PROJECT MANAGEMENT DETERMINANTS AND PERFORMANCE OF CONSTRUCTED ROAD PROJECTS IN NAIROBI METROPOLITAN REGION, KENYA

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION (PROJECT MANAGEMENT) OF KENYATTA UNIVERSITY

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DECLARATION

Declaration by Candidate:

This thesis project is my original work and has not been presented for a degree in any other university or any other award.

…….. ……..

Signature **Date**

Patrick Ong'uti Onsongo

D53/NYI/PT/37300/2016

Declaration by Supervisor:

I confirm that the reported in this Research Project was carried out by the student under my supervision.

For and on behalf of Kenyatta University

…….. ……..

Signature **Date**

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DEDICATION

I dedicate this project to my wife, children and my family members.

ACKNOWLEDGEMENT

I want to start by expressing my gratitude to the all-mighty God, without whom it would have been impossible for me to finish this leg of the voyage. I'd want to take this time to offer my sincere appreciation to Dr. Alfayos Ondara for his exceptional knowledge, direction, and ongoing encouragement over the course of this project. Furthermore, a lot of other people's support, assistance, and direction are essential for this project to succeed. I would want to take this opportunity to thank everyone who contributed to the successful completion of this research project.

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LIST OF ABBREVIATION AND ACRONYMS

AICCAD	African Inland Child and Community Agency for Development
CNN	Cable News Network
GOK	Government of Kenya
KeRRA	Kenya Rural Roads Authority
KES	Kenya Shilling
KPMG	Klynveld Peat Marwick Goerdeler
KRB	Kenya Roads Board
PwC	Price Waterhouse Coopers
SPSS	Statistical Package for Social Sciences
TIVET	Technical Industrial Vocational and Entrepreneurship
ToP	Theory of Performance

OPERATIONAL DEFINITION OF TERMS

A Project	Refers to the parties affected or influenced by road project.
Organization Structure	This is the hierarchical structure used by contractors in Constructed road projects.
Performance of Constructed Roads	Refers to process of creating, implementing and managing of Constructed road projects
Stakeholder participation	Refers to who is directly or indirectly affected by the project's activities are known as stakeholders.
Road Project	This is a temporary endeavor on contact basis undertaken to create/develop a two connection from one point to the other.
Management Skills	Refers to construction workers who are knowledgeable about specific construction skills gained through training or practical experience in the field.
Technological Innovation	This is a new or improved product or process whose technological characteristics are different from before.

ABSTRACT

There are determinants that influence the contractors' involvement that are paramount to performance of constructed road projects. This research sought to assess the project management determinant s and performance of constructed road projects in Nairobi Metropolitan Region Kenya. This study was anchored by the following specific objectives to determine the effects of stakeholder participation and performance of constructed road projects in Nairobi Metropolitan Region Kenya; to explore the effects of Management Skills and performance of constructed road projects in Nairobi Metropolitan Region Kenya, to assess the effects of organization structure and performance of constructed road projects in Nairobi Metropolitan Region Kenya, and to establish the effects of technological innovations and performance of constructed road projects in Nairobi Metropolitan Region Kenya. Moreover, the study was underpinned by the following theories: the theory of performance, expectancy theory and diffusion of innovation theory. This study adopted a framework of positivism, and a multiple regression model was used. The study adopted descriptive research design and targeted population of 201 officials. Using stratified random sampling and purposive sampling techniques 60 respondents were selected as the sample size. The findings indicated that Findings stakeholder participation has a significant positive influence on performance of constructed road projects ($\beta=0.296;\rho<0.05$). Similarly, Management skills significantly influences performance ($\beta=0.209$; $\rho<0.05$). Moreover, there was evidence of significant ($\rho<0.05$) and positive influence of Organization structure ($\beta=0.262$) and Technological innovation ($\beta=0.307$) on performance of constructed roads projects. The study concludes that project's success depends on the participation of stakeholders. This include a well-defined procedure regarding project team appointment, terms of reference, and feasibility plan of constructed road. Good management skills are needed for project management because it boosts productivity within an organization. Furthermore, positive organization's culture fosters collaboration among contractors and employee involvement. Finally, construction companies must make use of the proper technologies in order to properly execute their projects. The study recommends that construction firms should consider stakeholder involvement at all levels from project planning to implementation stages. Secondly, management should strengthen its organizing, coordinating, and leadership capabilities for the efficient execution of constructed road projects. Moreover, construction companies should have an inherent culture connected to its stakeholders in order to involve, inform, and respond to them. Finally, these firms need to adopt and employ technologies related to construction to improve on their productivity and effectiveness. The results of this study will be used by policymakers and scholars who could gain knowledge and develop policies to enhance performance.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Many people believe that building roads is both difficult and expensive. Road construction must be a top priority for any government in order to achieve economic success (Irandu, 2017). It's impossible to overstate the importance of a well-kept road system. Strategic and policy frameworks must be in place in order to guarantee that road construction projects are finished on schedule and within budget (Wissenbach & Wang, 2017).

The Kenyan government is working hard to build, develop, and maintain a road transportation infrastructure that will aid the country's economic growth and development (Irandu, 2017). Kenyans' quality of life can only be improved if the country's transportation system is always reliable, safe, and easy to use (Okita-Ouma, Lala, Moller, Koskei, Kiambi, Dabellen, & Pope, 2016). The government of Kenya has long used large-scale road construction projects as a means of gaining the public's trust and support. As a result, Kerr and Newell (2001) claim that policymakers play an important part in establishing the kind of technological equipment that is utilized in project execution.

According to Kafuna (2011), a country's good governance relies heavily on the success of its projects. Project deliverables, such as on-time completion, good management, and positive feedback from the public, are frequently used to measure success, finishing government-initiated building road projects is one of Kenya's most vital economic operations. It is critical for the Ministry of Public works to be able to foresee that the project is successfully completed with the expected efficacy through effective finance

management, project implementation management, human resource capability, and information technology adoption (Irandu, 2017).

Assessment of the effectiveness of Kenyan constructed road construction projects has not made use of participatory project planning (Mwakajo & Kidombo, 2017). In evaluating the success of Kenyan road projects, inadequate documentation has been cited as a problem (Ngacho & Das, 2014). A road construction project is deemed successful, according to Owolabi (2014), if it is finished on time, on cost, and with the required quality standards.

According to Ofori (2012), Ghanaian contractors and consultants face similar challenges to those faced by contractors and consultants in other third-world countries. Problems with Ghanaian contractors' abilities to generate necessary working capital, lack of organization, and a lack of technical competence have all been identified as having an impact on their performance in recent years.

High inflationary trends, shoddy organizational practices, and weak organizational structures all contribute to an unstable business climate (Njogu, 2016). (Vulink, 2004). An insufficient amount of technical study done by the contractor before bidding and unclear or incorrect specifications and drawings all have an impact on the quality of projects related to construction according to Sweis (2013). Inadequate tools and equipment are one of several causes of time overruns in Nigeria, according to Ameh and Osegbo (2011).

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system is always reliable, safe, and easy to use (Okita-Ouma et al., 2016). The government of Kenya has long used large-scale road construction projects as a means of gaining the public's trust and support. As a result, Kerr and Newell (2001) claim that the kind of technological advancement which is utilized to carry out projects is heavily influenced by policymakers.

According to Kafuna (2011), project performance is an important part of good governance in many countries. Success is frequently measured in terms of project deliverables like on-time completion, good management, and positive feedback from the public. The effectiveness of Kenyan constructed road projects has not been assessed using participatory project planning (Mwakajo & Kidombo, 2017). One of the difficulties in assessing the success of Kenyan constructed road projects has been ascribed to a deficiency of adequate documentation (Ngacho & Das, 2014). Success in road construction, according to Owolabi (2014), occurs when the project is accomplished on schedule, within required time and budget, as well as with the expected standard of excellence.

In Kenya, road transport accounts for the vast majority of all cargo and passenger traffic. An estimated value of Kshs 3.0 trillion is placed on the country's classified public road network of 161,451 kilometers. It will cost KShs. 400 billion to maintain the roads for a year, and another KShs. 50 billion to maintain them for another year. Kenya's urgent need to expand its road network is not included in these figures. As a result of the funding shortfall, the Ministry of Transportation is actively seeking increased government investment and promoting the use of new financing mechanisms for financing, developing, and managing road infrastructure. Additionally, 10,000 kilometers of roads are expected

to be tarmacked in the next five years under an Annuity financing model (Kenya Roads Board, 2016).

The effectiveness of road construction projects in Nairobi has not been evaluated (Mwakajo & Kidombo, 2017). Nairobi's road projects have had poor evaluations due to inadequate budget documentation and outdated technology (Ngacho & Das, 2014). Furthermore, Owolabi (2014), referenced in Kithinji (2017), defines success as completing road construction projects on required budget and time and to a high level of specification. Constructed road projects can help plan management strategies to revive the economy and build a more balanced and independent economy.

1.1.1 Performance of Constructed Road Projects

It is widely accepted that a road construction project's success or failure is determined by the inputs to a project management system, according to Ogwueleka (2010). It is claimed that the most critical determinants of a road project's time, cost, and quality are known as critical determinants by Adnan (2019). Construction project managers, according to Bourne (2016), must take into account all factors that affect the project's performance. Finance determinants which include delayed payment from the investor, customer authorization delays, poor planning and geological problems on the construction site, as well as unrealistic contract prices and staffing issues, hampered Egyptian road construction projects.

A lack of resources and poor planning were found to be the most common causes of construction delays or failures by Saraf (2013), Adnan, Sheriff, and Saleh (2019). Road

construction projects in Uganda were plagued by scope changes, environmental issues, and a lack of resources, according to Otim and Alinaitwe (2015). These aspects were also noted by Otim and Alinaitwe. Poor project administration was established to be a most important source of these issues, based on the survey's conclusions. Research that was carried out in Kenya's semiarid and dry regions by Muturi and Oguya (2016) discovered that the contractor's financial stability and disputes were responsible for 82.7 percent of the variation in the dependent variable.

A number of factors, including poor service delivery and cost overruns, support to interruptions in road construction projects; says Manowang and Ogunlana (2010). When it comes to road construction related projects, for example, efficiency and effectiveness are important factors to consider, according to Njenga (2019). A road construction project is deemed successful if it is finished on schedule, on cost, and to the intended performance standards.

Al-Momani (2010) determined that user changes, a shortage of skilled laborers, weather conditions, delays in deliveries, an increase in the number of projects, and economic conditions all contributed to construction delays. Instead of focusing on road construction, the research looked at other public works that might share some of the same characteristics. Another flaw in the research was that it only considered one aspect of a successful road construction project's completion, namely its on-timeness. It ignored quality or the project's adherence to its budgeted cost.

Kenyan studies share the limitations of their counterparts in other countries, failing to focus on road construction projects or relying solely on the costs and delays they incur as

indicators of a project's successful completion. Macharia (2016), for example, neglected to mention the importance of project costs in gauging the success of road construction projects. Unlike Seboru (2015) and Choge and Muturi (2014), Ngacho and Das (2014) only focused on CDF construction projects, while Ngacho and Das (2014) only focused on CDF construction projects. At first, they only wanted to look at a few independent variables that might have an impact on how quickly road construction projects in Kenya are completed. Despite its wide coverage, the survey merely concentrated on the impact of capacity issues on the country's ability to implement road construction projects.

Kenyan shillings worth more than 258 billion have been ploughed into the building of 114 kilometres of new roads in Nairobi County. We set out to examine the factors that previous research has shown to be important in ensuring the success of Kenyan projects in road construction within Nairobi City County (KRB, 2016). As well as the focus on Nairobi Metropolitan in Kenya that KRB, (2016) includes, other independent variables such as stakeholder participation, Management Skills and organizational structure have also been taken into account.

1.1.2 Project Management Determinants and Constructed road Projects

To produce outputs and keep an eye on the overall progress of the project, contractors have a number of duties (Gorog, 2013). They say that they had to complete all of the tasks listed in their application form in order for Lee, Hong, Katerattanakul, and Kim (2012) to claim that they had successfully implemented a road project. As the article points out, a road construction project's success is also influenced by a variety of issues, especially including how well the project's contractors, schedule, and budget meet the grant's requirements.

Defining a project can be difficult, but Cho and Gibson (2011) describe a project as a series of tasks or actions undertaken to achieve a specific goal within a distinct practical specification, as well as with regards to grant constraints and the availability of useful resources. According to Nogeste and Walker (2013), an infrastructure project related to road construction is a sequence of planned and managed activities having a beginning and an end that are carried out to achieve a particular goal while abiding by time, value, and asset restrictions.

A road project's success is inversely proportional to its completion time, according to Ashley et al (2012). This is the correct way to talk about management decisions like budgets, goals, and standards. A high-quality final product is the result of intertwining all of the steps in the road construction process. When it comes to high-quality endeavors, a completed road project has been defined as a measure of success in relation to the project's stated goals or dreams. When it comes to scope, schedule, and financial considerations, it is the project's crowning achievement (Amin, 2011).

When a road project is completed, Akintoye and Takim (2012) say that seven performance indicators can be evaluated: the construction cost and time, as well as consumer contentment with product or service, as well as client appreciation for the service; and three enterprise performance indicators: safety and profitability, according to Akintoye and Takim (2012). Road construction projects are notoriously difficult and fraught with complication, which is made worse by the fact that they typically involve a wide range of stakeholders, including customers, contractors, experts, stakeholders, shareholders, and regulators (Shaban, 2018).

Construction costs, such as equipment and materials, change orders, rework, and increases in material prices, all affect a project's performance, according to Auma (2016). A road project's crowning glory can be achieved through effective settlement control because it is fundamentally a human, material, and logistical trinity that must be addressed.

1.1.3 Performance of Constructed road projects in Nairobi Metropolitan

Nairobi Metropolitan has a large number of completed and ongoing Constructed road projects ranging in size from small to large. The construction of the Thika Superhighway, Nairobi Metropolitan's largest road project, by well-known Chinese contractors illustrates the difficulties in Nairobi Constructed Road developments along with the resulting insufficient competence among local contractors. According to the World Bank (2020), the budget of the Thika Superhighway have grown from 26.44 billion to 34.45 billion. More than 90% of the market's contractors are small or medium-sized businesses. Capitalization is used as a measure of financial strength for these companies. In terms of GDP and economic growth, the work of these subcontractors is critical. Construction sites rely on casual workers like these, who make up nearly half of all the building materials purchased (World Bank, 2020).

According to the following research and writings, contractors in Nairobi for road construction encounter a variety of difficulties and competency based limitations. Procurement procedures, design specifications, and contractor experience are among the most significant factors in whether government-funded Constructed Road projects in Nairobi are completed on time, according to Hassan and Guyo (2017). Because of the confluence of these factors, contractors were unable to meet the equipment, labor, material

and cost control standards expected of experienced contractors. In the city of Nairobi, there was a considerable effect of contract administration and finances, design variance, and technology on the completion duration of large constructed road projects, according to Badu et al. (2018).

Nairobi's Constructed Road project contractors have been found to have a soft underside due to their employees' competence and management systems in place. A study by Osedo (2018) claims that the efficiency of county road constructed projects in Nairobi is affected by how competent the people who are working on the projects are. It was also stated that the realization of county road construction projects is reliant on the support of management. According to Njenga (2019) road construction projects in Nairobi are hindered by a lack of benchmarking, ineffective project management techniques, ineffective procurement, and poor communication.

To cite one example, according to Wairimu (2020), the timely conclussion of road constructed developments is hampered by a lack of financial resources. Constructed road projects are also impacted by the level of expertise of the staff. In addition, employees will be better able to complete the task at hand if they have the necessary skills, experience, and knowledge on hand. The engagement of stakeholders has an impact on participation in the design and execution of road projects, and this collaboration should be promoted.

In spite of these setbacks, local contractors in Nairobi have been working on a number of constructed road projects in the City County of Nairobi. Of the total 2,968 kilometers of road network, 1,331.1 kilometers are asphalted, according to official records. On the planet's surface, there are 1,133.6 miles and 504.1 miles of gravel standards (County

Government of Nairobi, 2021). Knowing how well the local contractors can handle the work load is critical because most of these projects are being handled by them.

1.2 Statement of the Problem

Despite significant government investment, the road building industry still faces significant difficulties as a result of poor financial management and project completion delays (Ministry of Roads and Public Works, 2019). A number of Kenyan projects have been postponed, despite public expectations. Nearly three-quarters (79.2) of Kenya's projects were not accomplished within original budget or time frame in 2013. 6,212 km of tarmac are in good condition and 2,429 km are in poor condition, according to the latest Kenya Roads Board statistics. from 26.44 billion to 34.45 billion, the cost of the Thika Superhighway project has gone up (World Bank, 2014). From July 2011 to July 2013, the project's completion date has been pushed back. As many as 70% of abandoned projects were cited by Hussin and Omran (2012) as being the result of developer financial difficulties; however, according to Piper (2011), up to 71% of road and other infrastructure projects had been abandoned because of developer financial difficulties.

According to Ngacho and Das (2014) and Biamah (2016), project performance evaluation was the focus of their research in Kenya, but the current literature in Africa focuses on overall project performance (Aranda-Jan, Mohutsiwa-Dibe, & Loukanova, 2014). Road construction isn't an area of focus in empirical research, unlike in the United States, where this is the case (Estache, Perelman, & Trujillo, 2015; Kerr & Newell, 2013). As a result of inconclusive empirical studies into the variables influencing road construction project performance in Nairobi Metropolitan, Kenya, there is a lack of information on the

association between the performance of constructed roads and stakeholder participation. As a result, the necessity for this research and It is in light of this background that the research sought to fill the knowledge gap by assessing the project management determinants and performance of constructed road projects in Nairobi Metropolitan, Kenya.

1.3 Objectives of the Study

The following were the objectives that the study was anchored on

1.3.1 General Objective

The aim of the study was to establish the project management determinants and performance of constructed road projects in Nairobi Metropolitan, Kenya.

1.3.2 Specific Objectives

i. To determine the effects of stakeholder participation on the performance of constructed road projects in Nairobi Metropolitan, Kenya.
ii. To explore the effects of Management Skills on the performance of constructed road projects in Nairobi Metropolitan, Kenya.
iii. To assess the effects of organization structure on the performance of constructed road projects in Nairobi Metropolitan, Kenya.
iv. To evaluate the effects of technological innovations on the performance of constructed road projects in Nairobi Metropolitan, Kenya.

1.4 Research Questions

i) What are the effects of stakeholder participation on the performance of constructed road projects in Nairobi Metropolitan, Kenya?
ii) What are the effects of Management Skills on the performance of constructed road projects in Nairobi Metropolitan, Kenya?
iii) What are the effects of organization structure on the performance of constructed road projects in Nairobi Metropolitan, Kenya?
iv) What are the effects of technological innovations on the performance of constructed road projects in Nairobi Metropolitan, Kenya?

1.5 Significance of the Study

This study, which will provide details on how constructed roads perform, will be helpful to road construction companies. A successful construction project related to road infrastructure and well-documented management strategies can be expected as a result.

Policymakers will gain knowledge and develop policies to ensure that poor road construction projects are effectively mitigated in order to succeed effectively. The Kenya Roads Board (KRB) and the Kenya Rural Roads Authority (KeRRA) are two of the government organizations that will keep an eye on the policy formulation process.

The results of this study will be useful to both researchers and academicians if they have access to information on project management determinants and performance of constructed road projects in Nairobi Metropolitan, Kenya.

1.6 Scope of the Study

This study will look at the factors influencing project management and project performance in Nairobi Metropolitan, Kenya. The elements that affect the performance of constructed road projects will be one of the subjects examined, including stakeholder participation, managerial skills, organizational structure, and technological innovation. Private contractors and government representatives from the Ministry of Infrastructure as well as contractors (supervisors), consultants. Furthermore, the study will concentrate on technical auditors engaging in constructed road projects in Nairobi Metropolitan, engineers from Nairobi Metropolitan, and technical consultants by Contractors. The fact that Nairobi is Kenya's economic center and the capital city will justify its inclusion in the Nairobi Metropolitan area, as many of the roads in the area are rated as poor (KPMG, 2014). Between January 2018 and July 2022, researchers plan to conduct their investigation.

1.7 Limitations of the Study

During the course of the investigation, the investigator may run into a number of obstacles that obstruct their ability to gather data. Respondents may be hesitant to provide information out of fear that their answers will reflect poorly on them or that they will be intimidated by the study. In any event, they can rest assured that the information they give to the researcher shall be preserved in privacy and applied only for scholarly objectives.

Participants in a study may be reluctant to share their thoughts, feelings, attitudes, and perceptions because of the sensitive nature of the information sought. Research questionnaires will not require the participants to reveal their names in order for the

researcher to gather the information needed for the study without any reluctance on their part.

The researcher might have the finance challenge in undertaking the field data however the research will ensure that there is surplus by getting funds from his savings and soft loans if need be.

1.8 Assumptions of the Study

Stakeholder participation, Management Skills, organizational structure and technological innovations in Nairobi Metropolitan, Kenya, are assumed to be well-engaged by the contractors in the construction of roads in the area. The findings of this researcher are also expected to be applied to all Kenyan counties.

1.9 Organization of the Study

The existing research will be divided into five sections. The research's history is laid out in detail in Chapter 1. The literature review will be the subject of chapter two. The research methodology will be covered in the third chapter. The results and discussions of the survey will be the subject of chapter four, and the summary, conclusions, and recommendations will be the subject of chapter five.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The section herein lays the groundwork for the research's' theoretical framework by describing the theories on which it will be based. Also included in this section is an analysis of empirical work on the determinants of Performance of constructed road projects, a summary of the literature, and a list of research gaps to be filled.

2.2 Theoretical Literature Review

This chapter reviews the theory of performance, expectancy theory and diffusion of innovation theory as discussed therein.

2.2.1 Theory of Performance

The Theory of Performance (ToP) is a major guiding principle in this research. He is credited as the originator of the theory, Don Elger, who first proposed it in 2007. Humans are capable of extraordinary feats thanks to their high level of performance (Neu, 2013). According to Don Elger, the theory's advocate, performance is a process, with the level of performance being determined by the location. Anyone or a group of people working together can call themselves a performer (Elger, 2011).

Aiming to achieve extraordinary feats, this research incorporates factors such as project financing, technological advancements, and a well-trained workforce that affect the performance of constructed road projects (Bourne, 2006). Clarification of what constitutes a performance is an important aspect of this concept. As pertaining this principle, some of

the components that influence an intervention's performance are unchangeable, but others can be manipulated to generate better outcomes (Akinyele, 2014). Based on the theory of performance, there are a variety of project performance indicators. You'll get better results that go above and beyond when you work at a high level. Because waste and supplies necessary to deliver a result or invention are used more efficiently at higher levels of performance, these savings can be substantial. As performance increases, an entity's ability to produce more output is enhanced. By this theory, a project's performance is measured by the time it takes to complete each individual task (Hassan and Guyo, 2017). Consequently, because it explains the study's variables, such as performance and stakeholder participation, this theory is critical.

2.2.2 Expectancy Theory

The quality of work done by contractors is influenced by their expectations for the future (Elger, 2011). According to Vroom, who coined the term in 1964, people make decisions founded on their conviction that the actions they take will lead to desired results.

Smaller gains and losses are taken as quickly as possible in order to take advantage of short-term trends (Ghura, 2013). Small gains can add up over time to excellent annual returns. People can choose a behavior option if they believe that the results of the interventions are commensurate with their efforts and resources, according to this theory (Harold, 2013). The study's organizational structure lends credence to this hypothesis. There are three main components to Vroom's expectancy theory, and they are: expectancy, instrumentality and also valence. Aspiration is the conviction that the intervention's actions will result in the expected effects. The credence that one will be rewarded for achieving a

specific goal is referred to as instrumentality (Kafuna and Mumba, 2011). They argue that project teams' efforts should be proportional to their compensation. A person's valence is a measure of how much they value the reward of achieving a goal. An individual contractor's level of involvement in the project affects how much reward they feel for completing the task on time to a high standard. Because this theory explains the variables of management skills and organizational structure, it is relevant to this research.

2.2.3 Diffusion of Innovation Theory

First proposed by Everett Rogers in 1962, IDT (Innovation Diffusion Theory) is frequently referenced in case studies. Research into how innovations are adopted and the factors that influence people's decisions will be built on this foundation. Since the adoption of an innovation necessitates organizational change, Rogers' theory cannot be used as a process model (Straub, 2009). Innovation, communication channels used to spread information about benefits and drawbacks of the innovation, and social systems surrounding those who use or don't use it all play a role in the diffusion process, according to Rogers' diffusion theory. An person's determination to embrace or decline invention is influenced by the interplay of these elements (Straub, 2009). In Rogers' diffusion theory, innovation decisions and processes are a subprocess of diffusion. Five stages of adoption are outlined in Rogers' book. Learning as much as possible about the new technology is a critical first step. In the second step, you must persuade the potential adopter of the innovation to change their mind. During this phase, either the innovation is accepted or rejected. An innovation's fourth stage is adoption by the end user. The adopter's final step in the adoption process is to seek confirmation of their decision to put the innovation into action. A

decision must be made whether or not they will continue to implement the innovation and reap the benefits of its implementation (Rogers, 2003).

New technology adoption has two stages: initiation and completion. The company learns about the new technology, adopts a perspective on it, and conducts an assessment of it at this stage of the adoption process. At this point, the business has made the decision to acquire and put to use the innovation. A successful innovation is one that is adopted and implemented by an organization (Rogers, 2003). The diffusion of innovations is influenced by the compatibility, complexity, relative advantage, observability and trialability identified by Rogers in his theory (Rogers, 2003). An innovation's perceived superiority over its predecessor is its relative advantage. An idea's compatibility with the values, needs, and prior experiences of a group's members can be measured by the term "compatibility." A new innovation's complexity stems from how difficult it is to learn how to use, master, and comprehend it. An innovation's ability to be tested incrementally is measured by its trialability. Measuring innovation's observability is a way to gauge how easily others can access its results.

In addition, Rogers claims that five factors influence whether or not a new idea will be adopted: complexity, observability, trialability relative advantage and compatibility. These five factors are listed in Rogers' book. These factors extend beyond adoption. How much better or worse an innovation compares with its competitors can be measured by its relative advantage. Compatibility refers to whether or not a new technology is compatible with a user's current workflow. An innovation's difficulty in learning and implementing increases in direct proportion to how likely it is to be adopted. Complexity has been deemed to be

too much of a burden to bear. Potential adopters should be able to try out new ideas before making a final decision on whether or not to use them. Those who formerly had not considered implementing an innovation at least begin to consider or change their minds adopting it when enough people within a culture system have adopted and diffused the innovation (Rogers, 2003). Observability is a major reason why smart phones and FitBit-like devices have become so popular.. When it comes to online courses, some colleges and universities have waited until the practice has been widely adopted by their peers before offering them. As a result, they were able to see how the strategy performed and the difficulties that early adopters faced. When it comes to diffusion, Rogers (1962/2003) goes into greater detail in his book Diffusion of Innovation.

Introducing new technologies and non-technological advancements into society and culture is a process known as innovation dissemination. The theory of the diffusion of innovations states that, new ideas and practices can be adopted over long periods of time.

2.3 Empirical Literature Review

Examined are peer-reviewed journal articles as well as other relevant publications on the subject matter found on the internet, in research repository websites and databases. Stakeholder participation and performance of constructed road projects, management skills linked to performance of constructed road projects, organizational structure and performance of constructed road projects, and technological innovations and performance of constructed road projects are all discussed in depth in this study. It also looks at how well constructed road projects function in response to these parameters.

2.3.1 Stakeholder Participation and Performance of Constructed Road Projects

Note that the project's financial capacity and flow influence stakeholder participation. As a result of organizational cash flow issues and the late release of project funds, the performance of constructed road projects can be negatively affected (Odeyinka and Yusuf, 2014). When it comes to influencing Contractors' performance, Tony (2014) found that inadequate project financial projections, difficulty in obtaining financing from loan resources, and fluctuations in raw material prices were the most widespread financial aspects.

Rahmat and Ali studied Malaysian construction projects managed by ISO-certified contractors (2017). Thirty people involved in the building process were surveyed using descriptive statistics and a questionnaire. Cost is the worst indicator of Stakeholder involvement performance, with an average of 3.70. Previous studies in the same field found a high value for price, but this one found a low value for it. There was a gap in the research because of the inconsistencies in findings by various authors because of the complexity of construction projects.

According to David's (2015) article on a checklist for prequalifying subcontractors in Asia, the road construction industry faces financial risks due to budget overruns and project scheduling changes. Small contractors lack fixed assets, diversification, and subcontracting capabilities that larger companies enjoy. Jackson (2010) found that project funds have a significant impact on project completion, particularly for small-scale contractors who do not have adequate permanent assets, diversification, and subcontracting ability. Cash flow issues can cause delays or overruns in extensive highway construction initiatives in

Malaysia. In Kenya, many contractors are yet to establish themselves in the Kenyan road building industry.

According to Nwude (2016)'s investigation in Nigeria, which used descriptive statistics and 239 respondents, poor management can have a negative impact on productivity and profitability. For contractors, effective working capital management has taken on critical importance. If the project's working capital needs are not established, the project's working capital requirements will not be met.

Fetene has examined Ethiopia's public building construction projects for cost overruns (2018). As part of the descriptive and exploratory design of the study, project owners, contractors, and consultants were requested to complete a questionnaire. According to the research, 96% of all construction projects exceeded their budget. The cost overrun exceeded expectations by 126% of the original budget, according to the results. The projects' cost over expenditure were discovered as a consequence of incorrect cost estimates and ambiguous project specifications.

In a study published in 2017, Kobusingye investigated how the outcomes of the Rwandan water, sanitation, and hygiene (wash) project were impacted by the involvement of stakeholders. It is critical for public projects to have active participation from all stakeholders, according to the findings of the study, and project managers should be involved in the selection process. The study employed a descriptive research approach and descriptive analysis. Researchers found that involving stakeholders early on was critical to the project's success, and they attribute this to their findings. A key finding of the study is

that involving project beneficiaries in decision-making can help ensure that funds and expertise go to the projects that best meet their needs.

Project identification was examined in detail by Henry (2016) using the African Inland Child and Community Agency for Development as a case study in Kenya. Project stakeholders were found to be actively involved at all stages of the project, according to results. Most of the people who took part in our poll didn't think it was a good idea to create an early stakeholder map and include them in the project planning process. The AICCAD Television Engineering and Technology Program Project identification is facilitated by thorough problem analysis, according to the conclusions of the research. Furthermore, according to the study's findings, project managers should increase stakeholder involvement early on in the project's lifecycle and improve stakeholder mapping.

It was found that the Nairobi County, Kenya automobile emission control project's performance was influenced by stakeholder involvement in project identification, according to a Njogu study (2016). The data was analyzed using an exploratory research strategy and descriptive statistics. Results show that stakeholder involvement during project identification had an important influence on its success, as evidenced by this study this project's findings suggest that management should increase stakeholder involvement in project selection in order to reduce carbon emission rates, lower operating costs and improve cost efficiency while also increasing overall customer satisfaction.

Stakeholder involvement in road project identification and performance in Kenya's Bondo Sub County was examined by researchers in 2018. The analyses were carried out using descriptive statistics and an exploratory research strategy. Bondo Sub-County in Kenya's

road building projects was found to be successful because stakeholders were involved. Phase reviews, for example, were recommended as a way to involve stakeholders in various facets of project identification.

2.3.2 Management Skills and Performance of Constructed road projects

When it comes to "Management Skills" (Medugu, 2014), African economies are poised for a massive upswing. It is expected that the number of highly qualified and experienced Contractors will grow rapidly in the near future, as they will work in a wide range of business sectors and on a wide range of projects (World Bank, 2016).

European infrastructure projects were the focus of Mcrael (2013), an investigation into the importance of managerial skills. Researchers found that applying Management Skills to construction projects improved project quality and timeliness, which boded well for the success of those companies' operations. People would be able to improve decision-making and produce superior services and goods if they had a well-trained workforce that was empowered. In light of the findings, the project manager was able to determine the suitability of workers while developing a schedule and allocating road infrastructure.

It was found that sub-Saharan African road infrastructure firms face significant difficulties in completing high-quality projects, according to Carter (2012). Poor performance by contractors has an impact on outsourcing of technical human resources, according to a survey of 100 project managers and contractors. The lack of skilled and knowledgeable workers has made it difficult for local construction companies to complete projects. Some organizations, according to research, have very few resources at their disposal for

achieving their goals. It was the job of the project manager to come up with innovative solutions when faced with limited resources. Road infrastructure projects can only be successfully completed with the help of a team that has the necessary skills and experience (Warner well, 2013).

Kihoro and Waiganjo (2015) used a cross-sectional survey design to gather data in accordance with their research. In this research, 200 property managers from gated communities made up the population. The research looked at time, cost, and quality. According to the study, there is a positive association between project team proficiency and project performance of 0.8161. The number of workers required to complete a construction project is crucial to its success.

Kenyan housing projects were studied by researchers Githenya and Ngugi (2014). This descriptive study relied on a questionnaire as its primary research tool. The analysis of data was carried out using inferential and descriptive statistics. Many buildings collapsed because of faulty construction standards, causing property damage and even death. The study also discovered that many buildings remained unoccupied as a result of these disastrous failures in the housing sector. According to research, project team competence is linked to project success. The incompetence of project teams has been linked to project failure. Giving well-trained workers specific tasks would help construction projects. Only four variables accounted for 69% of the study's findings. Other technical factors are assumed to account for the remaining 31% of the variance.

In another research, Wambui, Ombui, and Kagiri (2015) studied factors influencing road construction completion in Nairobi City County. This descriptive research design focused

on 10001 financial and technical professionals. We analysed quantitative and qualitative data. The research found that the skill of the project leader to complete the road construction was a significant determinant of success. It was determined that the project team's qualifications and experience affected the project's completion. The project's equipment, funds, and technological advancements all contributed to its success. Building industry performance requires project team competence and employee training.

2.3.3 Organization Structure and Performance of Constructed road projects

According to Ubani (2012), an organizational structure for a construction project's various activities has been defined. The project team is able to work more efficiently and effectively if the project organization is well organized. According to Maduenyi, an organization's performance is directly influenced by its organizational structure (2015).

European Constructed Road Projects were studied by Wolf (2012) to determine the factors that affect their efficiency. Pearson correlation and 112 distributions of Likert scale questionnaires show that an effective institution's performance is positively influenced by its organizational structure, including its productivity process. This study relied on descriptive research methods. Higher productivity is a result of better organization, according to the findings of the study. Organizational structure and outputs were found to have a positive correlation.

Clemmer (2013) analyzed the influence of organizational structure on the effectiveness of Chinese contractors. It is clear from the 232 Contractors who participated in the study that using a Case study research design and structured questionnaires can help an organization's

employees communicate and perform better. Research shows that many construction firms in developing countries lack strong organizational structures. Thus, Contractor output and performance suffer as a result. Research shows that organizations should be structured to maximize their potential in order to meet the goals of the company and the effectiveness of the building industry. Contractors' productivity can be increased by allocating tasks properly, according to a study.

Road construction productivity was studied by Tran and Tian (2013). When the heads of various departments work together to improve their efficiency, a construction company's productivity rises, If the original goal of the organization was to make money, these can be categorized as either successful (profitable) or unsuccessful (non-profitable). As a means of achieving these aims, companies create internal order and relationships among the various components of their organizational structure. Organization, job description creation, and employee distribution are all tasks performed by a company's manager. The manager also assigns workers to various teams and supervisors. They know what is expected of them, and he makes sure they know what they are expected to do on time.

Akinyele conducted a study of Tanzanian construction companies' organizational structures (2014). When looking at market share data, the researcher found that local and government ownership structures, as well as the number of hierarchical levels within those structures, were all positively associated with the financial reporting performance of the corresponding companies. According to the study, successful companies in the same industry had clearly defined organizational structures.

Kenyan road construction firms' performance was examined by Law and Ngai (2018) to see how organizational structure affected that performance. Organizational learning and knowledge sharing were found to be connected in companies engaged in the building of roads. It doesn't matter how you look at it, the structure of an organization has a positive influence on its profitability. This means that the structure of an organization should promote a culture of openness and a systemic view of the organization's processes in order to help it achieve its goals for performance and growth.

2.3.4 Technological Innovation and Performance of Constructed road projects

By Lyytinen and Rose, technology innovation can be measured in four ways (2013). Some examples include technological innovations and the integration of interdepartmental processes, which involves integrating processes from all of the company's divisions. In the section following, the steps are thoroughly explained.

To find out how Chinese construction firms are utilizing cutting-edge methods in road construction and management, Fox News conducted a research project (2013). Using an explanational design and interview schedules, the study found that modern techniques could significantly improve infrastructure projects' quality. According to a recent study, projects were completed on time because of technological advancements.

To find out how much Central Europeans understand about the role of technology in agricultural development, researchers Graham and Mohamed (2013) set out on a mission. According to the study, there was a lack of appropriate technological innovation in European agricultural projects. According to a 2013 study, using technology innovation to

road infrastructure projects will produce a lot more high-quality projects and lessen schedule and expense overruns.

Stephene (2013) asserts that technical approaches have a significant role in the success of infrastructure projects in Kenya. According to an investigation conducted by 76 construction contractors, using outdated methods will never result in a successful project. It was suggested that more efficient and reliable road project management techniques be developed as well. Projects could be completed on time and within budget if technological innovation was used, according to the study.

The failure of Nigerian power projects was examined in a study by Might and Fisher (2011). The lack of progress in technology was mentioned as the major cause for the failure of the majority of power projects. Ancient power projects cannot be avoided, only reduced, they said. Some project managers fail to take advantage of technological advancements because of a lack of financial resources and incompetence.

A road infrastructure project in Kenya necessitated the acquisition of all necessary legal documents prior to construction, according to Ng'ang'a (2015). There are many considerations that contribute to the successful accomplishment of road infrastructure developments, including well-executed project analysis and management. This meant that the realization of infrastructure projects hinged on their capability to effectively oversee existing infrastructure and implement new technological innovations.

Researchers Hill and Utterback (2019) carried out a research in Kisumu County, Kenya, to establish what influences the productivity of businesses. Pearson Correlation, structured

questionnaires, and interviews with 46 contractors revealed that embracing technological innovation boosts productivity. Modern sectors in developing countries, particularly those with long histories of manufacturing and a substantial stock of capital goods, were also found to be actively engaged in technological innovation, according to the findings of the research study.

2.4 Summary of Literature and Research Gaps

As shown in Table 2.1, the current study has a number of specific goals, all of which are summarized for the reader's convenience.

***Table 2.*1:Summary of Literature Review and Identification of Research Gap**

Author(s)	Focus of the Study	Key Findings	Research Gap
Nwude (2016).	Factors influencing Contractors' performance in Nigeria.	The study revealed that managing working capital has been found to be very critical by contractor	The study failed to consider stakeholder participation and Performance of constructed road projects; also the study was done in Nigeria but not in Kenya.
Mandala (2018)	Investigated the effects of stakeholders' involvement in project identification and performance of road in Bondo Sub County, Siaya County in Kenya	This research found that road construction projects in Bondo Sub County, Kenya, were successful because stakeholders were involved in the project identification process.	Study did not consider stakeholder involvement on constructed roads.
Mcrael (2013)	Role of managerial skills in managing infrastructure projects in Europe.	The study asserted that the Management Skills would boost the performance and managerial skills of construction firms.	The study was done in Europe but not in Nairobi Metropolitan.
Wambui, Ombui and Kagiri (2015)	Factors affecting completion of road construction projects in Nairobi City County.	The study identified project manager competence as a major factor affecting completion of road construction.	The study did not consider the influence Management Skills and Contractors performance.
Clemmer (2013).	Importance of organization structure on performance of constructed road projects in China.	The study found that communication between staff of an organization is improved and leads to better performance of constructed road projects.	The study was done in China but not in Kenya. The study did not discuss about organization structure.

Law and Ngai (2018)	Impact of organizational structure on performance of road construction Companies in Nairobi Metropolitan, Kenya.	The study found that for road construction company's process improvements have a positive correlation with knowledge sharing and learning behaviors within an organization.	The study did not show correlation between organization structure and Contractors performance.
Might and Fisher (2011)	Conducted a study on Power Projects failure in Nigeria	The study found that ancient power projects can never be avoided, they can only be reduced.	The study was done in Power Projects in Nigeria, and not done on technological innovation in Kenya.
Hill and Utterback (2019)	Factors to consider to productivity of firms in Kisumu County, Kenya	The study found that adoption of technological innovation positively correlates with productivity using Pearson Correlation	The study didn't work on the relationship between technological innovation and contractor's performance.

Source (Researcher, 2021)

2.5 Conceptual Framework

The subsequent conceptual framework describes the association between the performance of constructed road projects as the predictor variables in this research are stakeholder participation (efficiency in funding, stakeholder participation and fixed assets); Management Skills (organizing, coordinating and leadership); Organization structure (involving, informing and responding); and finally technological innovation (resource allocation, finance and integrated processes). The dependent variable being Contractors performance of Constructed road projects (Recessed Cost, Quality and Durability).

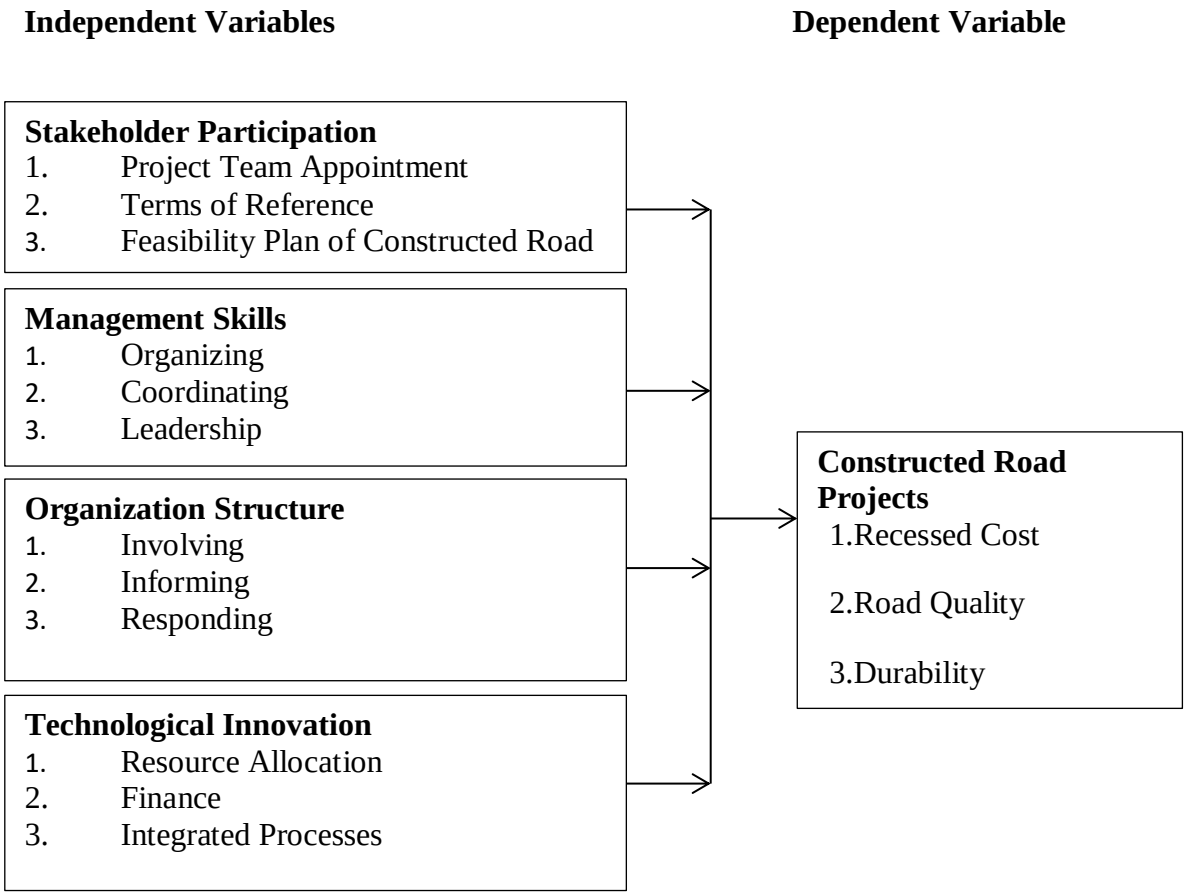

Figure 2.1: Conceptual Framework

Source: Researcher (2021)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The field research design is described in detail in this chapter. It focuses on data sources, data collection methods, sample procedures, and data presentation and interpretation tools. An emphasis is placed in this chapter on research design elements such as target population and sampling design as well as data collection and analysis techniques, as well as instrument validity and reliability.

3.2 Research Design

The term "research design" indicates a framework that serves as a outline for data compilation, measurement, and evaluation and explains how to obtain the information needed to solve a research problem (Cooper & Schindler, 2014). A descriptive study's main goal is to offer a valid and accurate description of the factors or variables that are appropriate to the study's questions and goals (Creswell, 2014). In order to learn more about the phenomenon's current status and describe what it entails in terms of factors or conditions, this study used a descriptive research design. As a consequence, the explanatory study methodology helped with the data collecting regarding the factors that affect project management and the effectiveness of constructed road projects in Nairobi, Kenya. Furthermore, an explanatory design or approach was used since it allows the investigator to use quantitative data to find common characteristics about the population or phenomenon under investigation (Zikmund, Babin, Carr & Griffin, 2010).

3.3 Empirical Model

In the current research, multiple regression models were used by the researcher since they allowed simultaneous control of a large number of different factors that could have an impact on the dependent variables (Gujarati, 2007).The factors that influence Contractor performance must be investigated in this research. The multiple regression analysis was used as part of the model building process (Gujarati, 2007).

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

$$\boldsymbol{PCRPs = \beta_0 + \beta_1 SP + \beta_2 MS + \beta_3 OS + \beta_4 TI + \mu} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{Model 3.1}$$

Where;

$\boldsymbol{\beta_0}$ intercept; $\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, $\boldsymbol{\beta_3}$ and $\boldsymbol{\beta_4}$ are regression coefficients.

PCTPs Performance of Constructed road projects

SP Stakeholder Participation

MS Management Skills

OS Organization Structure

TI Technological Innovations and

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

3.4 Target Population

One must first identify the study population, which Borg and Grall (2009) define as a "universal set of study of all members" if you want to generalize your findings to an complete group of people, objects or events. The target populations of this study were contractors currently running constructed road projects in Nairobi Metropolitan they will be government representatives from Kenya National Highway Authority (KeNHA) whom maintains Thika Road; then the Kenya Urban Roads Authority (KURA) who maintains Ngong Road, Southern By Pass and Outering Road. Contractors (project supervisors), engineers, technical auditors, and consultants working on Nairobi road construction projects (technical consultants employed by contractors) The investigation's sampling area was Metropolitan. According to the (Nairobi Metropolitan Public Works, 2021) has indicated there are 73 Contractors, 67 Contract consultant, 27 Ministry of Road Engineers licensed, there are 17 engineers from the Nairobi Metropolitan Public Works Department and 17 Technical Auditors currently working with Constructed road projects in Nairobi Metropolitan. The target population of the study must possess traits that can be observed, claim Mugenda and Mugenda (2003), in order for the study's conclusions to be generalized. Assuming the population is not homogeneous, this definition is appropriate. Hence the target population is of 201 staffs with four completed Constructed road projects (i.e. Thika Road, Ngong Road, Southern By Pass and Outering Road).

3.5 Sampling Design

All population units from which a sample will be drawn or taken are identified by the sampling design (Cooper & Schindler, 2003). Gay (2001) advises using a sample size

that captures between 10% and 30% of the population for any investigation. In a population with no homogeneous group, this technique is used to obtain a representative sample. As the number of people chosen increases or decreases, the applied stratified random sampling guarantees that different sub-groups are represented (Mugenda & Mugenda, 2003). Purposeful sampling was used to interview participants in the road construction project It included Ministry of Roads engineers, contractors, contractor consultants, county technical auditors. and Nairobi Metropolitan Engineers.

Table 3.1: Sample Size

Category	Frequency	Sample Size	Percentage
Contractors	73	22	37%
Contractor Consultant	67	20	33%
Ministry of road Engineer	27	8	13%
Engineers from Nairobi Metropolitan	17	5	8%
Technical Auditors	17	5	8%
Total	**201**	**60**	**100**

Source: (Researcher, 2021)

3.6 Data Collection Instrument

This current research study gathered data in two ways: primary and secondary. A representative sample in Nairobi Metropolitan, Kenya, was polled for primary data. The questionnaires was used to assess factors identified as essential to the realization of road construction projects. a structured and unstructured questionnaire.

A number of predictor factors impact the achievement or success of Constructed road projects. Stakeholder participation, management skills, organizational structure, road construction performance, and technological factors are examples. Two sections of the

structured and unstructured questionnaire, Part A collected demographic data and Part B looked at independent variables. With a scale of 1 to 5, strong disagreement is rated as 1, disagreement as 2, neutrality as 3, and agreement as 4, and strong agreement as 5. Respondents were able to express themselves when given an open-ended question.

3.6.1 Pilot Test

The questionnaire will be tested on a small pilot sample of participants who share the same traits as the study's participants. According to Saunders, Lewis and ThornHill (2007) asserts that 10% of the sample size can be used for pilot study. Hence this study utilized 10% of the sample size and who were only 6 Road Contractors from Nairobi Metropolitan, these were selected with the help of simple random sample. However, the results from the pilot testing were not used in the main study.

3.6.2 Validity of the Instrument

A data gathering tool's validity relates to how successfully it measures what it promises to measure (Kuada, 2012). The research supervisors and other professionals assessed the study's instrument to make sure it was valid and comprehensive. The content validity of the instrument was also safeguarded by clear and simple questions. Most of the questions was pre-structured around the main research goals.

3.6.3 Reliability of the Instrument

The degree to which research instruments consistently yield results after numerous trials is referred to as their reliability, according to Kuada (2012). To rate the instrument's precision

and dependability, Cronbach's Alpha will be employed. This research was considered adequate when the Cronbach Alpha for all constructs is at least 0.6. According to Kumar (2010) a reliability coefficient of at least 0.6 was acceptable for this research. The findings of the reliability analysis for the study is presented in Table 3.2.

Table 3.2: Reliability Test

Variable	No. of items	Cronbach Alpha Coefficient	Conclusion
Stakeholder Participation	5	0.828	Reliable
Management Skills	5	0.804	Reliable
Organization Structure	5	0.825	Reliable
Technological Innovation	5	0.838	Reliable
Performance of Constructed Road Projects	3	0.855	Reliable

The findings revealed that stakeholder participation and management skills variables had coefficient of 0.828 and 0.804 respectively. Equally, organization structure, technological innovation and performance of constructed road projects had coefficients of 0.825,0.838 and 0.855 respectively. This result shows that all the variables were reliable with internal consistencies.

3.7 Data Collection Procedure

The target sample was surveyed using the drop and pick method in Nairobi Metropolitan, Kenya, and the results were analyzed. Researchers' follow-up with participants via phone calls, email reminders, and visits at their registered offices to ensure that the study was viable. The data response was expected in three weeks, according to the researcher.

3.8 Data Analysis and Presentation

Data entry, coding, and analysis all allow for interpretation in the process of data analysis. Data were gathered and evaluated for the study that included both qualitative and quantitative information. For qualitative data, the respondents' responses were read and categorized into distinct themes. Responses were sorted into distinct categories based on common themes or patterns. Descriptive statistics was calculated from quantitative data entered into the Statistical Package for the Social Sciences (SPSS) (SPSS version 21). Furthermore, descriptive statistics include frequencies, percentages, means, and standard deviations. The results of the analysis were displayed using tables. In this study, multiple regressions were utilized to examine the impact of independent variables on the dependent variables.

3.9 Ethical Considerations

The researcher was duly required to submit an official letter of introduction from Kenyatta University outlining the study's purpose in order to maintain the highest ethical standards. In accordance with regulations, a research authorization was obtained from the NACOSTI through Kenyatta University. The widely-accepted ethical framework will outline respect for the respondent's beneficence and justice. Because the power differential between the participant and the investigator can lead to intentional or unintentional abuse, these responsibilities must be strictly followed. Participants were respected because they have the right to self-determination, which eliminated the need for participants' informed consent. The study gave participants the option of participating or not participating. Under the premise of collective and distributive justice, participants were treated fairly.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

Data analysis is the deliberate use of logical and/or statistical methods to explain and illustrate, sum up and evaluate, and evaluate data. This section describes data analysis beginning with response rate and respondents' general information. furthermore, exploratory analysis such as percentages, means and standard deviation were applied. Finally, correlation and regression analyses were computed, and inferences drawn.

4.1.1 Response Rate

Response rates show what proportion of a sample really responded to a survey. Typically, the percentage of survey respondents is used to assess the representativeness of the sample as a whole. A low response rate could indicate that the results are not representative, whereas a high response rate would suggest that the results are. Table 4.1 provides information on the researchs' response rate.

Table 4.1: Response Rate

Sample size	Returned sample	Percentage (%)
60	53	88

T begin with, 60 participants were included in the study's original sample size. The returned sample was 53 that gave a response rate of 88%. An appropriate range for response rates in business management research could be between 50 and 80 percent (Baruch & Holtom, 2008). This research had a response rate above the threshold, hence making the results representative.

4.2 Analysis of General Information

The basic information relating to the research was analyzed. This include role in the project as well as work experience. Subsequent Tables illustrates the results of this analysis.

4.2.1 Role in the Project

There were four categories that were sampled to provide primary data. Table 4.2 demonstrates these results.

Table 4.2: Role in the Project

Characteristic	Frequency	Percent
Contractor	36	68
Ministry of road Engineer	7	13
Engineer from Nairobi Metropolitan	5	9
Technical Auditor	5	9
Total	**53**	**100**

The results showed that contractors and ministry of road engineers were represented by 68% and 13% respectively. Moreover, engineers from Nairobi metropolitan area and technical auditors were represented by 9% each.

4.2.2 Work Experience

The respondents' years in industry were appropriately analyzed descriptively. The main objective here was to determine whether experience affect overall performance of the organization.

Table 4.3: Work experience in Nairobi County

	Frequency	Percent
less than 5 years	7	13
5-10 years	24	45
10-15 years	17	32
15-20 years	5	9
More than 20 years	0	0
Total	53	100.0

The findings demonstrated that the greater section of the participants (45%) had work experience between 5-10 years. Similarly, those between 10-15 years were 32% of the total sample. This imply that

4.2 Descriptive Analysis

Descriptive statistics aid by providing succinct summaries of the sample and data measures. Moreover, it can help describe and comprehend the characteristics of a particular data collection. In this section percentages, means and standard deviation was employed.

4.2.1 Stakeholder Participation and performance of constructed road projects

The first objective of the current research was to determine the effects of stakeholder participation on the performance of constructed road projects in Nairobi Metropolitan, Kenya. Descriptive statistics were computed to evaluate the variables. The results are displayed in Table 4.4.

Table 4.4: Stakeholder Participation

Statement	SD	D	N	A	SA	Mean	S.Dev
Project team appointment for constructed road is limited and given in Phases.	2%	17%	13%	51%	17%	3.64	1.02
Challenges are experienced during terms of reference on constructed road among employees	0%	11%	21%	42%	26%	3.83	0.95
Cost overruns are experienced due to poor feasibility plan of constructed road projects.	4%	13%	6%	40%	38%	3.94	1.15
There is concern about road stakeholder participation resource.	2%	17%	15%	47%	19%	3.64	1.03
For better constructed road project cost estimation there should be quality feasibility planning.	2%	17%	8%	43%	30%	3.83	1.10
Stakeholder Participation mean Index						3.77	0.81

Participation from stakeholders is critical to a project's success since it supports strong project partnerships. However according to the study, it was observed that 68% of respondents reported that project team appointment for constructed road is limited and given in phases. Correspondingly, a comparable percentage of respondents affirmed the observation that challenges are experienced during terms of reference on constructed road among employees. This suggests that such problems might make it difficult for stakeholders to participate effectively, which would affect how well road construction projects operate. The findings are consistent with those of Issa, Bdair, and Abu-Eisheh (2022), who contend that the technical and financial difficulties experienced by road projects during the planning, bidding, and execution phases of their projects are due to underestimation of the project budget, delays by the contractors, a lack of deterrent

measures, addition of new items, or making changes to the scope of the project that result in variation orders.

Project feasibility enables project managers evaluate a project's viability by identifying the elements that can make it successful. The study revealed that 78% acknowledged that cost overruns are experienced due to poor feasibility plan of constructed road projects. Similarly, 66% of respondents confirmed that there was concern about road stakeholder participation resource. It can be determined that the effectiveness of road project construction could be impeded by a combination of poor feasibility and inadequate stakeholder participation resources. This research concurs with that of David's (2015) who reports that the road construction industry faces financial risks due to budget overruns and project scheduling changes. Small contractors lack fixed assets, diversification, and subcontracting capabilities that larger companies enjoy.

Stakeholders who contribute to a project have varying degrees of responsibilities and influence. Their participation Finally, the survey found that 73 % of respondents believed that thorough feasibility planning was necessary for better constructed road project cost estimation. Stakeholder participation typically had an average index of 3.83 with a standard deviation of 1.10. This current finding agrees with that of Kobusingye (2017) who assert that involving stakeholders early on is critical to the project's success. A key finding of the study is that involving project beneficiaries in decision-making can help ensure that funds and expertise go to the projects that best meet their needs.

4.2.2 Management Skills and Performance of Constructed Road Projects

The second goal of the research was to explore the effects of Management Skills on the performance of constructed road projects in Nairobi Metropolitan, Kenya. Specifically, proportions, averages and standard deviations were utilized to analyze the variables. Table 4.5. show data presentation.

Table 4.5: Management Skills

Statement	SD	D	N	A	SA	Mean	S.Dev
Competency and managerial skills requires organized procedure in road project.	0%	17%	19%	42%	23%	3.69	1.01
Strong leadership helps in monitoring and evaluation for quality works in Constructed Road projects.	0%	8%	32%	38%	23%	3.75	0.89
The result-based management support is rated periodically.	2%	9%	21%	36%	32%	3.86	1.03
Coordination with Management Skills leads to better performance	2%	17%	11%	36%	34%	3.83	1.13
Contractors with organized and coordinated plans downsize risks that may arise.	0%	11%	9%	42%	38%	4.05	0.96
Management Skills mean index						3.84	0.75

Management skills is an important element in project management. From the findings, it was observed that 65% of participants accepted that competency and managerial skills requires organized procedure in road project. Equally, 61% agreed that strong leadership helps in monitoring and evaluation for quality works in constructed road projects. This means that when project managers are adequately competent, performance of the project will be enhanced. The result of the study corresponds with that of Mcrael (2013) who

asserts that applying management skills to construction projects improved project quality and timeliness, which boded well for the success of those companies' operations. People would be able to make improved conclusions and produce goods and services of higher quality if they had a well-trained workforce that was empowered.

It is widely accepted that enhancement of management skills improved better performance in an organization. According to the study, it was established by the findings that up to 68% of the participants agreed that the result-based management support is rated periodically. However,11% disagreed with the statement. Moreover, 70% of respondents were of the opinion that coordination with management skills leads to better effectiveness. The result of the research is consistent with that of Carter (2012) who reports that poor performance by contractors has an impact on outsourcing of technical human resources. The lack of skilled and knowledgeable workers has made it difficult for local construction companies to complete projects. Some organizations, according to research, have very few resources at their disposal for achieving their goals.

Successful coordination of organizations' project require skilled and experienced contractors. This opinion was backed by 80% of respondents who astoundingly acknowledged that contractors with organized and coordinated plans downsize risks that may arise. Similarly, the management skills mean index was observed to impact effectiveness of constructed projects in the road sector within Nairobi Metropolitan (Mean=3.84;SD=0.75). This finding agrees with those of Chang and Shen (2014) who indicated that the effectiveness of coordination is always higher for successful programs than for unsuccessful ones. It was also discovered that engineers might use coordination

techniques to reduce the amount of time they spent writing reports, plans, and correspondence without sacrificing their performance.

4.2.3 Organization Structure and Performance of Constructed Road Projects

The third objective of the research was to assess the effects of organization structure on the performance of constructed road projects in Nairobi Metropolitan, Kenya. exploratory statistics such as percentages, averages as well as standard deviations were applied.

Table 4.6: Organization Structure

Statement	SD	D	N	A	SA	Mean	S.Dev.
Organization culture helps involvement between employees and teamwork among Contractors.	4%	23%	11%	40%	23%	3.54	1.18
Departmental heads helps in informing apprehension throughout the constructed road projects	2%	4%	32%	32%	30%	3.84	0.96
Hierarchal layers builds good response among Contractors	6%	9%	21%	40%	25%	3.67	1.12
Through organization culture one understands the need to be informed for performance of constructed road projects	8%	17%	17%	34%	25%	3.50	1.24
Through hierarchical layers response and been involved helps in performance of constructed road projects.	2%	15%	13%	42%	28%	3.79	1.08
Organization Structure mean index						3.67	0.86

The organizational structure can affect how projects are organized and performed effectively. In this research, it was observed that 63% of participants affirmed that organization culture helps involvement between employees and teamwork among

contractors. However, 23% of respondents disagreed with the statement. This shows that certain organizational cultures may hinder the successful execution of projects. Additionally, majority of the respondents (62%) stated that departmental heads helps in informing apprehension throughout the constructed road projects. Unexpectedly, 32% of participants remained neutral concerning the statement. This suggests that some organizational cultures continue to be a significant obstacle to achieving the project goals. The current study concur with that of Clemmer (2013) who emphasizes that organizations should be structured to maximize their potential in order to meet the goals of the company and the effectiveness of the building or construction industry. Contractors' productivity can be increased by allocating tasks properly.

It is generally acknowledged that hierarchical structures generate distinct responsibilities for activities and departments. According to the study, it was observed that 65% reported that hierarchal layers builds good response among contractors. Similarly, these results were supported by 70% of respondent who agreed that through hierarchical layers response and been involved helps in performance of constructed road projects. This means that A rigorous chain of command is necessary for efficient construction work to establish responsibility for project managers. The results resonates with those of Tran and Tian (2013) who report that when the heads of various departments work together to improve their efficiency, a construction company's productivity rises. As a means of achieving these aims, companies create internal order and relationships among the various components of their organizational structure.

The organizational culture affects how employees collaborate to achieve shared objectives. The view were acknowledged by 59% of those who emphasized that through organization

culture one understands the need to be informed for performance of constructed road projects. This implies that timely feedback and information exchange are essential for coordinating project activities. Principally, the organization structure mean index was observed to be a factor that influence performance of constructed road projects (Mean=3.67;S.D=0.86). This finding coincides with that of Akinyele (2014) who states that local and government ownership structures, as well as the number of hierarchical levels within those structures, were all positively associated with the financial success of the corresponding corporations. According to the research, successful companies in the same industry had clearly defined organizational structures.

4.2.4 Technological Innovations and Performance of Constructed Road Projects

The fourth objective of the research was to evaluate the effects of technological innovations on the performance of constructed road projects in Nairobi Metropolitan, Kenya. The statistical tools used in this section include percentages, means and standard deviations.

Table 4.7: Technological Innovations

Statement	SD	D	N	A	SA	Mean	S.Dev
With the right equipment that is up-to date helps in performance of constructed road projects.	2%	11%	17%	38%	32%	3.86	1.05
With the right materials for constructed road projects firms' performance in increased.	8%	13%	13%	40%	26%	3.64	1.22
For productivity firms adopts the right technological innovation for constructed road projects.	2%	8%	15%	42%	34%	3.98	0.99
Necessary adoption of technological machinery requires funding and productivity planning process.	6%	11%	9%	53%	21%	3.71	1.09
Utilization of modern technological tools has increased contractors' performance of constructed road projects.	6%	8%	9%	49%	28%	3.86	1.09
Technological Innovation mean index						3.81	0.85

In order to complete a construction task effectively, the necessary tools and supplies must be available. The research showed that the bulk of participants (70%) affirmed that with the right equipment that is up-to date helps in performance of constructed road projects. Similarly, the results shows that 66% of respondents emphasized that with the right materials for constructed road projects firms' performance in increased. This suggests that the firm's performance will improve once it has acquired the essential supplies and equipment to carry out the project. This result agrees with that of Graham and Mohamed (2013) who in their study found that modern techniques could significantly improve infrastructure projects' quality. According to this study, projects were completed on time because of technological advancements.

In order to successfully complete their projects, construction firms must use the appropriate technologies. According to the research, majority of respondents (76%) cited that for productivity firms ought to adopt the right technological innovation for constructed road projects. A similar view was sown by 74% who underscored that necessary adoption of technological machinery requires funding and productivity planning process. The finding concur with that of Stephene (2013) who asserts that the quality of service received by contractors and engineers is directly impacted by technical infrastructure. The survey also revealed that using contemporary technologies in road construction aided in the effective delivery of good roads that satisfy customer needs. Modern technologies benefit projects, so it is crucial for contractors to be familiar with them so as to ensure the standard of road construction initiatives is maintained.

Technological innovation is imperative in project planning and management. According to this research, it was well recognized that up to 77% of the surveyed participants affirmed that utilization of modern technological tools has increased contractors' performance of constructed road projects. Nevertheless, up to 14% disagreed with the statement. This implies that technology enables project managers and contractors to make quicker and more knowledgeable decisions based on cost and labor data. In a summary, the technological innovation mean index disclosed that it affected performance of constructed road projects (Mean=3.81; SD=0.85). This finding is consistent with those of Agenbag and Amoah (2021) who observed in their research that the usage of construction technology will significantly affect the workforce since one piece of equipment will be able to complete tasks that a sizable number of laborers could perform. It was also discovered that

using equipment for construction technologies could boost the productivity of construction projects in South Africa.

4.2.5 Performance Constructed Road Projects

The dependent variable for the research study was evaluated in terms of recessed cost, road quality and durability. The statistics employed for this analysis include percentages, means and standard deviations. Table xx displays these analysis

Table 4.8: Performance of Constructed Road Projects

Statement	SD	D	N	A	SA	Mean	S.Dev
Constructed road projects are delivered to the right quality standards stipulated by contractors	2%	17%	21%	37%	23%	3.62	1.07
Constructed road projects usually are within the budget costs	4%	6%	19%	41%	30%	3.96	0.96
Constructed road projects undertaken are completed within the stipulated time and of durability.	5%	11%	15%	37%	32%	3.88	1.10
Performance of Constructed Road Projects Mean Index						3.82	0.92

The analysis revealed that 60% of respondents agreed that constructed road projects were delivered to the right quality standards stipulated by contractors. However, 40% of participants differed with the observation. This implies that performance appeared to be ineffective in some firms. Similarly, 71% asserts that constructed road projects usually are within the budget costs. However, 29% disagreed with the observation. Additionally, the results showed that 69% of participants concurred that constructed road projects conducted were finished within the allotted period and of reliability. However, 31% disagreed with

the statement suggesting that performance of constructed road projects did not meet up the set objectives hence impeding with the overall performance.

4.3 Quantitative Analysis

Inferential statistics employ data from a sample of research participants to compare the groups and draw conclusions about a larger sample of participants. In this section, person correlation and multiple linear regression were employed.

4.3.1 Pearson Correlation

The Pearson correlation assesses how strong two variables are correlated linearly. Pearson coefficients return a value between -1 and +1.This section attempts to ascertain the magnitude and the nature of independent variables on the outcome factor. Table 4.9 provides the study's outcome.

Table 4.9: Correlations Matrix

		Performance	X1	X2	X3	X4
Stakeholder	Pearson Correlation	.729**	1			
Participation	Sig. (2-tailed)	.000				
	N	53	53			
Management Skills	Pearson Correlation	.748**	.757**	1		
	Sig. (2-tailed)	.000	.000			
	N	53	53	53		
Organization Structure	Pearson Correlation	.741**	.432**	.526**	1	
	Sig. (2-tailed)	.000	.001	.000		
	N	53	53	53	53	
Technological Innovation	Pearson Correlation	.789**	.526**	.577**	.785**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	53	53	53	53	53

****. Correlation is significant at the 0.01 level (2-tailed).**

Key: X1- Stakeholder Participation; X2- Management Skills; X3- Organization Structure; X4- Technological Innovation

The study found that, at 0.05 alpha, there was a statistically significant correlation between Nairobi Metropolitan's constructed road projects' performance and stakeholder participation ($r=0.729^{**}$; $p<0.05$). This denotes that when there are clear procedures on project team appointment, terms of reference and feasibility plan of constructed road, performance of constructed road projects will be enhanced.

Additionally, at 0.05 alpha, the research found a substantial association between Management Skills and the success of built-road projects in Nairobi Metropolitan ($r=0.748^{**}$; $p<0.05$). This suggests that management ought to enhance skills related to organizing, coordinating and leadership for successful execution of constructed road projects.

Thirdly, at 0.05 alpha, there was evidence of a substantial and positive association between organizational structure and the effectiveness of road construction projects in Nairobi Metropolitan ($r=0.741^{**}$; $p<0.05$). This proposes that organization ought to possess intrinsic culture that are related to involving, informing, and responding to its stakeholders. This improves the performance of constructed road projects.

The study's outcome found that, at 0.05 alpha, there was a statistically significant correlation between technological innovation and the success of built-road projects in Nairobi Metropolitan ($r=0.789^{**}$; $p<0.05$). This infers that firms need to adopt and employ technologies related to construction to improve on their productivity and effectiveness.

4.3.2 Regression Analysis

Regression is a statistical approach for predicting a dependent variable by means of one or more independent factors. When performing a regression analysis, the researcher's primary

objective or rationale is to discover the relationship between the dependent variable and the independent variable. In this research, multiple linear regression was run and its finding presented in subsequent Tables.

4.3.3 Model Summary

The information on the relationship between the model and the dependent variable is provided in the model summary table. Table 4.10 provides the results.

Table 4.10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.899[a]	.808	.792	.421

a. Predictors: (Constant), Technological Innovation, Stakeholder Participation, Organization Structure , Management Skills

The model establishes that the adjusted R square is 0.792. This means that 79.2% of the variation in performance of constructed road projects can be explained in terms of stakeholder participation, management skills, organization structure and technological innovation. The unexplained variation for this research is 20.8%.

4.3.4 ANOVA

Analysis of Variance (ANOVA) comprises of calculations that serve as the foundation for tests of significance and provide information about the degrees of variability within a regression model. The findings are presented in Table 4.11.

Table 4. 11: ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	35.836	4	8.959	50.473	.000[b]
Residual	8.520	48	.178		
Total	44.356	52			

a. Dependent Variable: Performance of Constructed Road Projects
b. Predictors: (Constant), Technological Innovation, Stakeholder Participation, Organization Structure , Management Skills

The results indicates that the model is highly significant at 0.05 alpha, R^2_{adj} =0.792, F(4,48)=50.473; p<0.05. This suggests that all the independent variables significantly predicted performance of constructed road projects.

4.3.5 Coefficients

Regression coefficients quantify the association between a predictor variable and the response by providing estimates of the population's observable parameters. The finding is presented in Table 4.12.

Table 4.12: Coefficients

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	-.719	.330		-2.182	.034		
Stakeholder Participation	.337	.112	.296	3.009	.004	.413	2.424
Management Skills	.254	.126	.209	2.014	.050	.373	2.681
Organization Structure	.280	.111	.262	2.530	.015	.373	2.681
Technological Innovation	.332	.118	.307	2.808	.007	.336	2.980

a. Dependent Variable: Performance of Constructed Road Projects

The unstandardized coefficients shows how much a change in an independent variable X of one unit causes a change in a dependent variable Y. According to the study (Table 4.12), a unit increase in Stakeholder participation has a significant positive increase in performance of constructed road projects ($\beta=0.296;\rho<0.05$). Similarly, a unit increase in Management skills significantly increases performance of constructed roads Projects by 0.209 units ($\beta=0.209$; $\rho<0.05$)

Moreover, there was evidence of significant ($\rho<0.05$) and positive influence of Organization structure and Technological innovation on performance of constructed roads projects with unstandardized beta coefficients of $\beta=0.262$ and $\beta=0.307$ respectively.

4.3.6 Empirical Model

The relationship model between independent and dependent variables, together with the corresponding beta coefficients, is shown below:

$$PCRPs= \beta 0 + \beta 1SP+\beta 2MS +\beta 3OS+\beta 4TI+ \mu$$

$$PCRPs=-0.719+(0.296xsp)+(0.209xMS)+(0.262xOS)+0.307xTI$$

CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1 Introduction

The most important outcomes of the study are reviewed in this section along with the main conclusion. In addition, the primary goals were assessed in light of the data offered by each outcome. Finally, based on these research findings, recommendations were developed.

5.2 Summary

5.2.1 Stakeholder Participation and performance of constructed road projects

Stakeholder involvement is essential to a project's success because it fosters powerful project partnerships. However, the study found that 68 percent of respondents stated that project team appointments for roads that have been built are constrained and granted in stages. Accordingly, a comparable percentage of respondents agreed with the finding that employees have difficulties when their terms of reference are on newly constructed roads. This shows that such issues might make it challenging for stakeholders to participate in road construction projects successfully, which would have an impact on how well they function.

Project managers can assess a project's viability by figuring out what factors might make it successful using project feasibility. According to the study, 78% of respondents agreed that the poor viability of built-road projects often results in cost overruns. The concern over the resource for road stakeholder participation was also verified by 66 percent of respondents. The performance of road project construction may be hampered by a combination of poor feasibility and insufficient stakeholder participation resources, it might be determined.

The roles and levels of influence that stakeholders play in a project vary. Their involvement is essential for the project's successful execution. According to the study, 73% of respondents said that careful feasibility planning was required for more accurate cost estimation of road-built construction projects.

5.2.2. Management Skills and Performance of Constructed Road Projects

Project management requires strong managerial skills. According to the results, 65% of the participants agreed that planned technique is necessary for competency and managerial skills in road projects. Likewise, 61 % of respondents concurred that strong leadership skills helps in monitoring and evaluating the quality of construction projects for roads. This implies that when project managers are sufficiently competent, the project's performance will be improved. If people had an empowered and well-trained workforce, they could make much better conclusions and generate better services and goods.

It is generally acknowledged that improving managerial abilities leads to better performance within an enterprise. The study found that up to 68 percent of the participants agreed that the support for result-based management is evaluated on a regular basis. Furthermore, nevertheless 11 % of people disagreed with the assertion. Additionally, according to 70% of respondents, collaboration with managerial skills results in higher performance. According to studies, some companies have extremely few resources available to them for attaining their objectives.

Contractors with relevant experience and skill are necessary for the coordination of projects within companies. Surprisingly, 80% of participants supported this opinion, concurring that contractors with well-planned strategies reduce potential hazards. Similar to this, it

was shown that the management skills mean index affected how well road construction projects in Nairobi Metropolitan performed (Mean=3.84;SD=0.75). Additionally, it was found that without compromising performance, engineers could employ coordination approaches to cut down on the time they spent drafting reports, planning, and correspondence.

5.2.3 Organization Structure and Performance of Constructed Road Projects

Organizing and carrying out tasks efficiently can be impacted by organizational structure. According to the study, 63% of participants believed that an organization's culture fosters collaboration among contractors and employee involvement. Nevertheless, 23% of the responders refuted the assertion. This demonstrates how particular organizational cultures may make it harder for projects to be completed successfully. Additionally, the majority of respondents (62%) said that department leaders aid in educating apprehension throughout the construction of road projects. Unexpectedly, 32% of respondents had no opinion on the statement. This implies that some corporate cultures continue to be a significant challenge to accomplishing the project's objectives.

There is widespread agreement that hierarchical arrangements create distinct roles for activities and departments. The survey found that contractors respond well when there are hierarchical tiers because, according to 65% of respondents, they are present. The results were also corroborated by 70% of respondents, who concurred that participation in and reaction through hierarchical layers aids in the accomplishment of completed road projects. This indicates that in order to establish project managers' accountability, an exact chain of command is required for effective construction work.

The way that employees collaborate to achieve shared objectives is influenced by organizational culture. It was established that 59 percent of those who stressed that one realizes the necessity to be informed for the performance of developed road projects agreed with that statement. This suggests that effective information sharing, and timely feedback are crucial for coordinating project activities. The organization structure mean index (Mean=3.67; S.D=0.86) was primarily found to be a factor influencing the performance of constructed built-road projects.

5.2.4 Technological Innovations and Performance of Constructed Road Projects

The required equipment and materials must be on available in order to accomplish a construction operation successfully. In consistent with the research, the vast bulk of participants (70 percent) agreed that performing constructed road projects with the appropriate, modern equipment is helpful. Similar to this, the results show that 66% of respondents underlined that businesses' performance improved with the use of the proper materials for road construction projects. This means that once the company has obtained the necessary tools and supplies to complete the project, its performance will increase.

Construction companies must make use of the proper technologies in order to properly execute their projects. In consistent with the research, the bulk of participants (76 percent) stated that businesses should embrace the appropriate technical innovation for completed road projects in order to increase production. Similarly, 74 percent of respondents emphasized the need for funding and productivity planning processes in order to embrace technological gear, which they viewed as essential. Modern technologies are advantageous

to projects; thus contractors must be knowledgeable about them to guarantee the high quality of road building projects.

In order to effectively plan and manage projects, technology innovation is essential. This survey found that 77% of respondents felt that using contemporary technical tools had improved contractors' performance on built-road projects. However, up to 14% of respondents disagreed with the assertion. This suggests that technology enables project managers and contractors to make decisions based on cost and labor data more quickly and intelligently. The technical innovation mean index showed, in summary, that it had an influence on the performance of built-road projects (Mean=3.81; SD=0.85). It was also shown that utilizing construction-related technology could increase the productivity of building projects.

5.3 Conclusion

The study observed that stakeholder participation has a significant positive influence on performance of constructed road projects. A project's success depends on the participation of stakeholders. Therefore, the effectiveness of constructed road projects will be improved when there are defined procedures regarding project team appointment, terms of reference, and feasibility plan of constructed road.

Good management skills are needed for project management because it boosts productivity within an organization. Strong leadership skills helps in monitoring and evaluating the quality of construction projects for roads.

Some organizational cultures continue to provide a serious obstacle to achieving the project's goals. Consequently, positive organization's culture fosters collaboration among contractors and employee involvement.

Construction companies must make use of the proper technologies in order to properly execute their projects. Modern technologies are advantageous to projects; thus, contractors ought to be knowledgeable about them to guarantee the high quality of road building projects.

5.4 Recommendation

The study's principal recommendations are outlined below.

1. Construction firms should consider stakeholder involvement at all levels from project planning to implementation stages. This promotes ownership and success of the project.
2. This suggests that management should strengthen its organizing, coordinating, and leadership capabilities for the efficient execution of constructed road projects.
3. Construction companies should have an inherent culture connected to its stakeholders in order to involve, inform, and respond to them. This enhances the effectiveness of road construction initiatives.
4. Construction firms need to adopt and employ technologies related to construction to improve on their productivity and effectiveness.

5.5 Recommendation for Further Research

The adoption and usage of new technology is becoming an increasing problem for construction companies. However, there hasn't been much research done on technology

transfer from the standpoint of the construction industry. Research can be conducted to determine the factors influencing technological adoption in the implementation of road constructed projects in Kenya.

REFERENCES

Abdullah, M.N. (2017). Factors affecting road construction cost performance in project management projects. *Journal of the Nigerian Institute of Quantity Surveyors,* 46(5), 17-22.

Adnan, E., Sheriff, M. & Saleh, A. (2019). Factors affecting the performance of construction projects in the Gaza Strip. *Journal of Civil Engineering and Management, 15(3*), 269-80

Agenbag, H., & Amoah, C. (2021, February). The impact of modern construction technology on the workforce in the construction industry. *In IOP Conference Series: Earth and Environmental Science* (Vol. 654, No. 1, p. 012001). IOP Publishing.

Chang, A. S., & Shen, F. Y. (2014). Effectiveness of coordination methods in construction projects. Journal of Management in Engineering, 30(3), 04014008.Ahmed, K. (2009). Understanding Organization Structure in Project Implementation. *European Management Journal,* Vol. 17 (3), 239-51.

Akintoye & Takim (2012). Contract Management Practices and Completion of Electricity Connection Projects in Nairobi, Kenya

Akinyele. L.K. (2014). Organizational structures adopted by construction companies in Tanzania. A New Approach, *International Journal of Project Management*, 18 (78), 327-335.

Al-Momani, A. H. (2000). Construction delay: a quantitative analysis. *International journal of project management*, *18*(1), 51-9.

Ameh, H. & Osegbo, S. (2011). Factors influencing performance of constructed road projects in Indonesia, *proceedings of international conference on advancement in design, construction, Construction Management and Maintenance of Building Structure*, Bali, 14 (1), 20-34.

Amin, O. (2011). Failure and Collapse of Buildings in Nigeria: Roles of Professionals and Other Participants in the Building Industry. *Interdisciplinary Journal of Contemporary Research in Business*, 4, 1267-1272.

Ansoff, I. (2016). Strategies for Diversification. *Harvard Business Review 35* (5), 113-124.

Aranda-Jan, C. B., Mohutsiwa-Dibe, N., & Loukanova, S. (2014). Systematic review on what works, what does not work and why of implementation of mobile health (mHealth) projects in Africa. *BMC public health*, *14*(1), 188.

Arrow, N., & McGrath, P. (2014). Effects of negative social interactions on the implementation of infrastructure projects. *Journal of Operation Management*, 25, 732-749.

Ashley, S. A., & Al-Hejji, S. (2012). Causes of delay in large construction projects. *International journal of project management, 24*(4), 349-357.

Auma, M.O. (2014) Factors affecting performance of road construction in Kenya. *Journal of Construction Technology and Management,* 3(1), 91-103.

Auma, R. (2016). Managing quality in Projects: An empirical study. *International Journal of Project Management* 32 (1),178-187.

Aziz, R. F. & Asmaa, A. A., (2016). Exploring delay causes of road construction projects in Egypt. *Alexandria Engineering Journal. 55(2),* 1515-39.

Badu, E., Edwards, P., & Owusu-Manu, D. (2018). Trade Credit And Supply Chain Delivery In The Ghanaian Construction Industry: Analysis of Vendor Interactiorns With Small To Medium Enterprises. *Journal of Engineering, Design and Technology, 10* (3), 360-379.

Biamah, B. K. (2016). Factors affecting development projects in Kenya: a case of Nairobi Metropolitan, *Unpublished MBA Project*, University of Nairobi.

Black, K. (2004), *Business Statistics for Contemporary Decision Making*, 4th Ed., Wiley-India.

Borg, W. R., & Gall, M. D. (2009). *Educational Research: An Introduction* (Fifth ed.).New York: Longman.

Bourne, L. (2006). *Project Relationships and the Stakeholder Circle. Proceedings of PMI Research Conference, July 16-19 Centre Mont-Royal*. Montreal: Canada.

Breslin, Y. (2019). The Rise of Emerging Markets Multinationals and the Impact on Marketing. *Market Intelligence and Planning 3* (1), 353-358.

Burgess, J., & Stern, K. (2013). Efficient methods of managing of project teams Switzerland. *Journal of Management in Engineering*, *28*(3), 300-10.

Carter, B. (2012). The challenges facing road infrastructure firms in sub- Saharan Africa in their effort to deliver of quality projects.

Carter, K. (2012). Challenges facing road infrastructure firms in sub- Saharan Africa in their effort to deliver of quality projects. *The IUP Journal of Infrastructure*, 9(3), 63-73.

Cho, C. S., & Gibson J.G. (2011).Building project scope definition using project definition rating index.*Journal of architectural engineering, 7*(4), 115-125.

Choge, J. K. & Muturi, W. M. (2014). Factors affecting adherence to cost estimates: A survey of construction projects of Kenya National Highways Authority. *International Journal of Social Sciences and Entrepreneurship, 1* (11), 689-705.

Clemmer, L. (2013). Importance of organization structure on performance of constructed road projects in China. of Construction a. in Developing Countries, 18(2), 33–47.

CNN, (2013). Ancient Mayan Pyramid Destroyed for Road fill. https://edition.cnn.com/2013/05/14/world/americas/belize-mayan-pyramid-destroyed/index.html. Accessed 21st July 2021.

Compass, C. (2013). *Service Management and Marketing*. Lexington, MA: Lexington Books.

Cooper D., & Schindler, P. (2003). *Research Methods and Techniques*. New York: McGraw Hill.

Cooper, D. & Schindler, P. (2014). *Business research methods.* New York: McGraw Hill.

County Government of Nairobi, (2021). Influence Of Regulatory Framework On Performance Of Building Construction Projects In Nairobi Metropolitan, Kenya, *Master of Arts in Project Planning and Management of the University of Nairobi*

Creswell, J. (2014). *Research Design: qualitative, quantitative and mixed methods approaches.* Los Angeles: SAGE Publication.

David, E. (2013). The secrets behind successful management of infrastructure projects in Columbia. *Journal of Language, Technological innovations & Entrepreneurship in Africa, Vol.3 (1),* 109-32.

David, K. (2015). Checklist for prequalifying subcontractors in Asian Countries. *Building Research & Information*, 30.4, pp237-247. *International Journal of Construction Supply Chain management*, 67(1), 56-67.

Donaldson, R. (1995). The Dynamics of Collaboration in Multi-partner Projects. *Project Management Journal, 41*(4), 59-78.

Elger, U. (2011). Current Status and Future Potential of the Research on Critical Chain Project Management. University of Manchester, UK.

Ellaine, R. & Harris, U. (2014). Performance of power infrastructure projects in Uganda noted that offensive strategies could lead to completion of projects within the time schedule and budgeted cost. *Journal of Financial Management of Property and Construction, Vol. 11(1),* 3-20

Estache, A. Perelman, S. & Trujillo, L. (2015). Infrastructure performance and reform in developing and transition economies: evidence from a survey of productivity measures.

Fetene, Q. R. (2018). Causes and effects of cost overrun on public building construction projects in Ethiopia.

Fox, K.L. (2013). Effect of using modern techniques in the construction and management of Constructed road projects Chinese construction companies. *Civil Engineering Dimension Journal*, 12(1), 8–17 delivery of material.

Freeman, K. (1984). *Traditional Management of Infrastructure Projects*. Charies E. Mervil Publishing Company.

Ghura G., (2013). Efficient use of Regional Transport Infrastructure, Communication Networks and Human Capital, *Journal of Infrastructure Systems*, 15(4), 263-272.

Githenya, K. and Ngugi, E. (2014). Assessment of the determinants of implementation of housing projects in Kenya. Unpublished MBA project. University of Nairobi.

Githui, B. (2012). Normative observations on the value added chain and strategic groups. *Journal of International Business Studies 15* (1), 151–168.

Gorog S. L. (2013).Role of construction in economic development; Review of key concepts in the past 40 years. *Habitat International.*

Graham, T. & Mohamed, H. (2013). Establish the level of awareness on uses of offensive strategies in the construction of agricultural projects in Central Europe. *International Journal of Social Sciences and Information Technological innovations. 2(3),* 2412-294

Gujarati, H. (2007) Understanding Organization Structure in Project Implementation. *European Management Journal,* Vol. 17 (3), 239-51.

Harold, R. (2013). Effect of holding technique of infrastructure projects in Europe. *International Journal of Project Management*, *32*(3), 492-507.

Harries, W. & Benedict, B. (2010). Role of the project manager in the hold strategy system. *Journal of Small Business and Entrepreneurship Development*, *2*(3), 89-101

Hassan, H. I. & Guyo, W. (2017). *Determinants of Completion of Government Funded Urban Construction Projects In Nairobi City County, Kenya*.

Henry, W. (2016). Influence of Project Identification Process on Project Performance: A Case of African Inland Child and Community Agency for Development, Vocational Training Project, Kibra Constituency, Kenya.

Hill, R. & Utterback, Q. (2019). Factors to consider to productivity of firms in Kisumu County, Kenya. Contractual Procedures (6 ed.). Pearson Education Limited.

Hofer, L. (2018). Customer Acquisition in Sticky Business Markets. *International Business Review 5* (5), 509-530.

Hussin, H. & Omran, L. (2012). The assessment of user-perceived web quality: application of a satisfaction benchmarking approach, *European Journal of Operational Research.*

Irandu, Y. (2017). Interaction Effects of Information Technologies and Best Practices on Construction Project Performance. *Journal Of Construction Engineering & Management,139*(4), 361-371.

Issa, A., Bdair, R., & Abu-Eisheh, S. (2022). Assessment of compliance to planned cost and time for implemented municipal roads projects in Palestine. *Ain Shams Engineering Journal*, 13(2), 101578.

Kabwegyere, K. & Kiyega, G. (2010). Infrastructure Consortium for Africa. Annual Report, Vol.1, p.30

Kafuna, M. & Mumba, K. (2011). Cost escalation and schedule delays in road construction projects in Zambia. *International Journal of Project Management*, *27*(5),522-531

Kemps, A. J. & Seetanah, B. (2019). Transport infrastructure and foreign direct investment. *Journal of International Development*, *22*(1), 103-123

Kenya Roads Board [KRB], (2016). *Annual Public Roads Programme (APRP) 2016/2017*. KRB

Kerr, N. & Newell, A. (2013). Analysis of time and cost overruns in educational building projects in Egypt, *International Journal of Engineering and Technical Research*, 1(10), 1-5

Kerzner, H. (2011). *Organization Structure Concepts,* 2nd edition. Boston: PWS-KENT Publishing Co.

Kihoro, T. & Waiganjo, P. (2015). Factors affecting performance of projects in the construction industry in Kenya. *Journal of Engineering, Design and Technology*, 10 (3), 360-379.

Kithinji, M. Lisboa J. Yasin, M. & Figueira, J. R. (2017). Benchmarking in a multiple criteria performance context: *An application and a conceptual framework, European Journal of Operational Research*, 184 (452), 244 -254.

Kobusingye, B. (2017). Influence of Stakeholders Involvement on Project Outcomes. A Case of Water, Sanitation, and Hygiene (Wash) Project in Rwanda. *European Journal of Business and Social Sciences*, *6*(06), 195-206.

Kuada, J. (2012). *Research methodology: A project guide for university students.* Samfunds litteratur.

Kumar, R. (2010). *Research methodology: a step-by-step guide for beginners.* Sage Publishers

Law, M. and Ngai, W. (2018). Impact of organizational structure on performance of road construction Companies in Kenya. *Journal of Construction Technology and Management*, 3(1):91-103

Lee, S. Hong, J. Katerattanakul, R. & Kim, P. W. (2012). Analysis of the Impacts of the Number of Bidders Upon Bid Values: Implications for Contractor Prequalification and Project Timing and Bundling", *Public Works Management and Policy*, 12 (3), 503-514.

Leedy, M. (2010). *Social Science Research.* Theory and Principles. Applied Research.

Lehman, K. & Dubrene, D. (2011). Causes of defensive strategies by issuing 105 questionnaires to project managers and Contractors in the U.S. *International journal of project management*, *20*(1), 67-73

Leung, X. (2014). Role of supervising project activities in the performance of infrastructure projects in China. *International Journal of Management Science and Engineering Management.6 (5), 56-67.*

Lyytinen, R. and Rose, N. (2013). PPMS: A Web-based Construction Project Performance Monitoring System, Automation in Construction, 13(78), 361-376.

Macharia, A. & Glen, K. (2016): Improving Kenya's Infrastructure for future generations. *Economical Journal.* 62, 461-78.

Macharia, V.W. (2016). *Factors influencing completion of road construction projects in Embakasi, Nairobi Metropolitan Kenya*. Unpublished MBA Thesis, University of Nairobi.

Mahmoud R. (2014). *Project Risk Analysis and Management* (PRAM) Guide, APM, Buckinghamshire.

Maichuhie, J. (2017) Delivering Transportation Infrastructure Through Public- Private Partnerships: Planning Concerns. *Journal of American Planning Association*, 76(1), 43-58.Solution Group, Melbourne.

Maina, B. M. (2013). *Influence of Contractors' participation on the success of the economic stimulus programme: a case of education projects in Nakuru County, Kenya*. Retrieved from http://erepository.uonbi.ac.ke:8080/xmlui/handle/123456789/56416.

Maina, H. (2019). Strategic management practices and the effect on performance on the Non-Governmental Organizations in Kenya (*Doctoral dissertation, United States International University-Africa).*

Majanja, H. (2015). Factors influencing contractor's performance in Kenya. *The IUP Journal of Infrastructure*, 9(3), 63-73.

Majanja, U. (2012). Competitive strategies used on infrastructure projects in Kenya. *Journal of Emerging Trends in Economics and Management Sciences*, *2*(2), 142-145

Mandala, E. (2018). Influence of Stakeholder's Involvement in Project Management on the Performance of Road Construction Projects in Kenya: A Case of Bondo Sub County, Siaya County.

Manowong, E. and Ogunlana, S. (2010). *Strategies and Tactics for Managing Construction Stakeholders, in Construction Stakeholders' Management (eds. E. Chinyio and P. Olomolaiye).* Wiley-Blackwell, Oxford UK. 121-37.

Martin, Y. (2012). *Technological innovations and Engineering Cost*" Planning for Design Team.

Mcrael, K. (2013). The role of managerial skills in managing infrastructure projects in Europe. *International Journal of Social Sciences and Entrepreneurship* 1.6, 26-48.

Medugu, W. E. (2014). Causes of construction cost and time overruns: The 2010 FIFA World Cup stadia in South Africa. Acta Structilia, 18(10), 51 – 67.

Might, B. & Fisher, C. (2011) Power Projects failure in Nigeria. *Journal of Building Performance* ISSN: 2180- 2106 Vol. 1 (1), 21-28.

Miller,A. & Annard, L. (2011). Understanding Organization Structure in Project Implementation. *European Management Journal,* Vol. 17 (3), 239-51.

Ministry of Transport and Infrastructure (2019*). The ministry of transport and infrastructure*, Government Printers, Kenya.

Minnie, J.A. (2011). Critical success factors for Public-Private Partnerships in South Africa, *PhD Thesis*, Stellenbosch University, South Africa.

Mugenda, O. & Mugenda, A. (2003). *Research methods, quantitative and qualitative approaches.* Nairobi, Acts Press.

Muir, C. (2015). Developing a scorecard for service quality. *Management Services 48* (6), 8–13.

Muturi, W. & Oguya, S.A., (2016). Factors affecting performance of road construction projects in arid and Semi-Arid areas in Kenya. *International Journal of Social Sciences and Information Technology. 2(3),* 2412-294.

Mwakajo, W. & Kidombo, J. (2017). *Performance of constructed road projects in construction projects: a life cycle based framework* (Doctoral dissertation, Heriot-Watt University).

Nagcho, P. & Das, P. (2014). Challenges facing implementation of development projects in Isiolo County, Kenya, *Unpublished MBA Project*, University of Nairobi

Nairobi Metropolitan Public Works (2020). Public Works Department. <https://nairobi.go.ke/roads-and-transport/ > (Accessed 23 December 2020).

National Construction Authority (2014). Kenya Gazette Supplement No. 84. https://eregulations.invest.go.ke/media/74-NationalConstructionAuthorityRegulations2014final.pdf. Accessed 21 July 2021.

National Treasury, (2016). Annual Financial Report. Kenya

Ndandiko, H. (2014). The causes and effects of delays on infrastructure projects. *Journal of financial management*, 3, 35-43.

Nduta, N. A. (2011). *Factors influencing performance of the kazi kwa vijana projects.* Kenya: Kenyatta University.

Neu, B. (2013). An investigation in the Fundamentals of Critical Chain Project scheduling." *International Journal of Project Management 7*(19); 363-369.

Ng'ang'a, M. (2015). Road infrastructure and Contractors performance. *Journal of International Institute for Science, Technology and Education, 3(12) 149 – 156.*

Nga'ng'a J. M. (2011).Application of strategic issue management by independent oil companies in Kenya. Unpublished MBA Project: University of Nairobi, Kenya.

Ngacho, C. & Das, D. (2014). A performance evaluation framework of development projects: An empirical study of Constituency Development Fund (CDF) construction projects in Kenya. *International Journal of Project Management, 32*(3), 492-507.

Njenga, B.K. (2019). Factors Influencing Effective and Efficient Delivery Of Road Construction Projects In Kenya: A Case Of Nairobi Metropolitan. *Master of Arts in Project Planning and Management of the University of Nairobi*

Njogu, B. K. (2016). Factors influencing effective and efficient delivery of road construction projects in Kenya: A Case of Nairobi Metropolitan, *Unpublished MAPPM*, University of Nairobi

Njogu, E. M. (2016). Influence of stakeholder's involvement on project performance: a case of NEMA automobile emission control project in Nairobi County. *Unpublished MBA project, University of Nairobi, Kenya*.

Nogeste, K. & Walker, M. (2013) Influence Of Regulatory Framework On Performance Of Building Construction Projects In Nairobi Metropolitan, Kenya.

Noor, R. (2014). Mitigation of project management threats. *African Journal of Business Management, 2*(5), 93

Nwude, J. (2016). Factors influencing Contractors' performance. *IOSR Journal of Mechanical and Civil Engineering* (IOSR-JMCE), 1(3): 11–14.

Nyika, E. (2012). *The Theory of Constraints and its implications for management accounting, Montvale, Institute of Management Accountants and Great Barrington,* MA, North River Press

Odeyinka, C. and Yusuf, T. (2014). Causes and effects of delays in infrastructure projects in Nigeria. *Building and Environment*, *42*(2), 665-680.

OECD (2014), African Economic Outlook 20012-20013

Ofori, K. (2012) .The factors that affected road construction projects in Lagos, Nigeria. *Published project*, Lagos, Nigeria.

Ogwueleka, A. (2010). The critical success factors influencing project performance in Nigeria. *International Journal of Management Science and Engineering Management. 6(5)89-100.*

Okita-Ouma, J. Lala, U. Moller, U. Koskei, M. Kiambi, Y. Dabellen, T. & Pope, L. (2016). A study on the quantification of delay factors in construction industry, *International Journal of Emerging Technology and Advanced Engineering*, 4(1), 105–113

Olive, Y. & Abel, T. (2014). *Research methods: Qualitative and quantitative approaches,*Africancenter for technological innovations (ACT) press

Ondari, P. O. & Gekara, J. M. (2013). "Factors influencing successful completion of roads projects in Kenya." *International Journal of Social Sciences and Entrepreneurship* 1.6, 26-48.

Osedo, K. (2018).Determinants of Effective Implementation of County Construction Projects in Kenya: A Case of Nairobi City County. *Imperial Journal of Interdisciplinary Research* 3(3), 67-56

Otim, G. & Alinaitwe, H. M. (2015). Factors Affecting the Performance of Pavement Road Construction Projects in Uganda. *Research Gate SB13 (5)*, 243-51.

Owolabi, L. O., Ibironke, O. T., Ganiyu, B. O. & Ola, O. A.W. (2011). Evaluation Rework Cost. A Study of Selected Building Projects in Niger State, Nigeria. *Journal of Geography and Regional Planning* Vol 4(3), 147-151.

Owolabi, Y.W. (2014). *Causes and effects of delays in Malaysian construction industry, International Journal of project management Elsevier*. 25 (20), 517- 526.

Piper, K. (2011). Investigation of significant factors influencing time and cost overruns in Indian construction projects. *International Journal of Emerging Technology and Advanced Engineering*, 3(10), 734 – 740.

Prackel, Q. (2010). The effect of defensive dynamics on the performance of power projects in South Africa. *Journal of Social Sciences and Entrepreneurship.* Vol.1, Issue 2, 2013, 1 (2), 549- 56.

Prichad, K. & Lymer, Q. (2013). Technical threats in infrastructure projects in Europe. *International Journal of Scientific and Research Publications.* Vol 5(11), 525-47

Public Private Partnership Unit. [PPPU], (2016). A review of studies on public–private partnership projects in the construction industry. *International Journal of Project Management*, *28*(7), 683-694.

Raftery, J., Hitt, M. A., Duane, I. R. & Hoskisson, R. E. (2016) *Strategic Management: Competitiveness and Globalization* (4th ed.). New York, NY: Thomson Learning.

Rahmat, I. & Ali, B. (2017). Performance measurement of construction projects in Malaysia.

Reyman, Q. & Harries, R. (2008). Constraints and problems that hamper holding of development projects in Egypt. *Journal of Applied Research, 3*(5), 242-245.

Riedel, M. (2014). Assessments of the Determinants of Implementation of Infrastructure Projects. *Journal of International Development, Volume 23, Issue 2, March 2011, 165–180.*

Rimui, B. M. (2011). *To Investigate Factors Influencing Implementation of Upgrading Projects within Kibera Slum in Nairobi Kenya.* Nairobi: Kenyatta University.

Rogers, E. M. (2003). *Diffusion of innovations, 5th ed.* New York: Free Press.

Rosenau Y. & Vennemo, M. (2007).Investing in Infrastructure Funds. Accessed June 2020 from http:/www.irei.com/upload market research file.

Sang, P. K. (2015). *Sustainability of World Bank Funded Projects in Kenya.* Kenya: Kenyatta University.

Saraf, D. D. (2013). Study of factors affecting performance of construction project. *International Journal of Science and Research (IJSR) 6.14.* 2319-7064.

Saunders, M., Lewis, P., & ThornHill , A. (2007). *Research Methods for Business Students* , 4th Edition, Pearson Education Ltd, Harlow England.

Saunders, Q. (2014). *Overhauling the Engine of Growth; Infrastructure in Africa*; Background Paper of the Africa Infrastructure Country Diagnostic, Washington D.C

Seboru, M. (2015). An investigation into factors causing delays in road construction projects in Kenya. *American Journal of Civil Engineering, 3*(3), 51-63.

Shaban, Y. (2018). Contract Management Practices and Completion of Electricity Connection Projects in Nairobi, Kenya.

Shahid, H. A. (2011). Can high performance work systems really lead to better performance? *International journal of manpower* 27, 741-763.

Simmons, W. (2012). Connecting the Continent; *Costing the Needs for Spending on ICT Infrastructure in Africa*" AICD Background Paper 3 Africa Region, World Bank, Washington D.C

Smith, D. (2013). Causes and effect of defensive aspect in the construction of infrastructure projects in Nigeria. *Project Management Journal, 37*(1), 5-21.

Stephene, M. (2013). Importance of technical strategies in the performance of infrastructure projects in Kenya. *Journal of Construction Accounting and Taxation* 13(1), 35–37.

Stephene N. (2013). Effects of Application of Technology in the Performance of Infrastructure Projects in Switzerland. *International Journal of Project Management,* (19); 393-419.

Straub, E. T. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research, 79*(2), 625-649.

Sweis, G. J. (2013). Factors affecting time overruns in public construction projects: the case of Jordan, *International Journal of Business and Management*, 8(23), 120 – 129.

The Economist (2018). Competing through relationships: grounding relationship marketing in resource—advantage theory. *Journal of Marketing Management* 13 (5), 431-445.

Tiwana, M. (2009). *Research Methods for Business Students* , 4th Edition, Pearson Education Ltd, Harlow England.

Tony, B. (2014). Effect of offensive technique on performance in Europe asserted that some of the challenges that led to poor performance of road infrastructure projects. *Human Systems Management.24* (1), 67-81.

Tony, H. (2014). Causes of Client Dissatisfaction in The South African Building Industry and Ways of Improvement: The Contractors' Perspectives, In CIDB, South Africa.

Tran, M. and Tian, R. (2013). Organizational structures on road construction productivity in Nigeria.

Ubani, E. (2012). International Journal of Research in Engineering and Science , 2(2), 38 - 47.

Vulink, K. (2004). Investigation of significant factors influencing time and cost overruns in Indian construction projects. *International Journal of Emerging Technology and Advanced Engineering,* 3(10), 734 – 740.

Wairimu, U. (2020).Factors Influencing Completion of Road Construction Projects in Embakasi, Nairobi Metropolitan Kenya.*Master of Arts in Project Planning and Management at the University Of Nairobi.*

Wambui, M. Ombui, H. and Kagiri, N. (2015). Factors affecting completion of road construction projects in Nairobi City County. *Life Science Journal*, 9(4), 387-399.

Warner, W. (2013). Developing project competence: Empirical Regularities in Competitive Project Operations. *International journal of innovation Management* 9(4), 451-480

Well-Stam, J. (2012). Effect of swing techniques on the performance of railway projects in China. *Financial Accountability & Management*, *23*(3), 313-336.

Wisdom, J. P., Chor, K. B., Hoagwood, K. E., & Horwitz, S. M. (2013). Innovation adoption: A review of theories and constructs. *Administration Policy in Mental Health, 41*(4), 480–502.

Wissenbach, K. & Wang, W. (2017). Top management involvement in project management: Exclusive support practices for different project scenarios, *International Journal of Managing Projects in Business, 1*(3), 387 - 403

Wolf, G. (2012). Factors influencing the productivity of Constructed road projects in Europe. International Journal of Research in Engineering and Science , 2(2), 38 - 47.

World Bank, (2014). *Project appraisal document of Kenya transport Sector Support Project.*

World Bank, (2016). World Bank Annual Report 2014 .www.worldbank.org/.../the-importance-of-infrastructure-for-economic-growth-jobs-a. Assessed on the 28th July 2021.

World Bank, (2017). Report No: PAD2210. Infrastructure Finance and Public Private Partnerships Project. Finance and Markets.

World Bank, (2020).*World Bank group Infrastructure strategy update- issues and concept note. Master Of Arts In Project Planning And Management, University Of Nairobi.*

Zikmund, W. Babin, B. Carr, J. & Griffin, M. (2010). *Business research methods.* Australia: South-Western Press.

Zwikael, O. & Ahn, K. (2016). Project management: Exclusive support practices for different project scenarios, *International Journal of Managing Projects in Business, 1*(3), 387 – 403.

APPENDICES

Appendix I: Introduction Letter

Onsongo Ong'uti Patrick

Tel: +254-723 342 443

Email: patrick.onguti@gmail.com.

Dear Respondent,

RE: Collecting Data

I am a graduate student at Kenyatta University pursuing a Master's degree in Business Administration (MBA) with a concentration in Project Management. In partial fulfillment of the requirements for the degree, I am conducting an investigation on **"*Project Management Determinants and Performance of Constructed road projects in Nairobi Metropolitan, Kenya*".**

As an employee in an organization operating in this sector, your participation is of great importance for the accomplishment of this study and it will be highly appreciated. The information provided by you will be protected by the principle of confidentiality and a high degree of anonymity will be maintained. Should you have any questions or concerns with regards to the questionnaire, kindly do not hesitate to get in touch with me through the contacts provided below. I would like to express my sincere gratitude and appreciation for your cooperation in advance.

Thank you in advance.

Yours Sincerely,

Appendix II: Research Questionnaire

There are two sections to this survey, and your truthful responses are required in both. It's an academic project, so all information you provide will be kept private (Please tick on the appropriate answer).

Part A: General Information

1. Please indicate your role in your organization?

    a) Contractors [ ]
    b) Ministry of road Engineer [ ]
    c) Engineers from Nairobi County [ ]
    d) Technical Auditors [ ]
    e) Any other? Please specify……..

2. How long have you worked on Nairobi County's road development projects?

    a) Less than 5 years [ ]
    b) 5-10 Years [ ]
    c) 10-15 Years [ ]
    d) 15-20 Years [ ]
    e) More than 20 Years [ ]

Part B: Project management determinants and performance of constructed road projects in Nairobi Metropolitan, Kenya.

i] **Stakeholder Participation**

3. Below statements relate to stakeholder participation elements. Kindly specify the level of your agreement or disagreement in the following statements.

Use the following Keys to tick; (1 =Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

	Statement	1	2	3	4	5
1.	Project team appointment for constructed road is limited and given in Phases.					
2.	Challenges are experienced during terms of reference on constructed road among employees.					
3.	Cost overruns are experienced due to poor feasibility plan of constructed road projects.					
4.	There is concern about road stakeholder participation resource.					
5.	For better constructed road project cost estimation there should be quality feasibility planning.					

4. In your own opinion, what other stakeholder participations elements influences performance of constructed road projects on Constructed road projects in Nairobi Metropolitan, Kenya?

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PART C: Management Skills

5. Below statements relate Management Skills. Kindly specify the level of your agreement or disagreement in the statements that follows:

Use the following Keys to tick; (1 =Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

	Statement	1	2	3	4	5
1.	Competency and managerial skills requires organized procedure in road project.					
2.	Strong leadership helps in monitoring and evaluation for quality works in Constructed road projects.					
3.	The result-based management support is rated periodically.					
4.	Coordination with Management Skills leads to better performance.					
5.	Contractors with organized and coordinated plans downsize risks that may arise.					

6. In your own opinion, what other Management Skills elements influences performance of constructed road projects on Constructed road projects in Nairobi Metropolitan, Kenya?

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Part D: Organization Structure

7. Below statements relate to organization structure. Kindly specify the level of your agreement or disagreement in the statements that follows:

Use the following Keys to tick; (1 =Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

	Statement	1	2	3	4	5
1	Organization culture helps involvement between employees and teamwork among Contractors.					
2	Departmental heads helps in informing apprehension throughout the Constructed road projects					
3	Hierarchal layers builds good response among Contractors					
4	Through organization culture one understands the need to be informed for performance of Constructed road projects					
5	Through hierarchical layers response and been involved helps in performance of Constructed road projects.					

8. In your own opinion, what other organization structure elements influences performance of constructed road projects on Constructed road projects in Nairobi Metropolitan, Kenya?

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Part E: Technological Innovation

9. Below statements relate to technological innovation. Kindly specify the level of your agreement or disagreement in the statements that follows:

Use the following Keys to tick; (1 =Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

	Statement	1	2	3	4	5
1.	With the right equipment that is up-to date helps in performance of Constructed road projects.					
2.	With the right materials for Constructed road projects firms' performance in increased.					
3.	For productivity firms adopts the right technological innovation for Constructed road projects.					
4.	Necessary adoption of technological machinery requires funding and productivity planning process.					
5.	Utilization of modern technological tools has increased Contractors performance of Constructed road projects.					

10. In your own opinion, what other technological innovation influences performance of constructed road projects in Constructed road projects in Nairobi Metropolitan, Kenya?

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Part F: Performance of Constructed Road Projects

i]: Performance of Constructed Road projects

11. Below statements relate to performance of constructed road projects. Kindly specify the level of your agreement or disagreement in the following statements.

Use the following Keys to tick; (1 =Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

	Statement	1	2	3	4	5
1.	Constructed road projects are delivered to the right quality standards stipulated by contractors					
2.	Constructed road projects usually are within the budget costs					
3.	Constructed road projects undertaken are completed within the stipulated time and of durability.					

12. In your own opinion, what are the other determinants to performances of Constructed road projects elements in Nairobi Metropolitan, Kenya?

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Thank You for Taking Your Time!!!

Appendix III: List of Contracted Roads in Nairobi Metropolitan

List of Constructed Roads	Organizations
Thika Road	KeNHA
Ngong Road	KURA
Southern By Pass	KURA
Outering Road	KURA