literature review.

2.2 Maintenance of Roads

According to the Central Bank of Nigeria (2003) road maintenance refers to conserving and keeping of road erections as near as is probable in their initial condition. It consists of rectifying deterioration that has advanced due to age, prolonged usage and the effects of the elements, and making efforts to avert or defer the advancement of further deterioration (FMW & H). Road maintenance is vital in lengthening a roads beneficial life span. Through providing good running surface, well-maintained roads lessen the cost of operating vehicles.

According to The Road Management Initiative (RMI) – Matrix, (2006), by the year 2006 twenty seven countries in Sub-Saharan Africa had operational road funds in place. More and more countries set up road funds in these contemporary times, with nine of the road funds having been formed ever since the year 2000. The economic overheads of abysmal road maintenance get passed on mainly to road consumers. In the country side, dreadful road maintenance correspondingly has an adverse impact on farming productivity as roads often turn out to be impenetrable throughout the rainy season. A road that fails to be maintained, with time declines from good to poor state, the consequence being that for each dollar hoarded from road maintenance, it upsurges VOCs by two to three dollars (NSRA, 2003). Cutting back on road maintenance may be intended as a means to save money, but instead has the contrary effect, as it results in augmented road transport costs as well as elevated net overheads to the entire economy.

Putting off road maintenance occasions elevated direct and incidental overheads, whereas were road defects revamped straightaway, the resultant cost would typically be lowered. Neglecting these defects may cause the whole road section to flop utterly, hence necessitating complete rebuilding of the road at thrice the cost of maintenance on average. The South African National Road Agency Ltd. (SANRAL) approximates renovation expenditures upsurge to six times the cost of maintenance as a result of three years of disregard ,and to eighteen times in case of five years' negligence. To circumvent these ever-increasing overheads, SANRAL to begin with assigns its obtainable financial assets to typical repair activities like overlays, reseals, then subsequently to further widespread maintenance activities like rehabilitation, then lastly to fresh road building (SANRAL, 2004).

A road in a pitiable form will escalate vehicle operating cost, augment travel time and might even cause damage to the baggage in transit. It may furthermore promote the accident rate and become a source of discomfort to the road users. These are some of the numerous reasons why the socio-economic penalties of poor road maintenance ought to be well thought-out, during budget apportionment for roads, when determining the roads to be maintained and rehabilitated, as well as when deciding on maintenance approaches for the preferred roads (Svante, 2004).

Nations have need of a key road system able to withstand roughly eighty percent of nation-wide traffic flow, as well as core roads in metropolitan regions plus roads that satisfactorily offer admission to rural zones. A quota of the inclusive roads financial plan consequently ought to be apportioned towards roads building, whereas a different quota towards maintaining the core network. Lots of countries though have a tendency to prefer rehabilitation, new construction as well as reconstruction of roads, in place of maintenance (NSRA, 2003). It has triggered a sturdy rise in the build-up of road maintenances plus the forfeiture of development effect.

According to a report (World Bank 2003), for every kilometre of road reformed in Sub-Saharan Africa, a projected three kilometres of road plummet into bad shape, thus occasioning the net decline in the aggregate road system. The equivalent goes for several other developing countries. A copious amount of the capital requisite for road building is bankrolled through donor funding, which typically come attached with little professed

overheads to the receiver country, but high actual overheads. Since road maintenance is locally financed, it necessitates problematic, detested mobilization of taxes from the people.

A capable road infrastructure is fundamental in lieu of poverty abolition and economic sustenance of any republic. Managing the cost associated with road maintenance exercises besides sustaining the road infrastructure efficiency is a significant concern in any nation. The archetypal technique of the system of road maintenance is founded on the measure of work completed then payment is made grounded on a jointly fixed unit rate with contractors (Zietlow, 2004). From the existing literature, it is submitted that road authorities encounter challenges when quantifying the time, quality, and cost effectiveness of maintenance work using these typical methods of contracting.

The main glitches linked with these traditional approaches of contracting consist of inflation of time and cost, delay in completing maintenance projects, a public sector marred with unsuitable training, corruption and intense political interfering. In the late 1990s, professionals and engineers in the roads sector instigated a more proficient technique aimed at resolving the shortcomings linked with traditional approaches of contracting. This new technique (Zietlow, 2005) termed performance-based maintenance by contracting (PBMC) had the possibility of dipping the costs of maintenance by up to fifty percent.

PBMC is a technique whereby a contract is granted to a contractor based upon the joint understanding that said contractor bears the commitment of meeting set least standards of roads performance measures according to the road agency. In PBMC technique, contractors must stomach the risks plus necessities associated with the road maintenance work, as they are tasked with the implementation and design of the project through hiring own workers (Zietlow, 2005). A prudently developed PBMC may prompt contractors toward employing excellent road maintenance exercises that would better the general state of road resources within the period of contract. In PBMC, contractors may possibly have to assume extra amenities for instance assortment and administration of asset portfolio records, call-out plus attending to crises, as well as responding to community appeals, grievances, in addition criticism. Payments stand dispensed upon the contractor meeting set standards of performance as demarcated in the work contract (Zietlow, 2005). PBMC lessens the cost and

time of roads maintenance via the application of well-systematized operational techniques and know-hows.

In Kenya maintenance of the road system was at the outset the responsibility of the MORPW department of roads for the categorized central system, the Ward Road Boards for roads in the rural region while the municipal councils maintain city streets (ADF, 2007).In September of 2008, these obligations were reassigned to the freshly established Roads Authorities. Intermittent maintenance is wholly outsourced to private freelancers, whereas repetitive maintenance is done by the blend of dynamism account by means of short-term labour, and single exercise agreements compensated based on measured work amounts (Oumarou, 2007). The Kenyan government is in deliberations about fresh initiatives to further minimise and eventually do away with the use of force account for routine maintenance, through the introduction of longstanding performance-based repetitive repairs of sub-networks roads.

The pilot preparation as well as diagnosis research on the insufficiency of the Nairobi-Thika superhighway, was completed inside the framework of the Nairobi city regional metropolitan transportation grand strategy. The research which was ordered in the year 2004 by the Government of Kenya (GoK) using finance by JICA was wrapped up in the year 2006. The unearthing pointed to the largely insufficient city transport set-up and metropolitan public transport structure. The research explicitly cited the abysmal service level plus inadequate capability of Thika road characterised by slow operations, extensive delays, road accidents as well as great vehicle operational overheads (Oumarou, 2007). In a bid to counter said glitches, the Kenyan government outsourced a consultation company in the year 2006 who formulated the pecuniary viability, ecological plus community impact evaluation plus an in-depth manufacturing strategy, with an aim of upgrading Thika road into a superhighway that has complete entree control, as well as building interchanges at the main traffic clash junctures (Oumarou, 2007).

According to an appraisal report (ADF, 2007), in August 2006, the GOK approached the African Development Fund (ADF) Bank with the intention of securing financing for the project. An ADB identification consignment was sent to the country in the month of October in 2006 and together with the Kenyan government, settled on the project's scope and constituents. Provisions for the Thika road project commenced in the month of June in 2007, with an appraisal operation scheduled for September, 2007. Through talks with the Kenyan government plus deliberations with further interested parties, the conceptual context for the

project was framed by use of a comprehensive approach aimed at refining transportation facilities alongside Thika road and within the Nairobi central business district. Financing was conjointly assumed by the Kenyan government and ADF bank. An appraisal report was generated centred on the Thika road venture viability as well as comprehensive manufacturing strategy research, data assembled from the appraisal undertaking, and consultations done with development associates, Non-Governmental Organizations (NGOs), government organisations as well as community based societies within the Thika road improvement project area (ADF, 2007).

2.3 Availability of funds and Maintenance of roads

The budget for road maintenance fluctuates with road conditions, stream of traffic, topographical position, climate conditions, work techniques, technical gear, amongst other aspects. In the absence of an established maintenance program, budget computations do not need be exact to start with. The key idea is to initiate. Always commence with simple rules of thumb in the event that calculations of road maintenance necessitate the use of sophisticated road management systems or complex formulas .Therefore, for a decent road network, adopt overheads of roughly US Dollars (USD) 500 for each kilometre per year, this being for routine road maintenance done at the municipalities, then 500 to 750 US dollars for each kilometre yearly being for road maintenance done on a national scale. Therefore for a municipality for instance, in the Philippines preserves a road network stretching 50km in sensible state, the prerequisite yearly budget for routine road maintenance at the very least would be roughly USD25, 000, at USD500 per kilometre. (World Bank ROCKS, 2005).

Although road funds and agencies encounter challenges, there have been some exceptional successes that have stemmed from the reforms made so far. Although most sub-Saharan countries fail to raise ample revenue to accommodate all their maintenance necessities, under-funding for maintenance has reduced. According to the Gwillan & Kumar (2003) report, most of these countries are currently meeting between 30% and 80% of their road maintenance prerequisites. This is an increase from the 15% to 20% which was the norm in the early 1990s.Establishement of a reliable income intended for road maintenance ,combined with better-quality operational efficiency of road agencies had led to curbing of the worsening of road conditions. The situation has been significantly enhanced in some of these sub-Saharan countries. Tanzania for instance has upgraded the condition of its road network

from about 49% poor condition in 2000, down to around 15% poor condition by June 2006 (Addo-Abedi F Y, 2007).

Road funds were however not a novel occurrence to Sub-Saharan Africa as they had been established in some countries earlier on. These funds however met with major impediments that comprised of terrible financial administration, the absence of autonomous audits, the misappropriation of funds in the form of unsanctioned expenses, funds diversification as well as pathetic supervision (Addo-Abedi F Y, 2007).With the objective of crafting a clear market indicator, road users are encouraged to mandate value for funds through associating revenues with expenditures, so as to impose a tough budget control on the road agencies. This would translate into higher tariffs for increased roads spending, and lower tariffs for decreased roads spending. Local tax revenues would then finance the outstanding road maintenance costs for urban and rural roads. Many nations that have road funds possess laid down procedures of funds apportionment among the diverse road organisations. Ghana for instance uses simple formulas for its funds allocation, whereas Tanzania applies modified formulas that suit its necessities, while South Africa bases its funds allocation on a complex valuation of its roads' essentials (Brushett, 2005).

A steady, reliable cashflow is imperative for good maintenance of roads. This may be realised by banking on a unit yearly apportionment in the national budget for the road sector, whilst the roads agency is charged with apportioning adequate funds for maintenance (Burningham & Stankevich, 2005). This would work only whereby this road agency acknowledges the significance of roads maintenance and does not give priority to new roads construction. Another tactic to ensure a stable, reliable cash flow would be to craft a specified road maintenance channel detail in the national budget, where the finance ministry would stand in charge of funds allocation. Though it's not a secure, stable source of financing at all times, it has the benefit of being allotted in the budget by law. Establishing a steadfast road fund which is funded straight from road operator levies would be another mode to guarantee a stable, reliable cash flow. The road fund may be integrated into the budget, like in Kenya, or made off budget then run by an autonomous roads fund committee set up by the corresponding road user associations and ministries (Burningham & Stankevich, 2005). Although a dedicated roads fund affords a more reliable, secure spring of funding, besides being managed by an organization solely committed to the maintenance of roads, the finance

ministry may possibly be in conflict with this technique due to perceived allotting and the propagation of off budget funds.

In several South American nations which have unitary systems as well as severe economic restrictions, the finance ministry restricts the general funds apportionment to the individual sectors. In such a circumstance the road authority ought to function inside said budget cover, dispensing resources amongst rehabilitation, maintenance, and fresh construction. Accountability mechanisms remain correspondingly key. State treasuries are averse to releasing monies except where road organisations are able to justify how the funds allocated are expended and the scope of their efficacy. In Cambodia for instance, moneys raised by the road fund are being withheld due to inadequacies in the accounting and budgeting mechanisms (WB and ADB, 2003). Where the in-house accountability mechanisms are pathetic, independent parties may be summoned to appraise the roads maintenance schedule. External audits may determine the commitment of road agencies towards accountability for project management and may possibly remain more credible to state treasuries than in-house audits.

According to a topical World Bank research, general yearly maintenance finance necessities for all categorised and city road systems falls between US$ 120-130 million (Oumarou 2007). The outcomes and deductions of the study correspond to prior research: a 110 million US dollars in the (BKS paper, 2001), 113 million US dollars for the (Road Sector Strategy, 1997), plus 125 million US dollars in the (E. Rausch, 1992). These research suggest that finance for maintenance of roads is never a limitation, all the development associates admitted, but rather a most important feat unmatched by most developing republics.

In Kenya planning and programming in the road sector is carried out in the road department (RD), MoRPW for all categorised road setup. The Kenya Roads Board (KRB) is tasked with bankrolling roads maintenance, whereas fresh improvements, rehabilitation and rebuilding are usually sponsored via donors as well as fiscal apportionments by the finance ministry (Oumarou 2007). Supported by EU funding, a road sector plan and stratagem was drafted, inclusive of the year 2007 to 2020 investment agenda. The investment agenda became fashioned following considerable conferences with development associates and interested parties. It sketches an all-inclusive account of Kenya's stratagems, procedures and agenda meant for road transportation. It sets the foundation in marshalling finances by government

foundations besides from benefactors. A number of development associates became actively involved in the roads sector, offering aid in the restoration and rebuilding of a number of core road grids significant in the economy of Kenya. These development partners moreover support the Roads-2000 Strategy (ADF, 2007).

Although the moneys made from the fuel tariff are ample to meet the cost of systematic, typical road maintenance necessities, there remains still a massive repairs build-up. The Kenyan government faces the challenge of mobilizing 112 billion Kenya shilling necessary to clear the build-up plus to keep the road system to a workable state. In the road sub-sector investment plan for the years 2007 up to 2020, the Kenyan government projects to finish its road maintenance build-up within seven years. Funding essential to work on these build-up will be sourced from the supplementary fuel tariff that currently produces 7 billion Kenya shillings each year surplus of systematic road maintenance necessities, besides from donor finance (KARA, 2007). The Kenyan government also plans to raise funds from supplementary public funding mechanisms like pension reserves, in addition to trading road bonds to the public.

According to an appraisal report (ADF, 2007) generated by the ADF bank, the approximate project cost of the Nairobi Thika Highway Improvement Project (after duties and taxes) was UA 175.10 million, which is equivalent to KES 18.10 billion, at a foreign exchange fee of UA 101.62 million, an equivalent of KES 10.50 billion , while the local overheads was UA 73.48 million, an equivalent of KES 7.60 billion .Thika road improvement project overheads approximations for the public works were founded upon the building bill of measures of point design strategies finished in the month of August back in 2007, by an manufacturing company outsourced by the Kenyan government. These cost projections compared latest bid rates for parallel building works. Overheads projections for consulting services were founded on mean unit rates for comparable services. Considerations were made to factor for location and price contingencies. Location contingencies were approximated as 7.5% of the base expense. Mean value inflation of 3% annually on foreign exchange plus 7% annually on the Kenyan shilling was employed (Oumarou, 2007). These rates were founded on the latest inclination and conjectured price rises in the Kenyan manufacture industry.

A total of UA 140,000 was budgeted for the pecuniary and procedural audits for the project in the course of its implementation (ADF, 2007). This project was conjointly funded by a loan and award from the ADF, together with the Kenyan government. The loan from ADF

accommodated 70% of all public works, subsequent supervision plus audit services, while the Kenyan government financed the residual 30% for that classification. According to (Oumarou, 2007) the ADF grant funded 85% of the PSP and Nairobi Metro research, whereas the Kenyan government covered 15%. The Kenyan government was additionally, charged with the project relocation and reimbursement expenses, plus excises, taxes, fees, and tariffs, all of which do not qualify for funding from the ADF.

2.4 Community Participation and Maintenance of roads

According to (Chevalier, 2010) a stakeholder refers to any person that meaningfully influences or becomes affected from decisions made with regards to project activities. Communities where projects are implemented form part of the stakeholders, as they are directly affected by the projects. In the last ten years, globalisation has resulted in projects revolution as it presents a dynamic and much more interactive project process. Globally most of the projects being executed possess totally diverse cultures that intervene from various points of view, working in unity towards project success (Annon, 2010).

To a global perspective, the handling of community stakeholders poses a huge challenge according to Aarseth et al. (2012), as they generally need to be considered core to the success of road maintenance projects also according to (Turner, 2007). According to Ferreira (1999) the influence of community involvement on efficient implementation of road maintenance projects offers prospects in lieu of public cooperation. Furthermore Lemos (2002), investigated multi-participant procedures and discovered the role they play in the design and choice of fitting road maintenance projects.

Community involvement is significant in road maintenance projects. Although, crisis scenarios and minor decision making generally do not necessitate community contribution, multifaceted situations with long term consequences require community involvement, which when done proactively, instead of reactively, helps to prevent future problems (Maina, 2013).

Communities hold diverse responsibilities, authority in addition to influence on a road maintenance project, whereby these might evolve over the lifecycle of the project. These responsibilities, authority include the intermittent input in focus groups, surveys, complete project funding that may involve offering political plus pecuniary support. Communities that disregard their obligation may negatively impact project objectives. Ignoring community

engagement may result in damaging impact on road maintenance projects' outcomes. Failure to acknowledge the importance of community participation may give rise to significant complications for road maintenance projects (PMI 2006).

The Project Management Institute (2006), puts forward that the community might influence a project either positively or negatively. Positive community participants are those who recognise the benefits to be reaped owing to the fruitful result of a project, whereas negative community participants include those that only perceive negative consequences owing to road maintenance projects. The interests of these negative community participants would hence be well accomplished by derailing progress in road maintenance projects. Negative community participants need to be managed so as to reduce the risk of failure of road maintenance projects.

According to (Kennon, Howden & Hartley 2005) satisfied community participants enhance the significant progress of road maintenance projects, thereby contributing toward its success. It's therefore important to acknowledge and manage the key community participants. (Bourne 2006),points out that the community stakeholders comprises of groups and individuals each having differing probability to sway road maintenance projects outcome either positively or adversely. Road maintenance ventures have an organizational framework that consists of people with different needs, composition and objectives. Research by Bourne and Walker (2005) linked road maintenance project's success with how strong the relationship forged and cultivated is amongst community stakeholders .According to Burton and Nobel (2003), the road maintenance project environs is highly complex and uncertain thus making community stakeholder management difficult. Oyegoke (2006) was of the opinion that road maintenance projects impact different project interest groups directly or indirectly.

According to Bourne (2006) a significant facet of handling the road maintenance project setting is to comprehend the course and effect within which the project management needs to function in order to achieve project success. According to (Manowong and Ogunlana, 2010) the project managers ought to attempt recognising the relevant issues to all community stakeholders, so as to content all parties or at a minimum meet their lowest needs. Community involvement is vital for successful road maintenance. In a road maintenance project setting, these community participants are typically varied, and may differ

considerably in the extent to which they influence road maintenance exercises either positively or negatively.

According to Karl (2000) assessment of the influence of community participation has been conducted mostly through the examination of surveys statistical analysis, case studies and post evaluations. Both conventional Monitoring and Evaluation (M & E) methods and hands-on M & E have been employed in the lifetime of road maintenance projects. The proof though still restricted infers that community involvement influences road maintenance projects positively in terms of its performance, outcome and sustainability.

Community stakeholder consultations for the Nairobi Thika Highway Improvement project were held so as to articulate all the main concerns raised by all the interested parties. According to a (KARA, 2007) report, Kenyans seemed in support of the required upgrade of Thika Road and saw this as a significant ,modern strategy meant to counter the excessive overcrowding plus other connected problems. According to circumstantial sources founded on early focus groups carried out by CSUD, most Kenyans remained optimistic and buoyant regarding the renovation, plus most were excited about the potential benefits which the upgraded road would fetch. They echoed the prospective benefits as articulated by the government together with the AfDB (ADF 2007). For instance, the community assemblies consulted at Ruiru in 2010, expressed their hopes that the improvement project would result in quicker travelling, better employment and profitable opportunities, enhanced access to amenities, as well as accelerated community development.

Even though the media featured the Thika road improvement project to some amount, plus blogs did journal its development it remains ambiguous if the community affected, had ample chances to consult with the project engineers and the related government establishments on the project's architecture, operation and impact, in accordance with the acceptable procedures of context sensitive road building. According to the Environmental and Social Impact Study (2007), conducted by Consulting Engineering Services (CES), five community conferences were conducted with a total of 329 participants, where some government representatives were interrogated. Those few instances of community consultation were representative of a very small proportion of people affected day-to-day by the improvement project, who include commuters, businesses, landowners and other members of the community. In addition, there exists other documents available which outline details of the project, most remarkably an

appraisal report generated by (ADF 2007), a feasibility study and design report drafted by (CES and APEC 2007), in addition to environmental and social impact assessment reports (ADF 2007, and CES and APEC 2007). Nonetheless, some of these documents remain inaccessible to the affected residents and native governments. For instance, brochures such as the Resettlement Action Plan, outlining the resettlement strategy for the communities displaced by the Thika road improvement project, remain difficult to get to.

According to (Oumarou, 2007), two-phased community consultations were conducted within the project area between the 17th and 25th of May, 2007 .These consultations were purposed to articulate the issues of communities located alongside Thika road. The improvement project was met with an overwhelming amount of support except: a requirement of just, immediate reimbursement for properties; a prevention strategy for the infection of STIs and HIV/AIDS; resident involvement of the youth and females in building; minimising noise pollution plus dust emissions; minimised interference of utilities and infrastructure, in addition to commuter traffic digressions impacting negatively on livelihoods and trades located alongside the current road. The drafting of ESMP and ESIA assimilated all these issues articulated by the community participants. The Summary ESIA was circulated to the ADB Board on the 13th July of 2007, (ADF/BD/IF/2007/144) then posted online on the bank's PIC website.

2.5 Procurement Procedures of Contractors and Maintenance of Roads

Ashworth (2001) supposed that procurement, a noun of the verb procure, is defined as to acquire through carefulness or determination. According to the (Aqua Group, 2001) definition, procurement refers to the practice of securing services and merchandises from a different party at a cost. A business forum by Barrons (2007) described procurement as the acquirement of merchandises, infrastructure, amenities at the most opportune price, best quality and quantity, at the most opportune period, in the most opportune locale, for the most opportune advantage or usage by individuals, corporations, governments, commonly through a deal .As per Ombaka (2009) procurement refers to the wholesome procedure of obtaining resources, assets and facilities essential to a specific development.

The procurement procedure commences with identifying requirements, then a pronouncement on obtaining needs. The procedure proceeds to risk calculation, identifying and appraisal of alternate options, awarding contracts, supply then imbursement of the resource. According to

a report by World Health Organization (2007), an efficient procurement procedure avails resources at the opportune quantity, price, quality, for the right client. Furthermore Ombaka (2009) reiterates that procurement not only refers to the deed of purchase, rather encompasses a wide-ranging variety of security and risk management, information know-how, operation, legal systems, business, all conducted so as to meet an establishment's requirements.

According to (Corbett & Smith 2006), effective procurement constitutes four Critical Success Factors (CSF) namely: competitive procurement process; transparent procurement process; well-organized, committed public agency; plus sustainable procurement and operation. Competitive and transparent procurement procedure is significant in reducing transaction overheads, shortening negotiation period and closing the deal. Articulate project ideas and client needs ought to aid in attaining these during the bidding process. Generally, competitive bidding based solely on price may not translate into securing a solid private consortium and getting value for public funds; hence would require a long-term view in searching for the opportune economic partner (Corbett & Smith, 2006).

According to Ong'olo (2006) transparency is defined as how the design and initiation of projects, procurement and selection process should be organized. He argues that bribes and other forms of corruption that are employed in order to gain special treatment and approval for projects from government should be rejected. He also points out the importance of keeping contractual norms precise and unambiguous in a bid to counter opportunism.

The U.S. Department of Transportation (2007) noted that the existence of a sufficient number of capable private sector firms and groups, is core in guaranteeing a competitive procurement and election process. Yvrande-Billon (2005) explains that an ample service specification is key in franchising, firstly as the foundation for competition in the bidding process and, secondly, in setting the benchmarks for evaluation of bids. It is therefore important that the franchisor refine his call for tender as much as is possible. Failure to do so may result in an increase in the costs of bidding not to mention applicants may lose interest in the bid owing to the high uncertainty of the project.

According to Hodges and Dellacha (2007), although competitive selection of private investors is generally the popular method, in some cases private enterprises approach

governments pitching fresh project concepts, usually known as "unsolicited proposals". These types of pitches normally turn contentious if governments discuss project rights only with the initial proponent, in the absence of sufficient transparency and competing offers. To counter such occurrences, countries ought to develop policies and enforce efficient systems that assimilate unsolicited proposals into processes which combine transparency and competition.

Ekdahl (2001) stipulates that delays in project implementation and a rise in costs may occur due to the employ of inefficient labour, or over estimating the expected level of productivity of labour. This may occur where the quality of the employed sub-contractors is not regulated within the main project contract. Generally there exists a trade-off amongst price, experience and track record. Accepting the least priced tender does not always result in a project that's both time and budget efficient. In some instances contractors and sub-contractors declare bankruptcy in the course of the road maintenance project. This results in major deferrals at additional outlays incurred because the project sponsor is forced to re-bid the unfinished works to some other party. Ekdahl (2001) further argues that procuring a new contractor to finish another contractor's work is expensive as a result of the possible liabilities that the new contractor would have to bear for another's work.

The procurement of civil works for the Nairobi Thika Superhighway Improvement project was conducted using techniques for International Competitive Bidding (ICB), whereby a contractor's pre-qualification process was followed. According to a report (Oumarou, 2007),the public works expenditure for the Nairobi-Thika superhighway was calculated to be UA 144.16 million, then was drafted into a dual contracts. The public works expenditure for the Nairobi metropolitan areas was calculated to cost UA 22.67 million then was embalmed as one contract.

Consulting services used for the ADF-funded elements was procured in compliance with the Bank's guidelines of process for the employ of consultants. The Government of Kenya procured the consulting services for the Thika road construction via international competition (ADF, 2007). The consulting company chosen for the project architecture was also selected for the construction supervision. Both the project design expenditure and the cost of supervision services were financed solely by the Government of Kenya. The engineering design and feasibility of the Nairobi Metro Study was done through outsourcing consulting

services which was procured based on a short-list of competent consulting companies post the pre-qualification process (Oumarou, 2007). The procurement process was conducted on the basis of technical quality with price consideration.

According to an appraisal report on the Nairobi Thika Highway Improvement project (ADF, 2007), procurement for the consulting works outsourced in lieu of the viability plus contract review services for the Nairobi Thika PSP study, was done based upon a short-lists of competent consulting companies. The assortment process was founded on price and quality assessment. The financial audit facilities was subcontracted to audit firms procured via short-lists procedures, conditioned upon authorisation from the auditor general of Kenya before request for tenders (ADF, 2007). The procedural audit was retained based upon the short-listed professional engineers and engineering companies. The assortment process in the two audits was conducted by comparing and contrasting technical proposals, with the least expensive proposal preferred.

According to (Oumarou, 2007) the GOK was solely responsible for compensation, relocation and resettlement of the residents displaced by the Thika road improvement project. This exercise was estimated to cost UA 3.39 million and was factored as part of the project expenditures. A review of procurement regulations and principles in Kenya was done, particularly the public procurement and disposal regulations of 2006, and the public procurement act of 2005. These were deemed to be up to standard. The ministry for roads and public works together with the ministry for transport were the implementing organisations for the Thika road improvement project. In terms of experience, expertise, capacity and resources, the procurement sections of both implementing organisations were determined to be adequate to conduct the procurement activities.

Due to the high priority attached to the thika road improvement project, besides the urgency to commence building works in the early 2008, the GOK sought authorization from the ADF bank to commence on an Advance Procurement Action (APA). Following the bank's approval of the APA application, the GPN was printed on the 31st of July, 2007. An advance action entails the assessment of tenders, though it does not involve awarding contracts. It also involves the process of prequalifying contractors, the tendering process, as well as tender valuation for the public works contracts. According to an appraisal report for the project (ADF, 2007) the advance action was conducted in compliance with the Bank's Procurement

Procedures. Approval of the advance action did not translate to the bank's commitment towards financing of the project.

The documents placed under appraisal pending authorisation from the Bank as per the review processes, included: explicit procurement announcements; call for pre-qualification papers; bid papers and call for proposals from consultants; bid valuation reports; appraisal of consultants' proposals reports; draft contracts-in case the original contract document has been amended (Oumarou, 2007).

2.6 Project Managers Competency and Maintenance of Roads

There exists a strong correlation concerning project management with project performance, according to Brown and Adams (2006). In the road building business, management is considered among the most significant influences impacting performance. Brown and Adams (2006) researched on a novel approach to measure the impact of Building Project Management (BPM) on quality, time and cost outputs. They studied fifteen `cases' obtained from UK statistics. Evaluations carried out revealed that the BPM as it is currently enforced in the UK, falls below the standard set, with regards to the three core performance evaluation benchmarks of quality, time and cost. Lehtonen (2001) acquired a performance measurement model that helps a corporation's upper management and operations managers in receiving uninterrupted feedback concerning operational activities.

Maintaining an efficient filing and archives system for performance data could come in handy for future reference, conflict resolution with regards to claims, as well as in repair and maintenance works, according to Thomas (2002). Kuprenas (2003) stipulated that effects of project management practices may be analysed via a three-step analysis namely, comparison of summary statistics of performance design, proof of statistical significance of any differences, then the calculation of a least squares line of regression, with a plot of performance design measurement, against the application of project management, as a method to measure the influence of management on cost performance of the design phase.

Research completed by Cheung et al (2004) on project efficiency relative to project managers, suggested that an online Project Performance Monitoring System (PPMS) in road maintenance, may help project leaders in implementing indicators of project performance in road maintenance .PPMS may possibly enable project managers, project directors in

monitoring and evaluating the efficiency of road maintenance. Ugwu and Haupt (2007) stipulated that an ample performance knowledge, comprehension is significant in the actualization of managerial goals. For instance an upgrade in institutional transformations, fast plus efficient decisions in design, specification and building, at each maintenance project-level interface, employing relevant decision-support tools.

Ogunlana et al, (2006) suggested necessity for a concentrated effort by economy leaders and road construction corporations to supply infrastructure required for efficient management of road maintenance projects. Dissanayaka and Kumaraswamy (2009) stipulated that information that may affect latent performance, empowers project managers focus on controlling project performance efficiently. According to Chan and Kumaraswamy (2002), efficient liaison and information dissemination amongst project managers with their subordinates, assist in speeding up the progression and performance output of road maintenance projects. Kuprenas (2003) did research on the outcome of implementing project management-based administrative design, project manager trainer courses, regularity of strategy meetings, plus regularity of strategy reports, on design stage budget implications. Frequent design team meetings, generating reports on the design stage evolution significantly assisted in lowering design stage overheads.

Administration of the road system in Kenya is the collective obligation of a number of agencies. Presently, the department of roads in the MoRPW is responsible for roads classified as A, B and C; the committees for district roads govern roads classified as D, E plus the entire roads reserved for exceptional uses; while the Kenya Wildlife Services (KWS) oversees roads cutting across national parks. Uncategorized roads in metropolitan regions are managed by the local and metropolitan establishments, while the department of forestry under the environmental and natural resources ministry are accountable for all uncategorized roads inside both the natural as well as industrialised forestry. The Kenya Roads Board (KRB) was instituted in the year 2001 and had the duty of directing the Road Maintenance Fuel Levy (RMFL) fund besides supervising the expansion of the whole road system (Oumarou 2007).

The Government completed the execution of key institutional improvements in the road sector which commenced in the year 1999 with an aim of refining the road sector conveyance capability. Toward this goal, an all-inclusive road sector strategy was organised then sanctioned by the parliament in the year 2006 (Oumarou 2007). Additional legislature

intended for instituting three independent road segment organisations was approved by parliament then officiated into decree by the head of state in the month of September 2007.

This statute – named the Kenya Roads Act of 2007- set up three sovereign legislative road establishments, that is, the Kenya Urban Roads Authority, Kenya Rural Roads Authority and the Kenya National Highways Authority. KeNHA is in charge of the growth and administration of major roads classified as A, B and C; KeRRA is accountable for the growth plus supervision of countryside roads classified as D, E and others; while KURA is in authority of the improvement plus supervision of roads within metropolises and towns. These three organisations came to be wholly functioning in the month of September 2008. A step-by-step plan in lieu of the formation and function of these three organisations was set up and a Road Sector Reform Interim Management Committee was formed to supervise the change management process (Oumarou 2007).

According to the Kenya Roads Board Strategic Plan (2013-2017), The Kenya Roads Board (KRB) assumed a participating and advice-giving practice in the advancement of this Strategic Plan. A comprehensive examination of the policy and operational official papers was carried out. Consultations with the management and team were also conducted to deliberate on the internal strengths, weaknesses, opportunities and threats. Crucial policy documents studied consisted of the Constitution of Kenya 2010, the Roads sector policy documents, Kenya Vision 2030, first Medium Term Plan (MTP), economic survey 2011. An evaluation of the working atmosphere was also carried out to determine elements that touch on or may affect the growth of the roads sector in Kenya. The whole team of KRB was likewise engaged in the policy development retreat prearranged to appraise and improve the strategy document. This strategic plan specifies the strategic course that would be employed by the Board over the subsequent five years, in delivering on its directive.

The MoRPW has bestowed significant prominence to staff improvement through training so as to boost its capability in road government. As a way of its official restructurings, the Kenya Institute of Highways and Building Technology (KIHBT), a provision section in the MoRPW, was reorganized and renamed Semi-Autonomous Government Agency (SAGA) aimed at efficient implementation of its directive for preparing the private and public sector workforce in lieu of road improvement, restoration and repairs (ADB 2007). The training

division in the MoRPW deals with temporary and permanent training, and team improvement locally and out of the country.

In the Nairobi Thika Highway Improvement project, the development was executed by the department of roads in the MORPW apart from the Nairobi metro study that was executed by the transportation ministry (Oumarou 2007). These agencies had previously effected comparable road projects and studies sponsored by donors. According to an (ADB 2007) report, general management and monitoring was undertaken by a committee for project steering presided over by the MORPW PS. The implementing organisation for the public works, the building, administration, audit services, as well as the private sector involvement research was carried out by the department of roads (MORPW), via a Project Implementation Team (PIT). This team was directed by a team leader accountable to the MORPW permanent secretary, via the secretary for roads. Implementation duties for the Thika road improvement project was reassigned to KeNHA, as soon as it became functioning in compliance with the requirements in the Kenya Roads Act of 2007, as well as the processes and schedule set up by the acting management committee. The transportation ministry acted as the implementing organisation for the Nairobi metro research, constituent D via a Study Implementation Team (SIT). This team was chaired by a team leader accountable to the MOT permanent secretary (Oumarou, 2007).

According to an Appraisal report (ADF,2007) , the associates of the PIT comprised of a team leader for the project, a single procurement expert, a single fiscal professional, a single design architect, a single contracts architect, a single ecological associate, in addition to a round-the-clock support workforce. The SIT comprised of the research team leader from the ministry of transport in addition to agents of the roads and public works ministry, local government ministry, KEPSA, finance ministry, the attorney general chambers, Kenya Railways Corporation, as well as from the Nairobi Town Council. The PIT and SIT organizational and administration overheads which included (information expenses, operational payments, perdiems, workplace provisions, plus elementary gear) was incorporated in interim amounts in the consulting pacts. The selected PIT and SIT team leaders possessed at least ten years of experience; the other officers possessed at least five years of work experience in addition to credentials which were satisfactory to the ADF bank. This was drafted as a requirement of the credit facility in addition to the funding protocol.

The general management of the Nairobi Thika Highway Improvement project was delivered by a commission for project navigation presided by the MORPW permanent secretary. It comprised of agents of the Nairobi City Council, the transport ministry , ministry of lands and housing, the ministry of local government, finance ministry (Oumarou,2007) . The commission was to flag concerns which may impede or else adversely upset the implementation of the Thika road improvement project, as well as counsel on needed counteractive actions. The commission was engaged in appraising project development documentation, as well as provisional documentation for the research. The Commission convened four times a year for assessment and management conferences.

The implementation of the public works for the Nairobi-Thika superhighway and metropolitan trunk aerials was undertaken by contractors outsourced internationally. The building administration, the viability in addition to engineering strategy research was carried out by highly competent manufacturing consulting corporations. According to an (ADF, 2007) appraisal report, the project was executed over a span of thirty six months counting the period for procurement, beginning as of January 2008.

2.7 Theoretical Framework

The theoretical context for the research was supported by conventional theory of pavement deterioration as hypothesised by Van Rijn (2006). Van Rijn assumes that the requirement for episodic maintenance is contingent on the conventional theory of pavement deterioration, exhibited by weakness at the base of the road surface or structural distortion, and assumes that deterioration intensifies with time and traffic, as the pavement declines as a result of traffic prompted strains.

Roads become debilitated with usage over time. Ifeoma (2010) expounds that no road is built to sustain forever, similar to all other entities made by man. In metropolitan regions where most roads are tarmac, variations in weather circumstances over time, floods, usage and other aspects have some detrimental consequences on roads, right from the instant they are erected.

This study also incorporated participant's theory that as an arena of study, is inclined to centre on design in addition to handling the multifaceted range of undertakings prerequisite in completing a building project, like a road. Awareness in participants has developed significantly after the inspirational work by Freeman's (1984), Strategic Management: A

Stakeholder Approach became in book form. More than a hundred pupillages were printed on participant concept by (Donaldson & Preston 1995, p. 65), and numerous others circulated subsequently. Progressively the concept of participants had increased acquisition in educational editions, mass media as well as government journals (Miles & Friedman, 2002).

According to (Friedman & Miles, 2002), as awareness in participant notions augmented, so did the amount of interpretations on the matter .Some efforts at synchronisation of contrasting interpretations were made with the summary by Jones (1995) being the best generally acknowledged. He contends that participant theory may be separated into three core methodologies: descriptive methodologies, representing "what transpires"; instrumental methodologies describing "what transpires if"; and normative methodologies that propose "what ought to transpire". Though rooted in strategic management, participant theory remains pragmatic to numerous turfs of examination, comprising corporate social responsibility, this according to (Hillman and Keim, 2001) as well as in recent times road construction project management (Bourne and Walker, 2005).

In reply, McVea and Freeman (2001) crusaded for forthcoming participant study to shun hypothetical dispute, then in its place apply participant theory's acumens to evaluate real world problems .This study concentrated on the effectiveness of participant theory for investigating community participation in the execution of road maintenance projects.

2.8 Conceptual Framework

The study can be theorised in a conceptual framework illustrated in a diagram analysis expounding on the relationship. The Figure 2.1 demonstrates the relationship between the dependent and independent variables:

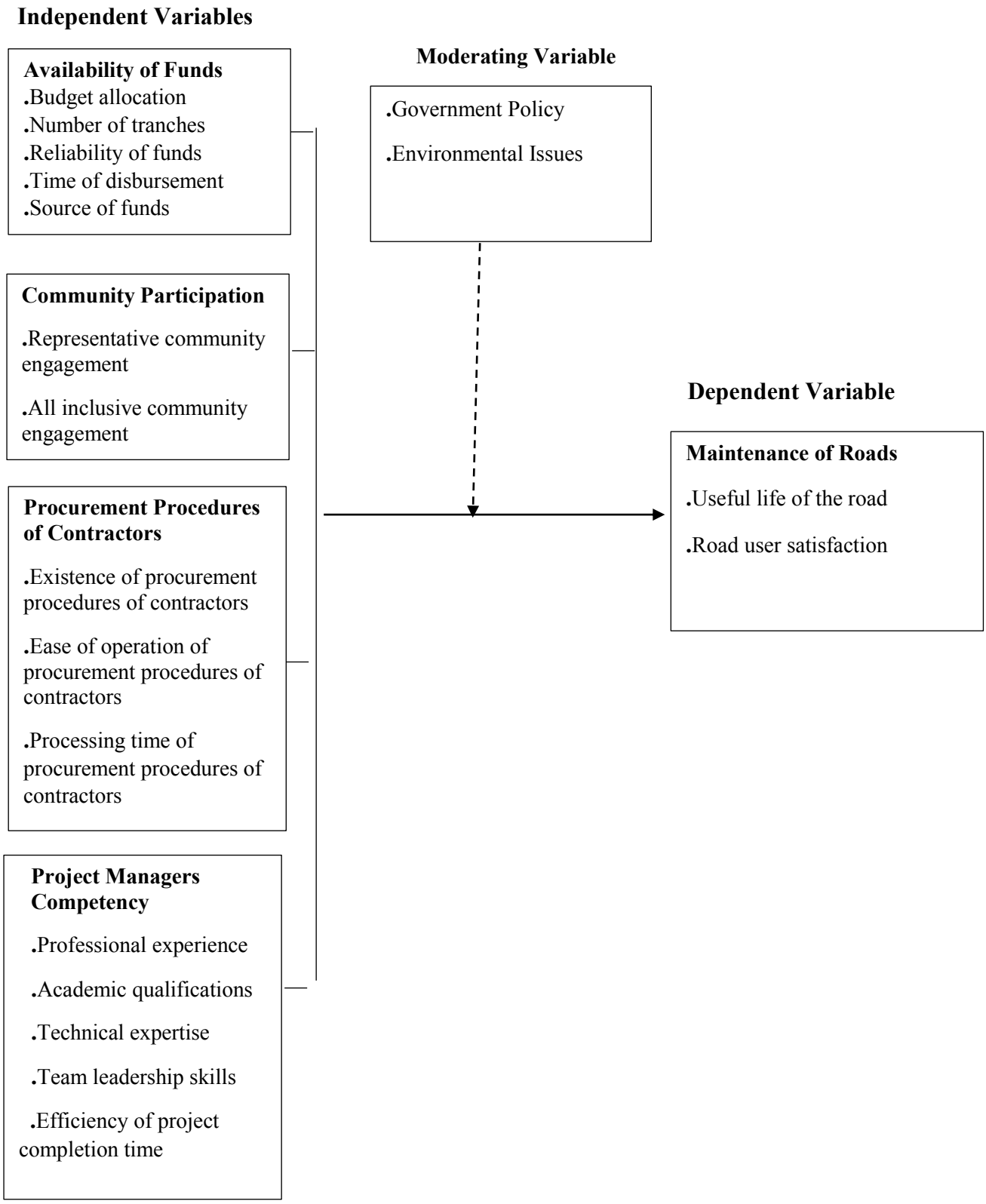

Figure 1: Conceptual Framework on Factors Influencing Maintenance of Roads.

Figure 1 displays the conceptual framework. The independent variables conceptualised as availability of funds, community participation, procurement procedures of contractors and project management competency are positioned left of the diagram. Each interacts directly with maintenance of roads, the dependent variable. Availability of funds will be measured using these indicators; budget allocation, number of tranches, reliability of funds, time of disbursement and source of funds. Community participation will be quantified by representative community engagement and all inclusive community engagement. The third variable, procurement procedures of contractors will be enumerated by the existence of procurement procedures of contractors, ease of operation of procurement procedures of contractors, processing time of procurement procedures of contractors while the last variable, project managers competency has the following indicator measures;, professional experience, academic qualifications, technical expertise, team leadership skills and efficiency of project completion time. The moderating variables are government policy and environmental issues while maintenance of roads will be quantified using these indicators; useful life of the road and road user satisfaction.

2.9 Knowledge Gap

The literature reviewed presents essential theoretical and empirical substantiation on factors influencing maintenance of roads in Kenya. Table 2.1 displays a matrix table outlining a recap of the empirical studies reviewed with observed knowledge gap.

Table 2.1 Matrix Table for Empirical Literature Review

Variable	Authors (year)	Title of the study	Methodological approach	Findings	Knowledge gap
Availability of Funds	Irandu E. and Malii J. (2013)	Nairobi-Thika Highway Improvement Project. University of Nairobi	The study adopted descriptive survey research design	The study established that availability of funds influences maintenance of roads in Kenya.	The study failed to do an in depth analysis of the aspects of availability of funds as key to implementation of road maintenance projects
	Teipelke R. (2014)	The Thika Highway Improvement Project: Changes in the Peri-Urban Northern Nairobi Metropolitan Region. University of Nairobi	The study assumed descriptive survey research design	The study established that availability of funds influences maintenance of roads in Kenya	The study failed to do an in depth analysis of the aspects of availability of funds as key to implementation of road maintenance projects
Community Participation	Oguso A. (2015)	Enhancing Road Infrastructure Development through Public Private Partnership in Kenya: A Comparative Analysis. Kenya Institute for Public Policy Research and Analysis.	The study engaged cross-sectional survey research design	The study revealed that community participation influences maintenance of roads in Kenya	The study merely concentrated on community participation in general rather than on the quality of community participation. Research is essential to show its influence on maintenance of roads in Kenya.
	KARA and CSUD (2012)	The Social/Community Component of the Analysis of the Thika Highway Improvement Project. University of Nairobi and Jomo Kenyatta University of Agriculture and Technology.	The study used descriptive survey research design	The study revealed that community participation influences maintenance of roads in Kenya	The study failed to address comprehensive community engagement. Research is required to show the influence of all-inclusive community participation on maintenance of roads.
Procurement	Mundinia P.M (2017)	Kenya 1st Mover	The study	The study	The study failed to

Variable	Authors (year)	Title of the study	Methodological approach	Findings	Knowledge gap
Procedures of contractors		PPP Road Projects. Kenya National Highways Authority	adopted descriptive research design	emphasised the significance of procurement procedures of contractors in maintenance of roads in Kenya.	do an in depth analysis of procurement procedures of contractors as a vital constituent for maintenance of roads in Kenya
	Teipelke R.(2014)	The Thika Highway Improvement Project: Changes in the Peri-Urban Northern Nairobi Metropolitan Region. University of Nairobi	The study assumed descriptive research design	The study emphasised the significance of procurement procedures of contractors in maintenance of roads in Kenya.	The study failed to do an in depth analysis of procurement procedures of contractors as a vital constituent for maintenance of roads in Kenya
Project Managers Competency	Mbataru P. (2018)	An Analysis of the Influence of Road Infrastructure Implementation on Local Development: The Case of Thika Superhighway in Kenya. Kenyatta University	The study engaged descriptive cross-sectional design	The study established that project managers competency influences maintenance of roads in Kenya.	The study disregarded the importance of project managers competency as a crucial constituent necessary for efficient maintenance of roads in Kenya.
	Irandu E. and Mali J.(2013)	Nairobi-Thika Highway Improvement Project. University of Nairobi	The study assumed descriptive cross-sectional design	The study established that project managers competency influences maintenance of roads in Kenya.	The study disregarded the importance of project managers competency as a crucial constituent necessary for efficient maintenance of roads in Kenya

2.10 Summary of Literature Review

The literature presented recognises various possible elements that may possibly impact on the performance of contractors on road maintenance projects. For example, qualitative proof presented by Ofori (2004) as well as Edmonds and Miles (2004) nearly ten years ago exposed prolonged deferment in the compensation of contractors for services delivered, absence of credit amenities for companies, dreadful communication lines and an undependable provisions resource base. By means of quantitative analysis, Ahadzie (2005) similarly conveyed proof of absence of ; funding and lending services for contractors, deferment in the compensation of contractors for services rendered, design modifications and deviations, diminished spirits and enthusiasm of skilled personnel, abysmal planning, administration and little automation, as some of the significant issues that may possibly be distressing road maintenance performance.

In the audit of Ghana, the World Bank (2003), have constantly filed documented proof of deals taking really drawn-out periods to attain business conclusion and moreover, regularly exposed to pointless postponements, abysmal synchronisation and communication systems, financial constrictions and widespread structures of controls and land proprietorship rows. In the latest study, Fugar and Agyarkwa-Baah (2010) fused a number of these dynamics in a bid to emphasise their prominence in present-day Ghanaian road maintenance exercises. The authors determined the factors affecting road maintenance performance might be categorised into these subjects: provisions, human labour, apparatus, funding, environs fluctuations, government acts, contractual associations, planning and regulatory practices.

Certainly, there is plenty of prevalent literature on factors affecting road maintenance in third world countries. While these noteworthy frames of information occur in the emergent economy setting, existent evaluation of the literature submits that there is absence of thorough speculative and practical analysis to determine the fundamental features of the various elements acknowledged in the literature, specifically with concerning the effective and competent accomplishment of road maintenance projects. Consequently, this study research strived to link this knowledgeable breach through examining the factors influencing effective, competent achievement of road maintenance projects in Kenya, with a concentration on the Nairobi Thika Highway Improvement Project.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter addresses the research methodology employed in the study. It outlines the research design, target population, sample size and sampling procedures, research instrument under pilot testing, validity and reliability of research instrument, data collection procedures, data analysis techniques, ethical consideration as well as operationalization of variables.

3.2 Research Design

The study employed descriptive survey design utilising quantitative methods. Descriptive survey design was effective for the study as it empowered the researcher to investigate influence of independent variables on a dependent variable free from manipulation (Kerlinger, 2000) , as it involved collection and comparison of data concurrently with the study.

3.3 Target Population

Borg and Grall (2009) defined target population as the universal set of study of total affiliates of a real or hypothesized group of individuals, events, entities on which the researcher intends on generalizing the outcome. The target population of this study was: 110 respondents from the Kenya Alliance of Resident Associations and from the Kenya National Highway Authority ,Nairobi Office, and was composed of managers, finance officers, procurement officers, engineers and KARA member association officers based along the Thika Highway. Mugenda and Mugenda (2003) supposes that the target population ought to possess discernible traits upon which a researcher intends on generalizing the study's outcome. This definition is based on the assumption of a heterogeneous population. Target population for this research is presented in Table 3.1:

Table 3.1: Target Population

Category	Target Population
Managers (KeNHA)	10
Finance Officers (KeNHA)	30
Procurement Officers (KeNHA)	25
Engineers (KeNHA)	20
Association Members (KARA)	25
Total	**110**

(Source: Department of Human Resources KeNHA; Member Register KARA)

3.4 Sample Size and Sampling procedure

This section covers sample size as well as sampling procedure employed in the study as follows:

3.4.1 Sample Size

According to (Cooper & Schindker, 2003) the sampling structure defines a wholesome tally of population components upon which the sample is chosen. Sampling refers to choosing a certain figure of subjects from a definite population being representative of said population. The researcher employed a sample size determination according to the Krejcie & Morgan table (Krejcie & Morgan, 1970) to achieve a sample size of 86 respondents out of the target 110. Proportionate stratified sampling was engaged to attain a sample for the individual strata as in Table 3.2:

Table 3.2 Sample Size Determination

Category	Target Population	Sample Size
Managers (KeNHA)	10	8
Finance Officers (KeNHA)	30	23
Procurement Officers(KeNHA)	25	20
Engineers(KeNHA)	20	15
Association Members(KARA)	25	20
Total	**110**	**86**

3.4.2 Sampling Procedure

According to Cooper & Schindler, (2003) the sampling procedure refers to the tally of total population constituents from which the sample is drawn. A sample size determination

according to the Krejcie & Morgan table (1970) was employed, in determining the sample size. As is the case for a stratified population, proportionate stratified sampling was engaged to attain a sample for the individual strata, whereby respective strata population was divided against the target population then multiplied by the extrapolated sample size from the Krejcie and Morgan Table (1970), as shown in Table 3.3:

Table 3.3 Sampling Procedure

Category	Target Population	Sample Size
Managers(KeNHA)	10	8
Finance Officers(KeNHA)	30	23
Procurement Officers(KeNHA)	25	20
Engineers(KeNHA)	20	15
Association Members(KARA)	25	20
Total	**110**	**86**

3.5 Research Instruments

This study utilised both primary and secondary data collection techniques. Primary data was gathered using questionnaires. Oppeinheim (1992) argues that as a significant instrument for research and a data collection tool, a questionnaire maintains its core functionality as measurement. Furthermore, according to Wilkinson and Birmingham (2003) questionnaires can be designed and utilised to gather huge quantities of information from different respondents. Questionnaires possess several advantages over other forms of data collection: they are normally cost friendly to administer; minimal training is required to develop them; once completed, the analysis of questionnaires is both simple and fast. Questionnaires were developed and circulated to respondents to complete so as to avail information meant for research, as a qualitative technique to collect data. The study employed unstructured questions as well as contingency questions to design the questionnaire. Unstructured questions encourage more in depth answers since they stimulate the respondent's emotions on the subject matter as they think on the best response to each question. Because contingency questions are not difficult to analyse, they assist in drafting the appropriate presentation of data. All the information gotten via the questionnaire was analysed to discover if there were inconsistencies, and corrective measures were initiated.

3.5.1 Pilot Testing of the Instruments

The instruments were deployed for piloting on a population that bore similarities with the target population in KeNHA Nairobi Offices and KARA association members located along the Thika highway. The purpose of piloting was to get rid of ambiguity, establish if there were any challenges in distributing the questionnaire, examine data collection instructions, demonstrate the feasibility of the study, foresee and rectify any logical and procedural challenges affecting the study, and permit preliminary (dummy) data analysis (Mugenda and Mugenda, 2003).Piloting aided the researcher with measuring validity and reliability of the instrument. The pilot study was carried out at KeNHA Thika Offices and with KARA association members located along the Eastern Bypass, as they bear comparable features to the study sample population. Piloting sample comprised of 10 participants, which is an estimated 10% of 86 respondents. This figure was deemed to be satisfactory according to Mugenda and Mugenda (2003), who supposes that piloting sample ought to be representative of 10% of the study sample. Pilot testing was completed over a three week time span, after which amendments were made to the instrument accordingly. Errors discovered during piloting were rectified.

3.5.2 Validity of Research Instruments

Nachmias and Nachmias (1996), define validity as the extent to which a test assesses what it professes and accordingly allows suitable inferences of results. According to Paton (2000), validity is the quality accredited to proposals or processes to the point to which they fit in to well-known information or facts. An attitude scale is thought to be useable, for instance, to the extent to which its outcomes obey other procedures of control of the attitude. Content validity of the study instruments is founded so as to ensure that they mirror the subjects of the theories under study. Firstly, the researcher examined the instruments and likened them with the set objectives to certify that they comprise all the statistics that respond to the fixed queries and speaks to the objectives. Second, experts (supervisor) were asked to inspect the applicability of the questionnaire articles compared to the set objectives of the research study.

3.5.3 Reliability of Research Instruments

Mugenda and Mugenda (2003), defines the reliability of a tool as a test of the degree to which a research instrument yields constant outcomes or statistics following recurrent trials. To assess the dependability of the instrument that was employed in the study, the test- retest

method was engaged at an interim period of a fortnight, to assess consistency of responses over time. Questionnaires were distributed to the piloting sample at an interim period of a fortnight. Subsequently, a correlation coefficient and a reliability coefficient was computed by the formula for Pearson's correlation coefficient: A mean reliability value of 0.763 was attained for all objectives, thus attesting to the reliability of the research instrument. This conformed to Kothari (2004) who directed that a reliability coefficient value (r) of 0.7 and upwards is a sign of an instrument's reliability.

3.6 Data Collection Procedure

The researcher received the go ahead to conduct field research through an introductory letter from the University of Nairobi, Department of Open Learning. Subsequently the researcher secured research permit from the National Commission for Science Technology and Innovation (NACOSTI), following payment of research permit application fee of one thousand Kenya shillings, paid in March,2019. Prior to questionnaire administration, the respondents' permission was sought. After the respondents consented to partake in the research, research instruments were delivered to them. The questionnaires were assembled once the respondents completed them.

3.7 Data Analysis Techniques

Data gathered in the study was considered and examined for extensiveness and correctness each field data collection day, prior to storage, as recommended by Kumar (2014). Information from the completed questionnaires was studied, coded and input into the computer manually by the researcher. The research produced quantitative information. Descriptive statistics was employed to evaluate quantitative data. Descriptive statistics comprised of frequency, percentage, mean and standard deviation. Quantitative data was presented in table form, illustrating findings comprising of frequency, percent, line mean and standard deviation, as well as composite mean and standard deviation.

3.8 Ethical Consideration

The data obtained from this research study was intended for the accomplishment of the researcher's academic prerequisite. The researcher notified the respondents that the intent of the study was exclusively academic and guaranteed them of discretion and anonymity.

Participants were not obligated to reveal their identities on the questionnaire. Names of the respondents were non-compulsory and were concealed to safeguard their rights. Individual particulars were restricted to general information.

3.9 Operationalization of Variables

Table 3.4: Operationalization of Variables

Research Objectives	Variable	Type of Variable	Indicators	Measurement Scale
To examine how availability of funds influences maintenance of roads in Kenya	Availability of Funds	Independent	.Budget Allocation .Number of Tranches .Reliability of Funds .Time of Disbursement .Source of Funds	Nominal
To assess how community participation influences maintenance of roads in Kenya	Community Participation	Independent	.Representative Community Engagement .All inclusive Community Engagement	Nominal Ordinal
To establish how procurement procedures of contractors influences maintenance of roads in Kenya	Procurement Procedures of Contractors	Independent	.Existence of Procurement Procedures of contractors .Ease of Operation of Procurement Procedures of contractors .Processing time of Procurement Procedures of contractors	Ordinal
To determine how project managers competency influences maintenance of roads in Kenya	Project Managers Competency	Independent	.Professional Experience .Academic Qualifications .Technical Expertise .Team Leadership skills .Efficiency of Project Completion Time	Nominal Ordinal
Maintenance of roads in Kenya	Maintenance of Roads	Dependent	.Useful life of Road .Road User Satisfaction	Nominal Ordinal

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

Chapter four encompasses data analysis, presentation and interpretation of outcomes. Data presented comprises questionnaire return rate, background statistics on the respondents and a display of results on objectives of the research. Data analysed and presented is centred on answers to matters in the questionnaire agendas. The researcher employed frequency, percentage, mean and standard deviation to present data in table form.

4.2 Questionnaire Return Rate

The researcher gave out 86 questionnaires, of which 80 were completed and given back, attributing to 93% return rate. This return rate was suitable and representative, following Mugenda and Mugenda (1999) provision of 50% return rate being sufficient for analysis and reportage; 60% return rate being good and 70% return rate and above being excellent. Six of the respondents remained unreachable to respond to the questionnaires, in spite of insistent follow up. This resulted to unreturned questionnaires and attributed to 7% unreturned. 93% return rate revealed an enthusiasm of respondents to take part in the study. The questionnaire return rate outcomes are as in Table 4.1.

Table 4.1: Questionnaire Return Rate

Research Instrument	Frequency	Return Rate (%)
Returned	80	93
Unreturned	6	7
Total	**86**	**100**

4.3 Demographic Characteristics of Respondents

As part of the over-all statistics, respondents were entreated to specify gender, department stationed, job title held in the institution, period, in years, of employment in the organization and highest academic credentials.

4.3.1 Distribution of Respondents by Gender

To get a well-adjusted viewpoint, the researcher wanted to get the assessment of both genders. This section was thus intended to establish gender of respondents .The outcomes were as per Table 4.2.

Table 4.2: Distribution of Respondents by Gender

Category	Frequency	Percentage (%)
Male	65	81
Female	15	19
Total	**80**	**100**

The results showed that 81% of the respondents were male whereas 19% were female. This revealed that a larger number of the managers, finance officers, procurement officers, engineers, and member association officers (KARA) are male. It also pointed toward a realistic illustration of both genders in the road construction industry which remains male dominated.

4.3.2 Distribution of Respondents by Number of Years in Respective Organisation

Table 4.3 Distribution of Respondents by Number of Years in Respective Organisation

Years of Service	Frequency	Percentage (%)
1-5 Years	20	25
6-10 Years	15	19
11-15 Years	10	12
Above 16 Years	35	44
Total	**80**	**100**

From the answers, 44% of respondents had operated in their respective organizations for over 16 years, 25% had worked for between 1-5 years, and 19% had served for between 6-10 years, whereas the rest 12% had worked in their organization for between 11-15 years. This inferred that majority of the respondents of this research study had served for extensive periods within the organization hence the ability to provide feedback on the factors which influenced road maintenance.

4.3.3 Distribution of Respondents by Level of Education

The academic qualifications of the respondents impacts the respondents' ability to perform their work and additionally offer criticism when required. The academic qualifications of respondents was summed up by Table 4.4.

Table 4.4: Distribution of Respondents by Level of Education

Level of Education	Frequency	Percentage (%)
Post Graduate	5	6
Under Graduate	40	50
Diploma	25	31
Certificate	10	13
Total	**80**	**100**

The results point out that 6% of the respondents had post graduate qualifications, 50% were undergraduates, and 31% had diplomas, whereas the rest 13% were certificate holders. This illustrated that majority of the respondents quizzed were well-informed to comprehend and respond to the questionnaire in the modus envisioned for the research study.

4.3.4 Distribution of Respondents by Position Held

Below, table 4.5 shows the stations held by respondents in their respective organizations. From the outcomes, 13% were managers (KeNHA), 31% were finance officers (KeNHA), 25% were procurement officers (KeNHA), 13% were Engineers (KeNHA) while the other 18% were association members (KARA). This demonstrated that all the departments relevant to the study were sufficiently represented and results were non-prejudiced.

Table 4.5: Distribution of Respondents by Position Held

Position of the Respondent	Frequency	Percentage (%)
Managers (KeNHA)	10	13
Finance Officers(KeNHA)	25	31
Procurement Officers(KeNHA)	20	25
Engineers(KeNHA)	10	13
Association Members(KARA)	15	18
Total	**80**	**100**

4.4. Availability of Funds and Maintenance of Roads

The study sought after establishing to what degree the different indicators of funding influenced the maintenance of roads in Kenya as below, employing a 5 point Likert scale, with 1 being very little extent, 2 being little extent, 3 being no extent, 4 being great extent, 5 being very great extent, and with (f representing frequency, % symbolising percentage, SD being standard deviation).

Table 4.6: Availability of Funds and Maintenance of Roads

Indicator	Very little extent		Little Extent		No Extent		Great Extent		Very Great Extent		Total		Mean	SD
	f	%	f	%	f	%	f	%	f	%	f	%		
Budget allocation	3	4	7	9	0	0	20	25	50	62	80	100	4.34	1.10
Number of tranches	4	5	11	14	5	6	15	19	45	56	80	100	4.08	1.53
Reliability of funds	2	3	3	4	0	0	20	25	55	68	80	100	4.54	0.88
Time of disbursement	5	6	7	9	3	4	25	31	40	50	80	100	4.10	1.20
Source of funds	3	4	8	10	6	7	21	26	42	53	80	100	4.14	1.15
Composite Mean, SD													**4.24**	**1.17**

The analysed data illustrated that 62% of the respondents opined to a very great extent, budget allocation influences maintenance of roads, and 25% felt to a great extent budget allocation influences maintenance of roads. Furthermore 9% and 4% felt to little extent and to very little extent does budget allocation influence maintenance of roads in Kenya. This inferred that most of the respondents were in covenant to a great extent that budget allocation positively influences maintenance of roads in Kenya; as presented by a mean result of 4.34 which is greater than the composite mean of 4.24, with a convergent SD of 1.10.This implies

there is need to apportion even more funds to maintenance of roads so as to enhance performance.

Additionally, the evaluated data showed 56% of respondents felt to a very great extent, number of tranches influences maintenance of roads, 19% opined to a great extent number of tranches influences maintenance of roads. In addition 14% and 5% felt to little extent and to very little extent does number of tranches influence maintenance of roads in Kenya. Nevertheless, 6% felt that number of tranches bears no influence on maintenance of roads. The data inferred that most respondents concurred to a great extent that number of tranches negatively influences maintenance of roads in Kenya; as depicted by a mean result of 4.08 which is lesser than the composite mean of 4.24 with a divergent SD of 1.53.This implies there is need to reduce the number of tranches of funds in order to enhance performance of road maintenance projects.

The evaluated information also exposed that 68% of respondents believed to a very great extent, reliability of funds influences maintenance of roads, 25% supposed to a great extent reliability of funds influences maintenance of roads. Moreover 4% and 3% thought to little extent and to very little extent does reliability of funds influence maintenance of roads in Kenya. This inferred that most of the respondents remained in accord to a great extent that the reliability of funds positively influences maintenance of roads in Kenya; as depicted by a mean result of 4.54 which is greater than the composite mean of 4.24, with a convergent SD of 0.88.This implies there is need to enhance reliability of funds even more in road maintenance, so as to boost performance.

From the analysed information, 50% of respondents supposed to a very great extent, time of funds disbursement influences maintenance of roads, 31% supposed to a great extent time of funds disbursement influences maintenance of roads. Furthermore 9% and 6% maintained to little extent and to very little extent does time of funds disbursement influence maintenance of roads in Kenya. Conversely, 4% of respondents felt that time of funds disbursement bears no influence on maintenance of roads. The data indicated that the bulk of respondents remained in accord to a great extent that time of funds disbursement negatively influences maintenance of roads in Kenya; as depicted by a mean mark of 4.10 which falls below the composite mean of 4.24, with a divergent SD of 1.20.This infers there is need to improve on time of funds disbursement in road maintenance, in order to enhance performance.

After analysis, the data depicted that 53% of respondents thought to a very great extent, source of funds influences maintenance of roads, 26% held to a great extent source of funds influences maintenance of roads. Additionally 10% and 4% felt to little extent and to very little extent does source of funds influence maintenance of roads in Kenya. On the other hand, 7% felt that source of funds bears no influence on maintenance of roads. This pointed out that majority of respondents were in consensus to a great extent that source of funds negatively influences maintenance of roads in Kenya; as depicted by a mean tally of 4.14 which falls below the composite mean of 4.24, with an SD of 1.15.This infers a need to increase sources of funds for road maintenance in order to boost performance.

4.5 Community Participation and Maintenance of Roads

The study sought after establishing to what degree the different indicators of community participation influence maintenance of roads as shown in the table 4.7 below, whereby on a 5 point Likert scale, 1 signifying very little extent, 2 signifying little extent, 3 signifying no extent, 4 signifying great extent, 5 signifying very great extent and f signifying frequency, % signifying percentage, SD signifying standard deviation.

Table 4.7: Community Participation and Maintenance of Roads

Indicator	Very little extent		Little Extent		No Extent		Great Extent		Very Great Extent		Total		Mean	SD
	f	%	f	%	f	%	f	%	f	%	f	%		
Representative community engagement	4	5	11	14	5	6	15	19	45	56	80	100	4.08	1.53
All inclusive community engagement	3	4	8	10	6	7	21	26	42	53	80	100	4.14	1.15
Composite Mean, SD													**4.11**	**1.34**

The analysed data represented that 56% of respondents supposed to a very great extent, representative community engagement influences maintenance of roads, 19% thought to a great extent representative community engagement influences maintenance of roads. Furthermore 14% and 5% felt to little extent and to very little extent does representative community engagement influence maintenance of roads in Kenya. Conversely, 6% felt that

representative community engagement bears no influence on the maintenance of roads. This denoted that the bulk of respondents remained in consensus to a great extent that representative community engagement negatively influences maintenance of roads in Kenya; as denoted by a mean result of 4.08 which is less than the composite mean of 4.11, with a divergent SD of 1.53.This infers there is need to have less representative community engagement in road maintenance as it may not communicate feedback effectively from the community.

Furthermore, the analysed data depicted that 53% of respondents held to a very great extent, all inclusive community engagement influences maintenance of roads, 26% believed to a great extent all inclusive community engagement influences maintenance of roads. Moreover 10% and 4% maintained to little extent and to very little extent does all inclusive community engagement influence maintenance of roads in Kenya. Nonetheless, 10% believed that all inclusive community engagement bears no influence on the maintenance of roads in Kenya. This inferred that most respondents remained in accord to a great extent that all inclusive community engagement positively influences maintenance of roads in Kenya; as illustrated by a mean mark of 4.14 which is greater than the composite mean of 4.11, with a convergent SD of 1.15.This implies there is need to have even more all-inclusive community engagement in road maintenance in order to enhance performance.

4.6 Procurement Procedures of Contractors and Maintenance of Roads

The research project wanted to find out to what extent the various indicators of procurement procedures of contractors influences the maintenance of roads as depicted below, whereby on a 5 point Likert scale, 1 signifying very little extent, 2 signifying little extent, 3 signifying no extent, 4 signifying great extent, 5 signifying very great extent and f symbolising frequency, % symbolising percentage, SD symbolising standard deviation.

Table 4.8: Procurement Procedures of Contractors and Maintenance of Roads

Indicator	Very little extent		Little Extent		No Extent		Great Extent		Very Great Extent		Total		Mean	SD
	f	%	f	%	f	%	f	%	f	%	f	%		
Existence of procurement procedures	4	5	11	14	5	6	15	19	45	56	80	100	4.08	1.53
Ease of operation of	3	4	8	10	6	7	21	26	42	53	80	100	4.14	1.15

procurement procedures														
Processing time of procurement procedures	5	6	7	9	3	4	25	31	40	50	80	100	4.10	1.20
Composite Mean,SD													**4.10**	**1.29**

The analysed data exhibited that 56% of respondents held to a very great extent, existence of procurement procedures influences maintenance of roads, 19% supposed to a great extent existence of procurement procedures influences maintenance of roads. Additionally 14% and 5% thought to little extent and to very little extent does existence of procurement procedures influence maintenance of roads in Kenya. Nevertheless, 6% felt that existence of procurement procedures bears no influence on maintenance of roads. This inferred that majority of respondents were in accord to a great extent that existence of procurement procedures negatively influences maintenance of roads in Kenya; as shown by a mean mark of 4.08 which falls below the composite mean of 4.10, with a divergent SD of 1.53.This inferred at a need to abolish the obstructive procurement procedures in road maintenance so as to improve performance.

After the analysis, the data disclosed that 53% of respondents supposed to a very great extent, ease of operation of procurement procedures influences maintenance of roads, 26% supposed to a great extent ease of operation of procurement procedures influences maintenance of roads. Additionally 10% and 4% supposed to little extent and to very little extent does ease of operation of procurement procedures influence maintenance of roads in Kenya. Still, 7% supposed that ease of operation of procurement procedures bears no influence on maintenance of roads. This inferred that most respondents were in concurrence to a great extent that ease of operation of procurement procedures positively influences maintenance of roads in Kenya; as presented by a mean outcome of 4.14 which falls above the composite mean of 4.10, with a convergent SD of 1.15.This inferred there is need to further increase ease of operation of procurement procedures of contractors in road maintenance in order to boost performance.

From the analysed data, 50% of respondents believed to a very great extent, processing time of procurement procedures influences maintenance of roads, 31% supposed to a great extent processing time of procurement procedures influences maintenance of roads. Moreover 9% and 6% believed to little extent and to very little extent does processing time of procurement procedures influence maintenance of roads in Kenya. Conversely, 4% of respondents

supposed that processing time of procurement procedures bears no influence on maintenance of roads. This indicated that majority of respondents were in consensus to a great extent that processing time of procurement procedures positively influences maintenance of roads in Kenya; as illustrated by a mean result of 4.10 which is equal to the composite mean of 4.10, with a convergent SD of 1.20.This implies there is need to lessen processing time of procurement procedures even more, so as to enhance performance in road maintenance.

4.7 Project Managers Competency and Maintenance of Roads

The study pursued towards discovering to what degree the several indicators of project managers competency influence the maintenance of roads in Kenya, as presented below, whereby on a 5 point Likert scale, 1 signifying very little extent, 2 signifying little extent, 3 signifying no extent, 4 signifying great extent, 5 signifying very great extent and f signifying frequency, % signifying percentage, SD signifying standard deviation.

Table 4.9: Project Managers Competency and Maintenance of Roads

Indicator	Very little extent		Little Extent		No Extent		Great Extent		Very Great Extent		Total		Mean	SD
	f	%	f	%	f	%	f	%	f	%	f	%		
Academic qualifications	2	3	3	4	0	0	20	25	55	68	80	100	4.54	0.88
Technical expertise	4	5	11	14	5	6	15	19	45	56	80	100	4.08	1.53
Team leadership skills	7	9	6	7	4	5	19	24	44	55	80	100	4.09	1.30
Efficiency of project completion time	5	6	7	9	3	4	25	31	40	50	80	100	4.10	1.20
Professional experience	3	4	7	9	0	0	20	25	50	62	80	100	4.34	1.10
Composite Mean,SD													**4.23**	**1.20**

The analysed statistics also disclosed that 68% of respondents held to a very great extent that academic qualifications influences maintenance of roads, 25% supposed to a great extent that academic qualifications influences maintenance of roads. Additionally 4% and 3% believed

to little extent and to very little extent does academic qualifications influence maintenance of roads in Kenya. This denoted that most of the respondents were in unanimity to a great extent that academic qualifications positively influences maintenance of roads in Kenya; as illustrated by a mean outcome of 4.54 which is greater than the composite mean of 4.23, with a convergent SD of 0.88.This infers that only project managers who possess relevant academic qualifications should be appointed to head road maintenance projects, in order to enhance performance.

The analysed information illustrated that 56% of respondents believed to a very great extent, that technical expertise influences maintenance of roads, 19% held to a great extent that technical expertise influences maintenance of roads. Moreover 14% and 5% supposed to little extent and to very little extent does technical expertise influence maintenance of roads in Kenya. Nevertheless, 6% felt that that technical expertise bears no influence on maintenance of roads. This indicated that the bulk of respondents were in accord to a great extent that technical expertise negatively influences maintenance of roads in Kenya; as portrayed by a mean result of 4.08 which is less than the composite mean of 4.23, with a divergent SD of 1.53. This infers that only project managers who possess relevant technical expertise should be appointed to head road maintenance projects, in order to enhance performance.

After analysis the information divulged that 55% of respondents thought to a very great extent, that team leadership skills influences maintenance of roads, 24% supposed to a great extent that team leadership skills influences maintenance of roads. Moreover 7% and 9% held to little extent and to very little extent does team leadership skills influence maintenance of roads in Kenya. Conversely, 5% maintained that team leadership skills bears no influence on maintenance of roads. This inferred that most respondents were in harmony to a great extent that team leadership skills negatively influences maintenance of roads in Kenya; as portrayed by a mean mark of 4.09 which is less than the composite mean of 4.23, with a divergent SD of 1.30. This infers that only project managers who possess relevant team leadership skills should be appointed to head road maintenance projects, in order to enhance performance.

From the analysed data, 50% of respondents supposed to a very great extent, efficiency of project completion time influences maintenance of roads, 31% thought to a great extent efficiency of project completion time influences maintenance of roads. Additionally 9% and 6% supposed to little extent and to very little extent does efficiency of project completion

time influence maintenance of roads in Kenya. Still, 4% of the respondents maintained that efficiency of project completion time bears no influence on maintenance of roads. This inferred that the bulk of respondents were in covenant to a great extent that efficiency of project completion time does negatively influences maintenance of roads in Kenya; as depicted by a mean result of 4.10 which falls below the composite mean of 4.23,with an SD of 1.20. This infers that only project managers who ensure road maintenance projects are completed in time should be appointed to head road maintenance projects, in order to enhance performance.

The analysed data illustrated that 62% of the respondents supposed to a very great extent, that professional experience influences maintenance of roads, 25% supposed to a great extent that professional experience influences maintenance of roads. Furthermore 9% and 4% supposed to little extent and to very little extent does professional experience influence maintenance of roads in Kenya. This inferred that majority of respondents were in accord to a great extent that professional experience positively influences maintenance of roads in Kenya; as illustrated by a mean outcome of 4.34 which is greater than the composite mean of 4.23, with a convergent SD of 1.10. This infers that only project managers who possess relevant professional experience should be appointed to head road maintenance projects, in order to enhance performance.

4.8 Maintenance of Roads

The study sought to scrutinise the indicator measures of maintenance of roads in Kenya: a case of the Nairobi Thika Highway Improvement Project, as below:

4.8.1 Useful life of the Road

The study sought to establish whether the Nairobi Thika Highway Improvement project promoted growth of a viable metropolitan public transport structure for the Nairobi city region. It likewise sought to establish whether the Nairobi Thika Highway Improvement project stimulated private sector involvement in managing, operating in addition to financing of road structure in Kenya.

The study sought to establish indicator measures of the useful life of the Nairobi Thika Highway as below ,whereby on a 5 point Likert scale, 1 signifying strongly disagree, 2 signifying moderately disagree, 3 signifying neutral, 4 signifying moderately agree, 5

signifying strongly agree and f signifying frequency, % signifying percentage, SD signifying standard deviation.

Table 4.10: Useful Life of the Road

Indicator	Strongly Disagree		Moderately Disagree		Neither Disagree nor Agree		Moderately Agree		Strongly Agree		Total		Mean	SD
	f	%	f	%	f	%	f	%	f	%	f	%		
Policy processes, strategies and investment plans to execute the Nairobi Metro system have been set	3	4	7	9	0	0	10	12	60	75	80	100	4.46	1.11
MOT contracts between the Kenyan government and private entities have been effected	5	6	7	9	3	4	15	19	50	62	80	100	4.23	1.24
There exists an operational public private partnership for private sector involvement in road maintenance projects	3	4	8	10	6	7	11	14	52	65	80	100	4.26	1.18
Composite Mean, SD													**4.32**	**1.18**

The analysed data illustrated that 75% of respondents strongly agree that policy processes, strategies and investment plans to execute the Nairobi metro system have been set, while 12% moderately agree that policy processes, strategies and investment plans to execute the Nairobi metro system have been set.However,9% of respondents moderately disagree policy processes, strategies and investment plans to execute the Nairobi Metro system have been set ,whereas 4% strongly disagree that policy processes, strategies and investment plans to execute the Nairobi Metro system have been set. These inferred that on average respondents agree that policy processes, strategies and investment plans to execute the Nairobi metro system have been set owing to the Nairobi Thika Highway Improvement project, as depicted

by a mean of 4.46 which is greater than the composite mean of 4.32, with a convergent SD of 1.11.

From the evaluated data, 62% of respondents strongly agree that MOT contracts between the Kenyan government and private entities have been effected, whereas 19% moderately agree that MOT contracts between the Kenyan government and private entities have been effected.Nonetheless,9% and 6% of the respondents moderately disagree and strongly disagree, respectively, that MOT contracts between the Kenyan government and private entities have been effected ,whereas 4% of the respondents neither agree nor disagree that MOT contracts between the Kenyan government and private entities have been effected. This inferred that on average respondents disagree that MOT contracts between the Kenyan government and private entities have been effected, subsequent to the Nairobi Thika Highway Improvement project, as illustrated by a mean of 4.23 which falls below the composite mean of 4.32, with a divergent SD of 1.235.

After analysis, the data revealed that 65% of respondents strongly agree that there exists an operational public private partnership for private sector involvement in road maintenance projects, whereas 14% moderately agree that there exists an operational public private partnership for private sector involvement in road maintenance projects. However, 10% and 4% of respondents moderately disagree and strongly disagree, respectively, that there exists an operational public private partnership for private sector involvement in road maintenance projects. Furthermore, 7% of respondents neither agree nor disagree that there exists an operational public private partnership for private sector involvement in road maintenance projects. This inferred that on average, respondents disagree that there exists an operational public private partnership for private sector involvement in road maintenance projects, owing to the Nairobi Thika Highway Improvement project, as depicted by a mean of 4.26 which falls below the composite mean of 4.32, with an SD of 1.18.

4.8.2 Road User Satisfaction

The study sought to establish whether the Nairobi Thika Highway Improvement project stimulated increased dependability, affordability, convenience of the transportation network with an aim towards encouraging economic and socioeconomic growth. The study also sought to establish whether the Nairobi Thika Highway Improvement project resulted to

better-quality road transportation facilities along the superhighway, as well as enhanced movement within the city owing to reduced traffic jam.

The study sought to establish indicators of road user satisfaction regarding the Nairobi Thika Highway as below , whereby on a 5 point Likert scale, 1 signifying strongly disagree, 2 signifying moderately disagree, 3 signifying neutral, 4 signifying moderately agree, 5 signifying strongly agree and f signifying frequency, % signifying percentage, SD signifying standard deviation.

Table 4.11: Road User Satisfaction

Indicator	Strongly Disagree		Moderately Disagree		Neither Disagree nor Agree		Moderately Agree		Strongly Agree		Total		Mean	SD
	f	%	f	%	f	%	f	%	f	%	f	%		
There has been improved, continuous economic development	3	4	8	10	6	7	11	14	52	65	80	100	4.26	1.18
There has been improved local trading	3	4	7	9	0	0	10	12	60	75	80	100	4.46	1.11
There has been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time.	5	6	7	9	3	4	15	19	50	62	80	100	4.23	1.24
Composite Mean, SD													**4.32**	**1.18**

After analysis, the data revealed that 65% of respondents strongly agree that there has been improved, continuous economic development, whereas 14% moderately agree that there has been improved, continuous economic development. However, 10% and 4% of respondents moderately disagree and strongly disagree, respectively, that there has been improved, continuous economic development. Furthermore, 7% of respondents neither agree nor disagree that there has been improved, continuous economic development. This inferred that on average, respondents disagree that there has been improved, continuous economic

development owing to the Thika road improvement project, as depicted by a mean of 4.26 which falls below the composite mean of 4.32, with an SD of 1.18.

The analysed data illustrated that 75% of respondents strongly agree that there has been improved local trading, while 12% moderately agree that there has been improved local trading. However, 9% of respondents moderately disagree that there has been improved local trading, whereas 4% strongly disagree that there has been improved local trading. This inferred that on average respondents agree that there has been improved local trading resulting from the Nairobi Thika highway improvement project, as depicted by a mean of 4.46 which is greater than the composite mean of 4.32, with a convergent SD of 1.11.

From the evaluated data, 62% of respondents strongly agree that there has been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time, whereas 19% moderately agree that there has been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time. Nonetheless, 9% and 6% of respondents moderately disagree and strongly disagree, respectively, that there has been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time, whereas 4% of respondents neither agree nor disagree that there has been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time. This inferred that on average respondents disagree that there has been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time, owing to the Thika road improvement project, as illustrated by a mean of 4.23 which falls below the composite mean of 4.32, with a divergent SD of 1.24.

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter entails summary of outcomes, discussion, conclusions and recommendations.

5.2 Summary of Findings

The study analysed the variables in chapter four and presented a summary of findings as below:

5.2.1 Availability of Funds and Maintenance of Roads

The study disclosed that budget allocation positively influences maintenance of roads as depicted by a mean of 4.34 with an SD of 1.10.The number of tranches negatively influences maintenance of roads with a mean of 4.08 and an SD of 1.53.Reliability of funds positively influences maintenance of roads as presented by a mean of 4.54 with an SD of 0.88.The time of disbursement negatively influences maintenance of roads as portrayed by a mean of 4.10 with an SD of 1.20.The source of funds negatively influences maintenance of roads as depicted by a mean of 4.1375 with an SD of 1.148.

5.2.2 Community Participation and Maintenance of Roads

The study discovered that representative community engagement negatively influences maintenance of roads as depicted by a mean of 4.08 with an SD of 1.53.All inclusive community engagement positively influences maintenance of roads as presented by a mean of 4.14 with an SD of 1.15.

5.2.3 Procurement Procedures of Contractors and Maintenance of Roads

The study illustrated that the existence of procurement procedures of contractors negatively influences maintenance of roads as portrayed by a mean of 4.08 with an SD of 1.53.The ease of operation of procurement procedures of contractors positively influences maintenance of roads with a mean of 4.14 and an SD of 1.15. The processing time of procurement procedures of contractors positively influences maintenance of roads as depicted by a mean of 4.10 with an SD of 1.20.

5.2.4 Project Managers Competency and Maintenance of Roads

The study demonstrated that academic qualifications positively influences maintenance of roads to a great degree with a mean of 4.54 and an SD of 0.88.Technical expertise negatively influences maintenance of roads as portrayed by a mean of 4.08 with an SD of 1.53.Team leadership skills negatively influences maintenance of roads as displayed by a mean of 4.09 with an SD of 1.30.Efficiency of project completion time negatively influences maintenance of roads as presented by a mean of 4.10 with an SD of 1.20.Professional experience positively influences maintenance of roads as demonstrated by a mean of 4.34 with an SD of 1.1.

5.2.5 Maintenance of Roads

The study established the useful life of the Nairobi Thika highway, as well as its road user satisfaction as follows:

5.2.5.1 Useful life of the Road

The study disclosed that policy processes, strategies and investment plans to execute the Nairobi metro system have been set, owing to the Nairobi Thika Highway improvement project ,as depicted by a mean of 4.46 with an SD of 1.11.Additionally, MOT contracts between the Kenyan government and private entities have not been effected, subsequent to the Nairobi Thika Highway Improvement project, as illustrated by a mean of 4.23 with an SD of 1.24.Further that there does not exist an operational public private partnership for private sector involvement in road maintenance projects, owing to the Nairobi Thika Highway Improvement project, as depicted by a mean of 4.26 with an SD of 1.18.

5.2.5.2 Road User Satisfaction

The study presented that there has not been improved, continuous economic development resulting from the Thika road improvement project, as depicted by a mean of 4.26 with an SD of 1.18.Additionally, there has been improved local trading resulting from the Nairobi Thika highway improvement project, as depicted by a mean of 4.46 with an SD of 1.11.Also, there has not been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time, owing to the Thika road improvement project, as illustrated by a mean of 4.23 with an SD of 1.24.

5.3 Discussion of Findings

This section centres on discoursing the variables in the fourth chapter and relates the outcomes with the literature reviewed in the second chapter as below:

5.3.1 Availability of funds and Maintenance of roads

The study disclosed that availability of funds influences maintenance of roads in Kenya. The study disclosed that budget allocation, number of tranches, reliability of funds, time of disbursement as well as source of funds do influence maintenance of roads in Kenya. This is in agreement with research findings by (Irandu and Malii, 2013) on the Nairobi-Thika Highway Improvement Project that concluded that availability of funds plays a critical role in the successful implementation of maintenance of roads in Kenya. Also with a study done by (UNEP, 2014) on the Cost Benefit Analysis of NMT Infrastructure Projects with a case study scenario of Thika Highway that found out availability of funds influences the successful implementation of maintenance of roads in Kenya. Findings are also supported by research conducted by (Teipelke, 2014) on The Thika Highway Improvement Project: Changes in the Peri-Urban Northern Nairobi Metropolitan Region, which concluded that availability of funds plays a critical role in the successful implementation of maintenance of roads in Kenya.

5.3.2 Community Participation and Maintenance of Roads

The study established that community participation influences maintenance of roads in Kenya. The study established that representative community engagement as well as all inclusive community engagement do influence maintenance of roads in Kenya. This is in line with research conducted by (KARA, 2012) on The Social/Community Component of the Analysis of the Thika Highway Improvement Project, and with research done by (Oguso, 2015) on Enhancing Road Infrastructure Development through Public Private Partnership in Kenya: A Comparative Analysis, whose research findings submitted that for effective maintenance of roads, community involvement and participation in the project area is imperative.

5.3.3 Procurement Procedures of Contractors and Maintenance of Roads

The study presented that procurement procedures of contractors influences maintenance of roads in Kenya. The study presented that existence of procurement procedures of contractors, ease of operation of procurement procedures of contractors, as well as processing time of procurement procedures of contractors do influence maintenance of roads. This is in

concurrence with research conducted by (Mundinia,2017) on Kenya 1st Mover PPP Road Projects, and with study completed by (Teipelke,2014) on The Thika Highway Improvement Project: Changes in the Peri-Urban Northern Nairobi Metropolitan Region, whose research findings submitted that procurement procedures in place for securing contractors in road maintenance projects, play a vital role in determining effective road maintenance in Kenya .The (ADF,2007) appraisal report on the Nairobi Thika Highway Improvement Project , also submitted that procurement procedures of contractors play a vital role in determining efficient road maintenance in Kenya.

5.3.4 Project Managers Competency and Maintenance of Roads

The study established that project managers competency influences maintenance of roads in Kenya. The study established that academic qualifications, technical expertise, team leadership skills, efficiency of project completion time, as well as professional experience do influence maintenance of roads in Kenya. This is in accord with research conducted by (Mbataru ,2018) on An Analysis of the Influence of Road Infrastructure Implementation on Local Development: The Case of Thika Superhighway in Kenya, and with research done by (Teipelke ,2014) on The Thika Highway Improvement Project: Changes in the Peri-Urban Northern Nairobi Metropolitan Region, whose research findings submitted that competency level of the project management tasked with overseeing road maintenance implementation does play a role in determining project success. The study conducted by (Irandu and Malii, 2013) on the Nairobi-Thika Highway Improvement Project, also submitted that competency level of the project managers tasked with overseeing road maintenance implementation influences project success.

5.3.5 Maintenance of Roads

The study revealed that the Nairobi Thika highway improvement project moderately promoted growth of a viable metropolitan public transport structure for the Nairobi city region, as well as stimulated private sector involvement in managing, operating in addition to financing of road structure in Kenya. The study also disclosed that the Nairobi Thika highway improvement project moderately stimulated increased dependability, affordability, convenience of the transportation network with an aim towards encouraging economic and socioeconomic growth. This is in concurrence with the (ADF,2007) appraisal report on the Nairobi -Thika Highway Improvement Project, as well as research conducted by (Chelugo,2017) on the Effects of Road Improvement on Safety: A Case Study of Nairobi

Thika Superhighway and the study done by (Muthoni ,2014) on the Socio-Economic Benefits and Environmental Impacts of Thika Road Superhighway, which established that as a result of the Thika road upgrade; policy processes, strategies and investment plans to execute the Nairobi metro system have been set, there has been improved local trading, as well as ,better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time.

5.4 Conclusions

The study concluded that availability of funds has the second most influence on maintenance of roads in Kenya. The study concluded that budget allocation, number of tranches, reliability of funds, time of disbursement as well as source of funds do influence maintenance of roads in Kenya. The study concluded that community participation has the third most influence on maintenance of roads in Kenya. The study concluded that representative community engagement as well as all inclusive community engagement do influence maintenance of roads in Kenya. The study concluded that procurement procedures of contractors has the least influence on maintenance of roads in Kenya. The study concluded that existence of procurement procedures of contractors, ease of operation of procurement procedures of contractors, as well as processing time of procurement procedures of contractors do influence maintenance of roads. The study concluded that project managers competency has the most influence on maintenance of roads in Kenya. The study concluded that academic qualifications, technical expertise, team leadership skills, efficiency of project completion time, as well as professional experience do influence maintenance of roads in Kenya.

5.5 Recommendations

The study consequently recommends the following:

1. The study recommends that the government increase funding and budget allocation distributed to the agencies in charge of road maintenance, so as to facilitate effective maintenance of roads.
2. The study recommends to the roads authorities management that community engagement be made all-encompassing and enlightening throughout road maintenance projects. The public ought to be briefed on the significance of roads towards economic development, in order for the community to contribute enthusiastically towards efficient maintenance of roads in Kenya

3. The study recommends that the government ought to put into effect clear and precise procurement procedures for contracting exercises, which have to be observed at all times all through procurement of contractors. Additionally hefty punishments ought to be imposed upon those determined to be in violation of these procurement procedures.
4. The study recommends to the public service commission that only exceedingly competent persons who hold the pertinent academic qualifications, professional experience, technical expertise and team leadership capabilities ought to be considered for project manager positions so as to enhance efficiency in road maintenance projects.

5.6 Suggestions for Further Studies

There are numerous additional factors which influence the maintenance of roads in Kenya, not examined in this study. As the study could not exhaustively investigate all the factors that influence the maintenance of roads in Kenya, there is necessity for further investigation in this area. Additionally, as the study was constrained to a case of the Nairobi Thika Highway Improvement project, owing to time and resource constrictions, studies with a broader scope could be undertaken, so as to corroborate the findings of this research project.

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APPENDICES

Appendix I: Introductory Letter

Maina Teresia Wangare,
University Of Nairobi,
Open Distance and e-Learning Campus,
School of Open and Distance Learning,
Department of Open Learning,
Nairobi Learning Centre.

13th July, 2018.

Dear Participant,

RE: INTRODUCTORY LETTER TO COLLECT DATA

My name is Maina Teresia Wangare, a student at the University of Nairobi pursuing a Master of Arts degree in Project Planning and Management. As prerequisite for the degree award am conducting research on ***Factors Influencing Maintenance of Roads in Kenya: A case of the Nairobi Thika Highway Improvement Project***. I humbly request your participation in data collection by filling the attached questionnaire truthfully.

Research is solely for academic reasons and information submitted shall be handled with strict confidentiality.

Thank you for your time.

Yours Sincerely,

Maina Teresia Wangare
L50/5609/2017
Mobile: 0728766036
Email:tesswangare@gmail.com

Appendix II: Questionnaire for KENHA staff and KARA members.

Instructions:

1. Data submitted in this questionnaire will be treated with strict confidentiality and is solely for the purpose of this research.

2. In case a question is inapplicable to your situation, you are at liberty to disregard.

PART I: DEMOGRAPHIC FEATURES OF RESPONDENTS

1. Please specify your gender by marking the right choice

A. Male [ ]

B. Female [ ]

2. Please specify your age group amongst the classes below

A. 20-30 years [ ]

B. 31-40 years [ ]

C. 41-50 years [ ]

D. 51-60 years [ ]

E. above 61 years [ ]

3. Kindly specify your uppermost academic qualification.

Certificate [ ]

Diploma [ ]

Degree [ ]

Masters [ ]

Others (Specify) [ ]

4. Kindly specify period served in your organisation?

Less than 1 year [ ]

1 year to 2 years [ ]

2 years to 3 years [ ]

3 years 4 years [ ]

Over 4 years [ ]

PART II: FACTORS INFLUENCING MAINTENANCE OF ROADS IN KENYA

Section A: Availability of Funds and Maintenance of Roads

5) In comparison to funds allotted to other road organisations, how would you define the budget allotted to KeNHA for the Nairobi Thika highway improvement project?

(i) Inadequate [ ]

(ii) Slightly adequate [ ]

(iii) Adequate [ ]

6) In how many tranches were funds received for the Nairobi Thika Highway Improvement project?

(i) One [ ]

(ii) Two [ ]

(iii) Three [ ]

(iv) Four [ ]

7).Kindly specify below the reliability of funds for the Nairobi Thika highway Improvement project.

(i) Reliable [ ]

(ii) Unreliable [ ]

(iii) Sometimes reliable [ ]

(iv) Very unreliable [ ]

8).At what fiscal period were funds received?

(i) At beginning of fiscal year [ ]

(ii) Middle of fiscal Year [ ]

(iii) End of fiscal year [ ]

9). Kindly specify funding agencies as well as donors you know to be sources of funding for the Nairobi Thika Highway Improvement project

……

……

……

Section B: Community Participation and Maintenance of Roads

10).To what extent do you agree with the below aspects of all inclusive community engagement with regards to the Nairobi Thika highway improvement project? Use a Likert scale of 1 to 5 whereby 1 is strongly disagree,2 is moderately disagree,3 is neutral,4 is moderately agree and 5 is strongly agree

Aspects	**1**	**2**	**3**	**4**	**5**
Nairobi Thika highway project vision was clearly articulated to the community					
Community engagement was all inclusive					
Community engagement boosted coordination, change management ,project supervision					
Community engagement stimulated successful completion of the Nairobi Thika highway improvement project					

11). To what extent did community participation influence successful completion of the Nairobi Thika Highway Improvement project?

a) To a very great extent ( )

b) To a great extent ( )

c) To very little extent ( )

d) To a little extent ( )

e) No extent ( )

12). To what extent did representative community involvement in below project undertakings influence the successful completion of the Nairobi Thika Highway Improvement project?

Project Activities	**Very great extent**	**Great extent**	**Very little extent**	**Little extent**	**No extent**
Specification of project scope					
Collecting and administration of data					
Supervisory exercises					
Project performance appraisals					

13).What are your recommendations for better quality community involvement in road maintenance projects?

……

……

……

Section C: Procurement Procedures of Contractors and Maintenance of Roads

14). Does your organization have procurement procedures of contractors?

a) Yes ( ) b) No ( )

15). If yes, did the terms of your organization procurement procedures of contractors ease operations for the Nairobi Thika Highway Improvement project?

a) Yes ( ) b) No ( )

16). To what extent did these procurement procedures of contractors influence successful completion of the Nairobi Thika Highway Improvement project? Please mark appropriately.

a) To a very great extent ( )

b) To a great extent ( )

c) To very little extent ( )

d) To a little extent ( )

e) To no extent ( )

17). To what extent did processing time for procurement procedures of contractors influence successful completion of the Nairobi Thika Highway Improvement project? Please mark appropriately.

a) To a very great extent ( )

b) To a great extent ( )

c) To very little extent ( )

d) To a little extent ( )

e) To no extent ( )

18). What are your recommendations for timely processing of procurement procedures of contractors in road maintenance projects?

……

……

Section D: Project Managers Competency and Maintenance of Roads

19). In your opinion does project managers competency influence maintenance of roads in Kenya?

a) Yes [ ]

b) No [ ]

20). To what extent did project managers competency influence the Nairobi Thika Highway Improvement project?

To a very great extent [ ]

To a great extent [ ]

To a moderate extent [ ]

To a little extent [ ]

No extent [ ]

21). To what extent did the below indicator measures of project managers competency influence successful completion of the Nairobi Thika Highway Improvement project?

Indicator	**To a very great extent**	**To a great extent**	**To a little extent**	**To very little extent**	**Not at all**
Academic Qualifications					
Technical Expertise					
Team Leadership Skills					
Efficiency of Project					
Completion Time					
Professional Experience					

22). For how long do road maintenance exercises typically run from initiation to completion?

Less than 3 months [ ]

More than 3 months but within 6 months [ ]

More than 6 months [ ]

More than 1 year [ ]

23). As per your choice response above, is this time span efficient for road maintenance activities?

Yes it's efficient [ ]

No it's inefficient [ ]

It's moderately efficient [ ]

24).What would you recommend to enhance project managers competency in road maintenance projects?

……

……

……

Section E: Maintenance of Roads

25).Has the Nairobi Thika highway promoted growth of a viable metropolitan public transport structure for the Nairobi city region?

Yes [ ]

No [ ]

26).Has the Nairobi Thika highway stimulated private sector involvement in managing, operating in addition to financing of road structure in Kenya?

Yes [ ]

No [ ]

27). To which magnitude do you agree with the below indicator measures of the useful life of the Nairobi Thika highway regarding promoting growth of a viable metropolitan public transport structure for the Nairobi city region, and stimulating private sector involvement in managing, operating in addition to financing of road structure in Kenya. Use a Likert scale of 1 to 5 whereby 1 is strongly disagree,2 is moderately disagree,3 is neutral,4 is moderately agree and 5 is strongly agree

Performance Indicators	**1**	**2**	**3**	**4**	**5**
Policy processes, strategies and investment plans to execute the Nairobi Metro system have been set					
MOT contracts between the Kenyan government and private entities have been effected					
There exists an operational public private partnership for private sector involvement in road maintenance projects					

28).Did the Nairobi Thika Highway Improvement project stimulate increased dependability, affordability, convenience of the transportation network with an aim towards encouraging economic and socioeconomic growth?

Yes [ ]

No [ ]

29).Did the Nairobi Thika Highway Improvement project result to better-quality road transportation facilities along the superhighway, as well as enhanced movement within the city owing to reduced traffic jam?

Yes [ ]

No [ ]

30).To what degree do you agree with the following indicator measures of road user satisfaction regarding the Nairobi Thika highway improvement project? Use a Likert scale of 1 to 5 whereby 1 is strongly disagree,2 is moderately disagree,3 is neutral,4 is moderately agree and 5 is strongly agree

Performance Indicators	**1**	**2**	**3**	**4**	**5**
There has been improved, continuous economic development					
There has been improved local trading					
There has been better-quality road traffic services depicted by less accidents, lessened delays, and lessened commuting time.					

PART III: BUDGET AND TIME FRAME IN MAINTENANCE OF ROADS

Section A: Budgetary Allocation and Maintenance of roads

31).To what extent do you suppose budget allocation for the Nairobi Thika Highway Improvement project was sufficient?

Very great extent ( )

Great extent ( )

Moderate extent ( )

Little extent ( )

No extent ( )

32).Specify the degree to which you agree or disagree with the below declarations regarding budgetary allocations in relation to maintenance of roads. Whereby on a Likert scale, 1-strongly disagree, 2- moderately disagree, 3- neutral, 4-moderately agree, and 5-strongly agree.

Budgetary Allocation	**1**	**2**	**3**	**4**	**5**
Budget for project undertakings generally afford efficient delivery of road maintenance					
Funds meant for road maintenance is normally directed to the intended purpose					
A realistic valuation of road maintenance expenditures is normally done during project planning					
Finding and getting fiscal support for road maintenance has its					

challenges

33).In what additional ways did budgetary allocations influence implementation of the Nairobi Thika Highway Improvement project?

…….

…….

Section B: Time Frame and Maintenance of Roads

34).Is time value a performance indicator in your organization?

Yes [ ] No [ ]

35).Kindly designate time value to below aspects of time as per your organisation in the Nairobi Thika Highway Improvement project. Whereby on a Likert scale, 1- very low significance, 2- low significance, 3- no significance, 4- high significance, 5-very high significance.

Aspect	1	2	3	4	5
Location preparation time					
Projected completion time for road maintenance project					
Ratio of orders supplied belatedly					
Time required to execute varied orders					
Time required to correct defects					
Average delay in claims authorisation					
Average delay in payments to service providers					
Average delay due to shortage of supplies					

36). To what extent did time efficiency of projects in your organization influence the Nairobi Thika Highway Improvement project? Specify below appropriately.

To very great extent [ ] To great extent [ ] To no extent [ ] To low extent [ ] To very low extent [ ]

37). In general what do you recommend to enhance time efficiency of road maintenance projects?

……

……

Thank You for Your Time and Participation.

Appendix III: Krejcie & Morgan Table

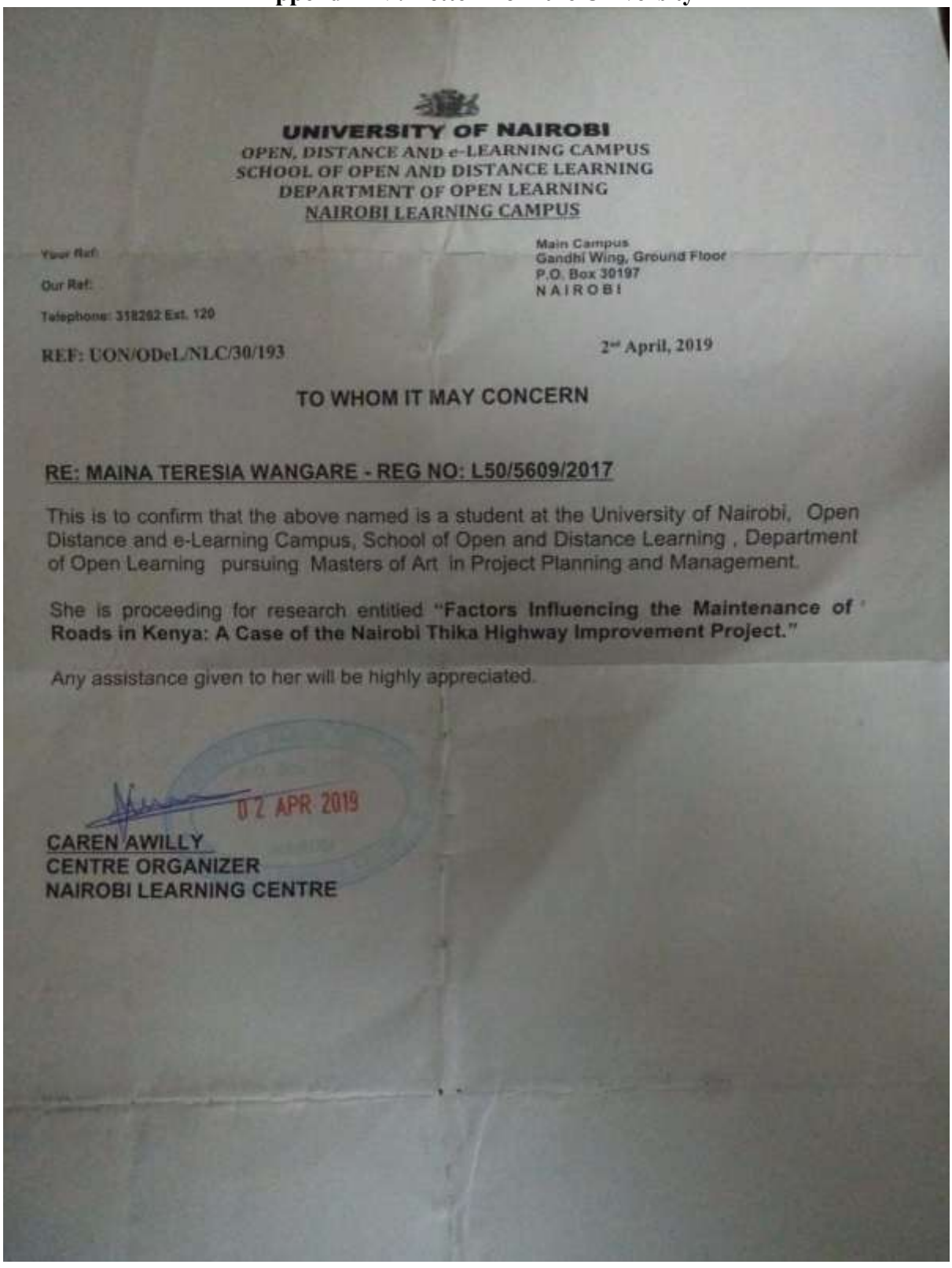
Table for Determining Sample Size for a Specified Population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

Appendix IV: Letter from the University



UNIVERSITY OF NAIROBI
OPEN, DISTANCE AND e-LEARNING CAMPUS
SCHOOL OF OPEN AND DISTANCE LEARNING
DEPARTMENT OF OPEN LEARNING
NAIROBI LEARNING CAMPUS

Your Ref:
Our Ref:
Telephone: 318262 Ext. 120

Main Campus
Gandhi Wing, Ground Floor
P.O. Box 30197
NAIROBI

REF: UON/ODeL/NLC/30/193

2nd April, 2019

TO WHOM IT MAY CONCERN

RE: MAINA TERESIA WANGARE - REG NO: L50/5609/2017

This is to confirm that the above named is a student at the University of Nairobi, Open Distance and e-Learning Campus, School of Open and Distance Learning , Department of Open Learning pursuing Masters of Art in Project Planning and Management.

She is proceeding for research entitled "**Factors Influencing the Maintenance of Roads in Kenya: A Case of the Nairobi Thika Highway Improvement Project.**"

Any assistance given to her will be highly appreciated.

02 APR 2019

CAREN AWILLY
CENTRE ORGANIZER
NAIROBI LEARNING CENTRE

Appendix V: NACOSTI Research Authorization Letter to Nairobi County

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 Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/19/65808/29626**

Date: **30th April 2019**

Teresia Wangare Maina
University of Nairobi
P.O Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Factors influencing the maintenance of roads in Kenya: A case of the Nairobi Thika highway improvement project."*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **30th April, 2020.**

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

The County Director of Education
Nairobi County

National Commission for Science, Technology and Innovation is ISO9001: 2008 Certified

Appendix VI: NACOSTI Research Permit

THIS IS TO CERTIFY THAT:
MS. TERESIA WANGARE MAINA
of UNIVERSITY OF NAIROBI, 0-610
NAIROBI,has been permitted to conduct
research in *Nairobi County*

on the topic: *FACTORS INFLUENCING THE MAINTENANCE OF ROADS IN KENYA:A CASE OF THE NAIROBI THIKA HIGHWAY IMPROVEMENT PROJECT*

for the period ending:
30th April,2020

Permit No : NACOSTI/P/19/65808/29626
Date Of Issue : 30th April,2019
Fee Recieved :Ksh 1000

Wangare
.....
Applicant's Signature

.....
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.

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

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH LICENSE

Serial No.A 24433

CONDITIONS: see back page