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School of Commerce
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Performance Assessment of road maintenance project management in Addis Ababa city administration

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DECLARATION

I Zerubabel Gebre, declare that this study by the title of "Performance assessment of road maintenance project management in Addis Ababa city administration" is the outcome of my own effort and study. All resource of material used from other source to support the study have been acknowledged. This study is my original work and it has not been submitted or presented for any degree in any university.

Zerubabel Gebre

Signature: _____

Date: _____

STATEMENT OF CERTIFICATION

This is to certify that this project work by the title of "Performance assessment of road maintenance project management in Addis Ababa city administration" undertaken by Zerubabel Gebre for the partial fulfillment of master of art in project management at Addis Ababa University school of commerce. I have read this project work prepared under my direction and recommended that it is accepted as fulfilling the research requirement

Signature _____

Date _____

Research Advisor

DEDICATION

I dedicate this study work for all the teachers that supported me to grow by their encouragement and motivation from elementary school until now. I admire their capacity of being role model to me, as a student. Even though it was not clear to me, they saw the potential within me and helped me to push harder by giving me encouragement to continue my education to this stage. And now I can say that we did it, to all my teachers who became a candle to my darkest paths by lighting my way even though it cost them being melt.

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My family and my amazing wife, Betelhem, I will be very ignorant if I miss mentioning your contribution to this paper. Thanks for standing by my side whenever I want your help. You're proofread and inputs helped me see the things I missed. Thanks all for your help.

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ABBREVIATIONS AND ACRONYMS

AACRA: Addis Ababa City Roads Authority

CCPM: Critical Chain Project Management

ERA: Ethiopian Road Authority

FERMA: Federal Road Maintenance Agency

GDP: Gross Domestic Product

GARBLT: General Authority of Roads, Bridges and Land Transport

GDP: Gross domestic product

HDM: Highway Development and Management

IHA: Imperial Highway Authority

INEA: Instituto Nacional de Estradas de Angola

IRI: International Roughness Index

JICA: Japan International Cooperation Agency

JIT: Just in Time

KENHA: Kenya National Highways Authority

KERRA: Kenya Rural Roads Authority

KHA: Kenya Highways Authority

KRB: Kenya Roads Board

KURA: Kenya Urban Roads Authority

M&E: Monitoring and Evaluation

MENA- OECD: Middle East and North Africa - organization for Economic Co-operation and Development

MRP: Material requirements planning

NTP: National Transport Policy

PMI: Project Management institute

PMS: Pavement management systems

RBV: Resource Based View Theory

RF: Road Fund

RMMS: Road Maintenance Management System

RSDP: Road Sector Development Program

RTA: Roads and transport authority

SANRAL: South African National Road Agency Ltd.

SPSS: Statistical Package for the Social Sciences

TDS: Transport Design and Supervision Works Sector

TOC: Theory of Constraints

TQM: Total Quality Management

UNESCO: United Nations Educational, Scientific and Cultural Organization

U.S: United State

ABSTRACT

Addis Ababa City Roads Authority manages and implements the construction and maintenance of roads within the Addis Ababa city Administration. Different literature support efficient performance of road infrastructure projects is essential for economic growth and development of the country, and data indicate that there is a high range of new construction of road coverage in Addis Ababa. Despite the growth of new road construction there is decline of road maintenance projects and there are different reasons mentioned as factors that affect road maintenance project management performance. Basically the aim of this research is to assess approaches to improve road maintenance projects management practice by tackling the challenges for future practices.

Through detailed review of different literature on theoretical and existing practice of different countries, it is able to develop questionnaires. Then distributed to all the 32 target population, which are professionals within Addis Ababa city road maintenance projects in Addis Ababa City Road Authority and the advisor Transport Design and Supervision works. Through the questionnaires survey of road maintenance professionals comprised of project managers, lead engineers, team leaders, office engineers, site engineers and civil engineers only 21 participants give their answer. Quantitative data was analyzed using Statistical Package for the Social Sciences software and interpreted to frequency and point scale.

The results indicated that, even though inadequate funding has higher factor that influence the performance of road maintenance project management, there are other factors such as no privatization of road maintenance work and lot of paper work had significant effects on the performance of road maintenance project management practice. The study also found out that not having standard manual and guideline did not have effect on the performance of road maintenance management practice. It does not mean that the organization does not need them but the standard manuals are mostly adapted. The study recommends that Addis Ababa City Road Authority need to improve its road maintenance project management practice by considering different factors that affect road maintenance. Moreover, the Authority has to introduce different technology into road maintenance project management.

Key words: road maintenance, project management, performance factors

CHAPTER ONE

1. Introduction

1.1 Background of the study

Road coverage is the main part for the countries development and to facilitate a smooth interaction throughout the country. In measuring the countries development rate international organizations put a grade on the coverage quality of road (world road association , 2014). In Ethiopia the expansion of road coverage throughout the country starts back in 1951 with the establishment of Imperial Highway Authority (IHA). By then, the road network in the whole country was only 6,400 km of which 3,400 km (53.1%) was asphalt and the remaining 3,000 km (46.9%) was gravel road. In the same manner, the current government has been working for the development of road transportation; particularly, by preparing the Road Sector Development Program (RSDP) and establishing separate Road Fund Administration in 1997 (ERA, 2015).

As the capital city of the country and also the sitting city of different international organizations including the African Union, the road coverage of the city is very important for the day to day activity of the society of the city as well as for the diplomats of the international organizations. Ethiopia's capital, Addis Ababa, is developing its road network with a series of projects underway. In the last six months the city authorities have pushed ahead with works to 385km of roads. Around US$231 million has been budgeted for road development work, including building new links and maintaining existing roads (Seid , 2015).

At present Addis Ababa's road network extends for a total of 5,915km, compared with 5,365km in 2014. Meanwhile 2,616km of the city's roads are surfaced with asphalt, around 44% of the total n Ethiopia's capital, Addis Ababa, is developing its road network with a series of projects underway. For months the city authorities have pushed ahead with works to 385km of roads. Around US$231 million has been budgeted for road development work, including building new links and maintaining existing roads (ERA, 2015) and (Fitz , 1996).

Much of the road expansion and maintenance program has been devised by the Addis Ababa City Roads Authority (AACRA). However, AACRA has the direct responsibility for just 16% of the city's total road network. Developing the city's road network has been placed as a high priority by

the city authorities. For 2018, the city authorities have allotted 15.5% of the total budget to road development work (Fitz , 1996).

The Addis Ababa road maintenance projects and planning has been done in coordination with a Japanese company called Japan International Cooperation Agency JICA. The Addis Ababa City Road Authority (AACRA) maintain the cities deteriorated roads coordinating with (JICA) in a sustainable manner. These development of road maintenance capacity of Addis Ababa city has been implemented but in order to do these activities with higher positive outcomes the management capacity and day to day follow-up of AACRA with regards to road maintenance must be enhanced (Seid , 2015).

The city's budget, which comes after the city endorsed a new master plan, focuses on mass transportation schemes, housing and socio-economic development, and industrialization, with the road sector getting the biggest portion. For the last five consecutive years, the city has allocated 1.4 billion, 1.5 billion, 3.9 billion, 5.7 billion and 5.8 billion birr on road projects. (Ethiopian Road Authority (ERA), 2003)

1.2 Statement of the problem

Road maintenance management in Addis Ababa city administration are severely suffering from a lack of proper maintenance and maintenance management system. Lack of efficiency and ineffective road management and maintenance project management are among other reasons which contributed to the bad conditions of roads in Addis Ababa. Despite the various maintenance measures, the road condition is still poor and vehicle operating cost are increasing and as statistic shows only 56% of constructed road are in good condition (Addisfortune, 2013). Upon routine maintenance, delays are usually observed which increases the severity of the problem. Therefore, leading the asphalt to poor condition and eventually for complete road maintenance in later years. This will in turn increases the operating costs associated with a specific road section (Road sector development program , 2001). Hence, identifying critical problems can be input towards improving road maintenance activities. Due to these reasons, the need to review the works done so far is vital to the growing road construction industry.

Even though there is the budget to the road construction and for road maintenance projects more than any sector but as the JICA advised the AACRA there is gap in maintenance management

projects to reach their goal in relation to budget time and quality and satisfy the need for the community. The deteriorated roads all around the city are the roots for the unsatisfied changes on the city road maintenance on the cities road authority. This problem has long-term effect on individual, community and country in general.

To address road maintenance challenges and the project management gap, it will be appropriate to assess other countries experiences to find out what type of techniques or new approaches they adopt in their road maintenance practice. Therefore, in this paper maintenance approach and the management on road maintenance studied. And what are the possible way to improve the road maintenance project management performance by maintaining other resources.

1.3 Objective of the study

1.3.1 General objective

The general objective of this study is to assess approaches to improve road maintenance projects management practice by tackling the challenges for future practices,

1.3.2 Specific objective

The specific objectives of these study are:

- To identify road maintenance project management practice used to manage maintenance projects in AACRA.
- To identify challenges of the road maintenance project management practices.
- To identify the approaches that are used to improve road maintenance project management practice.

1.4 Research question

1. Is there any established road maintenance management project practice used to manage maintenance projects in AACRA?
2. What are the challenges of the current road maintenance management practices?
3. What are the approaches that are used to improve road maintenance project management practice?

1.5 Scope of the study

The scope of this study focused on roads which are found in Addis Ababa, Ethiopia. It is specifically a road constructed and maintained by Addis Ababa City Road Authorities (AACRA). It is mainly for the road maintenance project for the entire city of Addis Ababa done by AACRA as the authority to implement road maintenance projects.

1.6 Significance of the study

The result of this research exhibit the level of Addis Ababa road performance and AACRA maintenance management capacity. This research also presents the drawback of the current performance of maintenance and its management system on the city road performance. Therefore, it can be great input to AACRA to check and evaluate their performance and use as resource. Also can be used as an input for other researchers whenever they want to do further studies on the road maintenance project management practices.

1.7 Limitation of the study

As a limitation for this study the data collection was too hard because the participants of this study are not always in the office and there is no specific place for them to be for more than a couple of consecutive days. And also are busy on doing their work so that most of the time they are not happy when they get questionnaires. The unreturned questionnaires are examples for this.

1.8 Organization of the study

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

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

The third chapter outlines the research methodology employed in the study which includes the research study area and research design used. The chapter also presents the research approach, data

collection procedure, target population and sampling techniques used in the study. In addition, the chapter explains the questionnaire design method and data analysis techniques that were used in the study.

The fourth chapter outlines research findings and discussions. The chapter covers response rate and demographic characteristics of the respondents by age, gender, education level and respondents' work experience. In addition, it covers established road maintenance project management performance in Addis Ababa city administration. The chapter also gives the findings of the study by using SPSS software as tool then interpreted the data through frequency and point scale analysis.

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

CHAPTER TWO

2. Literature review

2.1 Introduction

The purpose of literature review was to assess road maintenance project management practice and to understand different factors that influence road maintenance project management through different theories and empirical literature by using journals, books, dissertation, article and website as a source. The study also incorporates different developing countries technique and practice that embrace road maintained project management within practical performance of road maintenance. This investigation is important to give baseline to identify different challenge factors and approaches to improve road maintenance project management in the case of AACRA's road maintenance projects.

2.2 Background of road maintenance project

Around the world, roads are the dominant transport resources, which cover millions of kilometers over the countries. Roads foundations give a crucial establishment to the execution of all national economies, conveying a wide extend of financial and social benefits. Roads are regularly the single biggest freely possessed national resource and, it is road support that controls the deterioration in esteem and decides the effect of the organization on road clients and society. Without proper maintenance and good management practices, the high value of any road network can be quickly eroded and road users and society can experience significant hostile impact if a road network is in poor condition. Technical publications often mention the statistics that for every additional $ 1 a developing country spends on road maintenance; road users save $ 3 (Heggie, 1996).

According to the World Road Association considering purely the values added by commercial transport services, road transport contributes 3 -5 present of the Gross Domestic Product (GDP). However, this ignores a number of other considerations (input of fuel and transport Equipment's) which if taken in to account, the contribution of transport to GDP, would be 20-30%. Adequately maintaining road infrastructure is essential to preserve and enhance those benefits. Therefore, the importance of maintenance need to be recognized by decision-makers, funded appropriately, and

should be well managed to ensure maximum value achieved. Poor management of road maintenance will result serious consequences on the economic well-being of a nation (Levik , 2014).

However, indeed little budgets for upkeep make a distinction between appropriate arranging and the correct needs. The circumstance in numerous countries concerning the road condition isn't as it was pressing, it is basic. It is vital to know the costs included in road support and the costs of not keeping up the roads. The money which is spared in support budget by maintaining the streets is eventually paid by the clients and society. This is often the imperceptible charge, and the entire take toll on the economy is tremendous (Heggie, 1996).

To stakeholders or decision-makers to display themselves to the open, something should be done with this situation. Different proficient individuals have to offer the message that keeping up road are unequivocal significance for a nation (Levik , 2014). In reality, spontaneous or ineffectively arranged roads upkeep closes up being costlier than well-planned and executed support. So in arrange to supply ceaseless and appropriate road support, a productive, compelling and well-established support administration conspire is amazingly critical. Therefore, looking at big picture is key component to road maintenance management.

2.3 Theoretical review

Road maintenance project management integrate different theories that support the management and performance of road maintenance projects. Even though there are different theoretical perspective about road maintenance and it project management, this study used theories as base to construct factors that influence and approaches that can be used to improve road maintenance project management practice.

2.3.1 theory of constraints

The hypothesis of requirements is a general project management theory presented by (Goldratt, 2011). It targets assisting associations with accomplishing project objectives; that is, improvement in execution of their undertakings. It traces four primary imperatives that prevent the presentation of tasks. The requirements are extent of the task, cost of the venture, quality and time inside which the undertaking is to be finished.

The central proposal of TOC is that imperatives effects affect the exhibition of any firm. The hypothesis of requirements advocates that project directors should zero on viably dealing with these imperatives. (Lehman & Dubrene, 2011) Study demonstrated that around 40% of the road projects built in Europe experienced these limitations. The hypothesis likewise provokes chiefs to be inventive in discovering methodologies that will empower the authorities to accomplish quality foundation projects regardless of the presence of task requirements. (Linhares, 2009) Contends that a large portion of the requirements looked by firms begin from approaches and deficient actual assets. The hypothesis of requirements stresses ideal execution inside the current imperatives. It gives a system of exercises that directors ought to embrace throughout overseeing projects.

The hypothesis of limitations can be portrayed as a bunch of ideas, standards, and estimations that emphasis consideration on the strategic apparatuses that make project work to stream easily (William, 2013). Eric, Debra, and James (2015) concentrate on the impacts of venture the executives' abilities in project execution noticed that to improve productivity and adequacy in the presentation of street foundation projects, the undertaking chief should chip away at these imperatives. (Amit & Schoemaker, 2011) Concentrate on execution of ventures contended that Critical Chain Project Management (CCPM) is a utilization of hypothesis of requirements to projects. It is a strategy for arranging and overseeing project execution intended to manage vulnerabilities inborn in overseeing projects while contemplating restricted accessibility of assets. The assets could be physical, human abilities just as the executives and backing limit. The essential imperatives to project the board are cost, time, and extension.

The scope constraint incorporate to what ought to be done to create the task's final product. Greater and complex undertakings with a few errands to be performed are more difficult contrasted with more modest activities. Martin depicted a task as a mind-boggling movement as far as innovation of gear and materials, apparatus and individuals. (Bladderstone, 2008) Recommended that if the task is too large, a portion of the exercises could be sub-contracted to decrease the intricacy of the undertaking. Sub-contracting is significant since it empowered task chiefs to break complex activities into basic undertakings that can be handily organized and overseen viably. Steyn (2010). This improves opportune conveyance of task expectations and production of significant worth to clients through quality, decrease in project cost and venture consummation inside booked time.

(Mabin & Balderstone , 1999) Accepts that Goldratt's approach tries to distinguish a framework's bottlenecks, evaluate the effect of these bottlenecks, and help to recommend proficient answers

for the urgency. The examination additionally demonstrated that the hypothesis of imperatives gives an organized content that defines project management systems and plan answers for bottlenecks. The investigation further attested that the hypothesis is an apparatus that aides' project directors recognize requirements and receive answers for framework frameworks.

This hypothesis is significant in this examination as it brings into the surface the imperatives that hinder execution of road maintenance projects. The requirements are extent of the task, project cost, quality based on standard manual, and time inside which the venture ought to be finished. This hypothesis was utilized by (Gitenya & Ngugi, 2011) through the study of concentrate on "evaluation of the determinants of execution of lodging projects in Kenya". It was likewise utilized concentrate on from Management by Constraints to Management by Critical Activities.

2.3.2 Road maintenance management system

Before considering the process of road maintenance management system, there are different parameter that should be in mind to prioritize the work of limited resource. The scope of data and parameters likely to be collected in order to feed a data base to prioritize and facilitate road management is wide: traffic, technical data, road characteristics (geometry, deterioration, structure, etc.) (Hilson & Murray, 2012).

To properly decide on a maintenance policy, choose between alternatives, input data into deterioration and economic models such as HDM (Highway Development and Management), and finally come up with maintenance programming, it is necessary to rely on a good knowledge of the main characteristics of a road network and transport system over time. The main purpose of road management systems or pavement management systems (PMS) is to provide data and tools fitted for this issue.

Implementing a road maintenance system mainly consists in:

- taking into account the whole of a network through the use of a road data base;
- seeking a maintenance strategy corresponding to an economic optimum, by simulating the consequences of various alternatives;
- developing a sound maintenance multi-annual programming method (Republic of Indonesia National Development Planning Agency, 2008)

2.1.4 Project Management Competency Theory

This hypothesis was set up by (Mclelland & McBer, 1980). The creators characterized ability as the hidden attributes of a person that prompts accomplishing predominant execution in a task or a circumstance. The venture the board capability improvement system characterizes ability as a group of related abilities, information, perspectives, and other individual qualities that impacts the way an individual embraces a given assignment. Ability corresponds with project execution and can be improved through preparing and advancement of labor (PMI, 2011).

The hypothesis clarifies the part of task the executives' skills, observing and assessment of improvement undertakings and impacts of gathering elements in the exhibition of framework projects. (Gladder, 2010) Noticed that specialized undertaking administrators ought to have the option to apply information, abilities, instruments, and methods successfully to convey true to form and have the option to accomplish the task's objectives and improve the incorporated expense, timetable, and exertion. The investigation discovered that two of the most persuasive norms; the PMBOK address just the information part of capability while a third, Australian's National ability principles centers on evident execution. The examination likewise discovered that some undertaking chiefs do not have the necessary capability abilities to execute the street framework projects.

The project chiefs ought to have the option to choose a wide scope of the board practices and instruments that will improve the presentation of framework projects. The examination further noticed that profoundly talented task supervisors can successfully apply various techniques to various undertakings to advance venture execution (Edum-Fotwe & McCaffer, 2011) Associations are along these lines progressively overseeing foundation projects in an organized way to guarantee work sought after is steady and is embraced by labor force with the necessary abilities. The abilities of each colleague ought to be evaluated and included into a skill profile information base which ought to be refreshed and audited as often as possible (Kometa & Jubb, 2007).

Venture administrators in the present street development industry are confronted with a circumstance whereby the crucial jobs and capacities they perform are seeing a continuous change in center. To keep up their expert ability guidelines, task chiefs in this industry need to adjust to the changing business climate by depending on information and abilities gained through preparing and experience. The degree to which such preparing empowers project directors to viably adjust

to changing requests have impressive importance for the preparation of future task supervisors (Francist & Ronald, 2010).

As per this hypothesis, use of customary administration ways to deal with street framework projects is counter useful. (Ryssel, 2013) Contends that customary administration centers on exact work breakdown structure, control rules, long haul arranging and inflexible constructions that can cause street tasks to come up short. (Soderland, 2012) underlines that the venture director ought to have project the executives' capabilities, for example, having the option to; coordinate different cycles of the task, capacity to meet the extension, time, cost, and nature of the necessary undertaking, oversee and moderate task hazards and deal with the physical and HR associated with project execution. The hypothesis additionally centers around the essential methodology used to convey the street projects, contracting model utilized, standards of choosing the undertaking supervisor, project worker for hire and task group and the instruments allocated for conveying the venture.

(Hilson & Murray, 2012) Stated that to be skilled in any circle of life, one should be educated, have capacity to apply information adequately to accomplish a result and furthermore act. Ruth and David (2011) likewise fostered a system that illustrated five fundamental components that adds to capability. They include individual qualities, experience, mentality, information, and abilities. They likewise called attention to those administrators are bound to perform better if their own qualities meet the prerequisites of the position. They further contended that the creating of undertaking supervisor's imperative skill is to guarantee proficient execution that led to a fruitful task.

Simmons (2014) showed that the extraordinary design of the street development industry, administrative prerequisites that change regularly and the difficulties of world intensity have encouraged a high interest of instructed, talented and equipped street development project chiefs. Triestch (2015) showed that a skillful task supervisor should have specialized capabilities, conduct abilities and logical capabilities. They distinguished specialized capabilities as including capacity to perceive and like the rules and states of task execution, capacity to perceive and get objectives, prerequisites, and states of the venture, perceive and comprehend the dangers of the undertaking and overseeing them adequately, comprehend project designs, extension and expectations and design and put together assets needed for the venture.

As indicated by Triestch (2015), conduct capabilities incorporate; capacity to animate and propel colleagues, poise, self-assuredness, imagination, result arranged, proficient, solid and likes the upsides of colleagues. Logical capabilities incorporate; project direction, portfolio direction, understanding complex relations between the undertaking and its environmental factors and capacity to enroll, select, create, evaluate, and reward colleagues in a way that animates powerful conduct and fruitful cooperation.

This hypothesis is important to this examination since it diagrams specialized, social, and context-oriented skills needed by nearby development firms in the street development industry to convey street projects inside the spending cost, time timetable and meet wanted quality (Hilson & Murray, 2012) The hypothesis likewise clarifies the significance of managing and upgrading cooperation and proficiency during development of foundation projects. This hypothesis has been utilized, Effects of ability abilities in huge Swedish associations and Kometa and Jubb (2007) concentrate on Leadership Competency Profiles of fruitful undertaking directors.

2.4 Empirical review

The paper study different articles in peer-review on different reports and materials got from the internet destinations, research vault sites and data sets and other applicable distributions on the branch of knowledge. The examination explain about key develops, factors and viewpoints hidden the impacts of venture the board rehearses which contained asset preparation, project observing and assessment, bunch elements the executives and undertaking chances the executives.

2.2.1 Resource Mobilization and road maintenance project management

(Majanja, 2012) Directed an examination on financing limitations of foundation projects in Kenya. The investigation covered 87 firms that implement road construction and maintenance. Two elective factors to gauge financing requirements were utilized. The first depended on the level of financing requirements that organizations face and the different was on the utilization of bank credit by firms. To quantify apparent financing limitation, respondents were approached to rate admittance to financing as a requirement of venture execution. The investigation results uncovered that financing requirements were a significant obstruction looked by organization which works on road. It discovered that the nearby development firms confronted basic issues and issues which

influenced financing of their undertakings. Majanja proposed that, administration should encourage Public-Private Partnerships to raise satisfactory assets for developing road projects and maintenance. Simmons, (2012) additionally noticed that nearby firms had an issue of getting to acknowledge offices as they were seen to need insurance security. Nonetheless, Majanja expected that lone funds lead to the accomplishment of an undertaking. The current investigation included other significant factors, for example, checking and assessment and gathering elements the board to improve the practicality of the outcomes.

(Gitenya & Ngugi, 2012) Concentrate on the evaluation of determinants of execution of lodging road projects in Kenya brought up that a large portion of the neighborhood firms occupied with road projects are frequently ruined by absence of satisfactory monetary assets. There was consistently a financial plan for the task, and this was a significant imperative. The examination further expressed that while the general assets accessible would be in principle adequate to finish the venture, there were challenges emerging far removed in which the task had been planned. For instance, there were various exercises planned to happen simultaneously and this could not be conceivable given the measure of assets accessible. The measure of assets accessible thusly, assumed a basic part in the achievement of a venture attempted. Task supervisors required thusly to streamline the usage of assets to guarantee project culmination inside the planned expense (Allen, 2012).

Carter (2012) examined the difficulties confronting street foundation firms in sub-Saharan Africa in their push to convey of value projects. The examination dissected effect of re-appropriating specialized human asset utilizing 100 surveys gave to project directors and workers for hire. It showed that the nearby development firms confronted various difficulties in examination with the unfamiliar ones particularly in acquiring the specialized staff with the necessary ability abilities to embrace road projects. The investigation additionally discovered that each association has a predetermined number of assets to perform undertakings. An undertaking administrator's essential job subsequently was to figure out how to effectively execute a venture inside these asset imperatives. Appropriate execution of road construction and maintenance projects required intensive asset arranging which contained setting up a group that had the necessary abilities to

perform a day and a half exercises and planning different assets like devices and hardware (Warner well, 2013).

(Leyman, 2013) Contemplated the job of administrative abilities in overseeing road projects in Europe. The investigation declared that the level and preparing in administrative abilities would help the presentation of road construction and maintenance firms as far as quality and time taken to finish the undertakings. Preparing would in this way engage individuals to settle on better choices and give better quality labor and products. The examination likewise affirmed that in fostering the timetable and doling out road construction and maintenance assets, the venture administrator decided the appropriateness of laborers to project exercises. The investigation further stressed that reasonable agreement and documentation project length and term of each significant action was essential for the planning interaction. (Leyman, 2013) Called attention to that sufficient and convenient arranging of faculty would forestall cost invades in road projects. It was thusly significant for the undertaking supervisor to comprehend the quantity of colleagues needed to play out the exercises booked.

(Leyman, 2013) Study looked to set up project the board skill improvement in enormous Swedish associations. The examination noticed that absence of staff with the abilities needed to play out an undertaking in road construction and maintenance projects was another test in the development of road projects, this was basic to project achievement. The examination additionally contended that coordinating with the individuals' abilities and the works to be performed relied upon the time it took to play out a given errand. This perspective was discovered ailing in the nearby development firms and prompted projects being finished long after the time booked at first. The investigation along these lines suggested that project chiefs ought to foster a rundown of abilities needed for the execution of the undertaking which thus decided the faculty for the task. Likewise, the investigation showed that able human asset prompted the accomplishment of value, usefulness and effectiveness in developing road infrastructure projects.

David (2013) inspected the insider facts behind fruitful administration of foundation projects in Columbia. The examination illustrated different manners by which specialized assets could be applied in running different business undertakings to upgrade the board and improve efficiency. To guarantee that the norm of road infrastructure projects was not traded off, the Columbian

government made changes in the financing of road construction and maintenance projects so that agreements could not be granted offers made underneath the purported "lower sections" but instead to those that were nearer to the normal worth of offers. The previous keeps bidders from unreasonably bringing their offers down to get contracts. Moreover, the Columbian government had set out the public-private Act through which they managed both the financial backers in the activities and the assets for its execution. Notwithstanding, the investigation neglected to incorporate the control impact and other key factors that impact the presentation of framework projects.

Fox (2013) analyzed the impact of utilizing current instruments and procedures in the development and the executives of road projects Chinese development organizations. The examination stated that cutting edge devices and procedures would radically improve the nature of the street framework projects. The examination further contended that innovation prompted finish of the activities inside the predetermined time. Graham and Mohamed (2013) study's goal was to build up the degree of mindfulness on employments of innovation in the development of horticultural undertakings in Central Europe. The investigation discovered that rural ventures in Europe were portrayed by innovation that was fitting, undeniable level innovation and sufficient institutional ability to use present day mechanical abilities. The investigation further attested that utilization of present-day innovation in road infrastructure tasks would bring about mass top notch projects and furthermore diminish time and cost invades. The investigation did not fuse the balance impact.

(Stephene , 2013) Led an investigation to decide the significance of specialized assets in the presentation of road construction and maintenance projects in Kenya. The examination uncovered that no undertakings could prevail by applying old methods. The examination further pushed for the improvement of effective and dependable data frameworks in overseeing street projects after they did an investigation on use of innovation in project the executives. Also, the investigation showed that utilization of current innovation in business helped in proficient conveyance of good road infrastructure that meet consumer loyalty. Ellaine and Harris (2014) concentrate on the presentation 39 of road infrastructure projects in Uganda noticed that innovation could prompt fruition of ventures inside the time plan and planned expense.

The UNESCO Report on Education (2014) likewise noticed that there was need to give additional preparation freedoms to class leavers to outfit them with abilities for independence. It additionally requested that the public authority give commonsense instruction and preparing abilities which were applicable to Kenya's horticultural, business, financial and modern requirements. The public authority was additionally needed to give the specialized information and professional abilities important to support financial turn of events. Among the procedures suggested by the report were the public authority to increment institutional limits of different instructional hubs, to give quality preparing and increment the preparation openings through development and amplify usage of all specialized and preparing organizations.

(Odeyinka & Yusuf, 2014) Examined the circumstances and end results of postponements in road construction and maintenance projects in Nigeria. The examination noticed that construction and maintenance undertakings' presentation could be improved essentially through utilization of current hardware. The above examinations anyway did exclude different factors which additionally impact the presentation of road framework projects. Tony (2014) concentrates on the impact of innovation on execution in Europe declared that a portion of incites that prompted lackluster showing of road framework ventures could be tended to through utilization of mechanical arrangements. This viewpoint likewise prompted low confidence of laborers hence influencing their proficiency. The investigation further demonstrated that utilization of current procedures in the development of foundation activities would bring about top-notch projects and a decrease in the period of time for development.

Lu Shan and Due Fei (2015) concentrate on improving road infrastructure quality overall discovered that working of Eco roads assisted with expanding the strength, thickness and solidness of streets and street bases effectively and cheaply. Further, the examination declared that the development Eco roads decreased street building costs by 40 percent and street upkeep costs by 60 percent. The examination was directed in China.

2.2.2 Follow up and examination and road maintenance Project management

Venture checking and assessment assumes a vital part in project execution. Through M&E data is gathered and dissected that assists with following the advancement of a task (Martin, 2012). (Harries & Reyman, 2010) Directed an investigation to set up the limitations and issues that

hamper Monitoring and assessment of advancement projects in Egypt. To accomplish the planned destinations, information on 37 activities was utilized. The examination discovered that observing and assessment of tasks was progressively being perceived as a key administration work. The examination results likewise showed the fundamental limitations and issues that hampered observing and assessment being developed ventures. They included absence of obligation to direct observing and assessment, inability to complete, talk about, share and fuse the aftereffects of checking and assessment exercises. Different requirements discovered from the examination were: lack of prepared staff, deficient specialized assets, and insufficient designation of assets to observing and assessment and restricted preparing openings. These observing and assessment requirements influenced the road infrastructure firms in the conveyance of effective street projects. (Harold , 2013) Study tried to inspect the impact of observing intently road projects in Europe. The examination discovered that information about observing, and assessment helped project workers for hire and directors to adequately screen and assess the road construction and maintenance projects and hence improve the presentation of the ventures. The investigation likewise discovered that project administrators of road projects had to know the degree to which their ventures are fulfilling the ideal customer guidelines. Besides, the investigation demonstrated that data produced through observing and assessment empowered the venture chiefs to settle on better choice that prompted fruitful road construction and maintenance tasks. Harries and Benedict (2010) study looked to set up the part of the undertaking supervisor in the M&E framework. The investigation showed that the undertaking supervisor ought to have the option to distinguish the reason and extent of the M&E framework, plan for data detailing and usage, assortment and the board of information, examination of information, checking and limit working of human asset.(Kabwegyere & Kiyega, 2008) Concentrate additionally illustrated the key checking and assessment exercises in an undertaking. They included beginning requirements evaluation, project plan sensible structure, M&E arranging and benchmark study. The investigations further contended that M&E framework should zero in on the utilization of undertaking inputs and the viability of the venture execution interaction to guarantee that the last street project accomplishes the ideal quality.

In China, Leung Xha (2014) study tried to build up the job of managing project exercises in the presentation of road projects in China. The examination noticed that management of undertaking

exercises improves project execution. The examination results additionally showed that a well-working administrative framework is a basic piece of good venture the executives. The outcomes showed that M&E frameworks are a basic piece of Result Based Management (RBM). Result based administration upholds better execution of road maintenance projects as it shapes the reason for clear and precise giving an account of the outcomes accomplished by a task. Also, the investigation discovered that convenient, customary, and dependable checking and assessment framework on foundation projects gives data to help undertakings execution and add to hierarchical learning and information sharing, maintain responsibility and consistence, give freedoms to partner input and add to asset assembly.

(Harries & Reyman, 2010) Considers were not exclusively done in different nations further developed than Kenya yet additionally centered on different measurements other than execution of road infrastructure projects. The investigations likewise utilized informative examination plan while the ebb and flow study utilized both illustrative and clear exploration plans which made the outcomes more practical.

2.2.3 Group Dynamics Management and Road Maintenance Project Management

Prackel (2010) study to set up the impact of low group dynamic within project team on the exhibition of force projects in South Africa noticed that when individuals are doing a given venture, they frequently play certain jobs. The impact of these parts in others and on a gathering overall is portrayed as gathering elements. The investigation affirmed that a decidedly unique gathering made trust in each other, settled on aggregate choices and was responsible for making the presentation project nearby. The investigation further noticed that when a group did not have a solid chief, one part would dominate and that influenced the smooth endeavor of venture exercises, caused infighting or center on a misguided course. This prompted helpless gathering elements.

(Lehman & Dubrene, 2011) Considered reasons for deprived group dynamics by giving 105 surveys to project chiefs and workers for hire in the U.S. The outcomes showed that deprived group dynamics in framework tasks might be brought about by inordinate contrast to power. This happens when individuals dreaded to communicate their perspectives to be believed to concur with

their higher rank. Hindering was another reason for low group dynamic. Impeding happens where individuals from a group act in a way that thwarts the progression of data in a gathering either by contradicting others or being reproachful of others' thoughts. It can likewise occur through a part pulling out from support or presenting humor at improper occasions. The investigation additionally discovered that free riding was another reason for helpless gathering elements. Riding happens when a few individuals neglect to collaborate and hence leave other gathering individuals to accomplish practically everything while assessment trepidation happens when a few individuals feel judged cruelly by other gathering individuals. The investigation further stressed on feeble administration and extreme contrast as the principal factors that can created setbacks for street framework project finishing.

Burgess and Stern (2013) led an investigation with the target of setting up effective techniques for overseeing of task groups Switzerland. The outcomes showed that satisfactory and opportune arranging of faculty was critical in forestalling cost invades in road projects. The examination likewise noticed that the ideal size of a venture group needed in road construction and maintenance projects was guided by two principal factors, the quantity of venture errands to be performed and the exertion required in endeavor these assignments. Nonetheless, the examination neglected to diagram methods of improving attachment among project groups encountering helpless gathering elements.

Smith (2013) study looked to set up the causes and impact of helpless gathering elements in the development of road infrastructure projects in Nigeria. The examination discovered that; knowing colleagues, characterizing jobs and duties regarding everybody, battling of black sheep impact, handling issues rapidly and focusing on incessant consistent choice empowered venture chiefs to convey an effective undertaking inside the specified boundaries. The investigation further noticed that those techniques empowered task administrators to tackle the various abilities, gifts, and capacity of colleagues to improve the presentation of road maintenance projects. The examination noticed that numerous development firms do not accept the soul of gathering elements and this had enormously influenced the exhibition of road projects. Smith proposed that project chiefs should address the struggles so every one of the individuals could function collectively.

Saunders (2014) research in investigating devices of group greatness in road project execution demonstrated that venture groups were found in road projects as the best answer for a firm to effectively accomplish the ideal nature of the road project inside the expressed time plan. The examination was led in Central Europe. The investigation additionally showed that adaptability and speedy reaction of task groups made the groups more viable in developing street framework projects. Katzenbach (2014) concentrate on bunch elements discovered that a venture group experienced difficulties in beginning phases of framing a group. The investigation affirmed that each group began and grew progressively until it turned into a high performing group as the task advanced. The challenges identified with correspondence, joint effort, and inspiration particularly in the shaping and raging stage. Nonetheless, as indicated by Smith (2014), bunch elements speculations did not matter to firms with profoundly experienced groups whose individuals had cooperated for a long time.

In contemporary hierarchical settings, bunches have been accentuated as the key getting sorted out unit considering an incredible pool of assorted information and abilities among individuals and sharing of new data and mastery. Baldwin (2014) set up the effect of organization relations on bunch execution of foundation projects. The investigation discovered that correspondence assumed a huge part in encouraging the viability of the group in development projects. This data and aptitude were vital in improving execution of tasks as it prompted fast fruition of undertakings and fulfillment of the ideal quality.

Contrary social communications happen generally with individuals who might be depicted by colleagues as untrustworthy, unmotivated, or detached on the grounds that they don't offer esteemed data and experiences (Arrow & McGrath, 2014). This can result to ill-disposed connections. Such connections here and there are unavoidable because errand prerequisites are bound to cause passionate pain, outrage and lack of interest. This can prompt postponements in project consummation or inability to accomplish the ideal nature of the street projects. The significant impediment of the investigation was its inability to consider different factors that decide execution of development firms. The previously mentioned examines zeroed in on different regions other than execution of undertakings and were done in different nations subsequently a need to lead the investigation in Kenya.

2.2.4 Project Risks and Road maintenance Project Management

(Might & Fisher, 2011) Directed an examination on Power Projects disappointment in Nigeria. The investigation discovered that most force projects flopped because of inability to oversee project chances. They likewise stated that dangers can never be stayed away from, they must be decreased. They further discovered that some undertaking directors overlook chances inspired by a paranoid fear of seeming clumsy in dealing with the venture if the dangers were to be revealed. Further, assets will likewise be needed to moderate the dangers. By the by, uncovering of dangers and overseeing them could add to road project achievement.

Well-Stam (2012) led an investigation to build up the impact of venture chances on the exhibition of rail line projects in China. The investigation recognized various dangers which included legitimate dangers, hierarchical dangers, specialized dangers, monetary dangers, social dangers, and political dangers. Legitimate dangers included: absence of lacking knowledge into the entirety of the lawful prerequisites and conceivable alteration in the space of wellbeing climate. It additionally included cases from project worker because of execution blunders or inability to conform to laws and guidelines. In the street foundation setting it included getting every one of the applicable authoritative archives prior to leaving on the real development. The examination likewise discovered that hierarchical dangers which implied alteration in the program of prerequisites, absence of venture methodology, quality arrangement, vital labor, fulfillment, and acknowledgment systems, late requesting of materials and wrong and inadequacy in the appraisals contributed altogether to defer in project culmination. Further, the examination showed that these dangers truly influenced the nature of the undertaking and prompted time and cost overwhelms. The significant restriction of this investigation was that it did not consider different components that are likewise critical in the presentation of activities.

(Prichad & Lymer, 2013) Concentrate on specialized dangers in framework projects recognized a portion of the dangers as; helpless development strategies, unsatisfactory work done by sub-workers for hire, helpless innovations utilized and wrong gauges of the necessary crude materials. The examination was led in Europe. The examination additionally showed that monetary dangers were the fundamental driver of road project delays. Monetary undertaking chances included: cost

increments for materials, loan fees changes, plausibility of insolvency of provider, expanded duties and deviation from expected deterioration particularly on capital hardware utilized for the task. The examination further talked about friendly and political dangers. Social dangers, for example, strikes and disappointment to include the local area would create setback for finishing the task. Political dangers included political unsteadiness, change parents in law, approaches and guidelines and inability to get grants required.

As per Noor (2014) concentrate on relief of undertaking the executives' hazards, project directors had an obligation of recognizing the dangers and overseeing them adequately. The examination noticed that this should be possible by perceiving preventive measures to limit the dangers, carrying out emergency courses of action to counter danger, move of hazard to another resource and setting possibilities in spending assignments. Further, United Kingdom relationship for road project the board Guide offers valuable data about project hazard investigation and the executives particularly to new clients. The strategy includes the examination and association of dangers relating to explicit ventures. Appropriate execution of undertaking investigation and the board will prompt effective completing of street foundation projects as far as cost, time and anticipated execution. Thusly viable administration of foundation project chances was a vital determinant in framework projects achievement (Riedel, 2014).

(Might & Fisher, 2011) Study zeroed in on why force projects fizzled and not execution of road projects. (Prichad & Lymer, 2013) Tried to set up specialized dangers in road infrastructure construction and maintenance projects. Well-Stam (2012) investigated the impact of venture hazards on the exhibition of rail line projects. These investigations were done in created nations and since the natural conditions between created and agricultural nations are unique, it is imperative to look at the impact project hazard the executives on the exhibition of road projects.

2.2.5 Government Policy and Road maintenance project management

Kenya Roads Act 2007 and sessional paper No. 5 of 2006 on the turn of events and the board of road sub-area for reasonable monetary development gave the legitimate and institutional system for the administration of roads. The Roads Act set up three Roads Authorities specifically: Kenya National Highways Authority (KENHA), the Kenya Urban Roads Authority (KURA) and Kenya

Rural Roads Authority (KERRA). Kenya National Highways Authority is responsible for improvement, recovery, support, and the board of public roads. Kenya Urban Roads Authority is answerable for all open roads in the urban communities and regions. The Rural Roads Authority has obligation regarding rustic roads. In May 2009 the Integrated National Transport Policy (NTP) was created to explain the jobs of different parts in the conveyance and the executives of transport foundation.

Quality control is a significant necessity of expressway road projects. With expanding expenses and contracting staff assets, the public authority through Kenya Roads Board (KRB) and Kenya Highways Authority (KENHA) resolved this issue of value control. The workers for hire ought to likewise satisfy their quality control duty appropriately. As per (Gitenya & Ngugi, 2011) this methodology empowered the Kenyan government offices to utilize not many staff subsequently diminished their activity costs. The workers for hire likewise limited road project costs by controlling the utilization of materials and labor. Be that as it may, this expense investment funds decreased because of numerous individuals recruited to control project quality exercises.

The public authority organizations that oversee and administer the development cycle are needed to set guidelines to be fulfilled by the development firms. (Odeyinka & Yusuf, 2014) Concentrates in Nigeria noticed that administration delegates assessed some street activities to guarantee that the ventures met the set quality confirmation principles. The investigations further showed that workers for hire were punished if the road construction and maintenance projects didn't fulfill the necessary guidelines. Likewise, the examination noticed that motivators were given to those workers for hire who accomplished critical outcomes. Thomas and Greg, (2012) concentrate on effect of laws on the exhibition of road maintenance projects agreed with the discoveries of (Odeyinka & Yusuf, 2014)

2.2.6 Organization Structure and Road maintenance project management

(Lavasser, 2010) Analyzed the impact of association structure in the administration of road projects in Zambia. Lavasser gave 135 polls to project directors and 79 to project workers for hire. The investigation discovered that association structure was huge in deciding the span it took to finish the undertakings. The examination additionally discovered that there were numerous

degrees of power that one needed to go through to get endorsements of undertaking assignments. Further, the examination showed that transformation of projected association structure encouraged coordinated effort as well as accelerated dynamic. This prompted road project finishing inside the time planned. It additionally helped project administrators to conquer hierarchical issues and, in this way, improve the presentation of activities. The investigation utilized expense and time taken to finish the undertakings as markers for execution. Notwithstanding, the investigation didn't cover broadly different factors, for example, project the executives rehearse.

Nkandu, Rodrigo, Cecilia, and Alberto (2010) zeroed in on the impact of utilitarian association structure in the development of road maintenance projects in South Africa. The goal of the examination was to build up its pertinence in overseeing projects. The examination analyzed two regions; first the force projects and besides the rail route projects. Information for the investigation came from 37 task administrators and 20 workers for hire who were attempted the ventures. The investigation discovered that the practical administrator dispensed and checked the road maintenance work and did assignments like execution assessment and setting installment levels. They additionally noticed that in utilitarian hierarchical construction, project administrators and task project workers were consistently in struggle over asset distribution and control of laborers since project directors had restricted position. Anyway, the examination did exclude different factors like asset assembly and task observing and assessment.

(Richard, 2011) Study inspected utilitarian, network and projected authoritative designs to set up the effect of distributing authority and obligations to project supervisors and if this had any impact in the presentation of tasks. The investigation was directed in Eastern Europe. The investigation discovered that both venture supervisors and utilitarian directors had expert in framework association design, and this prompted having a more grounded group culture. Nonetheless, the potential for struggle between utilitarian chiefs and task supervisors exist due to asset struggle. Additionally, every individual who was in a venture group had two supervisors: practical director and undertaking chief. Notwithstanding, the examination neglected to address different factors that affected the presentation of road maintenance projects and the model utilized for investigation was not uncovered by the analyst.

Kumar, Ajay, and Fanny (2012) concentrate on the impact of association structure on the presentation of road projects in the United Kingdom showed that useful hierarchical constructions were set ready for progressing tasks and this association structure was found in firms whose main

role was to create normalized products (Gulyani, et al., 2009) concentrate on the part of association structure on road maintenance project execution in England noticed that projects that have a place with a similar practical division do not produce numerous hierarchical issues. Nonetheless, the examination showed that those tasks that cut across useful divisions are truly difficult to develop. Ventures that cut across utilitarian divisions are hard to oversee on the grounds that they require the task supervisor to acquire help and collaboration from different administrators. The task manager for this situation has no direct utilitarian position to embrace the undertaking to meet venture targets. This made the interaction muddled and caused project delays. Mwangi (2012) concentrate additionally attested that projected association structure empowered colleagues to have a profound aptitude and consequently prompted better execution of undertakings.

(Bjarne, 2010) Study looked to set up whether a firm acquired upper hand through appropriation of a given association structure in Central Europe. An example of 65 respondents comprising of task chiefs and venture workers for hire was utilized. The examination results showed that associations that received projected association structure finished activities inside the planned time and the nature of the tasks was palatable over those that utilized utilitarian or grid association structure. Graham and Mohamed (2013) study analyzed the job of undertaking administrators in the allotment and association of work for the assigned venture groups in the U.S. The investigation noticed that project administrators required full position and obligation in overseeing road maintenance projects. Daniels (2014) censured this association structure as having less specialization; colleagues are "handyman".

In projected association structure, the venture chief was exclusively liable for the development of the task (Lock, 2009). The undertaking administrator had position to designate assets and direct colleagues to perform project assignments (Schaffe & Siegele , 2009). Hodge and Greeve (2011) explored determinants of undertaking a positive outcome and discovered that with the end goal of legitimate execution of the task, an autonomous venture group ought to be made with its own specialized staff and the board. Assets ought to likewise be agreed to the task group and the venture director given full power to execute the undertaking. All individuals from the group should report straightforwardly to the venture supervisor. Nonetheless, the investigation didn't examine the impact of different factors, for example, bunch elements the board and task hazard the executives on execution of foundation projects.

(Guash, 2012) Study was on association design and its suggestions in overseeing foundation projects in Malaysia. The investigation covered 50 firms and discovered that when ventures were taken out from practical divisions, the lines of correspondence were abbreviated. This upgraded the capacity to settle on quick choices. The investigation additionally noticed that the foundation of venture groups prompted a significant degree of responsibility from colleagues, consequently viable and productive execution of framework projects. Further, project groups worked with solid force, more union and people have clear duties. Furthermore, projected associations likewise created and kept a pool of experienced staff because of their inclusion in numerous comparative activities. Bowman (2013) supplemented the discoveries of the exploration done by Bowman showed that projectiles association structure model made it simpler to oversee road projects because the entire construction zeroed in on the tasks.

2.5 Factor influencing road maintenance

2.5.1 Influence of Procurement Practices

(Shrestha, 2007) Notes that there is a general lack of public knowledge regarding the obligations and duties of different responsible organization and that, in the case of the municipal roads sector, this translates into impervious tendering processes for contracting. As a result, bribes are frequently paid to secure contracts, costs are inflated and it is relatively common for officials to charge commission to the contractor. This can undermine incentives for officials to hold contractors accountable for the quality of their work, leads to inefficient use of public money and resource diversion, with knock-on effects on the quality of the road network.

According to (World Bank, 2010), the creation of specialist management agencies and the adoption of performance-based contracts for maintenance in some Sub-Saharan African countries have had a very positive impact on road quality. Under these contracts, private contractors are required to maintain a set of public roads so they meet a set of quality conditions over a three- to ten-year period, in return for a steady stream of revenue. Estimates show that adoption of this method can reduce maintenance costs for paved roads by 10-20%.

2.5.2 Influence of Funding

A report by the World Bank (2010), looking at infrastructure in Sub-Saharan Africa also casts doubt on the viability of exclusion through toll financing, even for major trunk roads. It notes that toll roads currently make up only 0.1% of the region's formal road network, and that these are found almost entirely in South Africa. Going further, it estimates that a minimum traffic volume of 15,000 vehicles a day is necessary for toll concessions to be economically viable, and that these conditions exist on less than 10% of the existing Sub-Saharan road network, with these areas concentrated in South Africa and some areas of Nigeria. These forecasts demonstrate the difficulties of viable exclusion in the roads sector, but also illustrate that there is unexploited potential for doing so, at least within South Africa and Nigeria, and that this may become more viable in the future, if and when traffic volumes increase.

(Rafiqui , 2003) Provides a different perspective from rural Laos, where questions of economic viability combined with a lack of local legal ownership over community constructed and maintained roads have been found to undermine the ability of communities to exclude and charge tolls to non-local users. The author also notes 15 initiatives organized by the Swedish International Development Cooperation Agency (SIDA) and others that provide models for community roads and use taxation of non-community members to provide at least partial finance for them. Exclusion may therefore be possible but requires a legal framework and an acceptance that this cannot be the main source of road financing under most circumstances.

2.5.3 Internal and external Politics Influence

Burgess and Stern (2013) led an investigation with the target of setting up effective techniques for overseeing of task groups Switzerland. Internal politics such as type of project management system within the organization, road maintenance manual and standard has higher influence on road maintenance project performance.

In regard to external politics there road maintenance management According to (Wilson, 2004) in the context of Peru, looking at both the modern era and the immediate post-Independence period; the ability of road construction to allow greater government influence in the provinces and easier mobilization of the coercive force of the state meant that, even where roads were not demanded, or even were resisted, they were still eventually provided. In the current era, there is a clear

alignment between salience emerging from this desire to expand state authority and demand from rural people for connectivity. This ensures that road construction is a highly politically salient task and that, to a large extent, maintenance loses out as a result.

Kenya provides a good example of how ethnic polarization can lead to political market imperfections that then provide incentives for road construction targeted for patronage purposes. (Burgess , et al., 2009) Examine this case in detail, noting that Kenya has great ethnic and regional fragmentation, with five groups comprising 70% of the population, which have a high degree of geographic concentration and social segregation. They argue that this provides the ideal conditions for ethnic favoritism and patronage politics, as resources can be targeted to politicians‟ ethnic power bases with considerable ease and strong identities provide a common point of political identification for poorly informed voters.

For the roads sector, this contributes to the diversion of resources (chiefly paved road construction projects) towards areas that have provided support for ruling parties and politicians. (Burgess , et al., 2009) Demonstrate this by analyzing a comprehensive dataset of post-Independence era information on road construction patterns in Kenya, the (relatively unchanged) geographic distribution of ethnic groupings and the identities and home regions of central government ministers. They find strong evidence that road expansion in any given year is closely related to the home regions of the prime minister and the minister of public works, and to ethnic groups represented in the Cabinet, with the second largest group receiving a particular boost. This suggests that politicians have used road construction as a mechanism for distributing patronage, either to secure their own power bases, or to ensure political stability. This may contribute to under-provision of roads in some areas and a deterioration of the road network in areas that lack a high-ranking minister or political connections.

2.5.4 Prioritization of road maintenance

Because of the limited constraint, specifically limitation of budget to road maintenance projects there is need for prioritization of road. Based on the on site evaluation of the road that needs maintenance, the road authority prioritized (Federal roads maintenance agency, 2014). For budgetary reason there is need for road maintenance prioritization and there are different methods

to prioritized road maintenance projects; matrix method, condition index, benefit-cost analysis, cost effectiveness and maximum benefit procedure (PMS Review team , 2002).

Systematic question to analyze road maintenance projects that support prioritizing road maintenance project based on different requirement (Wolters, et al., 2011)

- What is the existing condition of the road?
- What is an acceptable condition goal (level of service) to provide?
- What amount of funding is needed to obtain the desired condition of the roads now and into the future?
- How will the road network condition change if funding levels are changed?
- What maintenance, preservation, and rehabilitation strategies have been most cost-effective on our road projects?
- Are there alternate treatment strategies that would be more cost-effective and result in better conditions?
- What is the most economical way to maintain the road network over time?

2.6 Road maintenance management in developing countries

For where ever there is road infrastructure there is ongoing maintenance through the year of use of road. Most country in the world estimate the maintenance budget, time and scope of the road while they are even in construction stage (World Bank, 2010). This study review different developing countries practice to acquire perspective on road maintenance project management.

2.6.1 West African Countries: Nigeria Approach

Nigeria is one of the speediest developing economies in Africa and has the biggest street arrange in West Africa and the moment biggest in Sub-Saharan Africa. The road organize in Nigeria is assessed to be nearly 200, 000km in length, be that as it may, the execution of the Nigerian road division has not been palatable. Hence, this has contributed adversely and hinders the financial development within the nation (United Nation , 2014). In spite of the fact that, a tremendous entirety of cash has been coordinated towards road improvement in Nigeria, due to the increment in activity volumes; roads are still not in great condition.

Federal road ,maintenance agency (FERMA) in Nigeria is saddled with the support issues at the government level whereas the state's services handle the state and advance makes a difference

with the nearby government roads (Federal roads maintenance agency, 2014). All things considered, the money-related and specialized necessities for successful support, recovery, and remaking are so stunning that the rate of upkeep might not coordinate the deterioration (Federal roads maintenance agency, 2014).In this way, there's a got to see into the upkeep plans embraced by Nigerian's road organization which brought almost the incapability. Not at all like Ethiopia, in spite of a few support activities performed in Nigeria, schedule and uncommon upkeep are still behind plan; this is often as a result of roads not start legitimately developed and insufficient subsidizing for support exercises. Overall, maintenance issues in Nigeria can be credited to the need of appropriate or reliable financing. Including up to that's the issue of the strategy of contracting out road maintenance work, which FERMA and State services still depend on conventional strategies; e.g. in-house groups; hence comes about in disappointment. In any case, privatization of maintenance work with performance-based contracts is considered as a cost-effective alternative (Federal roads maintenance agency, 2014).

2.6.2 Central African Countries: Angola Approach

Angola's road infrastructure arrange comprises of 7,777km cleared, 28,018km rock, and 36,528km soil roads, totaling 72,323km. In spite of the fact that, Government right now spends around 4.3 billion US dollar per year to modify the road, which is the identical to 14 percent of its GDP. However, there's still a parcel of work to do to drag Angola from the shadows of war. Instituto Nacional de Estradas de Angola (INEA) is dependable for arranging and overseeing Angola's national thruway between 2008 and 2009, add up to of 5,600 km of roads were reconstructed and maintained (United Nation , 2014). In expansion, much of the street arrange has gotten small or no support, as numerous roads are found within the previous war zone and have small or no activity. Hence, INEA has restricted information of the genuine condition of numerous roads and of the likely recovery costs. Hence, it is vital for INEA to progress information collection in order to get the display condition of roads and bridges and the nature and volume of road activity to be able to superiorly arrange high (World Bank, 2005).

The concept of a Road Fund (RF) was proposed to have independent management with the participation of different stakeholders, constituting the main source of revenue to INEA. Nevertheless, until the road user charges (tolls levies) are reviewed in Angola, the RF will be unable to serve its intended purpose to fund road rehabilitation and maintenance. Thus, INEA is proposing a strong increase, particularly in fuel and circulation taxes, with all proceeds reverting

directly to the road maintenance projects (World bank, 2005). By and large, advance to total Angolan road infrastructure is likely to require decades, but considerable endeavors are already being made within the right direction.

2.6.3 North African Countries: Egypt Approach

The National Roads project is the largest Egyptian infrastructure project, with an adequate investment (0.7% of the GDP). However, road maintenance is said to be neglected, as it constitutes only 0.15% of the Egypt's GDP; this is small in comparison with that of Ecuador (0.23%), Morocco (0.24%) and 0.45% for Ukraine (MENA-OECD initiative , 2010). This carelessness in-turn comes about in road infrastructure mishaps and thus accounted for 1.5% misfortune of the GDP or indeed more. Since 2001, the Egyptian government has in any case expanded the subsidizing apportioned to roads and railroad to make strides transportation division. Assist, in 2009 a financial boost bundle expanded the investing, putting transport framework catch-up tall on the political plan. However, 75% of the streets require upkeep; as about 700 bridges out of the 1,706 bridges in Egypt are on the skirt of collapse due to deficient upkeep and this has contributed antagonistically to the residential transport framework, as well as the universal transport system.

In tackling this circumstance, the Government of Egypt set up an organization for the advancement and support of streets (MENA-OECD initiative , 2010). General Authority of Roads, Bridges and Land Transport (GARBLT) is in-charge of not as it were support of streets in Egypt, but too its advancement. The organization's mission is centered on security, effectiveness and a well-managed road arrangement and has over 23,000 km of road arrangement. As of late GARBLT began a program for bridge maintenance/management and repair. In any case, the program has not been as fruitful, due to a need of human assets in terms of specialized know-how and gear for fitting assessment and assessment of bridges. In common, the state of support for street organizing in Egypt is still a dilemma (GARBLT, 2002).

Egypt at display, it needs restoration instead of support. Be that as it may, one of the major faltering pieces is financing. Through GARBLT's activity, reserves are produced through tolls, notices, fines on over-burden trucks etc. In any case, this structure changed with an unused administration taking over in Egypt in 2013. This altar brought about major ventures running quickly to grow the motorways beneath the supervision of the military. No information is accessible on these unused ventures, the unused structure, or the support plans (GARBLT, 2002).

2.6.4 Southern African Countries: South Africa Approach

South Africa has the longest add up to road coverage in Africa and the 10th longest within the world, so also the 18th longest paved road network within the world. The overall length is around 746,978 km, with as it were 21% cleared (153,719 km). Be that as it may, in spite of the truth that South Africa is financially first on the landmass, it has roads in a reasonable to destitute road condition of almost 38%. A few of these conditions are due to a pass in support actives, in spite of the fact that it is way better when compared with that of other African countries (Jones , et al., 2003).

Road upkeep in South Africa is dealt with by SANRAL; the creation of SANRAL in 1998 was a result of the government commitment towards changing open segment (SANRAL, 2014) SANRAL has purview over 92% of the national street arrange, of which 81% are non-toll and the remaining tolled (over 19,000 km). Encouraged, the remaining 8% of the entire road organize is additionally tolled and is created and overseen by private bodies. Administration by these private bodies is still directed by SANRAL based on concession contract understandings. The concession contract term is thirty a long time, after which the street is given over to SANRAL. The non-toll road in South Africa are supported straightforwardly by assess incomes produced by the national government, but as a result of the inadequate subsidizing from the government, in 1995, the toll street was presented to bolster the advancement and support of streets in South Africa. These are kept up with toll incomes and capital showcase borrowing (SANRAL, 2014). Generally, whereas toll road conceding is uncommon in Africa, South Africa within the Sub-Sahara locale has the foremost, which is roughly 0.1%.

It can be said that SANRAL is exceptionally near to accomplishing its point and was categorized as a beat entertainer nearby with Namibia. However, South Africa features a road support financing excess of roughly 80-149 billion Rand (Krygsman S., 2011).Separated from financing, SANRAL is getting it right with the techniques of upkeep such as; schedule, intermittent and extraordinary (critical) upkeep which are input. As it were the metropolitan streets are not well overseen, this comes about from destitute information collection (as it were 4%) of the show conditions accessible, and in this way district coordination and duty are befuddled. In any case, the way of contracting upkeep work, which is execution based, has enormously contributed to the victory accomplished in South Africa (Goitom H., 2014).

2.6.5 Road maintenance management in Ethiopia

Ethiopia is classified as an undeveloped nation and over a long time has expanded the measure of the road infrastructure due to the approach to road support and restoration. Ethiopian road Authority has expanded from 6,400 km in 1951, 46,812 km in 2010 and in 2015 to 85,966 km (World Bank, 2015).Prior, a need for a comprehensive approach to support in Ethiopia has driven to a collection of excess road support. In any case, with the transformation of the building squares of road administration activity; which are: administration, proprietorship, financing and obligation; Ethiopia is slowly coming out of the shadow of destitute road network (Road sector development program , 2001).

The increment in road systems in Ethiopia brought about from the controls and directions put in put by the RTA and the consideration given by the Ethiopian government, as this was an endeavor taken by the government to assist move forward the country's economy. RTA was established in 1967 to supervise things related to streets and vehicles utilizing road in Ethiopia (RTA, 2014). RTA's vision statement is; "…guarantee the arrangement of a present day, coordinated and secure street transport administrations to meet the requirements of all the communities for a solid and unitary financial and political framework in Ethiopia". Hence, RTA sees upkeep as the center in accomplishing this vision (RTA, 2014).

It is known that the road administration angle is continuously hampered by financing, but within the case of Ethiopia, this was settled by the presentation of a road finance. The street support in Ethiopia was set up in 1997, after incredible thought to resolve the upkeep issues. The street support in Ethiopia was created on the fee-for-service guideline. In any case, to an extraordinary degree this reconstruction has been empowering and hence, Ethiopia was classified as a great entertainer in terms of road support. Generally, the upkeep culture in Ethiopia has incredibly expanded over the long time, as a result of legitimate financing through the road finance demonstrate and the reconstruction made within the road administration sector (RTA, 2014).

As part of expanding and maintain road infrastructure, Addis Ababa Road Authority is incorporate road maintenance projects within one division of road infrastructure projects within Addis Ababa. Most of road construction and maintenance in Addis Ababa city is done by Addis Ababa city road authority (AACRA). Even though there is large increase on new road construction undergoes within the city of Addis Ababa, there is a declining number of road in meter covered by maintenance projects *see fig 3-1* (AACRA, 2014).

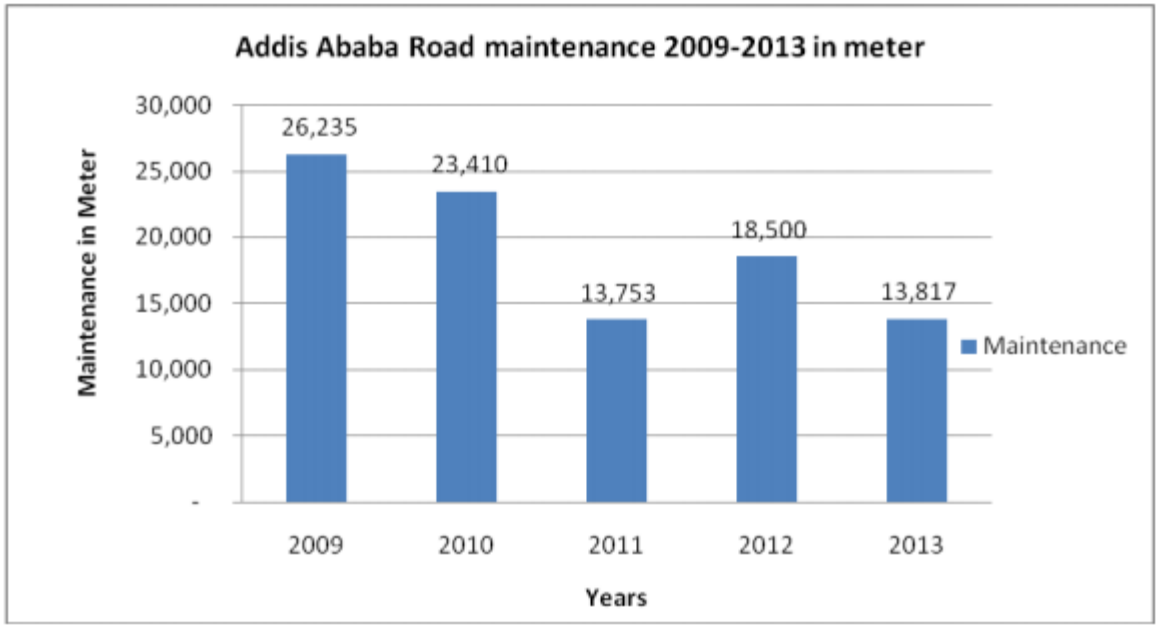

Figure 2-1 Addis Ababa city road maintenance in meter

There are different interrelated factors as a reason for decline road maintenance coverage in meter, for the reason it has nature of quantifiably evaluated, budget as one factor is taken to measure the factor that influence. Based on the study done by project administrator service the fund allocated to road maintenance is almost same as previous years *see fig*. Based on the allocation the fund didn't cover 50% of road which needs maintenance to function fully in Addis Ababa city (Project Administration Service, 2014).

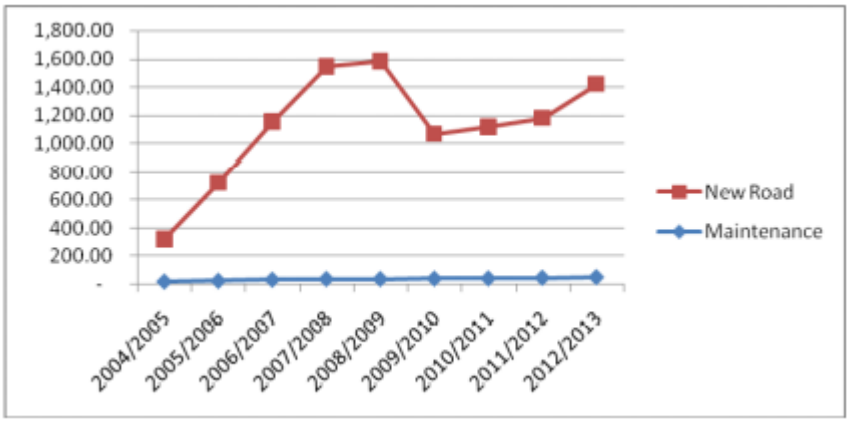

Figure 2-2 Budget allocation of new construction and road maintenance

2.6 Research gap

Based on the researcher's initial review on related literature in road maintenance project management theories and practice, there are interrelated factors that affect the performance of road maintenance project management. Which include; project management competency, project group competency, governmental policy, project management system, project prioritization, constraints etc. But in prior practical studies of different country including Ethiopia, the studies used funding and budget as variable because it can be quantifiable certainly. Current study sought to incorporate other factors that stated in other literatures to understand the challenges and approach to improve road maintenance project management practice in Addis Ababa city road authority (AACRA).

CAPTER THREE

3. Research Methodology

3.1. Introduction

This chapter emphasize to clarify more on the inquire about procedure, the approach of the information collection, strategies for information collection and examining method and test estimate that are utilized all through this consider to reach consider populace and to grant solid suggestion on venture usage hone and its challenges in Addis Ababa City Road Authority.

3.2. The Focus area

This study focus on the roads which exists in Addis Ababa, Ethiopia. As the city is the central city of different international organizations, the negative impact which are results from the failure of road maintenance project management affects the smooth traffic flow, vehicles accident and high fuel waste.

3.3. Research design

(Devaus, 2001) there are different types of research design that vary with type of research approach and how to address its problem statement and research question, but the most common are descriptive, explanatory, causal, case study, experimental etc. based on the data availability, how the researcher relate the problem and solution. Descriptive research design answers the research question of what, when, who and where about the existing condition of the situation. For this study **descriptive research design** is the preferred type of research design to assess the Addis Ababa city road maintenance management and conclude and give recommendation to the research question. The reason behind the selection of descriptive design to answer what are the existing road maintenance management practice and challenges the maintenance team face in the implementation of maintenance projects.

3.4. Research approach

For this study quantitative approach implement to gather information from respondent. **A quantitative** research approach used to quantify the existing situation of project implementation and challenges which is the Addis Ababa city road maintenance management practice.

3.5. Data collection

3.5.1. General

The basic data gathering method is; primary data collection through distribution of structured questionnaire.

3.5.2. Primary data collection

Structured questionnaires are developed and distributed to respondents to obtain the required information. In this study, a questionnaires are sent to AACRA to obtain data on current practices of the road maintenance management system. The questions in the questionnaire were focused on road maintenance management practice namely; identify road maintenance project management practice used to manage maintenance projects, identify challenges of the road maintenance project management practices and identify feature prospects of the road maintenance project management practices.

3.6. Research Population

Based on the research objective, the population for this study is set to be road maintenance department of AACRA to understand and give recommendation for road maintenance management in the organization. The population include mainly, maintenance engineer's management team, maintenance management team work, and different consultant firms that support AACRA at different consulting office. Even though Addis Ababa City Road Authority projects in Addis Ababa city, the population is department of road maintenance in this study. The department includes approximately 26 from AACRA and from consulting companies they have only one consulting company for maintenance department and this company is called TCD and 6 dedicated engineers are assigned to AACRA maintenance department.

Based on the data gathered from AACRA human resource management office about the department and number of expertise in the road maintenance management department. See table 3-1 the department and respective staff that works on road maintenance management.

Table 3-0-1the department and respective staff that works on road maintenance management.

Organization	**Department**	**No of expertise**
AACRA	Maintenance director	1
	PM	1
	Lead engineer	3
	Team leader	5
	Office engineer	4
	Site engineer	3
	Civil engineer	9
TDS	Consulting Engineers	6
Total		**32**

In this research because of the population size small and manageable, all 32 population taken as respondents to generate reach data and conclusion. Therefore, all Addis Ababa City Road Authority (AACRA) road maintenance department staff and transport design and supervision works (TDS) staff who work on Addis Ababa city road maintenance projects.

3.7. Questionnaire design

After selecting the populace and tests survey outlined as a closed basic survey since it is simple to inquire, speedy to reply and basic to examination it. The respondent of AACRA and counseling office worker; venture chief, the venture group reply the address by ticking from the elective one

or ranking. The survey was created to gather the fundamental information concerning street upkeep extended administration framework.

3.8. Data analysis

This research plan to use SPSS for the data collected on the questionnaire. SPSS is a data analyzing package for a researcher's data gathered. My plan is to prepare structured questionnaire to simplify the question to respondent and to make the process easy in the time of analyzing by using SPSS software. Identify every variable input to the tool and feed the response of so then it can calculate every variable to define the outcome properly.

CHAPTER FOUR

4. DATA ANALYSIS, PRESENTATION and DISCUSSION

4.1. INTRODUCTION

Based on the main objective of this study, which is assessment of approaches to improve road maintenance projects management practice by tackling the challenges for future practices, different data collection technique are used; the basic data gathering method is; primary data collection through distribution of structured questionnaire. Then afterward the questionnaire developed to the Employees of AACRA road maintenance department and the advising company which is called Transport Design and Supervision Works Sector (TDS).

In order to comprehend this, the data collected by communicating AACRA and TDS staffs who have been in the maintenance department is analyzed and interpreted to a given comprehensible result. In this study I find 32 total respondents and I choose to take them all for my study so that I can get a better understanding of the case, and also this number is small and easy to manage. Questionnaire is distributed to all 32 respondents to survey this study claims to begin with but out of the 32 respondents, only 21 respondents fill and rerun the questionnaire. Subsequently, this information analyzed based on 21 respondents that fill the survey by utilizing SPSS computer program for quantitative address and for subjective or open address which inquire to type in the comment of respondent, composed at the conclusion of information investigation and finding chapter.

Information investigation and finding covers three essential portions; the first part is the basic information of the respondent, which covers their educational level, year of past experience, work position, and specialization within the organization. The Second part contains project implementation practice of road maintenance practice which include the level of project execution, project management system which is strategic or tradition, project team competency, the frequency of the condition survey and the method they use to implement road maintenance management. And finally, it also discusses the challenges that the maintenance management face in project implementation and future prospects are analyzed for strong conclusions within the scope of this study.

4.2. Basic information about the respondents

This part cover basic information of respondent and in this study gender, educational qualification, position of respondent in the organization, year of experience, specialization of respondent, educational level and past experience in implementation of projects are analyzed. This give common ground to analysis project implementation practice and its challenges. This study focus on the respondent from AACRA and TDS in Addis Ababa city.

Distribution of Respondents by Gender

From the data taken from respondents of the two companies the amount of male who are working on maintenance department 85.7percent and that of females are 14.3%. The table below also show the frequency of respondents in number and also I try to put the figure in chart.

Respondents' Education Level

The study sought to find out the respondents' education level. This factor was critical because it could determine not only the accuracy of the responses given by the respondents but also their ability to manage projects of high quality. The results are presented in Table 4.2.

Table 4-0-1educational qualification

Educational qualification	Frequency	Percentage
Bachelor's degree	15	71.4%
Master's degree	5	23.8%
Missing	1	4.8%
Total	21	100%

Educational qualification as indicated in the table above, form the respondent that work in organization 23.8 percent have a master's degree, 71.4 percent have bachelor's degree, and 4.8 percent of respondents skip this question and it is labeled as missing information. This shows that almost all of the respondents were well educated with 95.2 percent having Bachelor's degree and Master's degree. This implies that respondents were well informed on the performance of road maintenance project management practices.

Respondents' position in the organization

There are lot of verity in the position of the organization and this position variety in the organization of respondent independent to the response help the study to see different perspective about the factor that influence project implementation and its challenges. From the data collected the highest number of respondents are working as civil engineers which is 33.3 percent, 14.3 percent of respondents are office engineers and there are also 4.8 percent consultant, 4.8 percent junior engineer, 4.8 percent lead engineer, marketing inspector is also 4.8 percent, PM team leader 4.8 percent, site engineer 9.5 percent, and team leader 19.0 percent. These dynamics of staffs of the organization also help to see through things from different perspective and managing these dynamics also gives opportunity for project implementation success.

Table 4-0-2Position in the organization

Position in the organization	Frequency	percentage
Civil engineer	7	33.3%
Consultant	1	4.8%
Junior engineer	1	4.8%
Lead engineer	1	4.8%
Marketing inspector	1	4.8%
Office engineer	3	14.3%
PM team leader	1	4.8%
Site engineer	2	9.5%
Team leader	4	19.0%
Total	21	100%

Respondents' Work Experience

The study sought to find out the respondents' work experience in the road maintenance project management sector. Experience of the respondents in road maintenance management is crucial in determining completion time and quality of the projects. Table 4.3 presents the respondents' work experience.

Table 4-0-3Year of experience

Year of experience	Frequency	Percentage
1 to 5	10	47.6%
6 to 10	9	42.9%
11 to 15	2	9.5%
Total	21	100%

Table 4.3, over list out year of encounter of respondent which have a least of 3 a long time and greatest of 13 a long time and 47.6 percent of the respondent inside 1 up to 5 a long time of encounter, 42.9 percent of respondent had 6 up to 10 a long time of involvement and 9.5 percent inside time outline of 10 up to 15-year encounter. Encounters of respondents inside the organization relate with the number of extensions executed but it isn't the same to all respondents based on the extent they are performing. On work involvement of the respondents, 42.9 percent had worked within the street development industry for more than 5 a long time. This infers that the direct number of respondents had wide information on street upkeep ventures, the challenges confronting the division and future prospects for superior street support administration. Respondents' work involvement was valuable in clarifying the competence of the respondents in street support venture management.

Respondents' specialization

The study sought to find out the respondents' specialization in the road maintenance department. Specialization of the respondents in road maintenance management is crucial in determining completion time and quality of the projects. Table 4.4 presents the respondents' specialization in the organization.

Table 4-0-4Classification of specialization

Classification of specialization	Frequency	Percentage
Team leader	5	23.8%
Coordinator	2	9.5%
Consultant	2	9.5%
Engineers	12	57.1%
Total	21	100%

In the sample used in this study, there are three of specialization of respondent as project team leader, coordinator, consultant and the rest of staffs are just in engineering level, there are 23.8 percent team leader, 9.5 percent coordinator, 9.5 percent consultant, 57.1 percent in engineer level are involved as respondent. As the majority of the respondents of this study are engineers and the moderate amount of respondents are team leaders in which both of these groups interact with other in the practice of road maintenance management their specialization is useful in explaining the practices they are using, the challenges they face and future prospects.

Respondents' participation in number of projects

Number of project implemented in past experience vary from 4 projects to 12 projects this means the respondent have a lot of experience and seen different type of implemented project this help the respondent to provide adequate response on project implementation practice and its challenges. Also from their experience in participating different maintenance practice they will provide us with different way out for different challenges in the practice. As different projects have their own type of challenges which are different one from the other these experience help the study to find out the varieties of challenges and techniques to overcome them.

Table 4-0-5Number of project implemented

Number of projects implemented	Frequency	Percentage
1 to 5	4	19%
6 to 10	3	14.4%

11 to 15	7	33.3%
Missing	7	33.3%
Total	21	100%

4.3. Established road maintenance project management

This part covers the practices that are implemented in the organization and are in practice. This includes level of execution, project management practice, and project manager integration to organizational objective, the organizational structure and communication within stakeholders, adoption of changes in project implementation, condition survey frequency, the method used for maintenance management and criteria, they use for prioritization. As a big organization, AACRA uses a wide variety of road maintenance project management practices. These practices differ for different kinds of maintenance projects because every project does have their own behavior.

The table 4.6 below shows the level of execution of the project management practice. From the sample high level of respondent agree the level of project execution in their organization is good, moderate level of respondents agree that there is fair project execution and 9.5 percent respondents agree on very good level of project execution within road maintenance projects implemented by AACRA and TDS. As per the response, in general project implementation practice is good but the experience of respondent in project implementation vary.

Table 4-0-6Level of project execution

Level of execution of project	Frequency	Percentage
Very good	2	9.5%
Good	15	71.4%
Fair	4	19.0%
Total	21	100%

Respondents were also asked to indicate whether the project management practice in the road maintenance project of Addis Ababa city is strategic or traditional? The gathered data in the table

4.7 below shows that most of the respondents who participate in the data collection answer the organization uses strategic management, it is 81.0 percent of the respondents. The rest of the respondents who are 19.0 percent of all respond that the organization use traditional management practice in implementing road maintenance project management. The implication of these results is that the organization AACRA is implementing strategic project management strategies.

Table 4-0-7Type of project management practice

Project management practice	Frequency	Percentage
Traditional	4	19%
Strategic	17	81%
Total	21	100%

Participants of this paper were also asked to identify the project manager integration with organizational objective to specific project objective? The table4.9 below shows the agreement and disagreement of respondents whether the project manager integrate organizational objective to specific project objective and in the collected data as such 61.9 percent of respondents agree that the project managers integrate and 19.0 percent also strongly agree the project managers integrate but the rest 19.0 percent disagree that the project managers did not integrate organizational objective. This result implies that as most of the participants agreed the project managers integrate organizational objective to specific project objective

Table 4-0-8Project manager integrates organizational objective to specific project objectives

Project manager integrates organizational objective to specific project objectives	Frequency	Percentage
Strongly agree	4	19.0%
Agree	13	61.9%
Disagree	4	19.0%
Total	21	100%

As table4.9 shows moderate amount of respondents agree that the organizational structure and communication within stakeholders are more flexible and easy for project manager to implement the project successfully. Also 33.3 percent of respondents disagree with the idea that organizational structure and communication within stakeholders is flexible and easy for project managers to implement the projects successfully and the rest 9.5 percent of respondents strongly agree with the idea that the flexibility and easiness of the organizational structure and communication within stakeholders. This results implicate that as 57.1 percent of respondents agreed with, the organizational structure and communication within stakeholder are more flexible and easy for project managers to implement the project successfully.

Table 4-0-9Project manager integrates organizational objective to specific project objectives

The organizational structure and communication within stakeholder are more flexible and easy for project manager to implement the project successfully	Frequency	Percent
strongly agree	2	9.5%
Agree	12	57.1%
Disagree	7	33.3%
Total	21	100%

In the case of adoption of the change and use more innovation way of project implementation practice, 57.1 percent of respondents disagree that the project management of the organization adopt new practices. 38.1 percent agree and 4.8 percent strongly agree that the project managers adopts the change and use more innovation way of project implementation practice. As the table below shows the response of respondents implies that the project management system of the organization does not adopt change to use more innovation way of project implementation practice. Even if it is important to adopt new techniques to tackle different problems as the answer from respondents show the management practice by the book management system.

Table 4-0-10 the project management system in adapt the change and use more innovation way

The project management system of the organization adapt the change and use more innovation way of project implementation practice.	Frequency	Percent
Agree	8	38.1%
Disagree	12	57.1%
strongly disagree	1	4.8%
Total	21	100%

For the question how often do the department carry out road condition survey in the organization? Almost all participants answer annually except only 4.8 percent of responder which is one person who respond the department only carry out condition survey when deterioration is occurred. This response showed us as 95.2 percent of respondents agreed on the company carry out road condition survey annually. As it is known that road condition needs a follow up monitoring and evaluation of its condition the AACRA road maintenance project management implements condition survey annually.

Table 4-0-11Frequency of road condition survey

Frequency of road condition survey in the organization	Frequency	Percent
Annually	20	95.2%
only when deterioration is reported	1	4.8%
Total	21	100%

Respondents were asked to indicate which method do they use for road maintenance management? The table below show that 66.7 percent of respondents answer that AACRA use its own method of road maintenance management and 14.3 percent of respondents answer they use formats from ERA. 9.5 percent of respondents answer that they use other international standards and the rest 9.5 percent answer they use formats from ERA standard and other international methods. As the given response of the respondents below in the table AACRA uses its own road maintenance management practice.

Table 4-0-12Method used for road maintenance management

method used for road maintenance management	Frequency	Percent
your own method	14	66.7%
formats from ERA standard	3	14.3%
other international standard	2	9.5%
formats from ERA standard and other	2	9.5%
Total	21	100%

The study also collected information on the case that if there are any particular road prioritization criteria in AACRA? 85.7 percent of the respondents answer that there are particular road prioritization criteria and 9.5 percent answer there is no particular road prioritization and 4.8 percent did not respond for this question.

Table 4-0-13Road prioritization criteria

Is there any particular road prioritization criteria in our organization?	Frequency	Percent
Yes	18	85.7%
No	2	9.5%
Missing	1	4.8%
Total	21	100%

The 85.7 percent of respondents who say there is prioritization of road maintenance in the organization give the prioritization criteria's. The prioritization criteria for the road maintenance are International Roughness Index (IRI) and KYOTO model, these two are scientific and international models. There are also other prioritization criteria's which are security level, media, individual compliant, good governance view, pavement condition, economic value, social advantage, accessibility and image building. This implies that the Addis Ababa city road authority use road prioritization criteria in the organization.

4.4. Challenges occur during road maintenance management system

By extracting common challenges faced in project implementation from the questionnaire and literature review, this study asked the response of respondent about the difficulty they are facing and to rank each challenges from strongly disagree to strongly agree. On the questionnaire there are six challenges listed and the respondents are expected to answer. The table below, table 4.14 shows the frequency of respondents answer.

Table 4-0-14Frequency of respondents answer for challenges

List of problems	**SDa**	**Da**	**Avg**	**A**	**SA**
Inadequate funding	4	4	8	4	1
Not have standard manual and guideline	1	6	5	4	5
Inadequate training	0	2	12	4	3
Lot of paper work	2	5	4	7	3
No privatization of road maintenance work	3	5	5	3	5
Traditional data collection system	3	2	7	5	4

Based on the data above this study use point scale method to rank the challenges where the project management practice in AACRA faced in road maintenance management. The table below shows the result of the point scale of respondents answer. Based on the analysis the top three challenges of the road maintenance project management from respondents of AACRA and TDS are inadequate funding, no privatization of road maintenance work and lots of paper work. The result also shows there are moderate challenges which are traditional data collection system and inadequate training. Not have standard manual and guideline is the list value as per the point scale analysis as a challenge for AACRA road maintenance project management practice.

As it is discussed on the theoretical review of the literature review funding is one of the constraints for road maintenance project. Inadequate funding plays a crucial role in challenging performance of road maintenance project management.

Table 4-0-15Point scale result for the challenges

List of problems	SDa (5)	Da (4)	Avg (3)	A (2)	SA (1)	Total
Inadequate funding	20	16	24	8	1	69
Not have standard manual and guideline	1	24	15	8	5	53
Inadequate training	0	8	36	8	3	55
Lot of paper work	10	20	12	14	3	59
No privatization of road maintenance work	15	20	15	6	5	61
Traditional data collection system	15	8	21	10	4	58

4.5. Future prospects of road maintenance

In his chapter the study focuses on the future prospects of the AACRA road maintenance management practice base on the responses of respondents of the study. The table below shows the frequency of response given by respondents from AACRA and TDS.

Table 4-0-16Frequency of respondents answer for future prospects

What should be done to improve road maintenance management system in your office?	SDA	DA	Avg	A	SA
Use of standard methods and methodology	0	1	6	8	5
Prioritization	0	3	3	7	8
Privatization of road maintenance	0	4	8	7	2
More funds	0	2	4	10	3
Central data base system	0	0	6	9	6
Advanced data collection tools	0	3	4	4	10
Improve human resource (by training)	0	1	4	6	10

As indicated below on the point scale analysis table the top three values are improving human resource (by training), advanced data collection tools and prioritization. As the respondents indicate that these three components help the company improve for future road maintenance

management practice. Use of standard methods and methodology, central database system and more funds are moderately important for future improvement of road maintenance management practice. Then finally privatization of road maintenance to sub-contractors.

Table 4-17Point scale result for the future prospects

What should be done to improve road maintenance management system in your office?	**SDA(1)**	**DA(2)**	**Avg(3)**	**A(4)**	**SA(5)**	**Total**
Use of standard methods and methodology	0	2	18	32	25	77
Prioritization	0	6	9	28	40	83
Privatization of road maintenance	0	8	24	28	10	70
More funds	0	4	12	40	15	71
Central data base system	0	0	6	36	30	72
Advanced data collection tools	0	6	12	16	50	84
Improve human resource (by training)	0	2	12	24	50	88

The participants of this research also asked to mention if there is any type of new technology introduced to facilitate the road maintenance management. Most of respondents mention that they are using the standard road maintenance management system but to improve the management system respondents give some recommendations as technologies to improve the project management and the output of their work. Some of the required tools and techniques they mention are, use of Nano technology for pothole maintenance, update AACRA standard with up-to-date technologies, drilling machineries to remove asphalt and they are using MS-management but it is not implemented properly so it need to be practical to get better results.

Finally, participants of this study give their view about any project management system the organization wants to introduce to improve road maintenance management practice. Giving training and weekly meeting to improve project manager's performance, use different software,

theory of management should practically have implemented and departments need to know systems of maintenance activity thus they need to be aware of what they are doing.

Chapter Five

5. Conclusion and Recommendation

5.1. Introduction

This part cover conclusion of the result that found after analyzing the road maintenance management practices in AACRA and their challenges based on 21 respondent response that found in AACRA and consulting company TDS. The questionnaire is developed by studying previous researches as input and by considering the actual problems in our country and it contains the practices they are using now, challenges in practicing the road maintenance management practice and then future prospects to improve this. And finally based on the data this study put forward recommendation on the existing practice and challenges of social work project implementation.

5.2. Conclusion

Addis Ababa City Road Authority (AACRA) is a government organization which is responsible for road maintenance in Addis Ababa City. AACRA develops different techniques to follow up and do the maintenance work in collaboration with their advising office called Transport Design and Supervision Works Sector (TDS). The road maintenance project management is done in different level as based on the priorities of the existing road and these priorities are based on different factors which are, location, economic factor, for better figure and media influence.

The project management practice in road maintenance of Addis Ababa City passes different level of management hierarchy. The level of execution and the project manager's integration is very good in many cases and also the organizational structure also flexible for project managers to communicate with stake holders. Also the management system of the organization adapts with innovation and new technologies.

The company also carry out its condition survey annually to detect any defective roads for maintenance and they use their own method and Ethiopian Road Authority (ERA) for the road maintenance management. AACRA use different maintenance prioritization methods such as, the severity level of roads, individual compliant, economic value, accessibility and social advantage.

When we came to the challenges on the road maintenance management practice inadequate funding is the most challenging condition and when we move down to the next three challenges, no privatization of road maintenance, lots of paper work and traditional data collection system are followed. The last two challenges in the organization for road maintenance management are inadequate training and not have standard manual and guideline. These challenges are not all the challenges that the company is facing in doing its maintenance work but which are the challenges that we have the time and capacity to study on.

For future prospects to improve the road maintenance management in Addis Ababa city the human resource management is helpful. Advanced data collection system also helps the project management to get every necessary information as they are required and helps the company to give priority as per the collected data and information. As a company AACRA require to use standard method and methodology in order to improve in future. Also central data base system, more funds and privatization of maintenance works help the company to improve as its employees suggest.

5.3. Recommendation

Based on the reviewed literatures and findings from data analysis this study recommends on road maintenance project management practice of AACRA to improve its performance and project implementation quality.

AACRA need to improve its road maintenance project management practice to more applicable strategic management so that the organization project implementation quality and performance speed boost up to better and considerable level. As the respondents agree on the questionnaire the company project management practice is strategic but the only insufficiency this study find on the organization is that it is not applied with full performance level.

The organizational structure and communication within stakeholders need to be more flexible and easy for project manager to implement the road maintenance project successfully. As these study shows that the communication level with stakeholders and managers is not as open as it supposed to be and flexible for them to pass critical decisions in the matter of fast moving and time sensitive as well as in general project. When the communication level between organizational structure and stakeholders increase it also develops a higher level of trust between them.

These study recognizes from the response of respondents that the company carryout road condition survey annually. As a standard doing a condition survey annually is acceptable but these study wants to add if after they did the condition survey they did prediction based on the result of the survey using scientific methods and also implement some follow-up strategies within a gap of sometime interval because the roads might be ready for maintenance before the next condition survey and if they did not get to it in time there will be a lot of work and investment.

As the finding from the study implies that the road maintenance management practice is different and different respondents use different method. This study recommends that there should be a standard project management method throughout the organization, it might not be the same to every single project but the same type of projects must practice same type of project management practice with different professionals. Doing these help the organization to keep a standard record of the maintenance report and it help as a reference for future practice.

To overcome the challenges of the road maintenance management considering an increase of maintenance budget in a careful consideration is important. It is obvious that organizations always complain about insufficiency of budget and it is not always right but this study recommends that after scientific consideration budget allocation deeds to be considered. These study also recommend that privatization of maintenance works to other subcontractors in some extent is required. As the findings show that the company didn't have the required day labor for the work and they contracted them for the work if they outsource some projects to other companies it will reduce some stress and increase the efficiency of the organization. Assigning of paper works for a dedicated personnel is also a better solution.

These study also recommend that the company also need to upgrade its traditional data collection system to digital and give training to its employees on new technologies and management approaches. The preparation of standard manual and guideline is necessary.

Improving the human resource management by training will also help the company to improve its productivity by assigning the professionals where they can be fruitful.

Finally, the prioritization of projects also helps project managers to save their time and energy from scattering all over the place at once. In doing this the prevention of deterioration of roads is the more effective by enforcing the law by studying the cause of deterioration for different areas.

5.4. Suggestions for further research

Academicians can use this study as supplementary to the capacity of the organization in implementing the maintenance projects satisfactorily and can also investigate the tools and machineries that the company has.

More studies can be done based on this paper limitation and detail activities that the company struggles to because of outdated technologies that are so crucial and have not been available in the organization because of economic capacity.

Findings on this study can help other researchers for further studies to solve problems in the road maintenance management practice and improve its performance.

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Appendix

ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
Project Management Department

QUESIONNAIRE

Dear Respondents

I am a graduating student of project management MA Program at Addis Ababa University, School of Commerce. For the partial fulfilment of my class I am working on the study with the title of: ASSESSMENT ROAD MAINTENANCE MANAGEMENT IN ADDIS ABABA CITY ROAD AUHORITY (AACRA). And the main objective of this questionnaire is to collect the necessary data concerning the practice and challenges of road maintenance management project implementation under taken by Addis Ababa City Road Authority.

This questionnaire will take approximately **15 minutes** of your time. And we are grateful for your kind participation in the enrichment of this research. Please tick; rank at the provided space below, any comment or suggestions are greatly appreciated. If you have any questions or suggestions, feel free to contact me with the address given below.

Best regards.

Name	Mobile phone no.	Email address
Zerubabel Gebre	+251-910-90-43-20	gebrezeru@gmail.com

Thank you for your cooperation.

Instruction: please read each of the following questions carefully and respond your opinion based on your past experience. There is written answer request on the given blank space for detail information needed, thick on the box. X Which approximately fit for you and the last one is grading the question by encircle he number given in he able.

0	1	(2)	3	4

Section 1- Basic information, this section collects basic information of the professional and his or her organization.

1.1. Gender Male ☐ Female ☐

1.2. Name of your organization (optional): …….

1.3. Educational qualification

☐ Diploma ☐ Bachelor's degree

☐ Master's degree ☐ Others (please specify)

1.4. Your position in the organization: ……

1.5. Years of experience: …….

1.6. Classification of specialization

☐ Project manager ☐ Team leader

☐ Coordinator ☐ Consultant

1.7. How many project did you implement in your past experience? ……

Section 2- established road maintenance project management practice

2.1. The level of execution of the project

Very good ☐ Good ☐ Fair ☐ Poor ☐ Very poor ☐

2.2. Project management practice (strategic or traditional)

2.2.1. Project manager integrate organizational objective to specific project objective

Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐

2.2.2. The organizational structure and communication within stakeholder are more flexible and easy for project manager to implement the project successfully

Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐

2.2.3. The project management system of the organization adapts the change and use more innovation way of project implementation practice.

Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐

2.3. How often do you carry out road condition survey in your organization?

☐ Annually ☐ Only when deterioration is reported ☐ Not carrying out

2.4. Which method do you use for road maintenance management?

☐ Your own method ☐ Formats form ERA standard ☐ Other international standard

2.5. Is there any particular road prioritization criteria in your organization?

☐ Yes ☐ No

If your answer is yes please state …….

……..

Section 3- Challenges occur during road maintenance management system

List of problems	**SDa**	**Da**	**Avg**	**A**	**SA**
Inadequate funding	0	1	2	3	4
Not have standard manual and guideline	0	1	2	3	4
Inadequate training	0	1	2	3	4
Lot of paper work	0	1	2	3	4
No privatization of road maintenance work	0	1	2	3	4
Traditional data collection system	0	1	2	3	4

4. Strongly Agree (SA) 3. Agree (A) 2. Average (Avg)

1. Disagree (DA) 0. Strongly Disagree (SDA)

4. Future prospective of road maintain

4.1 Approaches to improve road maintenance management system

What should be done to improve road maintenance management practice in your office?	**SDA**	**DA**	**Avg**	**A**	**SA**
Use of standard methods and methodology	0	1	2	3	4
Prioritization	0	1	2	3	4
Privatization of road maintenance	0	1	2	3	4
More funds	0	1	2	3	4
Central data base system	0	1	2	3	4
Advanced data collection tools	0	1	2	3	4
Improve human resource (by training)	0	1	2	3	4

4. Strongly Agree (SA) 3. Agree (A) 2. Average (Avg)

1. Disagree (DA) 0. Strongly Disagree (SDA)

4.2 mention if there is any type of technology introduced to facilitate road maintenance project management

……

……

……

……..

4.3mention if there is any type of project management system the organization wants to introduce to improve road maintenance management practice

……

……

……

……..