

**INFLUENCE OF CONTRACTORS' EXPERIENCE, OBSTRUCTION OF ROAD  
CONSTRUCTION SITES AND PROJECT SPECIFICATION CHANGES ON  
COMPLETION OF ROAD CONSTRUCTION PROJECTS IN KAKAMEGA COUNTY**

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the Degree of Master of Arts Degree in Project Planning and Management of the  
University of Nairobi**

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## DECLARATION

This project report is my original work and has not been presented to any other institution of higher learning for any award.

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**Date: 01/12/2022**

**L50/86327/2016**

This Project Report has been submitted with my approval as the university supervisor.

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## **DEDICATION**

I am thankful to my family for always being there for me during the time I undertook this important journey. I sincerely appreciate you all and pray that the almighty God may reward you abundantly. I dedicate the work to my late parents Boaz Andabwa Otinga and Rufina Isichi.

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## TABLE OF CONTENTS

<b>DECLARATION</b> .....	<b>Error! Bookmark not defined.</b>
<b>DEDICATION</b> .....	2
<b>ACKNOWLEDGEMENT</b> .....	iv
<b>LIST OF TABLES</b> .....	viii
<b>LIST OF FIGURES</b> .....	ix
<b>LIST OF ABBREVIATIONS AND ACRONYMS</b> .....	x
<b>ABSTRACT</b> .....	xi
<b>CHAPTER ONE</b> .....	1
<b>INTRODUCTION</b> .....	1
1.1 Background of the Study .....	1
1.2 Statement of the Problem .....	4
1.3 Purpose of the Study .....	5
1.4 Objectives of the Study .....	5
1.5 Research Question .....	5
1.6 Hypotheses .....	5
1.7 Significance of the Study .....	6
1.8 Delimitation of the Study .....	6
1.9 Limitations of the Study .....	6
1.10 Assumptions of the Study .....	7
1.11 Definition of Significant Terms of the Study .....	7
1.12 Organization of the Study .....	8
<b>CHAPTER TWO</b> .....	10
<b>LITERATURE REVIEW</b> .....	10
2.1 Introduction .....	10
2.2 Completion of Road Construction Projects .....	10
2.3 Contractors' Experience and Completion of Roads Construction Projects .....	12
2.4 Obstruction of Road Construction Sites and Completion of Road Construction Projects .....	14
2.5 Project Specification Changes and Completion of Road Construction Projects .....	17
2.6 Theoretical Framework .....	21

2.6.1	Stakeholder Theory .....	21
2.6.2	Theory of Constraints.....	22
2.7	Conceptual Framework .....	24
2.8	Research Gap .....	25
2.9	Summary of Literature Review.....	27
<b>CHAPTER THREE .....</b>		<b>28</b>
<b>RESEARCH METHODOLOGY .....</b>		<b>28</b>
3.1	Introduction.....	28
3.2	Research Design .....	28
3.3	Target Population .....	28
3.4	Sample Size and Sampling Procedure .....	29
3.5	Research Instruments .....	29
3.6	Pilot Test .....	30
3.6.1	Validity Test.....	30
3.6.2	Reliability Test.....	30
3.7	Data Collection Methods .....	31
3.8	Data Analysis Techniques.....	31
3.9	Operational Definition of Variables.....	32
3.10	Ethical Considerations .....	33
<b>CHAPTER FOUR .....</b>		<b>34</b>
<b>DATA ANALYSIS, PRESENTATION AND INTERPRETATION .....</b>		<b>34</b>
4.1	Introduction.....	34
4.2	Questionnaire Return Rate.....	34
4.3	Background Information.....	35
4.3.1	Distribution of Respondents by Gender .....	35
4.3.2	Distribution of Respondents by Age .....	35
4.3.3	Distribution of Respondents by Academic Qualification .....	36
4.3.4	Distribution of Respondents by Role in Road Construction Project.....	36
4.3.5	Distribution of Respondents by Period Worked in Project.....	37
4.3.6	Distribution of Respondents by Experience in Current Position .....	38

4.4	Extend to which Contractors Experience, Obstruction of Road Construction Sites and Project Specification Changes Influence Completion of Road Construction Projects .....	39
4.4.1	Extend to which Contractors' Experience Influence Completion of Road Construction Projects .....	41
4.4.2	Extend to which Obstruction of Construction Sites Influence Completion of Road Construction Projects .....	44
4.4.3	Extend to which Project Specification Changes Influence Completion of Road Construction Projects .....	47
4.5	Analysis of Variance (ANOVA) and Testing of Hypotheses .....	50
4.5.1	Analysis of Variance (ANOVA) .....	51
4.5.2	Multivariate Analysis .....	52
4.5.3	Hypotheses Testing .....	53
<b>CHAPTER FIVE .....</b>		<b>55</b>
<b>SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATION .....</b>		<b>55</b>
5.1	Introduction.....	55
5.2	Summary of the findings .....	55
5.3	Discussions .....	56
5.3.1	Project Completion.....	56
5.3.2	Extent to which Contractors' Experience Influences Completion of Road Construction Projects.....	57
5.3.3	Extent to which Obstruction of Construction Sites Influences Completion of Road Construction Projects .....	58
5.3.4	Extent to which Project Specification Changes Influence Completion of Road Construction Projects .....	59
5.4	Conclusions.....	60
5.5	Recommendations.....	62
5.6	Suggestions for Further Studies .....	63
<b>REFERENCES .....</b>		<b>65</b>
<b>APPENDICES .....</b>		<b>72</b>
	Appendix I: Introduction Letter.....	72
	Appendix II: Questionnaire For Respondents.....	73
	Appendix III: Authorization Letter.....	79

Appendix IV: Research License.....	80
Appendix V: Krejcie & Morgan 1970 Sampling Table.....	81

## LIST OF TABLES

<b>Table 2.1</b> Research Gap .....	24
<b>Table 3.1</b> Target Population.....	27
<b>Table 3.2</b> Sample Size.....	27
<b>Table 3.3</b> Operational Definition of Variables.....	30
<b>Table 4.1</b> Response Rate .....	32
<b>Table 4.2</b> Respondents’ Gender Distribution.....	33
<b>Table 4.3</b> Respondents’ Age Distribution.....	33
<b>Table 4.4</b> Respondents’ Academic Qualifications .....	34
<b>Table 4.5</b> Respondents’ Roles in the Construction Projects .....	35
<b>Table 4.6</b> Respondents’ Period of Work in Respective Projects.....	35
<b>Table 4.7</b> Respondents’ Experience in Current Positions .....	36
<b>Table 4.8</b> Interruption of Completion of Road Construction Projects .....	37
<b>Table 4.9</b> Extent of Interruption of Completion of Road Construction Projects .....	38
<b>Table 4.10</b> Influence of Contractors’ Experience on Completion of Road Construction Projects .....	39
<b>Table 4.11</b> Extent of Influence of Contractors’ Experience on Completion of Road Construction Projects.....	40
<b>Table 4.12</b> Influence of Obstruction of Construction Sites on Completion of Road Construction Projects.....	42
<b>Table 4.13</b> Extent of Influence of Obstruction of Construction Sites on Completion of Road Construction Projects .....	43
<b>Table 4.14</b> Influence of Project Specification Changes on Completion of Road Construction Projects.....	45
<b>Table 4.15</b> Extent of Influence of Project Specification Changes on Completion of Road Construction Projects .....	45



<b>Table 4.16</b>	Analysis of Variance .....	48
<b>Table 4.17</b>	Multiple Regression Analysis .....	49

### **LIST OF FIGURES**

<b>Figure 2.1</b>	Triple Constraint Figure .....	22
<b>Figure 2.2</b>	Conceptual Framework .....	22

## LIST OF ABBREVIATIONS AND ACRONYMS

<b>BOQ</b>	Bill of Quantity
<b><u>GoK</u></b>	Government of Kenya
<b><u>KeNHA</u></b>	Kenya National Highways Authority
<b>KIE</b>	Kenya Institute of Engineers
<b><u>KeRRA</u></b>	Kenya Rural Roads Authority
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>KURA</b>	Kenya Urban Roads Authority
<b>NACOSTI</b>	National Commission on Science, Technology and Innovation
<b>NCA</b>	National Construction Authority
<b>PMI</b>	Project Management Institute
<b>SPSS</b>	Statistical Package for the Social Sciences
<b>USA</b>	United States of America

## ABSTRACT

Both national government and county governments are committing a lot of resources towards infrastructure projects, specifically on road construction sector. Hence, timely finishing of the projects is important. The research sought to establish influence of contractors' experience, obstruction of road construction sites and project specification changes on completion of road construction projects in Lurambi sub-county in Kakamega County. Lurambi is one of the twelve sub-counties forming Kakamega County namely: Ikolomani, Khwisero, Malava, Lugari, Shinyalu, Navakholo, Mumias east, Mumias west, Matungu, Likuyani, Butere and Lurambi. Kakamega town falls under the Lurambi sub-county. Specific objectives included influence of contractors' experience on project completion, effect of obstruction of road construction sites on project completion, and how change in project specifications impacts road completion projects in Kakamega County. Descriptive research design was adopted for the study where purposive and systematic random sampling techniques were applied to select 92 respondents. A questionnaire was employed in data collection and descriptive analysis carried out using SPSS computer software. Analyzed quantitative data was presented using tables whereas qualitative data was presented using narratives. Throughout data collection process, all ethical considerations were observed. The interviewee had to consent first to be interviewed, they were informed what the research was about, they were assured that their identity would not be revealed and the information collected would only be used for the intended purpose and be held in confidence. The findings revealed that contractors' experience, obstruction of construction sites and change of project specifications significantly influenced completion timelines of the projects. Eighty-eight (88%), 76%, and 44% of the respondents respectively agreed that contractors' experience, obstruction of construction sites, and project specifications greatly influenced projects' completion schedules. Specifically, inexperienced contractors could not easily adjust to changing dynamics, such as rainy weather which often made it difficult to transport construction materials and machinery to the sites. Furthermore, such eventualities as land conflicts and negotiations for compensation of land for the affected community members sometimes turned to be too complicated for some contractors to handle in good time to allow progress of construction. Unexpected change of project specifications due to such issues as increase of price of some of the key construction materials led to review of initial plans, hence causing delays in completion. The research concluded that there was need for the government as a client to carefully vet contractors' experience and capacity before they are awarded contracts. This would also ensure that they have the right skills and machinery for effectively executing their mandate. Careful initial design and planning of projects would also avoid unnecessary change of specifications of project, which could cause delays in completion. The findings of the research are useful for policy formulation in the road construction industry, as well as acting as reference material for future researches.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Globally, delayed completion of projects is common. This is dictated by diverse factors (Chism and Armstrong, 2010). Inadequate projects financing, poor management models, and ineffective feasibility studies are some of the main hindrance factors to performance of projects (Omran, Abdalrahman & Pakir, 2012). According to McMiniminee, Shaftlin, Warne, Detmer, Lester & MroczkaG (2011), in Australia unfair pricing and uncertainty of the date of project completion as well as poor standards tend to delay project completion. Failure to strictly observe these factors often leads to contractors incurring huge losses during a project lifecycle. *Rose* (2013), carried out a study in the United Kingdom, statistics indicated that about 20% of the construction projects which delayed completion were affected by unclear objectives, improper costing and timing, and poor quality of the project management teams. Furthermore, the project managers lacked comprehensive knowledge in the overall costing of the project which sometimes leads to delay of completion.

Locally, Omran et al (2012) noted that in Sudan roads projects were significantly affected due to various issues. Regardless of the complexity of a project, a number of construction projects have experienced the challenge of cost overruns (Omran et al, 2012). Further, Gaba (2013) states that in Ghana many projects in road construction experienced rising cost overruns, unrealistic and unnecessarily broad objectives which caused unprecedented delays in completion. Similar sentiments were raised in a study conducted in South Africa by Olatunji (2010) where it emerged that poor project supervision led to delay and confusion regarding the direction and lifecycle of the project. The study further indicated that a number of road construction project management in South Africa did not comprehensively factor in clients' needs at the time of inception of the project hence causing confusion in the later project phases. Furthermore, many project managers in road construction sector did not have a comprehensive understanding of their roles as they lacked specialized project management skills. Ultimately, this led to project delays.

In another study carried out in Nigeria by Aibinu and Jagboro (2012), it revealed that road construction projects delay had become commonplace. In order to avoid this scenario, the research recommended that there was need for awareness creation among all the stakeholders in the road construction sector to engineer a sense of proper project planning right from inception phases. Avoiding the project completion delays will significantly save on cost and time of project execution (Subramani, Sruthi & Kavitha, 2014).

Road construction in Kenya is a robust industry, with several roads and buildings being constructed daily. Considered as a business hub in the East African region, Kenyan road construction sector has continued to attract foreign investors' funding hence making it one of the most vibrant project undertakings in the country (Wambugu, 2013). Other notable projects are often undertaken by private individuals as well as local and international companies. Regardless who direct players in the road construction projects were, Mathonsi and Thwala (2012) state that there must be project controls to ensure that specific assignments are completed on time where project objectives are met within set budgets. Road construction project managers are therefore required to have relevant skills, able to institute effective mechanisms for monitoring progress, evaluating plans and undertaking corrective initiatives whenever circumstances demand so (Ayudhya, 2011).

Road classification in Kenya depends on whether the road is crossing international borders, or ending at international ports, or linking centres of international importance, or linking the former provincial headquarters or a lower class road linking higher classes. KeNHA, KURA, and KeRRA are the agencies the government uses to construct, upgrade, maintain and for management of the various classes of roads. The national government funds the construction, upgrade, and maintenance of classes A, B and C roads while the county governments deal with the rest of the categories (Nyandika & Ngugi, 2014).

Irrespective of the government agency carrying out a particular road project in Kenya, the overriding goal for all the stakeholders revolves around timely completion (Ayudhya, 2011). Project contractors, engineers, and other consultants must always strive to complete work as planned while at the same time observing high quality standards for posterity (Baloi & Price, 2012). A good road network is a key enabler of economic activities since it improves

communication and lowers transport costs, hence significantly reducing the cost of goods and services and improving social services. Furthermore, since road construction projects are labour intensive in nature, effective road construction project management presupposes creation of job and training opportunities for the locals (Chai & Yusof, 2013). Furthermore, reduction in delay of road construction projects is important because when roads are completed in time they become available early for economic use. Yet, it has been observed that Government funded projects always fall behind schedule, thus inflating overall costs (Chinyio, 2011).

According to Fapohunda and Stephenson (2010), the delays in road construction projects are often influenced by changes in pricing, designs, and budgetary depletion, and need for hiring extra tools during construction not anticipated there was also the issues of underestimation of cost of construction, wrong time estimation and bad weather, among many other factors. Therefore, a study on road construction project is important for stakeholders to have a clearer understanding of what causes these delays so that proper planning, monitoring and evaluation, and effective use of resources can be implemented.

Kakamega County witnessed enhanced road construction projects in the years under review (2014 to 2020). Buoyed by the Kenyan Vision 2030 of achieving the country's integrated development in all sectors by 2030, the county continued to increase budgetary allocations for its roads network (Ogeno, 2016). For instance, in 2019/2020 financial year the county was proposing to spend 1.8 billion on roads infrastructure, public works, and Energy, which was a 20% increase from its 1.5 billion budget of 2018/2019 financial year (Ochunge, 2020). The increase in budget for roads construction hoped to achieve the national government's ambition of constructing enough good roads for economic expansion through timely transportation of all the necessities from all sources to relevant destinations. Yet, completion delay of road projects in Kakamega County was real. This state of affairs could be exemplified by the Kakamega – Webuye road which started in 2011 and planned to be completed by January 2019, but was yet to be completed (GoK, 2019). This continued to inconvenience the county residents and generally slowed down the economic performance of the region.

## 1.2 Statement of the Problem

The motorway transport network in Kakamega County budget was increased from 1.5 billion shillings in 2018/2019 financial year to 1.8 billion shillings for the 2019/2020 financial year, however, this has not improved the efficiency of project management to guarantee timely completion. For instance, the Kakamega – Webuye class A1 road which was initiated in 2011 with anticipation that it would be completed by January 2019 is yet to be completed. The upgrading to bitumen standard of the 45 kilometers Kakamega – Shikoti – Navakholo – Musikoma class C41 road had a budget of ksh1.8 billion, it has since been revised to ksh2 billion. The road project which is under KeRRA was started on 06/03/2017 and was planned to be completed by 04/09/2019, the project is being handled by three contractors covering different sections. It is only 44% complete. A lot of money is still allocated for many other road construction projects but which remain uncompleted several years after the expiry of the estimated time of completion. Besides the delay which denies the residents timely utilization of the roads for their economic development and general wellbeing, the costs of the projects tend to eventually shoot thereby causing a lot of frustrations to all key stakeholders (Shilista, 2020).

According to the county government of Kakamega, between 2014 and 2020 a total of 148 Class C road construction projects under KeNHA, 2,989 Class D&E under the county government, and 116 class D&E under KeRRA were started (County Government of Kakamega, 2021). Although some of these projects have since been completed, others are in progress and past their completion date and others remain in progress without clear indication whether they will be completed within schedule. The success of any development project is measured based on its timely and effective completion within allocated budget, client's envisioned scope and set quality standards. Yet, many road projects in Kakamega County and Kenya in general continue to witness delayed completion. However, it is not clear what exactly causes the delay and to what extent such factors contribute to delay of projects completion. Road contractors estimate that nearly 50% of road construction projects are never finished on time whereas 40-200% encounters budget overheads. The end result is delay of completion of the project, which in turn eats into the project consistency fund.

### **1.3 Purpose of the Study**

The purpose of this study is to establish influence of contractors' experience, obstruction of road construction sites and project specification changes on completion of road construction projects in Lurambi Sub County in Kakamega County.

### **1.4 Objectives of the Study**

The study had the following objectives:

- i. To determine the extent to which contractors' experience influence completion of road construction projects in Lurambi sub county, Kakamega County.
- ii. To establish the extent to which obstruction of road construction sites influence completion of road construction projects in Lurambi sub county, Kakamega County.
- iii. To examine the extent to which project specification changes influence completion of road construction projects in Lurambi sub county, Kakamega County.

### **1.5 Research Questions**

The following are the research questions:

- i. What is the extent to which contractors' experience influences completion of road construction projects in Lurambi sub county, Kakamega County?
- ii. What is the extent to which obstruction of road construction sites influences completion of road construction projects in Lurambi sub county, Kakamega County?
- iii. What is the extent to which project specifications changes influence completion of road construction projects in Lurambi sub county, Kakamega County?

### **1.6 Hypotheses**

1. **H<sub>0</sub>**: There is no relationship between contractors' experience and completion of road construction projects in Lurambi sub county, Kakamega County.
2. **H<sub>0</sub>**: There is no relationship between obstruction of road construction sites and completion of road construction projects in Lurambi sub county, Kakamega County.



3. **H<sub>0</sub>**: There is no relationship between project specification changes and completion of road construction projects in Lurambi sub county, Kakamega County.

### **1.7 Significance of the Study**

Interested parties in roads construction industry will benefit from the research, including the national and county governments and other relevant agencies, to better understand what influences completion of road construction projects. This understanding will help in redefining how to channel roads construction resources to critical areas thereby reducing delay in road construction in future. The research findings may also help the government in general management of roads construction projects where quality roads are constructed and completed on time within a reasonable short time. From a broader perspective, this study may serve as basis for future research and for policy formulation which encourages partnerships from different national and international donors or NGO players for quick and enhanced interconnectivity of the country both within and outside respective counties.

### **1.8 Delimitation of the Study**

The research area was in Lurambi sub county. The period of research was road construction projects between the year 2015 & 2019. Before the promulgation of the 2010 constitution that ushered in county governments in 2013, Kakamega County existed as Kakamega district, covering the same physical location. In the literature review, projects carried out in other locations and other periods were reviewed. The study specifically focused on influence of contractors' experience, obstruction of road construction sites and project specification changes on completion time of road construction projects in Lurambi sub county.

### **1.9 Limitations of the Study**

There was reluctance from project managers who were not willing to answer questions for fear that the information they volunteered would perhaps be used against them or their organization. Furthermore, some of the information sought was sometimes viewed by the respondents as classified and therefore not readily being availed to outsiders. Also, some project managers

intentionally gave incorrect information which was likely to lead to misrepresentation of data. Some of the targeted respondents such as contractors and government officials were also not present during the research team's visits. Additionally, limited financial resources and diversity of the respondents posed a challenge in terms of accessing the research participants.

In order to address the aforementioned limitations, an introduction letter was obtained from University detailing the research intention and clearly outlining its objectives. Assurance was given about confidentiality of data shared. Furthermore, the respondents were assured of protection of their personal privacy by not demanding of their actual names on the data collection tools and publishing of data anonymously at the time of writing the report. So as to overcome the challenge of lack of enough resources to reach all research participants, representative sampling was properly carried out through suitable sampling methodology. Above all, the researcher personally supervised data collection even in cases where research assistants may have been involved in data collection. This ensured that all research protocols were adhered to, to collect credible data.

#### **1.10 Assumptions of the Study**

It was assumed that the independent variables which comprised of contractors' experience, obstruction of road construction sites, and road specification changes had influence on the dependent variable which was project completion time, That the participants would be available, honest, and willing to give credible data. It was also assumed that the institutions or authorities granting the researcher and/or his research assistants the permission to collect the requisite data would do so. Further, the study made an assumption that the data collection instrument had high validity hence was suitable for measuring the desired constructs.

#### **1.11 Definition of Significant Terms of the Study**

**Contractors' experience:** is set and level of relevant skills, both technical and administrative that are required to effectively manage road construction projects. The experience may be viewed in terms of learned knowledge from a learning institution or gained understanding of work-related abilities for effective execution of tasks at hand. Contractors' experience as used in this study refers to the duration the contractor has had in the past on similar projects.

**Project specifications:** these refer to stipulations, provisions or disclaimers of a given project, especially at the time of inception or planning that are presumed to guide how the project is going to be implemented. Ideally, project specifications are supposed to be maintained from initiation throughout execution until termination of the project. However, sometimes these specifications may be modified as dictated by various dynamics such as the decision by the project manager, running out of the initial financial resources earmarked for the project, political influence, or agitation from local communities among other factors. Generally, road specifications refer to situations whereby the specifications have errors and require to be corrected or where there is a requirement by the client after the project has started to make some changes.

**Road construction sites:** these are locations which may be designated for construction of roads. Sometimes they may not be readily accessible due to various reasons including controversial of ownership of land, physical landscape, or political interference among other factors.

**Project completion time** as used in this research refers to that point in time when the contractor has successfully carried out all the work that is spelt out in the contract, then hands over the completed work to the client. This time is normally spelt out in the contract, therefore, the contract will state the planned start and completion time. In practice this project completion time might extend beyond what the parties involved had agreed on. In this case we end up with delay in completion time.

**Project delay** as used in this research, this denotes additional time needed, outside the agreed and binding contract period, to complete project.

**Accessibility of road construction sites** refers to the ease with which the contractor is able to get to the physical site where work is being carried out. A contractor can be prevented or obstructed from getting to the construction site by either site conditions or human action.

## **1.12 Organization of the Study**

The research has five chapters; Chapter one consists of background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, hypotheses, significance of the study, delimitation of the study, limitation of the study, assumptions of the study and definition of significant terms of the study. Chapter two contains literature review, stakeholder theory, theory of constraints, it also contains conceptual framework and research

gap. Chapter three contains research design, target population, sample size and sampling procedure, research instruments, pilot test, validity test, reliability test, data collection methods, data analysis techniques, operational definition of variables and ethical consideration. Chapter four contains questionnaire return rate, background information and analyzed responses from respondents. The chapter also deals with analysis of variance, multivariate analysis and hypothesis testing. Chapter five contains summary and discussion of the findings on project completion, extend contractors experience influences completion of road construction projects, extend site obstruction influences completion of road construction projects and extend project specification changes influence completion of road construction projects. The chapter also deals with conclusion and recommendation of the research, it also gives suggestion on further research.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Under this chapter, various literatures drawn from various scholars and related to the research themes were reviewed. Additionally, theories and conceptual framework are discussed in this section. Finally, research gaps were highlighted.

#### **2.2 Completion of Road Construction Projects**

Every project has its timelines based on various considerations such as the budget, manpower input, expertise of the project management, and the project underlying objectives among other factors. However, the phenomenon of delayed projects not only relates to roads sector but in all sectors (Idrus & Napiah, 2011). Delay in project completion is registered when completion timeline is not met. There are various factors that may affect completion timeline. A road construction project involves various dynamics based on budgetary allocations and completion schedules. According to the project management institute (PMI), three aspects related to cost, quality and time must be balanced for timely completion of projects. However, there are many delays experienced in road construction sector globally where progress of contracts tends to fall behind schedule (Apolot, Alinaitwe & Tindiwensi, 2011).

Aibinu and Jagboro (2012) carried out a study and noted that many delays related to road projects had become commonplace. To avoid this scenario, they recommended that there was need for awareness creation among all the stakeholders in the road construction sector to engineer a sense of proper project planning right from inception phases. Another study on influence of construction delays of traditional contracts noted that project owners, project consultants and project contractors ranked same set of delay factors differently.

In Malaysia, approximately 18% of road construction projects were delayed for at least three months or were completely terminated before their normal termination time (Hussin & Omran, 2012). A worse scenario was noted in Saudi Arabia where Hamzah (2012) state that more than

70% of road construction assignments fell behind schedules by at least 10-30% of anticipated completion time. Kaming et al (2012) conducted a research in Indonesia on cause of road construction projects delays, the research noted that projects that were poorly designed and specifications problems and ineffective management and supervision were some of the major hindrances to timely project completion. These findings were corroborated by Kikwasi (2013) which noted that late payments, poor coordination and communication posed serious risks to projects completion in the roads construction industry in Tanzania.

Although Reschke and Schelle (2010) postulate that delays in the roads construction sector is commonplace in modern construction industry where both the owners of a project and contractors are seriously affected, this state of affairs cannot be justified especially given the impact the delay has in the overall economy. Indeed, studies indicate that delays in road construction projects completion tend to lead to heavy losses to all stakeholders including the project owner/client, contractor, and subcontractors due to prolonged stay on construction site and loss of other opportunities elsewhere. Other prevalent causes of the delay include poor communication, inexperienced project managers, delayed procurement processes, poor planning, ineffective infrastructure and insufficient resources. Additionally, time and cost overruns have been linked to poor tendering methods, hostile project environment and lack of motivation among key stakeholders among other factors (Kwatsima, 2017).

Kenya Vision 2030 has infrastructure as one of its foundations (Kenya Roads Board [KRB], 2016). The national government through the development blueprint commits to give the highest priority to investment in the nation's infrastructure projects. Despite the government's efforts to ensure that roads are effectively constructed to catapult development, empirical studies have indicated that there are delays in completion of road construction projects which end up derailing development in a number of other sectors.

The Kenya government commits a lot of money for road construction and maintenance to improve road network. Available statistics attest to the fact that many projects in roads sector in Kenya has been experiencing an increase over the years as the government focuses on achieving the Vision 2030. However, completion delay is still experienced with most of the projects, with the delays

resulting into escalation of project costs (Macharia, 2016). Ahsan & Gunawan (2010) did research how delays affect construction project in Guatemala and noted that construction delays end up costing project owners in terms of extra finances and time, with some of these inconveniences going to resolving disputes and litigations. These experiences relate closely with the situation in the study site. For instance, Kakamega – Webuye road is said to have taken several years before completion hence experiencing all the aforementioned effects.

### **2.3 Contractors' Experience and Completion of Roads Construction Projects**

The importance of contractors' role in roads sector is such that they determine the direction, quality and timeframe of the project (Manowong and Ogunlana, 2010). According to Macharia (2016), contractors are involved in numerous aspects of the management and proper execution of the project. For instance, depending on the competence of a contractor, this may be associated with other key factors such as funding, cash flow, bankruptcies and insufficient funds. Mbogo (2011) studied the effect of construction project lapses among small & medium enterprises sector in Kenya. The research found out that client payment was one of the causes leading to delayed completion of projects. The study further indicated that client's payment problems are caused by project financiers, inaccurate estimates, variations and price increases.

A study by Macharia (2016) conducted in Embakasi Nairobi County noted that lack of finances was a serious cause of project delay. These findings reflected findings of a study by Seboru (2015) which established that delayed disbursement of money owed to a contractor is among the top five causes leading to completion lapses. Although the responsibilities were divided amongst different players in the implementation of the project, in both cases it was clear that the role of the contractor greatly counted when it came to successful and timely completion of the project.

Insufficient or inappropriate construction materials have been widely identified as a major delay factor in road construction projects in past studies. According to Mohammed (2012), shortages in basic materials can cause major delays in projects and price increase. Similarly, unsuitable or substandard materials for a given project can easily lead to a delay of a project as this is likely to force interruptions as the right materials are being sourced and procured. Although the question of materials may be viewed as an independent factor, often this cannot be isolated from the role or

experience of the contractor where he or she is supposed to be accurate in sourcing for the right materials and ensure that they are delivered on time. Muturi and Oguya (2016) further state that an effective and efficient contractor must be proactive enough to understand the dynamics involved in the whole construction process and be ready to mitigate any impending threats to the project.

In a study by Mahamid (2011) revealed that insufficient inspectors delayed completion of projects. Furthermore, project design counted a lot as a determinant factor of project completion. The delay of change in design according to the emerging needs of the project poses a danger to the project completion since it means work cannot move until the right direction is given. Some of the changes may be initiated by the client hence calling for the contractor to institute the newly proposed changes as soon as possible to allow smooth progress of the construction work. A contractor may also propose changes, which he or she should then be able to agree with the client as soon as possible so that they can be mounted to allow subsequent progress of construction processes. Inadequate design, poor design or design errors made by designers need to be redone and different site conditions set to allow smooth continuation of the work (Mahamid, Bruland & Dmairi, 2011).

Another study conducted by Ngacho and Das (2014) on roads construction in Kenya established that labour supply contributed to projects conclusion in the roads sector. Labour supply refers to both quality and quantity of labour. Road construction projects are labour intensive projects that also require personnel that understand well what they are supposed to do. According to Ntale, Litondo and Mphande (2013), the contractor on site has the responsibility to provide relevant and sufficient labour so that the project can run smoothly. Unfortunately, depending on the location of the project, construction workers with specific skills could easily lack thereby causing delays to the entire project. For instance, some project locations such as rural areas can easily lack qualified professionals such as surveyors or electricians; a fact that can easily cause major delays to a project (Ogwueleka, 2010).

Other studies have also indicated that lack of or unreliable equipment can be a big hindrance to achieving the objectives of a road construction project in time (Olusegun & Michael, 2011). According to Otim and Alinaitwe (2015), contrary to owning modern equipment for work, a number of contractors tend to hire them whenever they want to undertake certain projects. This



tends to erode certainty when it comes to estimating when to complete certain tasks at hand. Saraf (2013) further states failure to permanently own personal equipment and machinery for construction work by contractors can lead to unavailability and unreliability when they are on high demand.

Previous studies have also linked project delays to poor communication amongst stakeholders; which can easily be blamed on a contractor (Wambugu, 2013). A project involves many parties, therefore the need for effective communication. Furthermore, according to Wambui, Ombui and Kagiri (2015), slow approval processes also affect completion of road construction projects. Slow approval process includes approval of statutory documents, approval of work completion and payment and approval of other operational documents within the project team. Similarly, poor contractual relationships have been found to cause construction projects delay, which may include disputes between key stakeholders in the project. In another research by Hamza, Khoiry, Arshad & Tawil (2011), the findings indicated that there were sixteen important causes of project delay. These included abandonment, negotiations, court cases and disputes, disputes over variations and claims, poor relationship among stakeholders, and lack of a proper organizational structure delayed projects completion.

## **2.4 Obstruction of Road Construction Sites and Completion of Road Construction Projects**

Seboru (2015), notes that unforeseen site conditions refer to presence of such things as rock, clay soil, water and other geological problems on site that were not identified at the planning stage or were not anticipated. Seboru (2015) undertook research to identify causes of projects completion delays in Kenya and noted that several factors caused delay of completion of road construction projects, and these included subsoil conditions. In order to deal with these conditions, extra resources are required in terms of finances, expertise and labour. Furthermore, mismanagement of construction locations also sometimes acted as obstruction to road construction sites, hence ultimately caused a delay on the completion of projects. Poor site management included poor project planning, execution and relationships by the contractor.

Another research on projects delays in Malaysia noted that incompetent location managers were sometimes to blame for completion delays. A site that is poorly managed fails to respond to the issues that arise in a timely manner. Seboru (2015) added that bad weather is also critical when it comes to accessing road construction project sites. Bad weather is often viewed in terms of severe rain conditions which are likely to make roads to the construction site impassable. Rain was found by both consultants and contractors to be among the overall top delay factors. Besides, rain makes road construction work difficult, with some sites becoming inaccessible. Unpredictable weather also makes it difficult to plan for project activities.

Related to bad weather are the natural disasters, which can also be problematic when it comes to projects conclusion. Furthermore, a Haseeb and company tried to identify factors that led to project conclusion delays in Pakistan and noted natural disasters to be commonly leading to a major slow down. The unpredictability of natural disasters and their often devastating aftermath on the landscape and the people living around where they occurred made it an uphill task for construction companies and the construction site workers to quickly and easily adjust so that work can progress normally. Furthermore, the situation was even made worse if the contractors lacked superior technology to be able to handle any emergency caused by natural disasters. The end result would be automatic delays in work progress and project cost increase. Technology is very critical in making the project work easier. However, studies have indicated that failure by project managers and contractors to adopt new technology slows down work (Nyandika & Oyugi, 2014).

In a study by Kamau and Ayuo (2014) carried out in Eldoret, findings indicated that poor adoption of modern technology delays efforts for mitigating any unforeseen happenings. The study further noted that it was very important for project managers and contractors to adopt suitable IT techniques in project management to mitigate any delays and related consequences like increased project costs. Haseeb et al (2011) further identified old or obsolete technology to posing a great threat to projects completion.

According to Mahamid (2011), regulatory changes often led to obstruction of construction sites thereby causing delays to road construction projects. Similar sentiments were expressed by Odeh and Battaineh (2012) in a research on causes of construction delay which specifically focused on

traditional contracts. Regulatory changes were noted to have significantly contributed to lapses in project schedules. Furthermore, a study by Seboru (2015) into the challenges facing construction projects in Kenya, the findings indicated that access to site entry and exit points was one of the major delay factors. Additionally, poor resource management, insufficient inspectors, rework and organizational changes posed a great challenge to expeditious achievement of project goals, especially with regard to accessing sites (Haseeb et al, 2011). Also, posing threats to completion of road construction projects as related with access to construction sites were difficulties in obtaining work permits, bad weather conditions, financial closure, poor organization of the contractor/consultant, restrictive working environment (working hours), proximity to services, road closure, industrial relations (riots), lack of stakeholder participation, and poor cost control mechanism as well as embezzlement of project funds and risk occurrence (Gituro & Mwawasi, 2016).

In another study to understand cause of project completion delays in Egypt, the findings indicated that poorly qualified project managers is a serious obstruction to construction sites which end up delaying completion of projects. Kamanga and Steyn (2013) have also argued that late disbursement of monies to people or entities owning land intended for construction of the projects was also another way of obstruction to construction sites which in turn caused completion delay of the project. In their study to understand factors causing lagging behind of projects conclusion, the authors noted that at least 43% of land owners claimed not to have been compensated on time; a factor that delayed commencement of construction of the designated roads. Similar sentiments were expressed in a study by Patil and company undertaken in 2013 which had sought to determine factors causing completion lapses in India. Delayed land acquisition was identified as a factor causing the lapses.

Ludwig Rivera, Hilario Baguec, Jr. and Chunho Yaom (2020) carried out a research in 25 developing countries including Kenya on causes of delay in road construction projects, according to their study, delay can be caused by owners, contractors, consultants, shared and outside (external). Some of the causes listed under outside or external were: force majeure, disruption of traffic movement, subsurface and changing ground condition effects, environmental claims, strife, regulatory changes and accidents during construction. Most of these causes under external lead to

obstruction of construction sites. Obstruction of construction sites can sometimes be as a result of poor site management that leads to industrial strife. The study concluded that it was difficult to tell when a natural disaster might occur and their impact on road construction projects completion. The research, however, recommended that delays associated with such natural occurrences could be avoided by proper planning at the preparation stage. The study also recommended that stakeholders must plan project activities accordingly taking care of extreme weather conditions such as flooding. In another study done by Mohamad Kassam (2013) on road construction projects The study concluded that the challenges associated with the planning of road construction projects are as a result of their complexity and uncertainty affected by weather and site related conditions and lack of information technology systems.

Research by Kikwasi (2012) further stated that delays in Tanzania land acquisition arose when land owners failed to agree with the construction agency on key aspects of the transfer of ownership or when compensation money was not released on time. In this sense, the research noted that irregular compensatory procedures significantly contributed to project behind schedule scenarios. These views were reiterated by Mahamid (2011) who noted that general delays in commencement of projects in the roads construction sector were contributed to by controversies in construction site transfers and lack of clear mobilization strategies for the local communities so that they could embrace new projects without creating much controversy. Further to this, some contractors felt overloaded with the work thus causing them to delay in their overall delivery of anticipated services.

## **2.5 Project Specification Changes and Completion of Road Construction Projects**

Change in or poor specifications of projects have been identified as a factor influencing road construction projects completion in modern times. Gituro and Mwawasi (2016) undertook research in Kenya where it came out that poor specifications in the contract posed a big challenge to projects in the road construction sector. Numerous projects face what has been referred to as change order or variation; thus being considered as change in specification. The change in specification eventually leads to additional works thereby interfering with the whole process of project construction and completion. According to Zhang, Wu, Shen and Skitmore (2014), change order

can be initiated by a client or borne out of necessity. In this sense change in bill of quantity (BOQ) has been classified as a change order as well.

In a study done by Alfred in Nairobi, Kenya he recommended that “the problem of time overruns of construction projects is an area needing further research”. He found out that 70% of construction projects can overrun on time up to 53% of contract time, as compared to the chance that 53.7% can overrun on cost up to 20.7% above the initial contract sum regardless of the client.

In another study by Seboru (2015), it emerged that economic problems significantly contributed to delay in project completion. These include price fluctuations, inflation, high interest rates and lack of foreign currency. These sentiments echoed the findings of an earlier study by Kamanga and Steyn (2013) conducted in Malawi which established that shortage of fuel and scarcity of foreign currency significantly contributed to inconveniences experienced by managers in the roads construction sector. Further studies have indicated that in developing countries where foreign exchange rates fluctuate a lot, this factor can raise project cost which can lead to prolonged periods of stoppage and sometimes complete stalling of the project. Therefore, project managers need to take care of this factor when preparing project budgets.

In a study by Haseeb, Xinhai-Lu, Aneesa and Bibi (2011) to understand the role of change in project specifications in Pakistan, findings indicated that inaccurate cost estimation at the initial plan of the project created confusion when it became necessary to revise the budget to reflect the actual cost of the project. Furthermore, shortage of resources which included fuel and construction materials emerged as a serious concern causing delay in road construction projects. Similarly, delay in relocation of utilities such as underground cables and pipes dealt a major blow to timely project conclusion (Strenman, 2012). Patil (2013) noted inadequate project planning and scheduling of a contractor to also have placed obstacles to completion of road projects. Further studies have indicated that lack of proper execution roadmaps for a number of project planners and managers significantly negatively affected successful project conclusion since proper planning was required.

Inaccurate time estimation is also noted to have been one of the causes of lapses in completion of road construction assignments (Zhang et al, 2014). Inaccurate time estimation refers to situations

where the people charged with giving time estimate deliberately or inadvertently give wrong time approximation. Haseeb et al (2011) also identified inaccurate time estimation as significantly causing projects completion lapses in Pakistan. It further emerged that most roads projects tend to be behind time schedule even before they can take off. Failure to ask for sufficient time leads to delay from the start. Sometimes this is done intentionally to please other stakeholders or sometimes this happens due to absence of technical people in the concerned area (Wambui et al, 2015).

In a study by Ogotu (2017) to understand what impacts timely and successful project conclusion in Kisumu, the findings showed that delay in procurement services often created confusion thus forcing the project managers to delay the whole project so that the right specifications can be redone. These sentiments were a reflection of what Wairimu (2016) found out in her previous study in Embakasi in Nairobi County where it emerged that changes in procedure specifications significantly influenced completion of road construction projects at 33%. Bureaucracy in government agencies also significantly led to delaying of roads development initiatives, with this leading to slow decision making processes on important aspects of the projects (Abdullah, 2013). Slowness in decision making also affected quick approvals of shop drawings especially in cases where the initial drawing was inaccurate and therefore needed to be revised.

Sweis (2013) identified poor coordination among stakeholders (site engineers, contractors, subcontractors, consultant and other general site workers) to be causing interruption of project completion due to delayed various activities from being initiated in synch with the bigger picture of the project. In such confusion it was possible for specifications on certain items to keep on being changed hence throwing the whole project in disarray. Another study in Malaysia regarding significant factors causing time overrun in construction projects in Peninsular Malaysia indicated that incompetent subcontractors played a major role in this respect. These outcomes echoed an earlier study which established that incompetent project team was also causing similar challenges as they kept on changing specifications thereby creating confusion in the progress of the project. The study recommended hiring of competent project key stakeholders to avoid such confusion in the course of the project.

Studies have also indicated that poor workmanship causes interruptions of roads development projects (Odeh & Battaineh, 2012). In most cases the delay ends up increasing the overall costs of the project as this may call for change of contractors and other personnel involved in other key areas of the project. Furthermore, according to Michael and Olusegun (2011), politics tended to interfere with the flow of project development works, thus causing delay in completion schedules. Political interference may also be as a result of change of political leadership where the incoming leadership could decide to support or pull out support for a particular project thereby causing the delay or total abandon. Political decrees and civil strife have also been blamed for change of specification of projects to accommodate vested interests of those in power (Hamza et al, 2011). This revelation was aptly demonstrated in a study by Simon (2017) in a study conducted in Tanzania to investigate what impacts project completion cycles where project stakeholders blamed project delays on political interference.

In another study carried out in India to understand what affected roads project works, it emerged that shortage of skills for contractors and other personnel working in strategic positions significantly contributed to the situation. Furthermore, the study further noted that shortage was experienced in both skilled and unskilled labour. These sentiments were a reflection of the findings by Kamanga and Steyn (2013) in their study on determinants of project conclusion delays in works in Malawi which had attributed completion delay to shortage of technical personnel. The findings corroborated an earlier study carried out in Malawi which had blamed inadequate experience by contractor or subcontractors on the delay in road construction projects. Lack of relevant skills among the project leadership meant that the incoming management was likely to change specifications of the projects and end up destabilizing the progress of the entire process. Contractors and subcontractors who are ill-equipped in terms of skills, equipment, and finances among other aspects of the work cannot properly plan and manage the project, this eventually leads to project completion delay. Similarly, client interference often led to change of specifications for the project, which ultimately leads to delay in completion of the project (Olusegun & Michael, 2011).

## **2.6 Theoretical Framework**

Stakeholder theory and Theory of Constraints were used in the study. Each of these theories is elaborately discussed below.

### **2.6.1 Stakeholder Theory**

This theory was founded on premise stating that ‘holders’ with ‘stakes’ interrelate with the institution in order to make it operational (Blair, 1998). In this sense, it is not possible for the organization to operate effectively without the conscious input of the stakeholders holding various positions and undertaking different responsibilities. The theory further postulates that various constituents in an organization must be dedicated and fully aware of the organization’s objectives and vision in order for them to fully offer their services. There are many players involved to ensure road projects are completed in the county of Kakamega. In all cases, role of different players in the road construction projects is being analyzed, hence emphasizing the concept of the stakeholder’s role in the success of a project.

The theory further is centered on defining the concept of shareholders and their relationships in a project and how this is likely to shape the future of the project or the institution in general. The stakeholder theory categorizes individual stakeholders as having unique responsibilities which require being coordinated well if the best outcome is to be realized (Waddock, 2002). The theory further views a stakeholder as an individual or individuals whose actions can influence or can be influenced by the achievements of institution hence providing them ground for claiming a share or stake in that institution. In project supervision or management, the aspect of ownership of the project is very critical for smooth progress and timely completion. From a roads construction project, this would be viewed in terms of various professionals whose unique roles ensure overall project success. For instance, a contractor in a project may not be viewed as any superior to an engineer, technician, plumber, or any other unskilled worker because the project needs each one of them to offer their respective services in a dedicated manner for the overall good of the project.

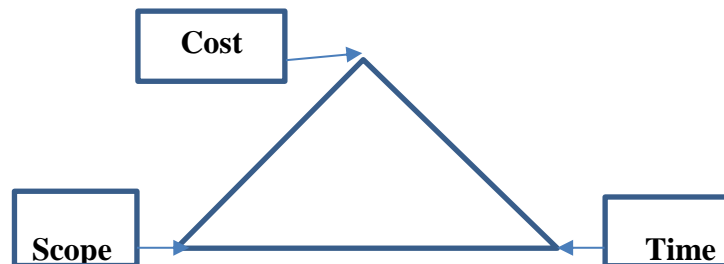
According to Amber and Wilson (1995), since each stakeholder has a unique role to play for the success of the project, each one of them will have a share in the outcome of a project. Hence, each



player in a project tries their best to ensure that the outcome is satisfactory. The sense of ‘equal’ ownership of the project propels the workers in a construction site to put in their best bearing in mind that they will all share into the success of the project if everything goes according to plan. To this extent, Waddock (2002) states that there must be some level of synergy in order for all these elements to work towards a common goal; that of accomplishing the project according to the original plan. However, the theory further postulates that in order for mutual coexistence among all the stakeholders of a project, roles must be clearly defined so that each individual knows their boundaries and common loci. Waddock (2002) further argues that this understanding will enable all the players to unite towards a common purpose. It is on this basis that Amber and Wilson (1995) state that firms prefer to respond to collective concerns where multiple interests are addressed rather than focusing too much on individual fears.

### 2.6.2 Theory of Constraints

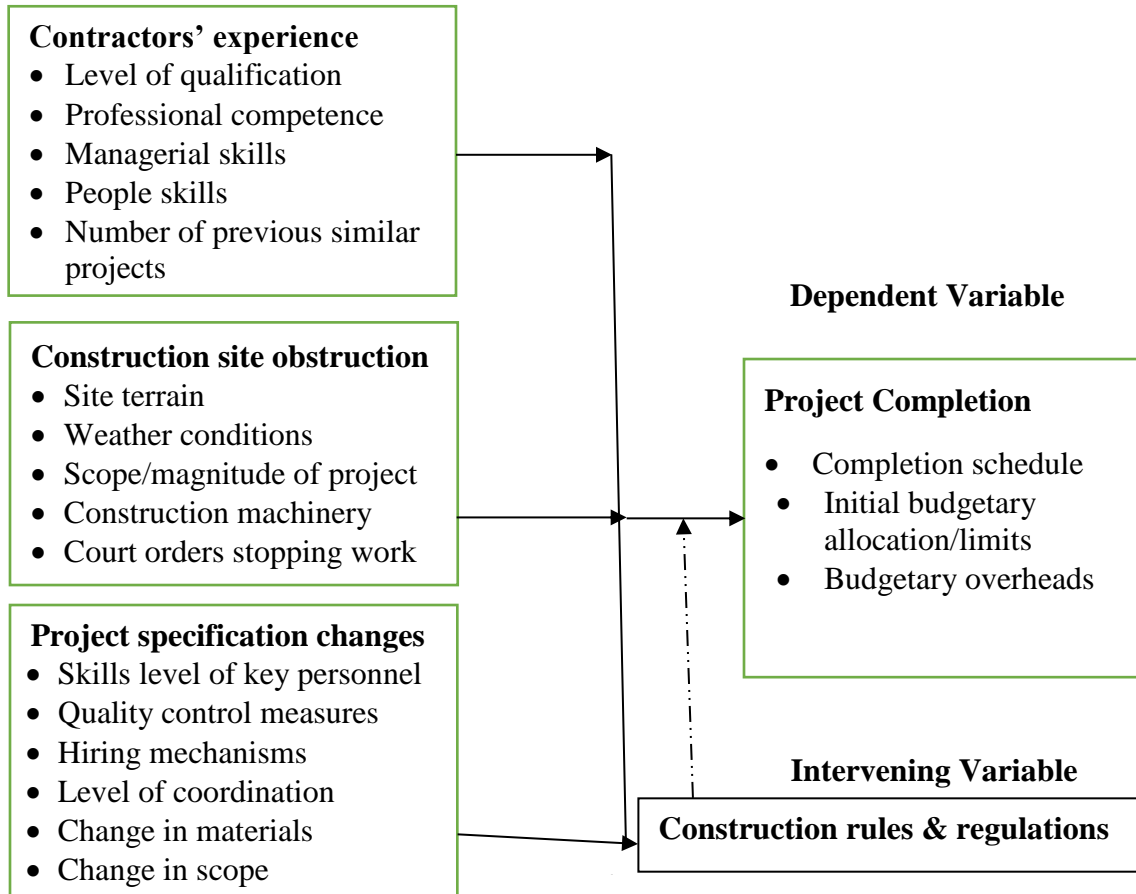
This theory states that any system contains a choke point that prevents it from achieving its objectives. The theory was initiated by Eliyahu (1984) as management philosophy for guiding organizational objectives and helping the company to achieve its vision. Lau & King (2006) argue that many projects are faced with limitation where a constraint slows down progress on objective. Constraints and their impact on a project should be identified at the initial phases while all stakeholders are made aware so that the constraints can be managed. Theory of constraints is very relevant to this study, given that many projects operate within scope, cost and time constraints. With regard to the variables of the study, contractor’s experience, accessibility to the construction sites, and project specifications, all revolve around the aspects of cost, scope and timing of the project.



**Figure 2.1 Triple Constraint Figure**  
**Source:** (Researcher, 2021)

## 2.7 Conceptual Framework

### Independent Variables



**Figure 2.2 Conceptual Framework**

Source: (Researcher, 2021)

Kuada (2012), argues that a conceptual framework offers an overview of the relationship between the two sets of variables and helps a researcher to clearly conceptualize their ideas. In this case, project completion was the outcome of the research while independent variables included contractors' experience, obstruction of road construction sites and project specifications. Through the conceptual framework therefore, it becomes clearer to identify the problem being studied, the frame of the research questions and the right literature to help answer the research questions.

## 2.8 Research Gap

Literature review for the study exposed certain knowledge gaps that needed to be addressed in line with the intended objectives. All project managers anticipate commencing and completing their projects successfully and within the set time, budget and quality standards (World Bank, 2016). Another research on construction delay: tradition contracts noted that one of the things to note from their findings is that project owners, project consultants and project contractors ranked same set of delay factors differently. In a study by James, G. Kimemia (2015) on determinants of projects delay in the construction industry in Kenya. The study focused on roads in Kenya's coast region implemented by KeNHA. He found out that 67% of the delay was as a result of contractor's experience.

Talukhaba (1988) done in Nairobi, Kenya, recommended that "the problem of time overruns of construction projects is an area needing further research". He found out that 70% of construction projects can overrun on time up to 53% of contract time, as compared to the chance that 53.7% can overrun on cost up to 20.7% above the initial contract sum regardless of the client. The current research therefore was a follow up on recommendations by Talukhaba (1988) on overrun of roads projects. Furthermore, delays in road projects had become commonplace. Hence, so as order to avoid such a scenario, the study recommended that there was need for awareness creation among all the stakeholders in the road construction sector to engineer a sense of proper project planning right from inception phases. The research noted the need for awareness creation among all the stakeholders; the current research intended to create awareness among stakeholders in the identified location.

In a study carried out by Kikwasi (2013) regarding what influences roads project delays in Tanzania, he found out that several factors delayed successful and timely project completion of projects, design change ranked number 1. Understanding factors influencing completion of road projects is important because if not successfully completed then a number of effects will ensue as observed by Kikwasi (2013); thus leading to stakeholders getting frustrated. In a study by Mensah and Knight (2017), it was noted that causes of delay in one area can be different from another; it is also possible the causes of delay can be different from one period to another. Since no such

study has been done in the sub county of Lurambi in Kakamega before, it is important to research to find out how completion of road projects is influenced by various factors.

**Table 2.1 Research Gap**

<b>Variable</b>	<b>Author &amp; title</b>	<b>Findings</b>	<b>The gap</b>
Contractor's experience	Mensah & Knight (2017), The professionals' perspective on the causes of project delay in the construction industry.	Different dynamics related to delays in project completion based on country or area of study	Studies may have been done elsewhere but not in Lurambi sub county. Previous study was general on its objectives
	J. G. Kimemia (2015), determinants of projects delay in the construction industry in Kenya.	67% of the delay was as a result of contractor's experience.	Establishment of the influence of contractors' experience on road projects in Lurambi is important since a similar study has not been done there before.
Obstruction of road construction sites	Aibinu & Jagboro (2012), the effects of construction delays on project delivery in Nigerian Construction Industry.	Delay in completion of road projects had become commonplace, partly due to bad weather which rendered sites inaccessible.	Previous study done in Nigeria about 10 years ago; current study to focus in Kenya where dynamics may vary.
	Ludwig Rivera, Hilario Baguec, Jr. and Chunho Yaom (2020), Causes of delay in road construction projects.	It was difficult to predict when natural disasters might occur and their impact on completion of road projects.	Occurrence of disasters is unpredictable. Therefore, it is necessary to carry out studies in other locations including Lurambi sub county to understand the likely disasters and come up with mitigation plans.
Project specification changes	Gathoni, J. & Karanja, N., (2016). Drivers of effective project performance in the National Government Constituency funded projects.	Project owners, project consultants and project contractors' skills were very critical in project performance.	Previous study did not link personnel skills with change of project specifications
	Kikwasi, G. (2013), Causes and effects of delays and disruptions in construction projects in Tanzania.	Design change ranked number 1 in cause of delay.	There is need to establish the influence of design change on road construction projects in Lurambi sub county..

Source: (Researcher: 2020)

## **2.9 Summary of Literature Review**

Research focused on roads projects in Lurambi sub-county, Kakamega County. Research focused on three independent variables including contractors' experience, obstruction of construction sites, and project specifications. Literature review was conducted based on subthemes emanating from these variables. Furthermore, two theories – stakeholder theory and theory of constraints – have been critically reviewed to bring out how these can shape the study's direction. Additionally, conceptual framework of the study has been addressed, depicting theoretical framework. Gaps to be researched on were exposed under literature review thereby giving a justification for the current study.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The following has been covered under this chapter: methodology which includes research design, target population, sampling techniques and sample size, and the research instruments. The chapter also outlines the validity and reliability of the research instruments, data collection procedure, data analysis methods and ethical considerations.

#### **3.2 Research Design**

Descriptive research design was used to address research objectives. According to Kumar (2010), this design is appropriate for reporting the research constructs without manipulating them. This implies that the design involves acquiring of objective information which helps the researcher to effectively answer the ‘how’, ‘when’ and ‘what’ questions without his/her influence. Zikmund, Babin, Carr & Griffin (2013) further opine that descriptive research design is useful for summarizing collected information before arriving at conclusions.

#### **3.3 Target Population**

The target for the study was national government and county government road construction projects in Lurambi Sub County in Kakamega County. Relevant data was obtained from contractors, project consultants, project engineers, and project managers working on various projects. According to the county government of Kakamega, between 2015 and 2019, there were 98 class C road construction projects under KeNHA, 1,435 class D&E under the county government, and 79 class D&E under KeRRA, giving a total number of 1,612 roads constructed projects from 2015 to 2019. In this study a population of 30 ongoing projects was targeted which had 120 officials as contractors, project consultants, project engineer, and project managers. Table 3.1 illustrates the sampling frame.

**Table 3.1 Target Population**

Category of Respondent	Target Population (N)
Contractors	30
Project consultants	30
Project engineers	30
Project managers	30
<b>Total</b>	<b>120</b>

**Source:** (Researcher, 2021)

### 3.4 Sample Size and Sampling Procedure

Stratified random sampling technique was used to sample 92 from 120 respondents in the categories of contractors, project consultants, project engineers, and project managers. Krejcie & Morgan 1970 sampling table (*see appendix III*) was applied to select 92 respondents. Table 3.2 illustrates sample based on four categories of the respondents.

**Table 3.2 Sample Size**

Category of Respondent	Target Population (N)	Sample size (n)
Contractors	30	23
Project consultants	30	23
Project engineers	30	23
Project managers	30	23
<b>Total</b>	<b>120</b>	<b>92</b>

**Source:** (Researcher, 2021)

### 3.5 Research Instruments

A structured questionnaire was used for collection of primary data. According to Mugenda and Mugenda (2013), a questionnaire is the best tool for gathering descriptive data. Furthermore, a questionnaire can easily be applied for collection of bulk data since it is more convenient when it comes to organization and coding of collected data in preparation for analysis. A questionnaire also saves time during data collection.



The questionnaire was designed so that it can collect respondents' general background data. Section 1 of the questionnaire collected the respondents' background information while section 2 collected information on independent variables of the research which included contractors' experience, obstruction to construction sites, and project specifications. Likert scale was used in close-ended questions for quantitative data whereas open-ended questions provided an opportunity for collecting of qualitative information.

### **3.6 Pilot Test**

This allowed the researcher to correct the research tool. This ensured that the statements and language used in the questionnaire was clearly and uniformly understood and interpreted. The process also helped to clear any likely ambiguity in the instrument (Bougie and Sekaran, 2010). Nine respondents were used for pilot testing, having been proportionately selected from each of the 4 categories. To avoid any likely bias, the respondents who participated in the pilot test were excluded from the main research.

#### **3.6.1 Validity Test**

This was necessary to test the questionnaire for content and construct validity before being taken to the field. Content validity involved subjecting the instrument to scrutiny by experts whereas construct validity is meant to ensure clarity of the questions where all the respondents can understand them in a similar manner. To test construct and content validity, the researcher closely involved the university supervisor for valued input and direction. Furthermore, the questionnaire was subjected to peer-review where fellow students and faculty members from the University Department gave their views on how to improve the instrument.

#### **3.6.2 Reliability Test**

The questionnaire was also subjected to reliability test to ensure that it collected credible data. Reliability accounts for consistency of tool of data collection after several trials. This helps to standardize a research tool so that collected data can be objective enough to allow generalization of the findings to other locations or populations (Gall, Gall & Borg, 2008). To test research

instrument, split-half technique was applied. Pilot data was keyed into SPSS and Cronbach's alpha subsequently generated. A figure in range of 0.7-1.0 was considered ideal for reliability of the questionnaire.

Nine respondents were interviewed for the pilot study. These findings were used to adjust and revise the questionnaire accordingly to capture correct data during the actual study. The study applied Pearson correlation analysis to examine contractors' experience, obstruction to construction sites, and project specifications and projection conclusion in Lurambi in Kakamega County. The researcher further used level of significance of 5% and level of confidence of 95% to test the hypotheses. According to Oso and Onen (2009), a level of significance of 5% gives the researcher 95% chances of making the correct decision when drawing study conclusion.

### **3.7 Data Collection Methods**

Blank questionnaires were dropped to the research participants who were comfortable with self-administered interview approach. In such a case, the respondents filled blank questionnaires that had been distributed to them. The completed questionnaires were collected afterwards. Where the respondents were not comfortable filling the questionnaire by themselves, the research team booked interviews so that they could be visited during their convenient time. High level of integrity was maintained during the entire period of data collection.

### **3.8 Data Analysis Techniques**

Fielded forms were organized in order to ensure that analysis ran smoothly. This process ensured that any incomplete questionnaire was removed from the final tally and that all the remaining ones were completely free from errors. SPSS computer software was used for descriptive data analysis and analyzed data presented through frequency tables. Qualitative data generated through the open-ended questions was analyzed using thematic content analysis technique and presented using narratives which were embedded into the main text.

The regression model for the study is:  $Y = \beta_0 X_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$

Where:

Y = Project completion

X<sub>1</sub> = Contractors' experience

X<sub>2</sub> = Construction site obstruction

X<sub>3</sub> = Project specification changes

ε = Error Term for the regression model

β<sub>0</sub>X<sub>0</sub> = Beta Coefficient

β<sub>1</sub>, β<sub>2</sub>, & β<sub>3</sub> are the regression coefficients for the variables X<sub>1</sub>, X<sub>2</sub>, & X<sub>3</sub>, respectively. Overall significance of the model was tested using analysis of variance by use of F statistics at 95% confidence level whereas the coefficient of determination R<sub>2</sub> was used to show the contribution of independent (predictor) variables on the dependent variable (outcome of the study).

### 3.9 Operational Definition of Variables

As presented in Table 3.3, the study focused on three independent variables including contractors' experience, construction site's obstruction, and project specifications. These were presumed to affect projects' completion, which was the dependent variable of the study.

**Table 3.3 Operational Definition of Variables**

Variables	Indicators	Measurement scale	Data collection technique	Tools	Methods of data Analysis
<b>Projects' completion delay</b>	Dependent Variable				
	<ul style="list-style-type: none"><li>• Completion schedule</li><li>• Initial budgetary allocation/limits</li><li>• Budgetary overheads</li></ul>	<ul style="list-style-type: none"><li>• Ordinal scale</li><li>• Nominal scale</li></ul>	<ul style="list-style-type: none"><li>• Mixed methods</li></ul>	<ul style="list-style-type: none"><li>• Questionnaire</li></ul>	<ul style="list-style-type: none"><li>• Descriptive statistics</li><li>• Content analysis</li></ul>
	Independent Variables				

1. Contractors' experience	<ul style="list-style-type: none"> <li>• Level of qualification</li> <li>• Professional competence</li> <li>• Managerial skills</li> <li>• People skills</li> <li>• Number of previous similar projects</li> </ul>	<ul style="list-style-type: none"> <li>• Ordinal scale</li> <li>• Nominal scale</li> </ul>	• Mixed methods	• Questionnaire	<ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• Content analysis</li> </ul>
2. Construction sites' obstruction	<ul style="list-style-type: none"> <li>• Site terrain</li> <li>• Weather conditions</li> <li>• Scope/magnitude of project</li> <li>• Construction machinery</li> <li>• Court orders stopping projects</li> </ul>	<ul style="list-style-type: none"> <li>• Ordinal scale</li> <li>• Nominal scale</li> </ul>	• Mixed methods	• Questionnaire	<ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• Content analysis</li> </ul>
3. Project specifications changes	<ul style="list-style-type: none"> <li>• Skills level of key personnel</li> <li>• Quality control measures</li> <li>• Hiring mechanisms</li> <li>• Level of coordination</li> <li>• Change in materials</li> <li>• Change in scope</li> </ul>	<ul style="list-style-type: none"> <li>• Ordinal scale</li> <li>• Nominal scale</li> </ul>	• Mixed methods	• Questionnaire	<ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• Content analysis</li> </ul>

### 3.10 Ethical Considerations

During the entire process of the research, the principles of informed consent, confidentiality and anonymity of data, were strictly observed. This required proper briefing of the participants before agreeing to participate. They were also informed of the need to freely participate without any form of coercion or trickery. Additionally, authority was sought from relevant sources, university and NACOSTI, before commencement of fieldwork. Permission was also duly obtained from the top management of road construction projects before relevant project workers were interviewed.

**CHAPTER FOUR**  
**DATA ANALYSIS, PRESENTATION AND INTERPRETATION**

**4.1 Introduction**

The chapter presents analyzed and interpreted data where it begins with respondents' background information and questionnaire return rate before dwelling on analyzed data. Data is presented based on contractors' experience, obstruction to construction sites, and project specifications changes, as specific objectives.

**4.2 Questionnaire Return Rate**

The research sampled 92 officials, however, only 75 officials fully participated, this translated to 82% of the total officials sampled. Table 4.1 presents the frequency and percentage of respondents under each category.

**Table 4.1 Response Rate**

Category	Sample Size	Response Rate	
		Frequency (n)	Percentage (%)
Contractors	23	21	91
Project consultants	23	19	83
Project engineers	23	15	65
Project managers	23	20	87
<b>Total</b>	<b>92</b>	<b>75</b>	<b>82</b>

In all the four categories of respondents at least 65% of them were able to successfully participate in the study, hence indicating a high degree of representativeness.

### 4.3 Background Information

The background information captured from the respondents was: gender, age bracket, academic qualification, role played in the project, period worked in the project, and experience in the current position. The information was helpful in understanding the respondents' characteristics which were likely to influence their views concerning the study.

#### 4.3.1 Distribution of Respondents by Gender

Gender of the respondents was tabulated as below.

**Table 4.2 Respondents' Gender Distribution**

<b>Gender</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Male	61	81
Female	14	19
<b>Total</b>	<b>75</b>	<b>100</b>

Statistics in Table 4.2 indicates that there were far more men than women respondents in the roads construction which accounted for 61 (81%) and 14 (19%) respectively. The skewed distribution may be indicative of the general scenario in the construction industry where more men than women are involved. Despite the gender biased distribution of the respondents, the views of either gender were representative enough when it came to the analysis of data provided.

#### 4.3.2 Distribution of Respondents by Age

Respondents' age was tabulated as illustrated in table 4.3.

**Table 4.3 Respondents' Age Distribution**

<b>Age Category</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
20 - 30 Years	14	19
31 - 40 Years	38	51
41 - 50 Years	17	23
51 - 60 Years	6	8

Above 60 Years	0	0
<b>Total</b>	<b>75</b>	<b>100</b>

It is evident from table 4.3 that the project officials were fairly young, with 70% of them having a maximum age of 40 years. This may further suggest that the sector employed more vibrant individuals to manage its operations in various professional capacities.

#### 4.3.3 Distribution of Respondents by Academic Qualification

Responses on academic qualifications of the respondents were captured as below.

**Table 4.4 Respondents' Academic Qualifications**

<b>Academic qualification</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Secondary	10	13
College	13	17
University	52	70
Other (Specify)	0	0
<b>Total</b>	<b>75</b>	<b>100</b>

Fifty two (70%) of the respondents had a university qualification, 13 (17%) of them had a college certificate, and 10 (13%) had reached secondary. A greater percentage of the employees in key positions in the roads construction were very competent by virtue of their high level of education. Hence, the information gathered was of high quality in terms of answering the research questions.

#### 4.3.4 Distribution of Respondents by Role in Road Construction Project

Responses on respective roles played in the road construction projects is listed in Table 4.5.

**Table 4.5 Respondents' Roles in the Construction Projects**

<b>Role in the construction project</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
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Contractors	21	28
Project consultants	19	25
Project engineers	15	20
Project managers	20	27
<b>Total</b>	<b>75</b>	<b>100</b>

Out of the 75 respondents who managed to fully participate in the study, 21 (28%) were contractors, 20 (27%) project managers, 19 (25%) project consultants, and 15 (20%) project engineers. The distribution of the respondents in terms of different roles played by key employees in the projects demonstrates well-balanced views which were critical for addressing objectives of the study in an objective manner.

#### 4.3.5 Distribution of Respondents by Period Worked in Project

The respondents' duration of stay in respective project provided the researcher with an opportunity to understand the extent to which each of the respondents understood operations in their respective projects. The information was also critical in gauging the respondents' knowledge about the dynamics or challenges related to the specific projects in question.

**Table 4.6 Respondents' Period of Work in Respective Projects**

Period worked in project (Years)	Frequency (n)	Percentage (%)
1 - 5 Years	42	56
6 - 10 Years	26	35
11 - 15 Years	3	4
15+ years	4	5
<b>Total</b>	<b>75</b>	<b>100</b>

The table above indicates that 91% of the officials interviewed had worked for 1-10 years in their respective roads construction projects. The trend may further be a reflection of the average period a roads construction project lasts; where 10 years might be ideally on the higher side. This analysis may also imply that many projects in Lurambi sub-county do not delay beyond 10 years.



#### **4.3.6 Distribution of Respondents by Experience in Current Position**

Table 4.7 represents responses from the officials interviewed when asked about the duration worked in their current positions.

**Table 4.7 Respondents' Experience in Current Positions**

<b>Experience in the current position</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
1 - 5 Years	42	56
6 - 10 Years	25	33
11 - 15 Years	5	8
15+ years	2	3
<b>Total</b>	<b>75</b>	<b>100</b>

Forty two (56%) of the respondents had worked for 1-5 years, 25 (33%) for 6-10 years, 5 (8%) for 11-15 years, and 2 (3%) for over 15 years in the positions they were currently holding. Overall however, most of the officials interviewed had spent considerable time in their respective positions in the project management which gave them a clear understanding of the operations of their projects.

#### **4.4 Extend to which Contractors Experience, Obstruction of Road Construction Sites and Project Specification Changes Influence Completion of Road Construction Projects**

Asked whether there was any serious interruption of completion of road construction projects at any given time in Lurambi sub-county, Kakamega county, 60 (80%) of the respondents said yes while 15 (20%) of them said no.

**Table 4.8 Interruption of Completion of Road Construction Projects**

<b>Interruptions in project completion</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Yes	60	80
No	15	20
<b>Total</b>	<b>75</b>	<b>100</b>

Issues of cash flow from the government contributed significantly to interruption of completion of road construction in Lurambi sub-county. Such a scenario led to late payment of workers; a situation that often demoralized them thus ending up not working optimally. This was despite the fact that majority of them were being managed by skilled professionals. Furthermore, bad weather,

and poor planning by key stakeholders lead to the delays. Respondent 56 who was a project manager intimated that improper planning of the projects which was sometimes occasioned by delayed disbursement of funds from the exchequer often led to delays in completion of projects. For instance, the Lurambi – Shikoti - Navakholo road had lagged behind schedule due to delayed release of funding for the project. There was also the case of lack of goodwill from some of the key stakeholders in the projects.

Besides delaying of funds, there were also cases of corruption and mismanagement of cash meant for the projects which sometimes were diverted by unscrupulous contractors for personal use. In a number of cases, some contractors tried to change specifications of projects midway due to delay of funds in an effort to meet their delivery timelines.

Furthermore, several other parameters were used to inquire about how long interruption of roads projects in Lurambi sub-county in Kakamega County had been experienced. A number of statements were used to specifically narrow down to common aspects related to the progress and subsequent project conclusion. The responses were measured based on a 5-point Likert scale where 5 = strongly agreed whereas 1 = strongly disagreed.

**Table 4.9 Extent of Interruption of Completion of Road Construction Projects**

<b>Project completion interruptions</b>	<b>1= strongly disagree</b>	<b>2= disagree</b>	<b>3= unsure</b>	<b>4= agree</b>	<b>5= strongly agree</b>	<b>Total</b>
	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>
A number of road construction projects in the county tend to lag behind completion schedule	11 (15)	17 (23)	10 (13)	24 (32)	13 (17)	75 (100)
A number of road construction projects in the county tend to surpass initial budgetary allocation limits	11 (15)	11 (15)	13 (17)	31 (41)	9 (12)	75 (100)
A number of road construction projects in the county suffer budgetary overheads due to delay in completion	18 (24)	10 (13)	8 (11)	30 (40)	9 (12)	75 (100)
Delay in completion of road construction projects in the county is experienced in all	15 (20)	22 (29)	15 (20)	10 (13)	13 (17)	75 (100)

categories of roads regardless of class.						
There are concerted efforts from all key stakeholders.	10 (13)	18 (24)	13 (17)	16 (21)	18 (24)	75 (100)
<b>Composite Mean</b>	<b>13</b>	<b>16</b>	<b>12</b>	<b>22</b>	<b>12</b>	<b>75</b>

Thirty seven (49%) of the respondents agreed that several roads projects in the county tend to lag behind completion schedule, while 28 (38%) of them had a contrary opinion. At the same time, 10 (13%) of the respondents were unsure about this claim. It also emerged that a number of projects in the county tend to surpass initial budgetary allocation limits, with 40 (53%) of the respondents holding this opinion. On the other hand, 22 (30%) of them disagreed with this view while 13 (17%) said that they were unsure. The findings further indicated that a number projects in the county suffer budgetary overheads due to delay in completion, with 39 (53%) agreeing with this view. 28 (37%) of the officials interviewed disagreed with this line of thought whereas 8 (11%) of them indicated that they were uncertain.

Regarding whether delay was experienced in all categories of roads regardless of class, 37 (49%) of the respondents disagreed, 23 (30%) agreed, while 15 (20%) were not sure. There were also mixed reactions regarding whether there were concerted efforts from all key stakeholders in addressing the delays, 34 (45%) of the respondents agreed with view, 28 (37%) disagreed, while 13 (17%) were unsure. Based on the general distribution of the responses regarding factors influencing projects in Lurambi Sub County in Kakamega, evidently, while there were some delays, this did not happen to an alarming rate. Overall, on average 34 (45%), 29 (39%), and 12 (16%) of the respondents respectively agreed, disagreed and were unsure about the fact that there were interruptions.

#### **4.4.1 Extend to which Contractors’ Experience Influence Completion of Road Construction Projects**

Asked whether contractors’ experience had a serious influence on completion of road construction projects in Lurambi sub county in Kakamega, 66 (88%) of the respondents agreed while 9 (12%) disagreed.

**Table 4.10 Influence of Contractors' Experience on Completion of Road Construction Projects**

<b>Contractors' experience</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Yes	66	88
No	9	12
<b>Total</b>	<b>75</b>	<b>100</b>

It further emerged that contractors with minimal experience face serious challenges in executing their work, hence the delay in completion of the projects. Inexperienced contractors had the tendency to waste time in the planning stage which ended up eating into the originally allocated schedule. On the contrary, experienced contractors often understood their roles thereby being able to expedite their projects.

As respondent 17 said, good experience of key officials running a roads construction project directly relates to planning and execution of a project. It was common for inexperienced contractors to compromise the quality of their work. For instance, the Kakamega – Webuye road was delayed because of problems with the first contractor, the contractor had to be changed but the road is yet to be completed. Although most of the road construction projects usually have experienced contractors, but some of them end up subcontracting due to heavy workloads and this compromises completion timelines and even the quality of work.

Additionally, a number of specific clarifications were sought regarding the manner or extent to which contractors' experience influenced projects direction and schedule. The responses were measured based on a 5-point Likert scale where 5 = strongly agreed whereas 1 = strongly disagreed.

**Table 4.11 Extent of Influence of Contractors' Experience on Completion of Road Construction Projects**

<b>Contractors' experience</b>	<i>1=</i>	<i>2=</i>	<i>3=</i>	<i>4=</i>	<i>5=</i>	<i>Total</i>
	<i>strongly disagree</i>	<i>disagree</i>	<i>unsure</i>	<i>agree</i>	<i>strongly agree</i>	
	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>
Road construction projects in Kakamega County engage highly qualified contractors with previous track records.	3 (4)	18 (24)	0 (0)	40 (53)	14 (19)	75 (100)
Road construction projects in Kakamega County tend to engage professionally competent project managers	0 (0)	22 (29)	16 (21)	18 (24)	19 (25)	75 (100)
Majority of the roads construction projects in Kakamega County engage highly skilled contractors	0 (0)	23 (31)	28 (37)	11 (15)	13 (17)	75 (100)
A number of roads construction projects engage contractors with high people skills	4 (5)	31 (41)	3 (4)	24 (32)	13 (17)	75 (100)
Majority of the contractors engaged in roads construction are evaluated based on the number of previous similar projects.	0 (0)	14 (19)	3 (4)	33 (44)	25 (33)	75 (100)
Generally, there is lack of accountability among contractors in road construction projects in Kakamega County which usually interrupt smooth running of the project	3 (4)	19 (25)	26 (35)	10 (13)	17 (23)	75 (100)
Both the national and county governments are doing enough to ensure project success	8 (11)	25 (33)	10 (13)	14 (19)	18 (24)	75 (100)
<b>Composite Mean</b>	<b>3</b>	<b>22</b>	<b>12</b>	<b>21</b>	<b>17</b>	<b>75</b>

The findings in Table 4.11 indicate that road construction projects in Kakamega County engage highly qualified contractors with previous track records, where 54 (72%) of the respondents expressed this view. However, 21 (28%) of the respondents contradicted the claim that qualified contractors were usually engaged by the county government. Regarding whether road construction projects in Kakamega county tend to engage professionally competent project managers, 37 (49%)

of the respondents agreed, 22 (29%) disagreed while 16 (21%) were unsure. Similarly, 24 (32%) of the respondents agreed projects in Kakamega engage highly skilled contractors. In the contrary, 28 (37%) said they were unsure while 23 (31%) disagreed with this view.

About whether a number of roads construction projects engage contractors with high people skills, 37 (49%) of the respondents agreed, 35 (46%) did not agree while 3 (4%) were unsure with this view. It further emerged that majority of the contractors engaged in roads constructions were evaluated based on the number of previous similar projects successfully completed. 58 (77%) of the respondents agreed, 14 (19%) disagreed while 3 (4%) of them indicated that they were uncertain about this view. There were mixed reactions regarding the view that generally, there is lack of accountability among contractors in road construction projects in Kakamega County which usually interrupt smooth running of the project.

Out of those interviewed, 27 (36%) of the respondents agreed, 26 (35%) were unsure while 22 (29%) disagreed with this account. There were also mixed feelings about whether the national and county governments are doing enough to ensure that contractors' experience does not derail them, 33 (44%) contradicted this view, 32 (43%) agreed while 10 (13%) of them were unsure. Overall, on average, 38 (51%), 25 (33%), and 12 (16%) of the respondents respectively agreed, disagreed and were unsure about the fact that contractors' experience influenced projects.

#### **4.4.2 Extend to which Obstruction of Construction Sites Influence Completion of Road Construction Projects**

Establishment of the influence of obstruction to construction sites on completion of road construction projects in Lurambi sub county in Kakamega was the second objective. About whether there is a serious influence of obstruction of road construction sites on road construction projects in Lurambi sub county, Kakamega County, 57 (76%) of the respondents said yes while 18 (24%) said no.

**Table 4.12 Influence of Obstruction of Construction Sites on Completion of Road Construction Projects**

<b>Obstruction of road construction sites</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Yes	57	76
No	18	24
<b>Total</b>	<b>75</b>	<b>100</b>

A number of unforeseen challenges tended to bog down some of the road construction projects, such as impassable roads or passageways to take the machinery and materials to the construction sites. There was also the question of unpredictable weather conditions, such as when heavy rains came unexpectedly. Furthermore, some contractors faced protracted land tussles which made it difficult to complete roads projects on schedule as negotiations and renegotiations sometimes took place endlessly. Similarly, land conflicts involving local communities often affected completion of projects as it sometimes took too long to reach agreements on where exactly some roads should pass.

According to respondent 64 who is a roads contractor in the sub-county, some of the common conflicts between local communities and contractors involve demolitions of building or houses where the affected individuals or groups need compensations. Sometimes it takes too long to agree on the amount and modalities of compensation hence the delay in completion of the projects. In a few cases, there have also been witnessed court injunctions that end up taking too long to be lifted. However, the biggest impediment relates to heavy rains which make roads to construction sites impassable, or change of physical map where the road is supposed to pass which may take longer time than necessary to resolve. Lurambi – Shikoti – Navakholo road which was started on 06/03/2017 and planned to be completed by 04/09/2019 is yet to be completed up to now, the completion was delayed by some of these factors.

In addition, a number of specific clarifications were sought on how obstruction of construction sites influenced completion of road projects in Lurambi sub-county. The responses were measured based on a 5-point Likert scale where 5 = strongly agreed whereas 1 = strongly disagreed. Table 4.13 presents a summary of the analysis of these responses.



**Table 4.13 Extent of Influence of Obstruction of Construction Sites on Completion of Road Construction Projects**

Obstruction of road construction sites	1= <i>strongly disagree</i>	2= <i>disagree</i>	3= <i>unsure</i>	4= <i>agree</i>	5= <i>strongly agree</i>	Total
	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>
A number of projects in the county encounter completion interruptions due to poor site terrain	9 (12)	21 (28)	11 (15)	20 (27)	14 (19)	75 (100)
Poor weather conditions often cause projects completion interruptions	21 (28)	6 (8)	3 (4)	15 (20)	30 (40)	75 (100)
Clear identification of scope or magnitude of the projects is sometimes poor, leading to interruptions in completion	15 (20)	16 (21)	4 (5)	33 (44)	7 (9)	75 (100)
Often, inefficient construction machinery causes completion interruptions of the projects	6 (8)	15 (20)	3 (4)	33 (40)	18 (24)	75 (100)
There are often court orders stopping the projects which cause interruption of completion	24 (32)	18 (24)	9 (12)	11 (15)	13 (17)	75 (100)
Both the national and county governments are doing enough to ensure that inaccessibility to construction sites does not derail completion of road construction projects in the county	17 (23)	21 (28)	7 (9)	11 (15)	19 (25)	75 (100)
<b>Composite Mean</b>	<b>15</b>	<b>16</b>	<b>6</b>	<b>21</b>	<b>17</b>	<b>75</b>

Statistics in Table 4.13 indicates that there were mixed reactions regarding the influence of obstruction of construction sites on completion of roads projects. For instance, 34 (46%) of the respondents agreed that a number of projects in the county encounter completion interruptions due to poor site terrain. At the same time, 30 (40%) of them disagreed with this view while 11 (15%) said they were unsure. On whether poor weather conditions often cause projects completion

interruptions, 45 (60%) of the respondents agreed, 27 (36%) of them disagreed while 3 (4%) were uncertain. A similar trend was witnessed regarding the view that clear identification of scope or magnitude of the projects is sometimes poor, leading to interruptions in completion, with 40 (53%) of the respondents agreeing with view. However, 31 (41%) disagreed while 4 (5%) were unsure about this proposition.

There was also a popular view that often, inefficient construction machinery causes completion interruptions of the projects, with 51 (64%) of the respondents holding this view. Conversely, 21 (28%) of the respondents disagreed while 3 (4%) of them were unsure about this view. However, majority of the respondents disagreed that there are often court orders stopping the projects which cause interruption of completion of the projects, where 42 (56%) of the respondents expressing this view. Twenty four 24 (32%) of them concurred with this view while 9 (12%) indicated that they were not sure. Also, more than 50% of those interviewed disagreed that both the national and county governments are doing enough to ensure that inaccessibility to construction sites does not derail project conclusion, where 38 (51%) of them expressed this view. Besides, 30 (40%) were in agreement with these thoughts while 7 (9%) disagreed with the view. Overall, on average, 38 (51%), 31 (41%), and 6 (8%) of the respondents respectively agreed, disagreed and were unsure about the fact that obstruction to construction sites influenced projects in Lurambi, Kakamega.

#### **4.4.3 Extend to which Project Specification Changes Influence Completion of Road Construction Projects**

Asked whether there is a serious influence of project specification changes on roads construction projects in Lurambi sub county, Kakamega County, 42 (56%) of the respondents said no while 33 (44%) said yes.

**Table 4.14 Influence of Project Specification Changes on Completion of Road Construction Projects**

<b>Project specifications</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Yes	33	44
No	42	56

Total	75	100
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The biggest challenge relating to change of specifications had to do with unexpected increase in costing of projects which ended up causing delays in completion as the stakeholders struggled to adjust to the new changes accordingly. There was also likelihood of contractors getting confused on how to proceed after the new changes are introduced midway the project. According to respondent 31, every time there is change in specifications, the cost and other key aspects of the project get to be interfered with. This automatically leads to delay of completion of the project as key stakeholders of the project have to take a lot of time trying to adjust in a number of affected areas. These may include looking for alternative materials which are likely not to be readily available. At some point, some contractors have tended to opt for cheaper materials due to change of project specifications; a situation which interferes with the general execution of the affected project.

Specific questions were asked to clarify how project specifications impacted timely dispensation of construction of road projects in Lurambi sub county. The responses were measured based on a 5-point Likert scale where 5 = strongly agreed whereas 1 = strongly disagreed. Table 4.15 presents a summary of analysis of these responses.

**Table 4.15 Extent of Influence of Project Specification Changes on Completion of Road Construction Projects**

<b>Project specifications</b>	<b>1= strongly disagree</b>	<b>2= disagree</b>	<b>3= unsure</b>	<b>4= agree</b>	<b>5= strongly agree</b>	<b>Total</b>
	<b>n(%)</b>	<b>n(%)</b>	<b>n(%)</b>	<b>n(%)</b>	<b>n(%)</b>	<b>n(%)</b>
Many projects hire enough experienced skilled personnel to ensure that there is no irregular change of project specifications	3 (4)	37 (49)	7 (9)	28 (37)	0 (0)	75 (100)
Many projects in the county put in place enough quality control measures to avoid regular change of project	4 (5)	15 (20)	16 (21)	31 (41)	9 (12)	75 (100)

specifications to forestall interruptions of project completion						
Experienced engineers are often engaged on the projects to avoid errors in initial designs and prevent subsequent change of project specifications	8 (11)	13 (17)	0 (0)	41 (55)	13 (17)	75 (100)
Many projects tend to discourage the issue of later variations on specifications to forestall delays in completion	24 (32)	3 (4)	15 (20)	25 (33)	8 (11)	75 (100)
Competent project managers are usually hired in road construction projects in Kakamega County for consistence of work progress	8 (11)	19 (25)	18 (24)	14 (19)	16 (21)	75 (100)
A number of road construction projects in the county have incurred extra costs due to change of project materials midway	11 (15)	11 (15)	9 (12)	16 (21)	28 (37)	75 (100)
Both the national and county governments are doing enough to ensure that project specifications do not derail projects	17 (23)	12 (16)	10 (13)	25 (33)	11 (15)	75 (100)
<b>Composite Mean</b>	<b>11</b>	<b>16</b>	<b>11</b>	<b>26</b>	<b>12</b>	<b>75</b>

The results above indicate that there was a popular feeling that many projects did not hire enough experienced skilled personnel to ensure that there is no irregular change of specifications of road construction projects in the county, with 40 (53%) of them holding this view. On the other hand, 28 (37%) and 7 (9%) of them respectively agreed and expressed uncertainty about this view. It however emerged that many projects in the county put in place enough quality control measures to avoid regular change of project specifications to forestall interruptions of project completion, where 40 (53%) of the respondents held this opinion. Meanwhile, 19 (25%) of the respondents disagreed with this view while 16 (21%) of them were unsure.

A similar trend was noted regarding the view that experienced engineers are often engaged on the projects to avoid errors in initial designs and prevent subsequent change of project specifications, where 54 (72%) of the respondents expressed this view. However, 21 (28%) of the respondents had contrary opinion. The findings also indicated that there were mixed reactions regarding the opinion project managers in Lurambi sub county in Kakamega tend to discourage the issue of later variations on specifications to forestall delays in completion. 33 (44%) of the respondents agreed, 27 (36%) disagreed and 15 (20%) of them were unsure of this view. Similarly, 30 (40%) of the respondents agreed, 27 (36%) disagreed, while 18 (24%) were unsure about the view that competent project managers are usually hired in road construction projects in Lurambi sub county, Kakamega County for consistence of work progress.

Furthermore, 44 (58%) concurred that a number of road construction projects in the county have incurred extra costs due to change of project materials midway. Furthermore, 22 (30%) of them had contrary opinion while 9 (12%) of them were unsure about this view. Lastly, 36 (48%) of the respondents agreed, 29 (39%) disagreed, while 10 (13%) of them were unsure about the view that both the national and county governments are doing enough to ensure that project specifications do not derail project completion. Overall, on average, 38 (51%), 26 (35%), and 11 (14%) of the respondents respectively agreed, disagreed and were unsure about the fact that project specifications influenced project conclusion.

Generally, experienced contractors are a great asset to road construction projects such that they are able to quickly understand how to change their operations every time they experience any unexpected challenge. Furthermore, such contractors are able to flexibly adjust to the new challenges so that they can deliver on their mandate. However, a few delays have been witnessed in the sub-county, which were attributed to unforeseen challenges such as unexpectedly heavy rains which may lead to obstruction of construction sites. In this sense, project specifications should not be altered unless it is absolutely necessary.

#### **4.5 Analysis of Variance (ANOVA) and Testing of Hypotheses**

ANOVA and testing of hypotheses was carried out to justify how the independent variables relate with the dependent variable.

#### **4.5.1 Analysis of Variance (ANOVA)**

Regression model was used to test significance of correlation between the independent and dependent variables. Table 4.16 presents the ANOVA findings.

**Table 4.16 Analysis of Variance**

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
<b>1</b>	Regression	24.615	1	24.62	25.82	.000 <sup>b</sup>
	Residual	69.597	73	0.95		
	Total	94.212	74			

a. Dependent Variable: project completion

b. Predictors: contractors' experience, construction sites obstruction, project specification changes

Based on the ANOVA in table 4.16, the P-value was 0.000. The findings further showed that the *F* statistic (1, 73) at 95% level of significance (0.95) was less than *F* calculated (25.82). Hence, the regression model had significant effect in predicting the effect of independent variables (contractors' experience, construction sites obstruction, project specification changes) on the outcome of the study.

#### 4.5.2 Multivariate Analysis

A multivariate regression was undertaken to understand the strength of the correlation between the independent variables and the dependent variable. Table 4.17 presents regression coefficients with P-values of individual variables.

**Table 4.17 Multiple Regression Analysis**

<b>Predictor</b>	<b>Unstandardized Coefficients</b>		<b>Standardized Coefficients</b>	<b>t</b>	<b>Sig.</b>
	$\beta$	Std. Error	Beta		
Constant	4.121	0.041		1.531	0.000
X <sub>1</sub> Contractors' experience	-0.532	0.109	0.4121	3.312	0.051
X <sub>2</sub> construction sites obstruction	-0.321	0.037	0.301	1.510	0.060
X <sub>3</sub> project specification changes	-0.351	0.047	0.209	2.231	0.063

a. Project completion

Based on the statistics in table 4.17 above, the following model was established:  $Y=4.121+(-0.532X_1)+(-0.321X_2)+(-0.351X_3)$  where Y represents project completion, and  $X_1$  stands for contractors' experience,  $X_2$  construction sites obstruction, and  $X_3$  project specification changes. Taking all factors to be zero, the constant was 4.121, signifying the level of project completion. But, a unit increase in contractors' experience when all other factors remained constant would lead to a 0.532 decrease in project completion level. Besides, at 5% level of significance, this meant that  $P=0.051 > 0.05$ , contractors experience had a strong negative influence on project conclusion in Lurambi sub county, Kakamega County.

Statistics further indicated that assuming all factors at zero, a unit increase in obstruction to construction sites would result into a -0.321 improvement in completion of road construction projects in Lurambi sub county, Kakamega County. Also, at 5% level of significance where  $P=0.060 > 0.05$ , this meant that obstruction to construction sites significantly negatively influenced completion of the projects.

Also, a unit increase in changes in project specifications when all other factors remained constant would result into a 0.531 negative performance of completion of projects of road construction projects in Lurambi sub county, Kakamega County. At 5% level of significance where  $P=0.063 > 0.05$ , this implied that changes in project specifications strongly negatively influenced completion of road construction projects in Lurambi sub county, Kakamega County.

### 4.5.3 Hypotheses Testing

**Hypothesis I:** The hypothesis of the study was:

**H<sub>01</sub>:** There is no relationship between contractors' experience and completion of road construction projects in Lurambi sub county, Kakamega County.

**H<sub>a1</sub>:** There is a relationship between contractors' experience and completion of road construction projects in Lurambi sub county, Kakamega County.

In testing this hypothesis, multiple regression analysis was carried out between contractors' experience and completion of road construction projects and there was a significant influence of contractors' experience on completion of road construction projects. Hence, we reject the null (**H<sub>01</sub>**) hypothesis.



**Hypothesis 2:** The hypothesis of the study was:

**H<sub>02</sub>:** There is no relationship between obstruction to construction sites and completion of road construction projects in Lurambi sub county, Kakamega County.

**H<sub>a2</sub>:** There is a relationship between obstruction to construction sites and completion of road construction projects in Lurambi sub county, Kakamega County.

In testing this hypothesis, multiple regression analysis was carried out between obstruction to construction sites and completion of road construction projects and there was a significant influence of obstruction to construction sites on completion of road construction projects. Hence, we reject the null (**H<sub>02</sub>**) hypothesis.

**Hypothesis 3:** The hypothesis of the study was:

**H<sub>03</sub>:** There is no relationship between project specifications and completion of road construction projects in Lurambi sub county, Kakamega County.

**H<sub>a3</sub>:** There is a relationship between project specifications and completion of road construction projects in Lurambi sub county, Kakamega County.

In testing this hypothesis, multiple regression analysis was carried out between project specifications changes and completion of road construction projects and there was a significant influence of project specifications changes on completion of road construction projects. Hence, we reject the null (**H<sub>03</sub>**) hypothesis. In all cases, the study rejected the null hypotheses by establishing that there was a significant relationship between each one of the independent variables and the dependent variable of the study.

## **CHAPTER FIVE**

### **SUMMARY OF THE FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

The chapter contains summary of the findings, discussions, conclusion, recommendations, and suggestions for further research.

#### **5.2 Summary of the findings**

The study examined influence of contractors' experience, obstruction of road construction sites and project specification changes on completion of road construction projects in Lurambi sub county Kakamega county. Specific objectives included to determine to what extent contractors' experience influence completion of road construction projects, to establish to what extent obstruction to construction sites influences completion of road construction projects, and to investigate to what extent project specification changes influence completion of road construction projects in Lurambi sub county, Kakamega County.

Stratified random sampling technique was used to sample 92 from 120 respondents in the categories of contractors, project consultants, project engineers, and project managers. Out of 92 respondents sampled, 75 respondents fully participated giving a return rate of 82%, this was above 60% and could therefore allow generalizing the results to the target population. Averagely 45%, 39% and 16% of the respondents respectively agreed, disagreed and were unsure about the fact that there were interruptions of completion of road construction projects in Lurambi, Kakamega county. On average 51%, 33% and 16% of the respondents respectively agreed, disagreed and were unsure about the fact that contractors' experience influenced completion of road construction projects in Lurambi, Kakamega county; while 51%, 41% and 8% of the respondents respectively agreed, disagreed and were unsure about the fact that obstruction to construction sites influenced completion of road construction projects in Lurambi, Kakamega county; and 51%, 35% and 14%

of the respondents respectively agreed, disagreed and were unsure about the fact that project specification changes influenced completion of road construction projects in Lurambi, Kakamega county.

Analysis of variance and testing of hypothesis was carried out to justify how the predictor and outcome variables relate. In testing the hypotheses, multiple regression analysis was carried out between the predictor and outcome variables, in all cases, the study rejected the null hypotheses by establishing that there was a significant relationship between each one of the predictor variables and the outcome variable of the study.

## **5.3 Discussions**

### **5.3.1 Project Completion**

Asked whether there was any serious interruption of completion of road construction projects at any given time in Lurambi sub-county, Kakamega county, 60 (80%) of the respondents said yes. Generally, it emerged that roads projects were likely to be delayed due to different factors. These revelations were in synch with a study by Aibinu and Jagboro (2012) which noted that delay in the road construction projects had become commonplace due to poor planning. They advocated for awareness creation among all the stakeholders in the road construction sector to inculcate a sense of proper project planning right from inception phases.

Similarly, in their study, Mensah and Knight (2017) noted that factors of delay were varied and dependent on a country, region, and/or era. Their view echoed that of the World Bank (2016) which noted that there are numerous challenges impacting projects but they are not uniformly experienced across countries or geographical areas. For instance, in Malaysia, approximately 18% of road construction projects were delayed for at least three months or were completely terminated before their normal termination time due to poor original designs (Hussin & Omran, 2012). A worse scenario was noted in Saudi Arabia where Hamzah (2012) state that more than 70% of road construction assignments fell behind schedules by at least 10-30% of anticipated completion time.

Kaming, Olomolaiye, Holt & Harris (2012) carried out in Indonesia to understand the cause of delay in road projects, it emerged that poor project designs and specifications and ineffective

management and supervision were some of the major hindrances to timely project completion. These findings were corroborated by Kikwasi (2013) by noting that in Tanzania late payments, poor coordination and communication posed serious risks to projects completion in the roads construction industry.

Additionally, time and cost overruns were linked to poor tendering methods, hostile project environment and lack of motivation among key stakeholders among other factors (Kwatsima, 2017). As confirmed by this study, despite the government's efforts to ensure that roads are effectively constructed to catapult development, empirical studies have indicated that there are delays in completion of road construction projects which end up derailing development in a number of other sectors.

### **5.3.2 Extent to which Contractors' Experience Influences Completion of Road Construction Projects**

Contractors' experience came out strongly as influencing completion of road construction projects, with 88% of the respondents indicating that this mattered significantly in the construction industry. While majority of the constructions were managed by qualified and experienced professionals such as contractors, engineers and project managers, it was also clear that some of the contractors did not have sufficient experience. The responsibilities of a contractor are enormous and include; management of resources including funds, identification of right personnel for various activities, identification of necessary equipment, maintaining good public relationship with all stakeholders, identification of materials and suppliers among many other responsibilities. Therefore, contractors' experience is critical for success of road construction projects not only in Lurambi sub county but also other location as revealed by the following studies.

James, G. Kimemia (2015) carried out a study on determinants of projects delay in the construction industry in Kenya; The area of focus was road projects in the coast region implemented by KeNHA. The research found out that 67% of the delay was as a result of contractor's experience. Manowong and Ogunlana (2010) noted that contractors in road construction projects determined the direction, quality and timeframe of the project. Similarly, Macharia (2016) noted that contractors are involved in numerous aspects of the management and proper execution of the

project. Hence, depending on competence of a contractor, issues related to funding, cash flow, bankruptcies and insufficient funds are likely to commonly hamper execution of projects.

Furthermore, Macharia (2016) revealed that lack of finances, which was directly linked to the competencies of a project contractor, was a serious cause of project delay. Further, according to Mohammed (2012), insufficient or inappropriate construction materials were also viewed as a function of the level of experience or qualification of a contractor working in a particular project. Muturi and Oguya (2016) further state that an effective and efficient contractor must be proactive enough to understand the dynamics involved in the whole construction process and be ready to mitigate any impending threats to the project. Another study conducted by Ngacho and Das (2014) established that labour supply significantly influenced projects in the roads sector. This touched on both quality and quantity of labour which also depended on the ability of the contractor to identify the right match. Therefore, the findings of this study in Lurambi, Kakamega county very much agrees with studies done in other locations with other researchers.

### **5.3.3 Extent to which Obstruction of Construction Sites Influences Completion of Road Construction Projects**

Seventy six percent (76%) of the respondents involved in this study indicated that obstruction to road construction sites influenced completion of road construction projects schedule in Lurambi, Kakamega county. Impassable roads due to bad weather and type of subsoil, such as clay soils during rainy seasons, often made it difficult for the contractors to transport machinery and building materials to the construction sites. Hence, this ultimately contributed to delay of completion of the projects. Obstruction was also experienced where the residents had erected structures on road reserves, therefore, the site was not readily available to the contractor for road construction. In some cases, the contractor had to get court orders to carry demolitions to enable road construction to proceed.

There was also a popular view that often due to obstruction to construction sites, insufficient and inefficient construction machinery causes completion interruptions of the projects, with 64% of the respondents holding this view. The following previous studies agree with these findings. Seboru (2015) noted that some of the common obstructions include huge rock, clay soil, too much

water and other geological problems on site that were not identified at the planning stage or were not anticipated. Another common obstruction factor as noted by Haseeb et al (2011) was heavy rains as this made construction sites inaccessible. Generally, unpredictable weather also makes it difficult to plan for project activities. As noted in the current study, Kamanga and Steyn (2013) established that delay in compensation to the land owners was also another way of obstruction to construction sites which in turn caused delay in completion of the whole project.

The findings by Kamanga and Steyn (2013) were a reflection of Patil et al (2013) who noted in their research to understand factors causing delay projects conclusion in India that at least 43% of land owners claimed not to have been compensated on time, hence delaying project completion. Similarly, delayed acquisition of land played a critical role in projects completion delays. Kikwasi (2012) further stated that in Tanzania's roads development sector delays in land acquisition arose when land owners failed to agree with the construction agency on key aspects of the transfer of ownership or when compensation money was not released on time.

#### **5.3.4 Extent to which Project Specification Changes Influence Completion of Road Construction Projects**

Change of specifications in road projects was noted to be a cause of interruption in projects completion, with 44% of the respondents in this study agreeing with this view. The biggest challenge relating to change of specifications had to do with unexpected increase in costing of projects which ended up causing delays in completion as the stakeholders struggled to adjust to the new changes accordingly. The study further revealed that a number of projects in the county have incurred extra costs due to change of project materials midway, with 58% of the respondents expressing this view. Due to unexpected change of specifications of road construction projects, some inexperienced contractors were likely to take too long to adjust to the new provisions hence delaying completion. In this sense, the research noted that project specifications should not be altered midway in the project unless it is absolutely necessary.

Like in some analyzed past empirical literature, this study further revealed that change of specifications can be initiated by a client or borne out of necessity. However, some of the causes for altering specifications of a construction project included inaccurate cost estimation at the initial

plan of the project, sudden rise of prices for some key construction materials, deliberate or inadvertent wrong completion timelines approximation. Furthermore, delay in procurement services often created confusion thus forcing the project managers to delay the whole project so that specifications can be redone to meet the needs of the current status. The following previous studies agree with these findings. Change of or poor specifications of projects have been identified as a factor influencing road construction projects completion (Gituro and Mwawasi, 2016). According to Zhang et al (2014), change of specification can be initiated by a client or borne out of necessity.

Also, Seboru (2015) noted that price fluctuations necessitated changes in specifications of projects. These sentiments echoed the findings of an earlier study by Kamanga and Steyn (2013) conducted in Malawi which established that shortage of fuel and scarcity of foreign currency significantly caused delays. Furthermore, a study by Haseeb et al (2011) in Pakistan showed that inaccurate cost estimation at the initial plan of the project sometimes made it necessary for the key stakeholders to revise project specifications.

Most road projects tend to be behind time schedule even before they can take off, failure to ask for sufficient time leads to delay from the start. Sometimes this is done intentionally to please other stakeholders or sometimes this happens due to absence of technical people in the concerned area (Wambui, 2015). Ogutu (2017) undertook research in Kisumu County in Kenya where the findings showed that delay in procurement services often created confusion thus forcing the project managers to delay the whole project so that the right specifications can be redone. Sweis (2013) identified poor coordination among stakeholders (site engineers, contractors, subcontractors, consultant and other general site workers) to be causing projects completion delays. In such confusion it was possible for specifications on certain items to keep on being changed hence throwing the whole project in disarray.

## **5.4 Conclusions**

Each of the three predictor variables had varying influence on the outcome of the study.

Predictor variable 1, extent to which contractors' experience influences completion of road construction projects. 88% of the officials interviewed agreed that the variable had influence on the outcome. This was quite a high percentage which gave an indication of the central role contractors' experience played as a determinant of road construction projects. There was therefore need for both levels of governments as a client in the sub-county road construction projects to carefully vet contractors before they are awarded contracts. This would ensure that there are minimal challenges in management of the projects.

Predictor variable 2, extent to which obstruction of road construction sites influences completion of road construction projects. 76% of the respondents agreed that the variable had influence on the outcome. This was also quite a high percentage which meant that indeed obstruction of road construction sites in Lurambi sub county was delaying most of the road construction projects. It is therefore imperative for all stakeholders in any road construction project to carefully evaluate all prevailing circumstances in order to forestall emerging of unforeseen challenges that could result into obstruction of road construction sites and hence delay completion of the project. This includes putting in place contingent measures for handling unavoidable situations and or planning construction activities such that they happen at an appropriate time.

Predictor variable 3, extent to which project specification changes influences completion of road construction projects. 44% of the respondents agreed that the variable had influence on the outcome. While this variable compared to the first two had a lower influence, at 44% influence it would still upset project plans. It is therefore imperative that careful planning right from the designing level of the project is carried out to minimize chances of alterations of the original plan that could eventually lead to delay of the project.

All the three Predictor variables namely contractors' experience, obstruction of road construction sites and project specification changes influences the outcome variable (project completion). Therefore, for successful completion of road construction projects in Lurambi sub county Kakamega county, stakeholders in this sector must always evaluate these variables at the design stage of every project to prevent negative influence of those variables by either resolving them or coming up with mitigation measures.



## **5.5 Recommendations**

As regards contractors' experience, there was need for a multipronged approach in recruiting contractors where thorough background checks are undertaken to ensure that only well-qualified and experienced contractors are given contracts by the county. It is also important for the county government to clearly assess and determine the capacity of road construction contractors before they are awarded contracts. This would ensure that there are minimal challenges in terms of the overall management of the projects. Contractors whose work is found not to be satisfactory need to be referred to accrediting and registering institutions like National Construction Authority (NCA) or Institute of Engineers of Kenya (IEK) for sanctions. The National Construction Authority which is charged with accreditation and registration of contractors and regulation of their professional undertakings normally issues certificates for practice starting with NCA8 (lowest) to NCA1 (highest). When a contractors' work is evaluated and found to be unsatisfactory, the certificate of such a contractor should be withdrawn and reissued with a lower certificate, i.e. withdraw NCA1 and issue with NCA3. What it would mean is that such contractor would now only bid for low value works. Such contractors can also be considered for training by NCA.

Regarding obstruction of construction sites, it is imperative for all stakeholders in any road construction project to carefully evaluate all prevailing circumstances in order to forestall emerging of unforeseen challenges that could interfere with timely completion of the project. This includes putting in place contingent measures for handling unavoidable situations. Road authorities should also ensure all road reserves are free from habitation at all times.

The main causes of obstruction to road construction sites in the study were bad weather and subsoil condition and structures on road reserves. Bad weather is a natural condition that the contractors need to plan their activities bearing in mind the weather conditions. It is recommended that the contractors work closely with the meteorological department or local weather stations. The contractor would then need to plan the construction activities such as excavation and dumping of excavated material to happen during dry periods. It is only after being clear on the weather pattern that the contractor should confirm the general plan of the project and come up with detailed activities showing timelines. Therefore, the contractor should provide for this time in the project plan.

For subsoil condition the contractor need to plan for appropriate machinery and also plan to rock fill where necessary, the cost arising out of such activities should be planned at the design stage and included in the project cost to avoid cost variations once the project has started which would delay the project further. Even though obstruction looks like an influencer on its own, it can be noted from above that the contractor plays a big role in mitigating the issue of bad weather and subsoil condition.

Structures on road reserves, authorities charged with ensuring that road reserves are free from construction should always ensure that this is actually the case at all times, they should not wait until when a project is started is when they issue vacate notices. A lot of time is lost once a project has started because some of the people with illegal structure go to court and the court cases take too long to resolve.

On specification changes of the project, careful planning and use of professionals right from the design stage of the project would minimize chances of alterations of the original plan that could eventually lead to delay of the project. Inbuilt within the design procedure formal reviews of plans and specifications including quality assurance plans.

## **5.6 Suggestions for Further Studies**

A proposal is made of further research on the role of Kakamega county on mitigating delays in completion of road projects in the county. It's imperative that both levels of government come up with strategies to mitigate delays in completion of road projects. Once a road project starts a lot of public resources get committed, it is only logical that the projects get concluded so that the public can make use of the projects.

Another area proposed for future studies in the sub county of Lurambi, Kakamega county is to establish how many roads have illegal structures on their road reserves. This will help the agencies planning for road construction projects to proactively take action and not to wait until a road construction project starts before they swing in action.



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## APPENDICES

### Appendix I: Introduction Letter

My name is Elijah Otinga, a Masters student in the University of Nairobi and conducting an academic study to help me complete my studies. The study is on **factors influencing completion of road construction projects in Kenya: a case of Lurambi sub-county in the county of Kakamega**, and would like you to help me complete this questionnaire by providing as accurate information as possible. It is my assurance that all the information you share shall be treated with utmost confidentiality and will only be used for the purpose of this research.

You are free to stop me any time in the course of the interview and ask any clarifications you may need. It is my hope that you will fully participate in the study and that you will give me credible information to enable me accomplish my research. Thank you.

Kind regards,

Sign.....

**Elijah Jamhuri Otinga**

## Appendix II: Questionnaire for Respondents

This questionnaire is meant for collection of data on **factors influencing completion of road construction projects in Kenya: a case of Lurambi sub-county, Kakamega County**. Please, kindly provide as accurate information as possible.

### SECTION I: RESPONDENTS' PERSONAL INFORMATION

1. What is your gender?  
Male  [ ]  
Female  [ ]
2. What is your age bracket?  
20 - 30 Years  [ ]  
31 - 40 Years  [ ]  
41 - 50 Years  [ ]  
51 - 60 Years  [ ]  
Above 60 Years  [ ]
3. What is your level of education?  
Secondary  [ ]  
College  [ ]  
University  [ ]  
Other (specify).....  [ ]
4. What is your role in the construction project?  
Contractor  [ ]  
Consultant  [ ]  
Project Engineer  [ ]  
Project Manager  [ ]
5. How long have you worked in this project?

- 1 - 5 Years [ ]
- 6 - 10 Years [ ]
- 11 - 15 Years [ ]
- 15+ years [ ]

6. What is your experience in the current position?

- 1 - 5 Years [ ]
- 6 - 10 Years [ ]
- 11 - 15 Years [ ]
- 15+ years [ ]

**SECTION II: COMPLETION OF ROAD CONSTRUCTION PROJECTS**

7. Do you think that there is serious interruption of completion of road construction projects in Lurambi sub-county, Kakamega County?

- a) Yes [ ]      b) No [ ]

Please, briefly explain in details your answer above?

8. Using a Likert scale of 1-5 where **5=strongly agree; 4=Agree; 3=Unsure; 2=Disagree; 1=strongly disagree**; please indicate by putting a tick (√) in appropriate response with regard to the following statements regarding interruption of roads construction projects in Kakamega County:

Project completion interruption		1	2	3	4	5
i.	A number of road construction projects in the county tend to lag behind completion schedule.					
ii.	A number of road construction projects in the county tend to surpass initial budgetary allocation limits.					
iii.	A number of road construction projects in the county suffer budgetary overheads due to delay in completion.					
iv.	Delay in completion of road construction projects in the county is experienced in all categories of roads regardless of class.					
v.	There are concerted efforts from all key stakeholders in the road construction projects to address the problem of delay of completion of projects.					

**SECTION III: INFLUENCE OF CONTRACTORS' EXPERIENCE ON COMPLETION  
OF ROAD CONSTRUCTION PROJECTS**

9. Do you think that there is a serious influence of contractors' experience on road construction projects in Kakamega County?

- a) Yes [ ]      b) No [ ]

Please, briefly explain in details your answer above?

.....

10. Using a Likert scale of 1-5 where **5=strongly agree; 4=Agree; 3=Unsure; 2=Disagree; 1=strongly disagree**; please indicate by putting a tick (√) in appropriate response with regard to the following statements on contractors' experience in relating to project completion:

<b>Contractors' experience</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
i.	Road construction projects in <u>Kakamega</u> County engage highly qualified contractors with previous track records.					
ii.	Road construction projects in <u>Kakamega</u> County tend to engage professionally competent project managers.					
iii.	Majority of the roads construction projects in <u>Kakamega</u> County engage highly skilled contractors.					
iv.	A number of roads construction projects engage contractors with high people skills					
v.	Majority of the contractors engaged in roads construction are evaluated based on the number of previous similar projects.					
vi	Generally, there is lack of accountability among contractors in road construction projects in <u>Kakamega</u> County which usually interrupt smooth running of the project.					
vii	Both the national and county governments are doing enough to ensure that contractors' experience does not derail projects					

**SECTION IV: INFLUENCE OF OBSTRUCTION OF ROAD CONSTRUCTION SITES  
ON COMPLETION OF ROAD CONSTRUCTION PROJECTS**

11. Do you think that there is a serious influence of obstruction of road construction sites on road construction projects in Kakamega County?

- a) Yes [ ]      b) No [ ]

Please, briefly explain in details your answer above?

.....

12. Using a Likert scale of 1-5 where **5=strongly agree; 4=Agree; 3=Unsure; 2=Disagree; 1=strongly disagree**; please indicate by putting a tick (√) in appropriate response with regard to the following statements on obstruction of road construction sites relating to project completion:

<b>Obstruction of road construction sites</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
i.	A number of projects in the county encounter completion interruptions due to poor site terrain.					
ii	Poor weather conditions often cause projects completion interruptions.					
iii.	Clear identification of scope or magnitude of the projects is sometimes poor, leading to interruptions in completion.					
iv.	Often, inefficient construction machinery causes completion interruptions of the projects.					
v.	There are often court orders stopping the projects which cause interruption of completion.					
vi.	Both the national and county governments are doing enough to ensure that inaccessibility to construction sites does not derail projects completion.					

**SECTION V: INFLUENCE OF PROJECT SPECIFICATION CHANGES ON  
COMPLETION OF ROAD CONSTRUCTION PROJECTS**

13. Do you think that there is a serious influence of project specification changes on road construction projects in Kakamega County?

- a) Yes [ ]      b) No [ ]

Please, briefly explain in details your answer above?

.....

14. Using a Likert scale of 1-5 where **5=strongly agree; 4=Agree; 3=Unsure; 2=Disagree; 1=strongly disagree**; please indicate by putting a tick (√) in appropriate response with regard to the following statements on project specifications relating to project completion:

<b>Project specification changes</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
i.	Many projects hire enough experienced skilled personnel to ensure that there is no irregular change of specifications of road construction projects in the county.					
ii.	Many projects in the county put in place enough quality control measures to avoid regular change of project specifications to forestall interruptions of project completion.					
iii.	Experienced engineers are often engaged on the projects to avoid errors in initial designs and prevent subsequent change of project specifications.					
iv.	Many projects tend to discourage the issue of later variations on specifications to forestall delays in completion.					
v.	Competent project managers are usually hired in road construction projects in <u>Kakamega County</u> for consistence of work progress.					
vi.	A number of road construction projects in the county have incurred extra costs due to change of project materials midway.					
vii.	Both the national and county governments are doing enough to ensure that project specifications do not derail projects completion.					



15. Give general views regarding factors influencing projects completion Kakamega with specific focus on contractors' experience, accessibility to project sites, and change of project specifications. In your opinion, what specific role does any of these factors play?

.....  
.....  
.....  
.....

Thank you

Appendix III: Authorization Letter



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

Your Ref:

Our Ref:

Telephone: 318262 Ext. 120

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

REF: UON/ODeL/NLC/32/442

17<sup>th</sup> March, 2021

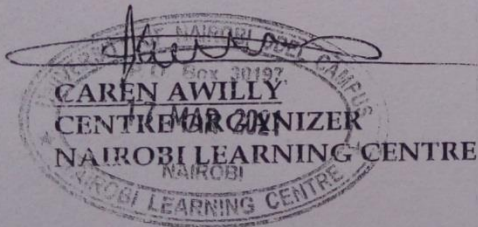
TO WHOM IT MAY CONCERN

RE: ELIJAH JAMHURI OTINGA - REG NO: L50 /86327/2016

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

He is proceeding for research entitled "*Factors Influencing Completion of Road Construction Projects in Kenya: A Case of Lurambi Sub County, Kakamega County.*"

Any assistance given to him will be highly appreciated.



Appendix IV: Research License

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 354583	Date of Issue: 10/March/2022
<b>RESEARCH LICENSE</b>	
	
<p>This is to Certify that Mr. ELIJAH JAMHURI OTENGA of University of Nairobi, has been licensed to conduct research in Kakamega on the topic: FACTORS INFLUENCING COMPLETION OF ROAD CONSTRUCTION PROJECTS IN KENYA: A CASE OF LURAMBI SUB COUNTY, KAKAMEGA COUNTY for the period ending : 10/March/2023.</p>	
License No: NACOSTI/P/22/16215	
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Appendix V: Krejcie & Morgan 1970 Sampling Table

Table 3.1									
<i>Table for Determining Sample Size of a Known Population</i>									
N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384
<i>Note: N is Population Size; S is Sample Size</i>					<i>Source: Krejcie &amp; Morgan, 1970</i>				

