FACTORS AFFECTING ROAD CONSTRUCTION PROJECTS COMPLETION IN KENYA.A CASE OF KENYA RURAL ROADS AUTHORITY,NYAMIRA COUNTY KENYA.

BY

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DECLARATION

This project report is my original work and has not been presented to any other examining body.

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Reg. No. L50/5416/2017

This project report has been submitted for examination with my approval as the university supervisor.

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DEDICATION

This project report is dedicated to my beloved wife, my son and my daughter for their financial and moral support they accorded me during my entire period of study.

ACKNOWLEDGEMENT

I would like to thank the Almighty God for giving me the strength and ability to undertake this Project Report. Secondly, I would like to thank my supervisor Dr.Otieno for his unending support and critical ideas without which this work would not have materialized. His immense and constructive criticism largely shaped this research project. Thanks to The University of Nairobi for the opportunity to study.

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LIST OF ABBREVIATIONS AND ACRONYMS

KeRRA Kenya Rural roads authority

OSHS Occupational health and safety standards

POA Procurement Oversight Authority

ABSTRACT

This research study sought to assess the factors affecting roads Construction Projects Completion in Nyamira county. The county currently has four road construction projects being carried out by KeRRA. The objectives of the study were: To evaluate how project managers competency influence road construction projects Completion in KeRRA, NyamiraCounty, To establish the influence of project funds on road construction projects Completion in KeRRA, NyamiraCounty., To what extent does project equipment influence road construction projects delivery in KeRRA, Nyamira County and To examine whether project technological innovation influence road construction projects Completion in KeRRA, Nyamira County . The significance of the study was to determine the factors affecting roads construction projects Completion in Nyamira County so as to identify the areas where urgent action need to be taken to safeguard the interest of the sector. The study will help in application of theoretical training to policy makers to address practical problems in the sector, and to provide insights to today's and the future managers on the importance of properly road construction completion. The target population comprisedof all 12 members of staff in all maintenance, design and construction, special projects, human resource, it, accounts and procurement departments. It will also include all the 60 field staff based at the four road construction projects in Nyamira County. The study adopted a census survey design. The study used a census study since the population of 72 was small and the study aimed to reach all the staff in KeRRA in all the four road construction projects. The study population comprised of 72 members of staff working in KeRRA in Nyamira county. Questionnaires were used as the main data collection instruments and a pilot study was undertaken to pre-test the questionnaires for validity and reliability. Data collected was analyzed using quantitative method with the help of (SPSS) version 22 and excel. Quantitative data was analyzed by employing descriptive statistics and inferential analysis. Descriptive statistics such as measures on central tendency and dispersion along with percentages will be used to organize and summarize numerical data. The study revealed that project manager's competency, project technology, project funds and project equipment greatly influence road construction projects. The study recommended that further study be

done on key performance indicators inorder to identify their relationship with road construction.

CHAPTER ONE

INTRODUCTION

1.1Background of the Study

The construction industry plays a fundamental role in the development of a nation and helps in meeting one of the society's basic needs of shelter. The industry contributed up to 10% to a country's gross national product. Most third world countries face acute endemic construction problems that over the years have raised both national and international concerns (Auma, 2014).however a growing number of unfinished government construction projects in such countries seem to overshadow the efforts and thus pose many questions as to what is behind the failure in providing such a highly needed commodity. One may wonder whether such a failure has anything to do with architecture, attitudes and practices of the people or is it just a thing to be pegged on socio-economic platform of the society (Sawhney, Iyrer&Rental, 2012).

Kemps (2012) described project delivery as the world's oldest documented profession.Professionals use a number of definitions to define project efficiency .Road contractors performance problem appears in many aspects in developing countries. Many road projects fail in time performance, others fail in cost performance and others fail in other performance indicators. in the past there were many road projects which finished with poor performance because of many evidential reasons such as: obstacles by client, non-availability of materials, road closure, amendment of the design and drawing, additional works, waiting the decision, handing over, variation order, amendments in Bill of Quantity (B.O.Q) and delay of receiving drawings. There are other indicators for problems of road contractor's performance in developing countries such as project management, coordination between participants, monitoring, and feedback and leadership skills. In addition, political, economic and cultural issues are three important indicators related to failures of road projects' performance in a country (Becerik,2007).

The importance of identifying an organizations performance is evident throughout the world-wide markets, the results of which are to attract future investment, increase share value and attract high caliber employees. Therefore, it is important to consider how an organizations

performance is measured and how it can be communicated to the wider market i.e. how can it be understood and interpreted by the potential investors, employees and customers. The basis formulating performance indicators that achieve the latter have been in operation as early as the beginning of our century (Chan &Mohan 2009). Those performance indicators have traditionally concentrated on finances e.g. return on investment, sales per employee, and profit per unit production, which as Chan (2007) suggests "financial measures are useful- but they tend to measure the past- and they tend to measure the easily- measurable. The apparent inadequacy of financial measures for contemporary business has been identified by a number of authors (Arditi and Mochtar, 2006).

History of construction projects can be traced back to Egyptian pyramids, early Greek settlement around Mediterranean, Roman Empire constructions of temples and structures in medieval age (Lewis, 2008).as it is known that in the 18th century is renaissance period which saw much significance to architecture and industrial revolution. Also, 19th century saw large improvements in construction industry particularly in railways and buildings. Marasini and Dawood (2006) mentions that during the 1959-1969, the construction of Suez Canal was an international project of great proportions and contractors had gained experience in the construction of large buildings, railways, petrochemicals, dams and reservoirs. Lewis,(2008) mentions that great Britain was first to go global with railway construction and the first major international construction company was built up by Pearson in great Britain at about the turn of the century. Now there are massive projects constructed all over the world, driving the national economy.

Reschke and Schelle (2010) mentions that large engineering projects such as airports, transport, power, oil and gas constitute most important business sectors in the world. This massive infrastructure investment has led to emergence of companies such as Vandervoorde and Vanhoucke (2006) who assert that 'construction is a $3.5 trillion industry worldwide, amounting to between 6 and 8 percent of GDP in most countries.'

Work on providing construction services in Nyamira has made considerable progress since Kenya rural roads authority (KeRRA), assumed responsibility for them, but the construction companies have had to build from a low base, including a huge backlog of rehabilitation and

development work, few institutions , and very little funding. So, they have had to work in every difficult physical, social, political, economic and institutional circumstance. For a number of reasons, the performance of construction projects has not been as impressive fundamentally because of the government failure to establish a coherent institutional and policy framework (World Bank, 2008).

Performance is related to many topics and factors such as time, cost, quality, client satisfaction; productivity and safety. Construction industry in the Kenya suffers from many problems and complex issues in performance. For example, construction of 10 dwelling units for the Kenya police and administration police at Nyamira area suffered from poor performance because of delay for about 4 years. There are many realistic reasons such as closures amendment of drawings and amendment of the design and delayed funds release. In addition, there are other different reasons affecting construction projects performance in the Kenya such as poor management and leadership; inappropriate participants; poor relations and coordination; absence of motivation, minor or decision making systems; inadequate infrastructure, political problems; cultural problems and economic conditions. (Strenman, 2012)

In Kenya, there are many construction projects fail in performance. In addition, performance measurement systems are not effective or efficient to overcome this problem. Construction projects performance problem appears in many aspects in the Kenya (Weil, 2005).There are many construction projects fail in time performance, others fail in cost performance and others fail in other performance factors. In 2009 there were many projects which finished with poor performance because of many evidential reasons such as: obstacles by client, on-availability of materials, road closure, amendment of the design and drawing, additional works, waiting the decision, handing over, variation order, amendments in Bill of Quantity(B.O.Q)and delay of receiving drawings(Strenman,2012).There are other factors for problems of performance in Kenya such as project management, coordination between participants ,monitoring, and feedback and leadership skills. In addition, political, economic and cultural are three important indicators related to failures of projects' performance in the Kenya.

1.2 Statement of the Problem

In Kenya Construction projects are facing challenges of non-Completion. Many construction projects fail due to factors like time in efficiency, lack of adequate funds and lack of advance working equipment. Kenya Rural Road Authority, (2013) reported there were many projects which were not completed due to obstacles by client, non-availability of materials, poor infrastructure, lack of funds and lack of project managers' competency.

Local studies have not focused on factors affecting roads Construction Projects delivery in KeRRA, Nyamira County. Musa (2012) did a study on effects of total quality management on performance of companies in Kenya a case study of Inter build Company Limited. He found that human resource management and resource management affects performance of the building company to a great extent. Bundi (2011) did a survey on challenges in the management of procurement services within Kenya Rural Roads Authority. She found that political interferences and inadequate allocations of funds hinder completion of KeRRA activities even though the authority fully implements procurement policies. Nyamwaro (2011) did a study on analysis of challenges facing project implementation a case study of Ministry of Roads Projects. The study deduced that poor communication and lack of awareness in POA which is also used in the implementation of the Ministry's Projects were the main challenges facing project implementation.

Despite previous studies focusing on ministry of roads and its associates, none has focused on the factors influencing the roads Construction Projects Completion in KeRRA, Nyamira County. The researcher was motivated to fill knowledge gap by evaluating factors influencing road construction projects Completion in Kenya with focus to KeRRA, Nyamira County, to determine how manager's competence, funds, equipment and Technology influence efficient delivery of road construction projects in Nyamira County.

1.3 Purpose of the Study

The study sought to assess the factors affecting road construction projects in Kenya and in particular those handled by KeRRA in Nyamira County.

1.4Objectivesof the Study

1.4.1GeneralObjective

To determine factors affecting roads construction projects Completion in Kenya. A case study ofKeRRANyamira County

1.4.2SpecificObjectives

The study was guided by the following objectives:

1. To evaluate how project managers competency influence road construction projects Completion in KeRRA, Nyamira County
2. To establish the influence of project funds on road construction projects Completion in KeRRA, Nyamira County.
3. To what extent does project equipment influence road construction projects delivery in Nairobi KeRRANyamira County.
4. To examine whether project technological innovation influence road construction projects Completion in KeRRA, Nyamira County

1.5 Research Questions

The study was guided by the following questions:

1. How does project managers competency influence road projects Completion in KeRRA, Nyamira County?
2. To what extent does project funding influence road projects Completion in KeRRA, Nyamira County?
3. How does project equipment influence road projects Completion in KeRRA, Nyamira County?
4. To what extent does project technological innovation influence road projects Completion in KeRRA, Nyamira County?

1.6 Research Hypothesis

The study was guided with the following research hypothesis

H_1. Project manager's competency has an influence road project Completion

H_o. Project managers competency has no influence on road completion

H_I. Project funds has an influence on road project Completion

H_o. Project funds has no influence road project Completion

H_I. Project Equipment has an influence on road project Completion

H_o. Project equipment has no influence on road project completion

H_1. Project technological innovation has an influence on road project completion

H_0. Project technological innovation has no influence on road project completion

1.7Significance of the Study

The study determined the factors affecting roads construction projects Completion in Nyamira County so as to identify the areas where urgent action need to be taken to safeguard the interest of the sector. The study helped in application of theoretical training to policy makers to address practical problems in the sector, and to provide insights to today's and the future managers on the importance of properly road construction completion.

1.8 Delimitation of the study

Having worked in Nyamira County, knowledge of the area made my study successful since iknow the whole county very well

The study limited itself to road construction projects and specifically those being carried out by KeRRA, specifically Nyamira County and in that case it was not be generalized to other construction projects and other areas due to peculiarities in other areas.

1.9 Limitations of the Study

This study was faced with challenges of poor road network to access the areas where road construction is on progress.

1.10 Assumptions of the Study

The basic assumptions of the study were:

i) That all correspondents cooperated by giving the required information without fear.

ii) Those interviewed were familiar with road construction projects and will be able to articulate freely.

iii) That the correspondents were honest to the best of their knowledge

1.11Definition of Significant Terms

Project: A set of organized activities aimed at achieving a set of goals. It has a specific time

Project Cost: Refers to the degree of compilation of construction work within the estimated budget

1.12 Organization of the Study

Chapter one contains: Background of The Study, Statement of The Problem, Purpose of the Study, Objectives of the Study, Research Questions, Research Hypothesis, Significance of the Study, Delimitations of the Study, Limitations of the Study, Assumptions of the Study, Definitions of Significant Terms and Organization of the Study.

Chapter two contains: Introduction, Theoretical Framework, Management Theory, And Agency Cost Theory, Change Agency Theory, Project Success Criteria and Conceptual Framework.

Chapter three contains: Introduction, Research Design, Target Population, Sample Procedure and Sample Size, Data Collection Instruments, Reliability and Viability of Research Instruments, Data Collection Procedure and Data Analysis.

Chapter four contains: Data analysis and presentation

Chapter five Contains: Research findings, recommendation and further research studies

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter researched and sourced literature ranging from academic books and journals that address the factors affecting efficient delivery of roads construction for the purpose of this study. Academic articles stimulate and provide theoretical understanding relevant literature on the aspects pertaining to the efficient performance on road construction among KURA. It comprises the conceptual framework, theoretical review, and empirical review, and critique of the review.

2.2 Theoretical Framework

A Theoretical framework is a set of statements or principles devised to explain a group of facts or phenomena especially one that has been repeatedly tested or is widely accepted and can be used to make predictions about natural phenomena (Lucia, and Lepsinger, 2009). Theories are analytical tools for understanding, explaining, and making predictions about a given subject matter. It comprises the conceptual frame work, theoretical review, and empirical review, critique of the review and the research gap of the study.

2.2.1 Management Theory

Management is the process of designing and maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims (Koontz and Weihrich, 2000). In its expanded form, this basic definition means several things. First, as managers, people carry out the managerial functions of planning, organizing, staffing, leading, and controlling. Second, management applies to any kind of organization. Third, management applies to managers at all organizational levels. Fourth, the aim of all managers is the same to create surplus. Finally, managing is concerned with productivity this implies effectiveness and efficiency.

Managing, like all other practices whether medicine, music composition, engineering, accountancy, or even baseball is an art; it is know-how. It is doing things in the light of the realities of a situation. Yet managers can work better by using the organized knowledge about management. It is this knowledge that constitutes science. However, the science underlying managing is fairly crude and inexact. This is true because the many variables with which managers deal are extremely complex. Nevertheless, such management knowledge can certainly improve managerial practice. Managers who attempt to manage without management science must put their trust to luck, intuition, or what they did in the past (Gardiner, 2000). In managing, as in any other field, unless practitioners are to learn by trial and error, there is no place they can turn for meaningful guidance other than the accumulated knowledge underlying their practice; this accumulated knowledge is theory. For practical purposes, all managers must develop three sets of skills, namely; conceptual, technical, and human (Peterson 2004).

2.2.2 Agency Cost Theory

Agency theory is the branch of financial management theory that looks at conflicts of interest between people with different interests in the same assets. This most importantly means the conflicts between: shareholders and managers of companies, shareholders and bond holders. The theory explains the relationship between principals, such as a shareholders, and agents, such as a company's managers. In this relationship the principal delegates (or hires) an agent to perform work. The theory attempts to deal with two specific problems: how to align the goals and principal of funds management so that they are not in conflict (agency problem), and that the principal and agent reconcile different tolerances for risk.

The case fund managers faced major problems in implementing finance theory, especially with MPT and CAPM when estimating stock returns, and when using optimization routines to find the efficient frontier and the optimum risk, return portfolio. The problems arose, in part, because of the limitations of public domain data and because of the uncertainty implicit in forecasting stock risk and return characteristics. These problems also arose because of the many controversies and fundamental problems facing finance theorists laid the foundations of modern portfolio theory (Minocha, 2005). He stated that investors seek a risk/return trade off by seeking to maximize returns for a given level of risk or to minimize risk for a given level

of return. He argued that a portfolio manager needed to know the weighting of for each of N stocks, N estimates of expected return and of variance of return, and N (N-1)/2 estimates of covariance of return between each pair of stocks in the portfolio. This information could be used to generate a large number of feasible portfolios which were dominated by a smaller number of efficient risk/return portfolios lying on the efficient frontier.

Risk averse, rational portfolio managers could choose one of these portfolios to reflect their or their clients risk/return preferences (utility). Given the above input data the portfolio selection problem could be solved to find the optimal solution using a quadratic programming approach. This approach was further simplified by the development of the Capital Asset pricing model by Sharpe and Lintner in the 1960s. They identified a single factor, linear model, in which a company's Beta measured the stock's return volatility relative to that of the market overall. This model reduced the number of covariance (now company to market return) to be estimated to the number of stocks in the portfolio. This much simplified the estimation and portfolio construction decision process.

Markowitz (2005) argued that finance theory tells us what is to be estimated in the form of future risk and return and how estimates for specific shares are to be combined to form estimates for the portfolio as a whole. However, theory does not tell us how to make the estimates of return, variance and covariance. These parameters are not known with certainty and some form of estimation bias is inevitable, given that some combination of historic data and/or forward looking subjective or expectancy data has to be used.

2.2.3 Change Agency Theory

Change agency theory has been found to be of particular relevance to understanding innovation associated with electronic construction project, where financial, managerial, informational and technological constraints tend to restrict innovativeness and entrepreneurship (Mole, 2002) agents can either be internal or external. Internally the owner of institutes and other sectors forces can act as champions, advocates and leaders of change (McElroy, 2010). According to Ross (2008), technology simplifies and reduces task needing manual skill and strengths especially in factories and either forms of production property applied can increases productivity. The use of reprogram able robots for such tasks as

welding spraying material handling and other helps to eliminate dirty or harassers and repetitive work robots and computer aid manufacturing (CAM) as well as reducing costs improving quality and the consistency of finished quality and the consistency of finished products. The unused technology requirements enhance problem solving skills and the ability to interpret, and is thus likely to lead to widening gap between skilled and non-skilled workers (Leslie, 2005).

2.3Project Success Criteria

2.3.1 Time and Cost Criterion

Almost every paper on success criteria never forgets to mention about these two traditional criteria which are often grouped under project efficiency dimension. Further, it could be noted that there is no confusion among researches on the usage of those two terms (e.g. Chovichien and Nguyen, 2013; Al-Tmeemy, 2011; Heravi 13th International Conference on Business Management 2016 704 and Ilbeigi, 2012; Khosravi and Afshri, 2011).

2.3.1.1 Time or Schedule

Refers to the agreed/approved duration for the compilation of a project. Time can be measured in terms of construction time, speed of construction and time overrun (Naoum, 1994 and Chan, 1997 as citedin Chan and Chan, 2001). Heravi and Ilbeigi (2012) proposed schedule performance index and it is a measure of the schedule efficiency of a project.

2.3.1.2 Cost

Refers to the degree of compilation of construction work within the estimated budget Chan and Chan (2001) explain that cost should not be confined only to the tender sum and therefore, it includes any costs arise from variations, modification during construction period and the cost created by the legal claims, such as litigation and arbitration. The measure of cost can be in the forms of unit cost, percentage of net variation over final cost (cost overrun). Heravi andIlbeigi (2012) introduce the cost performance index (CPI) which is a measure of the cost efficiency of the project.

2.3.2 Quality Criterion

This isa traditional criterion but it is confusingly used. In literature, it could be noted that while some researchers used quality as a single main criterion (e.g. Lim and Mohamed,

1999; Chan and Chan, 2001; Pinto and Slevin, 1988; Atkinson, 1999) some other researchers use quality, technical performance and functionality as separate criteria (e.g. Chovichien and Nguyen, 2013; Al-Tmeemy, 2011). Heravi and Ilbeigi (2012) use product quality and process quality separately. Elattar(2009) also refers quality and technical performance as two distinctive criteria. However, the quality of a project was commonly defined as meeting technical specifications (Khosravi and Afshari, 2011). Prabhakar (2008) as cited in Serradora and Turnerb (2014) mentions that quality is intertwined with issues of technical performance, specifications, and achievement of functional objectives and it is the achievement against these criteria that will be most subject to variation in perception by multiple project stakeholders. It is assumed that product quality and process quality are embedded in the functionality and technical performance in construction project context. Chan et al. (2002) stress thatquality, technical performance, and functionality are closely related and are considered important to the owner, designer, and contractor. Chan and Chan (2001) further mentions that the quality would be measured subjectively using a seven-point scale. Chan (2000) and Chan et al. (2002) as cited in Takim and Adnan (2008) consider project functionality as one of the success measures in the post-construction phase when the project is finished and delivered. According to them, project functionality correlates with expectations of 13th International Conference on Business Management 2016 705 project participants and can best be measured by the degree of conformance to all technical specifications.

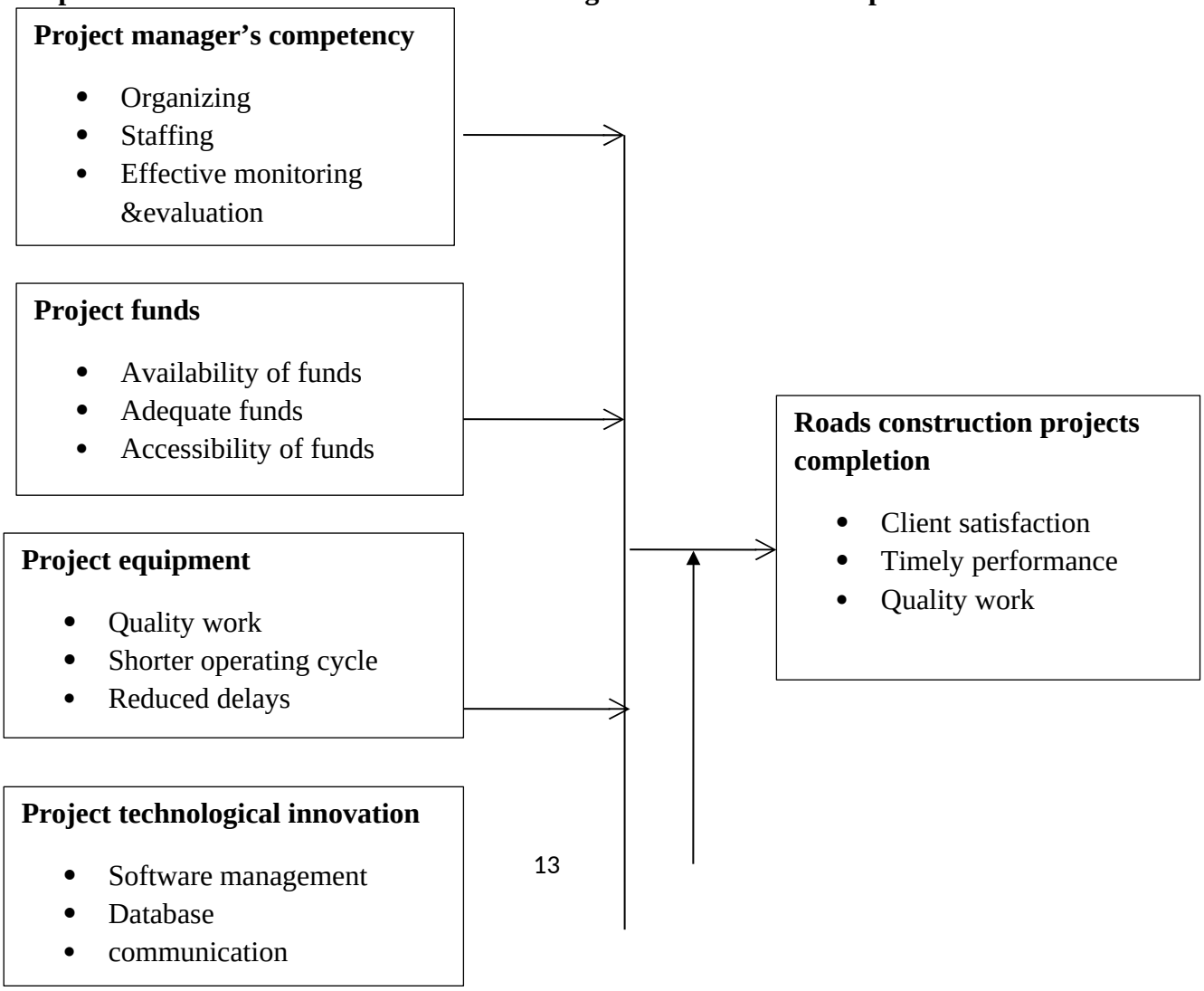
2.3.3 Safety Criterion

The issue of safety has been raised for a long time (Sanvido et al., 1992; Parfitt and Sanvido, 1993) and it has been used without complication. Chan and Chan (2001) adopt the definition presented by Bubshait and Almohawis (1994). Accordingly, safety refers to the degree to which the general conditions promote the completion of a project without major accidents or injuries. Generally, safety assessments would be carried out by regulatory bodies such as Department of Labour of Sri Lanka and institutions offering certifications such as ISO, OSAHS. These evaluations which are commonly known as audits form a strong base to measure safety in project sites. Heraviand Ilbeigi (2012) propose a safety performance index considering safety issues in executive project outcome.

2.3.4 Client Satisfaction Criterion

Chovichien and Nguyen (2013) use the term “satisfaction” while Elattar (2009) and Chan and Chan (2001) use “participant satisfaction” and “user satisfaction” separately. Pinto and Slevin (1988), Al-Tmeemy et al. (2011), Heravi and Ilbeigi (2012) and Khosravi and Afshari (2011) use only “the client/customer satisfaction”. Takim and Adnan (2008) use client satisfaction and describe it with benefit to end user, benefit to client, project +functionality, aesthetic value, client satisfaction on service, end user satisfaction on product, pleasant environment and easy to maintain. Heravi and Ilbeigi (2012) proposed client satisfaction index which is the result of a questionnaire consisting of 28 sub-factors. Chan and Chan (2001) propose that participant satisfaction could be measured by the seven-point scale system as it is subjective. However, for the purpose of developing this framework, it is important to develop specific criteria to avoid confusions.

2.4Conceptual Framework



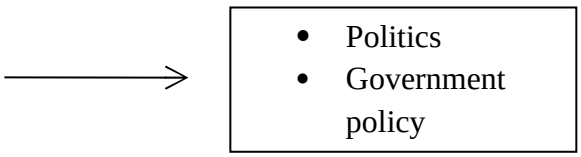


Figure 2.1: Conceptual Framework

Source: (Author 2018

2.5 Explanation of Variables

2.5.1 ProjectManagers Competency

Competencies the ability of an individual to do a jobproperly. A competency is a set of defined behaviors that provide a structured guide enabling the identification, evaluation and development of the behaviors in individual employees (Chan and Mohan 2009). Competencies are also what people need to be successful in their jobs. Job competencies are not the same as job task. Competencies include all the related knowledge, skills, abilities, and attributes that form a person's job. This set of context-specific qualities is correlated with superior job performance and can be used as a standard against which to measure job performance as well as to develop, recruit, and hire employees Competencies provide organizations with a way to define in behavioral terms what it is that people need to do to produce the results that the organization desires, in a way that is in keep with its culture. By having competencies defined in the organization, it allows employees to know what they need to be productive. When properly defined, competencies, allows organizations to evaluate the extent to which behaviors employees are demonstrating and where they may be lacking (Dubois and Rothwell 2006). For competencies where employees are lacking, they can learn. This will allow organizations to know potentially what resources they may need to help the employee develop and learn those competencies. Competencies can distinguish and differentiate your organization from your competitors. Competencies can provide a structured model that can be used to integrate management practices throughout the organization. Competencies that align their recruiting, performance management, training and development and reward practices to reinforce key behaviors that the organization values.

Monitoring is the systematic and routine collection of information from projects and programmes for four main purposes. Monitoring is a periodically recurring task already beginning in the planning stage of a project or programme. Monitoring allows results, processes and experiences to be documented and used as a basis to steer decision-making and learning processes. Monitoring is checking progress against plans. The data acquired through monitoring is used for evaluation. Evaluation is assessing, as systematically and objectively as possible, a completed project or programme. Evaluations appraise data and information that inform strategic decisions, thus improving the project or programme in the future (Dubois and Rothwell, 2007).

2.5.2 Project funds

"Funding" is the act of providing financial resources, usually in the form of money, or other values such as effort or time, to finance a need, program, and project, usually by an organizationor government. Generally, this word is used when a firm uses its internal reserves to satisfy its necessity for cash, while the term ‘financing‘ is used when the firms acquires capital from external sources (Gyula, 2008) . Available funds may also refer to funds that can be withdrawn from a margin account at a brokerage firm, where margin loans are still outstanding.

2.5.3 Project Equipment

Equipment are the tools, machines, or other things that you need for a particular job or activity Tangible property (other than land or buildings) that is used in the operations of a business. Examples of equipment include devices, machines, tools, and vehicles (Hyvari, 2006). Krazner (2005) defined construction equipment as to heavy-duty vehicles, specially designed for executing construction tasks, most frequently ones involving earthwork operations. They are also known as heavy machines, heavy trucks, construction equipment, engineering equipment, heavy vehicles, or heavy hydraulics. They usually comprise five equipment systems: implement, traction, structure, power train, control and information Heavy equipment functions through the mechanical advantage of a simple machine, the ratio between input force applied and force exerted is multiplied. Some equipment uses hydraulic drives as a primary source of motion.

2.5.4 Project Technological Innovation

Technology is the collection of techniques, methods or processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation. Technology can be the knowledge of techniques, processes, etc. or it can be embedded in machines, computers, devices and factories, which can be operated by individuals without detailed knowledge of the workings of such things. Technology has many effects. It technology has helped develop more advanced economies (including today's global economy) and has allowed the rise of a leisure class (Karimand Marosszeky, 2009). Various implementations of technology influence the values of a society and new technology often raises new ethical questions. Examples include the rise of the notion of efficiency in terms of human productivity, a term originally applied only to machines, and the challenge of traditional norms. Innovation is a new idea, more effective device or process. Innovation can be viewed as the application of better solutions that meet new requirements, inarticulate needs, or existing market needs. This is accomplished through more effective products, processes, services, technologies, or ideas that are readily available to markets, governments and society. The term innovation can be defined as something original and more effective and, as a consequence, new, that "breaks into" the market or society. While a novel device is often described as an innovation, in economics, management science, and other fields of practice and analysis innovation is generally considered to be a process that brings together various novel ideas in a way that they have an impact on society (Kenny, 2007). Innovation is the process of translating an idea or invention into a good or service that creates value or for which customers will pay. Innovation involves deliberate application of information, imagination and initiative in deriving greater or different values from resources, and includes all processes by which new ideas are generated and converted into useful products. In business, innovation often results when ideas are applied by the company in order to further satisfy the needs and expectations of the customers. Innovation is synonymous with risk-taking and organizations that create revolutionary products or technologies take on the greatest risk because they create new markets (Lehtonen, 2007).

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter contains the methodology that was used by the study. It is sub divided into the following sub headings; research design, target population, sampling procedures and sample size, data collection methods, validity and reliability of the methods, data collection procedures and data analysis.

3.2 ResearchDesign

This study used descriptive survey designed to establish the determinants of completion of government construction projects in Kenya. A descriptive study is designed to obtain pertinent and precise information concerning the current status of phenomena and whatever possible to draw valid general conclusion from the facts discovered.

3.3 Target Population

The target population comprised of 12 KeRRA office staff and 62 field staff in Nyamira County. The study adopted a census survey design. This therefore ruled out application of specific sampling technique. The study used a census since the population of 72 small and the study aimed to reach all the staff in KeRRA in all the four road construction projects.

3.4 Sample Procedure and Sample Size

According to Mugenda (1999), a sample of 10-20% is useful when the population is high. Since the population of 72 is too small,represented the sample size hence a sample size of 72 respondents

3.5 Data Collection Instruments

On the data collection, the study relied mainly on primary data. The researcher used questionnaire as the research instrument. The study utilized questionnaire that was developed for generating information on key variables of interest from the target respondents in the study. A self-administered questionnaire were dropped to each respondent and picked later. The questionnaire consisted of closed ended questions. A pilot study was conducted to determine if there were flaws, limitations, or other weaknesses within the data collection instrument to make the necessary revisions prior to the implementation of the study.

The study took 10% of the population for pilot test (Coopers & Schindler, 2010). The researcher adopted content validity which refers to the extent to which a measuring instrument provides adequate coverage of the topic under study. The content validity was achieved by subjecting the data collection instruments to an evaluation group of experts who will provide their comments and relevance of each item of the instruments and the experts to indicate whether the item was relevant or not.

3.6 Reliability and Validity of Research Instruments

3.6.1 Reliability of Research Instruments

Reliability is the constituency with which research instruments measure what it purports to measure. The test –retest technique was used to test reliability of research instruments; the test involved administering the same instruments twice to the same group of subjects

3.6.2 Validity of Research Instruments

Mugenda and Mugenda (1999) define validity as the accuracy and meaningfulness of inferences, which is based on research results. The study applied content validity as a measure to which data obtained from the research instruments meaningfully and accurately reflect or represent a theoretical concept. The researcher used the expert judgment method to determine content validity. The researcher gave a copy to the supervisor, to check if it represents all objectives of the study.

3.7 Data Collection Procedures

The researcher sought permission from relevant authority and be assisted in refining timings of distribution of questionnaires. The researcher agreed with respondents when the research instruments will be administered and the specific date of collecting the questionnaires.

3.8 Data Analysis

Data collected was analyzed using quantitative method with the help of (SPSS) version 22 and excel. Data processing was carried out through editing, coding and classification. Quantitative data will be analyzed by employing descriptive statistics and inferential analysis. Descriptive statics such as measures on central tendency and dispersion along with percentages will be used to organize and summarize numerical data.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1Introduction

This chapter presents analysis and findings of the study as set out in the research methodology. The results are presented on the factors affecting road construction projects completion in Kenya a case of KeRRA, Nyamira County. The primary data was gathered exclusively from a questionnaire as the research instrument while secondary data was derived from the organization's project status reports.

4.1.1 Questionnaire Return rate

From the study, out of 72 respondents from Kenya rural roads authority, Nyamira County Office and contractors who are implementing KeRRA projects, 66 respondents filled and returned the questionnaires. This constituted 92% response rate. Mugenda and Mugenda (2003) indicated a respondent rate of a response rate of 50% is adequate for analysis and reporting, a rate of 60% is good and response rate of 70% and over is excellent hence a response rate of 92% for this study is sufficient for a study.

4.2 Bio Data information

The study sought the general information on gender, age of the respondents, level of education and working period in KeRRA of the respondents to validate the study information.

4.2.1 Gender of the respondents

The respondents were requested to indicate their gender. From the findings, majority 75% of the respondents were male while 25% of the respondents were female. This implied that data was collected from both male and female and that the KeRRA Nyamira County

Office management and contractors include more men than women in road project implementations. The findings concurred with Asif (2012) who revealed that in third world countries good completed roads eliminate poverty by improving access between regional and rural communities and improve live of both men and women.

Table 4.1 Gender of the Respondents

Category	Frequency	Percentages
Male	50	75
Female	16	25
Total	**66**	**100**

4.2.2 Age categories

Table 4.2 Distribution of Respondents by Age

Age bracket	Frequency	Percentage
20-30	6	9.1
31-40	20	30.5
41-50	25	37.9
51-60	10	15
Above 60 years	5	7.5
Total	**66**	**100**

The study sought to investigate the age categories under which the respondents were in. From the findings, majority 37.9% of the respondents were aged between41-50 years, 30.5% of the respondents showed that they were aged between 31-40years, 15% were 51-60 years 6 respondents were aged 20-30 years of age respectively. The study implied that respondents

were mature in age as approximately all were aged above 20 years of age and therefore information collected from them can be treated as valid.

4.2.3 Education Level of the Respondents

Table 4.3Distribution of Respondents by Level of Education

	Frequency	**Percentage**
Bachelor Degree	36	55
Diploma	14	21
Certificate	10	15
Postgraduate	6	9
Total	**66**	**100**

This study sought to investigate the highest academic qualification attained by the respondents. From the findings, majority 55% of the respondents indicated that they had attained Bachelor Degree academic qualification. 21% of the respondents had attained diploma academic qualification 15% of the respondents had attained certificate academic qualification while 9% of the respondents had attained post graduate academic qualification. This implied that KeRRA funded projects mostly employed qualified personnel who had better understand of the l factors influencing completion of KERRA funded road projects, a case of Nyamira County, Kenya. The findings concurred with Chan and Kumaraswamy (2012) that educated personnel are able to effectively communicate and share ideas. This enhances fast information transfer s of age, 46 between managers and participants influencing successful implementation and completion of the projects.

4.2.3 Working period in KeRRA

Table 4. 4 Distributions of Respondents by Working Period

	Frequency	Percentage
Over 4 years	40	61
3 years 4 years	15	23
2 years to 3 years	6	9
1 year to 2 years	5	7
Total	**66**	**100**

The study requested the respondents to indicate the working period in years that they had been working in KeRRA as indicated in the Table 4.3. From the findings, 61% of the respondents indicated that they had been working in KeRRA for over 4 years, 23% indicated that they had been working for 3 to 4 years, 9% indicated that they had been working for 2-3 years while 7% indicated that they had been working in KeRRA for 1 to 2 years. This implied that the majority of the respondents had worked in KeRRA for over 4 years and had experience on factors influencing completion of KERRA projects

4.3 Management competency

Contractors and engineers have different skills, expertise, competence and experience.This section addressed objective to which sought to examine the influence of competency of project managers in completion of projects. This was important in establishing whether the road subsector was doing enough in terms of allocating competent staff in their construction projects

4.3.1 The rating on influence of project manager's competence influences completion of construction road projects. The findings were as indicated

Table 4.5 Rating manager's competence

Extent	Frequency	Percent
To Very great extent	40	61
To Great extent	20	30
To Moderate extent	6	9
Total	**66**	**100**

From the findings in Table 4.4, majority 61% of the respondents indicated that

Project manager's competency influences the completion of KeRRA projects to a very great extent. 30% of the respondents indicated that manager's competency influence the completion of KeRRA projects to a great extent. While 9 of the respondents indicated that manager's competencyinfluence the completion of KeRRA projects to a moderate extent. This implies that project manager's competency the completion of KeRRApr

4.3.2Indicators of competency of project managers and completion of road construction projects

The study sought to establish the extent to which the following factors influenced completion of road construction projects. The results were as shown in table 4.6

Table 4.6 Indicators of Competency of Project Managers

Statement	Mean	Standard Deviation
Turnaround time(time taken to complete a task)	3.81	1.014
Lack of Experience	3.35	0.486
Lack or required skills	3.94	0.250
Lack Knowledge in the area of constructions	3.45	0.568
Accuracy levels	**3.19**	**1.167**

According to findings, the respondents indicated that lack of required skills and time taken to complete a task influenced completion of road construction projects to a very great extent with a mean of 3.94 and 3.81 respectively. The respondents further indicated that lack of experience and accuracy levels also influenced completion of construction projects with a mean of 3.35 and 3.19 respectively. This implies that the above factors influence completion of road construction projects to great extent

4.3.3 Rating on how project staff skills improve their ability to handle assigned duties competitively

The researcher wanted to know the extent to which project staff skills improve their completion. In order to do so various respondents were asked to rate capabilities on scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent.

Table 4.7: Rating on project staff skills and completion of projects

Scale	Frequency	Percentage
1	40	61
2	16	24
3	6	9
4	4	6
5	0	0
Total	**66**	**100**

The findings show that 61% of the respondents were to a very great extent, 24% to a great extent, 9 % to a moderate extent while 0% to no extent. The outcomes showed that the respondents admitted that project staff skills improve their ability to handle assigned duties competitively to a very great extent.

4.4 Project funds availability and completion of road construction projects in Nyamira County

The respondents were requested to indicate the extent to which they agreed on the given variables regarding funds availability and completion of rural roads projects as indicated inTable 4.8

	Moderate extent	Great extent	Very great extent	Mean	Standard deviation
Availability of funds influences rural roads construction projects completion	5	10	30	4.70	0.65
Adequate funds influences rural roads construction project completion	10	15	20	4.47	0.35
Management of funds influences rural roads construction projects completion	40	30	31	4.60	0.51
Cost saving influences rural roads construction projects completion	3	3	32	4.61	0.60
Accessibility of funds influences rural roads projects completion	8	8	12	4.11	0.24

From the findings in table 4.8 majority of the respondents strongly agreed that adequacy of funds and managements influences rural roads construction projects completion m=4.70 and 4.60. Most of respondents agreed accessibility of funds and cost saving are considered key to successful project completion. Also the findings agreed with Aitken (2000) for a to be successful there should be adequate fund allocation to finance its completion. Also the

findings agreed with Jackson (2010) added that project funds availability is an important factor that influences delivery of a project

4.5 Project Equipment

Table 4.9 Project Equipments

	N	Mean	Std. deviation
Quality work is influenced by project equipments of road construction projects completion in KeRRA Nyamira County	66	2.5273	0.29720
	66	2.6182	0.18075
plant & and machinery influences road construction projects completion in KeRRA Nyamira County	66	2.7182	0.06772
Project level of advancement is influenced by project equipment in road construction projects completion	66	2.2273	0.39720

From the finding it was noted that majority of the respondents agreed that project equipment influences road construction projects Completion in KeRRA, Nyamira County. The researcher found that majority agree that road construction projects completion in KeRRA Nyamira County influence efficiency which attained a mean of 2.7182, Quality work is influenced by project equipment's of road construction projects Completion in KeRRA Nyamira County scored a high mean of 3.5273 Shorter operating cycle is influenced by project equipment's in road construction projects completion in KeRRA Nyamira County scored a high mean of 2.6182 and project equipment's in road construction projects Completion in KeRRA scored a high mean of 2.2272. the study established that majority of the respondents agreed that the study variables had a significant influence on KeRRA construction project completion.

4.6 Project Technological Innovation

The study sought to identify how project technology influence rural road construction projects completion in KeRRA Nyamira County. As mentioned by the respondent to their own views project technology influence road construction projects completion in KeRRA. The findings are shown in table 4.9 below

Table 4.10 Project Technological Innovation

	N	Mean	Std. Deviation
Software management influence road construction projects completion in KeRRA Nyamira County	66	2.6181	0.180746
Database influences road construction projects completion in KeRRA Nyamira County	66	3.2909	0.09499
Communication influences the road construction projects completion in Nyamira County	66	3.0364	0.32670
Creativity influences rural roads construction projects completion in KeRRA Nyamira County	66	2.6091	0.12597

From the findings it was indicated that majority of the respondents project managers competency influences rural roads construction completion in KeRRA Nyamira County. This was shown by majority who agreed that Database influences road construction projects completion scored a high mean of 3.2909, software management influence road construction projects completion in KeRRA Nyamira County attained a mean of 3.61818 communication influences the road construction projects Completion in Nyamira County, attained a mean of 3.0364 and creativity influences road construction projects Completion in KeRRA Nyamira County attained a mean of 2.6091. This indicated that project technology influence road construction projects completion in KeRRANyamira County. The findings agreed with Stake (2005) who stated that the use of IT improves better coordination and communication among project teams and participants. It increases the speed of communication and decrease documentation errors.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gave a summary of the major findings on the factors influencing rural roads construction projects completion in KeRRA, Nyamira County. The chapter draws the study conclusions and discuses major recommendations and gives suggestion for further studies

5.2 Summary of the Findings

The main objective of this study was to establish factors influencing rural roads construction projects completion a case of KeRRA Nyamira County. The study found out that road construction project completion is greatly influenced by project Manager Competency, Project Technology, project funds and project equipment. The study drew conclusion that road construction project completion is greatly influenced by project Managers competency, project Technological innovations, project funds and project Equipment

5.2.1 Project Managers competency

From the study majority agreed with the following variable on Project managers Competency that organizing influences road construction projects completion in KeRRA Nyamira County. Staffing influences the road construction projects completion in Nyamira County, Evaluation influences road construction projects completion in Nyamira County and monitoring influences influences the road construction projects completion is greatly influenced by project mangers competency. Project technology, project funds and project equipment

5.2.2 Project Technology

From the study majority agreed with the following variable on project technology that Software management influence road construction projects completion in KeRRA Nyamira County. Database influences road construction projects Completion KeRRA Nyamira County, which communication influences the road construction projects completion in Nyamira County and creativity influences road construction projects Completion in KeRRA Nyamira County. The study drew conclusion that road Construction Project completion is greatly influenced by, Project Technology.

5.2.3 Project Funds

From the study majority agreed with the following variable on project funds that Availability of funds influences rural roads construction projects completion in KeRRA, Nyamira County. Adequate funds influences rural roads construction projects completion inKeRRA Nyamira County. Management of funds influences the road construction projects completion in KeRRA., Nyamira County. Cost saving influences road construction projects completion in KeRRA Nyamira County. And accessibility of funds influences road construction project completion is greatly influenced by project funds.

5.2.4 Project Equipment

The study revealed that respondent agreed with the following statement on project Equipment showing that Quality work is influenced by project equipment's of road construction projects completion in KeRRA Nyamira County. Shorter operating cycle is influenced by project equipment's in road construction projects completion in KeRRA Nyamira County. Plant and machinery influences road construction projects completion in KeRRA Nyamira County and project level of advancement is influenced by project equipment's in road construction projects Completion in KeRRA Nyamira County.

5.2.5 Project Completion

From the study majority of the respondent stressed tha project completion influences on road construction projects completion in KeRRA Nyamira County influence on client satisfaction road construction projects completion in KeRRA, Nyamira County influence timely

performance and road construction projects Completion in KeRRA Nyamira County influences meeting budget.

5.3 Conclusion

5.3.1 Project Managers Competency

The study concluded that project Managers' Competency project Technology. Project funds and project Equipment greatly influence towards road construction projects completion.

5.3.2 Project technology

The study concluded that Project technology is the major contributor towards road construction Project Completion. The findings indicate that majority of the respondents agreed that project managers competency influences road construction shown by the majority who agreed that Effective evaluation influences the road construction projects Completion in KeRRA Nyamira county. This was shown by majority who agreed that effective evaluation influences the road construction projects Completion in Nyamira County attained a mean of 2.800

5.3.3 Project Funds

The study concluded that Project Funds greatly influence towards road construction project Completion From the findings it was indicated that majority of the respondents agreed that project managers competency influences road construction projects Completion in KeRRA, Nyamira County. This was shown by the majority who agreed that Database influences road construction projects Completion in KeRRA, Nyamira County scored a high mean of 4.2909.

5.3.4 Project Equipment

The study concluded that Project Equipment is the major contributor towards road Construction project Completion from the findings it was noted that majority of the respondents agreed that projects adequate funds influences road construction projects completion in KeRRA, Nyamira County and this was shown by the mean score of majority 2.8909

5.4 Recommendations

This study recommended that Managers competency, project Technology, Project funds and project Equipment greatly influence towards road Construction Project Completion From that

5.4.1 Project Managers Competency

The study findings established that there is a significant positive relationship between Project Managers Competency, project Funds and project Equipment. Thus the study recommended that Managers competency is important in construction firms since it influences project completion. The study recommends that the project Managers Competency influences road construction project completion greatly. Thus the study recommended that training of employees in construction firm is a requirement to improve to improve performance.

5.4.2 Project Technology

The study recommends that the Project technology influences road construction project Completion greatly. Project technology was found to have great influence in construction project. Software management was found with great influence on road construction projects completion in KeRRA Nyamira County thus the study. Thus the study recommended that adoption of technology in construction firm is a requirement to improve performance.

5.4.3 Project Funds

The study recommended that the Project Funds influences road construction project Completion. Availability of funds influences road construction projects Completion in KeRRA Nyamira County. Adequate funds influences road construction projects completion in KeRRA Nyamira County and Management of funds influences the road construction projects Completion in KeRRA Finally Accessibility of funds influences road construction projects Completion in KeRRA. Nyamira County

5.5 Suggestions for Further Studies

The researcher suggested that since the study was conducted to evaluate influences road construction project completion in KeRRA Nyamira County other study should be conducted in other counties and also different variables should be employed

The following areas of further research were identified from the study.

i. Further study should be done on the key performance indicators (KPIs) in order to identify the casual relationships between completion of road construction projects and KPIs.

ii. A study should also be conducted in order to assess the resource mobilization approaches and capacity needs for effective completion of road construction projects.

iii. A comparative study should also be done on the effectiveness of contract documentation in different types of projects to allow for generalization

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APPENDICES

APPENDIX I: LETTER OF TRANSMITAL

Shem Sing'ombeOmari

P.O Box 72

Nyamira

Date……..

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: DATA COLLECTION

My name is Shem Sing'ombeOmari student pursuing a Masters of Arts in project planning and management at the school of Continuing and Distance Education of the University of Nairobi.

I am undertaking a study to establish Factors affecting Road construction projects completion in Kenya. Case study of KeRRA Nyamira County

The attached questionnaire is therefore intended to seek your views on the various aspects of projects. Kindly fill it with all sincerity and honesty. The information you provide will be utilized purely for academic purposes and will be treated with outmost confidentiality.

Thank you for your cooperation.

Yours faithfully,

Shem Sing'ombeOmari

Student (M.A PPM)-L50/5416/2017

University of Nairobi (Odel Campus)

Appendix 2: Individual Questionnaires for all staff of KeRRA Nyamira County

This questionnaire is intended to gather general information on the factors influencing completion of road construction projects in Nyamira County.

The questionnaire has 2 sections. Kindly respond to all questionnaire items honestly.

Your response will be kept strictly confidential. Please tick in the appropriate box or write in the spaces provided. Your assistance and cooperation will be highly appreciated.

SECTION A: DEMOGRAPHIC INFORMATION

1) Kindly indicate your gender

a) Male ( )

b) Female ( )

2) What is your age?

a) Below 25 years ( )

b) 26-35 years ( )

c) 36-45 years ( )

d) 45yrs and above ( )

3) What is your highest level of education?

a) Primary ( )

b) Secondary ( )

c) Certificate ( )

d) Diploma ( )

e) Undergraduate ( )

f) Postgraduate ( )

4) Indicate the position that you hold in the area of working

a) Contractor ( ) b) Consultant ( )

c) Engineer ( ) d) Technical auditors ( )

e) Any other specify

_____

_____

_____

5) How long have you worked with in the road construction industry?

a) 1-5 years ( )

b) 6-10 years ( )

c) 11-15 years ( )

d) Above 16 years ( )

6) Who are the main clients that you serve?

a) Private ( ) b) Public ( )

7) Have you been involved in road construction?

a) Yes ( ) b) No ( )

SECTION B: RESOURCES INFLUENCE ON PROJECT COMPLETION

8) In your own opinion does the availability of resources influence completion of road Construction projects?

a) Yes ( ) b) No ( )

9) If no why?

_____

_____

10) To what extent does the project manager's competency influence completion of road construction projects? Please tick next to the appropriate column in the table below

To a very great extent

To a great extent

To a moderate extent

To a little extent

No extent

11) To what extent do the following indicators influence the completion of road construction projects? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is no extent

Factors 1 2 3 4 5

Construction materials

Construction work force

Construction equipment

Material mobilization

12) To what extent does the following influence completion of road construction projects?

Use a scale of 1 to 5 where 1 is to a very great extent and 5 is no extent

Factors 1 2 3 4 5

Lack of finances

Lack of skilled personnel

Poor project management

13) To what extent does the availability of resources influence completion of road construction projects? Please tick next to the appropriate column in the table below

To a very great extent

To a great extent

To a moderate extent

To a little extent

No extent

14) What would you recommend to be done in order to improve competency of staff in road construction projects?

_____

_____

_____

15) To what extent does the project technological innovation influence completion of road construction projects? Please tick next to the appropriate column in the table below

To a very great extent

To a great extent

To a moderate extent

To a little extent

No extent