

**RESOURCE MANAGEMENT AND PERFORMANCE OF ROAD  
CONSTRUCTION PROJECTS: A CASE OF KENYA NATIONAL  
HIGHWAYS AUTHORITY, NAIROBI CITY COUNTY, KENYA**

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## **DECLARATION**

### **Declaration**

The project is entirely my own work, and it has never been used to give a degree to any university.

Sign:

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### **Approval by Supervisor**

A do approve this project for examination as the supervisor.

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## ABSTRACT

Globally, infrastructure development is critical in defining a country's overall productivity and economic development. Road construction project performance is critical for every economy's growth and development. It is vital to the economy in terms of wealth creation and job creation. However, road infrastructure projects in developing nations are more frequently underfunded, and a higher percentage of road projects built by local enterprises in these countries have encountered cost and time overruns, as well as failing to reach promised quality standards. The general objective of this study was to investigate the influence of resource management on the performance of construction projects by Kenya National Highway Authority (KeNHA) in Nairobi City County. The study specifically sought to determine how human management, finance management, materials management, machinery and equipment management influences performance. The study was anchored upon the theory of constraints, institutional, resource-based view and the stakeholder's theory. A descriptive research design was adopted targeting an accessible population of 10 ongoing road infrastructure projects within Nairobi City County undertaken by the Kenya National Highways Authority from 2019. The sample of the study comprised of 175 respondents made up of project managers, site engineers and project team members. A semi-structured questionnaire was used to collect primary data. Validity of the study instruments was assessed with the help of the supervisors. The reliability was determined using Cronbach's alpha coefficient. Descriptive and inferential statistics were employed to analyze the data. Simple linear regression analyses were used to determine the relationship between variables. Estimates of statistical parameters were used to present the findings. The study results indicated that there was a positive relationship between human management, financial management, material management and machinery management. The findings of the regression analysis reveal that human resource management showed an improvement in the performance of road construction projects. Similarly, the study established that financial management improved the performance of road construction projects. It was also established that material management, machinery and equipment had a positive effect on road construction projects. The study recommends that it is critical that qualified, The Kenya National Highways Authority should use experienced and professional human resources in road development projects. This makes an assurance that road construction projects are finished at the stated time, on budget, and on schedule. Further the study recommends that The Kenya National Highways Authority in collaboration with county government should ensure that funds set aside for implementation of road projects are fully utilized. This will ensure that the county gets value for money. The results of this study are expected to generate significant empirical data for scholars interested in this area of study. In addition, the research is likely to add to more knowledge pertaining planning and management of projects.

## TABLE OF CONTENTS

<b>DECLARATION .....</b>	<b>ii</b>
<b>ABSTRACT .....</b>	<b>iii</b>
<b>LIST OF TABLE .....</b>	<b>vii</b>
<b>LIST OF FIGURE .....</b>	<b>viii</b>
<b>ACRONYMS/ABBREVIATION .....</b>	<b>ix</b>
<b>OPERATIONAL DEFINITION OF TERM .....</b>	<b>x</b>
<b>CHAPTER ONE: INTRODUCTION.....</b>	<b>1</b>
1.1 Background to Study .....	1
1.1.2 Resource Management .....	4
1.1.3 Project Performance .....	4
1.2 Statement of the Problem .....	6
1.3 Objectives of the study.....	8
1.3.1 General objective .....	8
1.3.2 Specific Objectives .....	8
1.4 Research Question .....	9
1.5 Significance of the Study .....	9
1.6 Scope of the Study .....	10
1.7 Limitations of the Study.....	10
<b>CHAPTER TWO: LITERATURE REVIEW .....</b>	<b>12</b>
2.1 Introduction .....	12
2.2 Theoretical Review of Literature.....	12
2.2.1 Theory of Constraints (ToC) .....	12
2.2.2 Institutional Theory.....	14
2.2.3 Resource Based View Theory .....	15
2.2.4 Stakeholders Theory .....	16
2.3 Empirical Review of Literature .....	17
2.3.1 Human Management .....	17
2.3.2 Finance Management .....	19
2.3.3 Materials Management .....	20
2.3.4 Machinery and Equipment Management .....	21
2.3.5 Project Performance of Construction Projects .....	22

2.4 Summary and Gaps .....	25
2.5 Conceptual Framework .....	29
<b>CHAPTER THREE: RESEARCH METHODOLOGY .....</b>	<b>30</b>
3.1 Introduction .....	30
3.2 Research Design .....	30
3.3 Target Population .....	30
3.4 Sampling Design and Sample Size .....	31
3.5 Data Collection Instruments .....	33
3.6 Pilot Testing .....	33
3.6.1 Validity .....	34
3.6.2 Reliability .....	34
3.7 Data Collection Procedure .....	35
3.8 Data Analysis .....	35
3.9 Ethical Consideration .....	37
<b>CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION .....</b>	<b>38</b>
4.1 Introduction .....	38
4.2 Response Rate .....	38
4.3 Demographic Profile of Respondents .....	39
4.3.1 Gender of Respondents. ....	40
4.3.2 Age Bracket of Respondents .....	40
4.3.3 Level of Education of Respondents .....	41
4.4 Reliability Statistics .....	39
4.5 Descriptive Statistics for the Study Variables .....	42
4.5.1 Human Management .....	42
4.5.2 Finance Management .....	44
4.5.3 Materials Management .....	46
4.5.4 Machinery and Equipment Management .....	48
4.5.5 Road Construction Projects Performance .....	50
4.6 Inferential Statistics .....	51
4.6.1 Correlation Analysis .....	52
4.6.2 Regression Analysis .....	53
<b>CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMENDATION... 59</b>	
5.1 Introduction .....	59

5.2 Summary .....	59
5.3 Conclusions .....	60
5.4 Recommendation .....	61
5.5 Suggestion for Future Research.....	62
REFERENCES .....	64
APPENDICES .....	69
Appendix I: Letter of Transmittal .....	69
Appendix II: Respondents' Questionnaire.....	70
Appendix III: Current Road Projects in Nairobi City County .....	78
Appendix IV: Research Authorization .....	79

## LIST OF TABLES

<b>Table 2.1: Summary and Gap .....</b>	<b>25</b>
<b>Table 3.1: Target Population.....</b>	<b>31</b>
<b>Table 3.2: Sample Size .....</b>	<b>33</b>
<b>Table 4.1: Response Rate .....</b>	<b>38</b>
<b>Table 4.2 : Reliability Analysis.....</b>	<b>39</b>
<b>Table 4.3 : Gender .....</b>	<b>40</b>
<b>Table 4.4: Age Bracket .....</b>	<b>40</b>
<b>Table 4.5: Level of Education of Respondents .....</b>	<b>41</b>
<b>Table 4.6: Length of Service in the Road Construction Industry .....</b>	<b>42</b>
<b>Table 4.7: Human Management.....</b>	<b>43</b>
<b>Table 4.8: Finance Management.....</b>	<b>45</b>
<b>Table 4.9: Materials Management .....</b>	<b>46</b>
<b>Table 4.10: Machinery and Equipment Management.....</b>	<b>48</b>
<b>Table 4. 11: Road Construction Project Performance .....</b>	<b>50</b>
<b>Table 4.12: Correlation Analysis.....</b>	<b>52</b>
<b>Table 4.13: Model Summary .....</b>	<b>54</b>
<b>Table 4.14: Analysis of Variance.....</b>	<b>55</b>
<b>Table 4.15: Regression Coefficient.....</b>	<b>55</b>

## LIST OF FIGURES

<b>Figure 2.1: Conceptual Framework Diagram .....</b>	<b>29</b>
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## **ACRONYMS/ABBREVIATIONS**

<b>AFDB</b>	African Development Bank
<b>ANOVA</b>	Analysis of Variance
<b>CA</b>	Competitive Advantage
<b>GDP</b>	Gross Domestic Product
<b>GOK</b>	Government of Kenya
<b>HRM</b>	Human Resource Management
<b>ICT</b>	Information Communication Technology
<b>KenGen</b>	Kenya Electricity Generating Company
<b>KeNHA</b>	Kenya National Highways Authority
<b>KeRRA</b>	Kenya Rural Road Authority
<b>KPI</b>	Key Performance Indicators
<b>KURA</b>	Kenya Urban Roads Authority
<b>KWS</b>	Kenya Wildlife Service
<b>MW</b>	Mega Watts
<b>NACOSTI</b>	National Council of Science and Technology
<b>NaMATA</b>	Nairobi Metropolitan Area Transport Authority
<b>RBV</b>	Resource Based View
<b>SD</b>	Standard Deviation
<b>SPSS</b>	Statistical Package Social Sciences
<b>TOC</b>	Theory of Constraint

## OPERATIONAL DEFINITION OF TERMS

<b>Compensation</b>	:	Monetary payment given to an individual in exchange for their services. In the workplace, compensation is what is earned by employees.
<b>Construction</b>	:	A professional service that provides a project's owner(s) with effective management of the project's schedule, cost, quality, safety, scope, and function.
<b>Financial Management</b>	:	The process of managing a company's finances in such a way that it can be successful while also adhering to regulations.
<b>Human Management</b>	:	Is a method of managing people in a company or organization that is both successful and efficient.
<b>Materials Management</b>	:	Is the process of planning and directing the flow of materials. Materials planning and procurement, supplier selection and selection, purchase, cost, shipping, material acquisition processes (including quality control), inventory and inventory, and supply chain are all integrated.
<b>Machinery &amp; Equipment Management</b>	:	Refers to managing, monitoring and maintenance of both motorized assets and non-motorized machinery and equipment.
<b>Maintenance</b>	:	Involves functional checks, servicing, repairing or replacing of necessary road infrastructure.
<b>Motivation</b>	:	The process that initiates, guides, and maintains goal-oriented behaviors.

<b>Project performance</b>	:	Refers to road construction projects being done on schedule, on budget, and to the client's satisfaction in the required quality
<b>Staff Training</b>	:	A programme implemented by a manager or person of authority to provide specific staff members with the necessary skills and knowledge for their current role.
<b>Remuneration</b>	:	The total compensation received by an employee.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1. Background to the Study**

#### **1.1.1. Performance of Road Construction Projects**

Projects of infrastructure among them road projects have a crucial role within societies of converging the economic development need and most importantly to change the citizens' quality of life (Matu et al., 2020). The central role of public infrastructural projects in sustaining development is acknowledged in Chapter 27 of the 21<sup>st</sup> agenda of United Nations (UN Charter 1945). Likewise, the Kenya Vision 2030 recognizes infrastructure as an enabler for sustained development under the economic pillar. According to Klynveld Peat Marwick Goerdeler (KPMG), (2014), cost and time overruns occurred in 68 percent of African road projects completed by local contractors. Furthermore, in less than five years, the bulk of the roads failed to meet the needed quality standards and were plagued with potholes. A few of them were reconstructed with the help of other companies (Maendo et al., 2018).

However, there is currently no clear indication that this problem is a major consequence of a lack of understanding or poor definition of project performance, management, planning and scheduling in practice. A survey on the schedule performance of Saudi construction projects, Alotaibi et al. (2016) reported that 45 out of 76 projects investigated were delayed by more than 30% beyond the originally scheduled completion date. Another study revealed that more than 50% of the sample of construction projects in UAE experienced varying degrees of schedule deviations and cost overruns (Habibi & Kermanshachi, 2018).

In Qatar, over 85% of construction projects were subject to time and cost overruns as a result of factors such as poor design and deficiencies in schedule and cost estimates (Adam et al., 2017). The Bahrain construction industry has faced the same problems, with projects delayed due to critical factors such as inadequate planning and scheduling (Altoryman, 2014). In Oman, a number of construction projects were also found to be subject to schedule delays by more than 40% beyond their original schedule plans (Alnuaimi & Al Mohsin, 2013). These studies within the Gulf region indicated that insufficient planning and poor scheduling of project activities, ineffective design stages, improper coordination between project stakeholders and lack of knowledge about project requirements are amongst the most critical factors causing schedule deviations and cost overruns ultimately affecting project performance.

When it comes to infrastructure development, Sub-Saharan Africa lags far behind, and existing roads in many poor places fall well short of what is required. Maintenance of existing infrastructure has been abandoned and left in bad shape, affecting the economic progress of many African countries and deterring to some extent investments that may be made as a result of the infrastructure established. In Nigeria, seven out of ten had delays in completion (Sanni-Anibire et al., 2020). A Alhafeez (2018), for example, find that despite a large number of recorded events in Sudan, cost overruns have become increasingly common in building projects ranging from the simplest to the most complicated. This pattern is also seen in Ghana, according to Akande et al. (2018) in most construction projects, The study revealed an increase in additional costs, delays in completion, unsatisfactory project outcomes, and unattended project objectives.

Despite the government's efforts to improve the delivery of road projects in Kenya, repeated project delays have hampered progress. According to a report published by the Kenyan government and the World Bank in 2012, the building of the Thika

Superhighway, which was scheduled to be completed in 2011, was completed a year later. The deadline was pushed back twice, causing cost and time overruns (Ndung'u, 2020). The project exceeded the original budget by kshs.7 billion. Political disputes and tensions in the coalition government, lack of community involvement, terrible weather conditions as a result of the 2011/2012 El Nio rains, substandard technology from local sub-contractors and economic fluctuation were cited as the major causes of delay

The Construction projects, especially the highway construction projects, use huge amounts of resources on and off the field in various forms of resources viz., materials, plants, equipment and human resources along with money, time and space. The uniqueness of the projects makes the resource management a tedious job as the efficiency of each resource depends upon a huge number of working condition factors (Vishnuraj & Vishak, 2017).

The Kenyan government's Vision 2030 aims to make the country a better place that is tightly connected through a network of motorways and other infrastructure. It also suggests a more intensive use of science, technology, and innovation in the road infrastructure industry to boost productivity and efficiency. The government has stated that funding for the country's road infrastructure will be prioritized. According to Vision 2030, the annual demand for the investment of road infrastructure and other tangible assets is estimated at 3.5 percent of the world's GDP by 2030 (OECD, 2012) (Nyumba et al., 2021; Owusu-Manu et al., 2019). However, this is set against the backdrop of a road network that is insufficient about integration to meet current and future needs. The small road sector in Kenya has been dominated by road development and development activities since the release of Kenya Vision 2030 in 2009 (Nyumba et al., 2021). Due to the size of the road network, traffic jams, and expected growth rates

in the future, the need to invest in road infrastructure. Kenya is very high, in addition to the country's budget resources.

### **1.1.2. Resource Management**

One of the most significant organizational developments in recent years has been the massive spread of project work across all industries and businesses (Javid, 2019). In many developing countries' rural areas, projects are utilized to address challenges such as poverty, poor health, and unemployment (AbdulKareem et al., 2021). Infrastructure development projects play a critical part in defining a country's overall productivity and economic development. Infrastructure investments of international standard serve as a key motivator for both domestic and international investors (Bhattacharya et al., 2015).

### **1.1.3. Project Performance**

According to Project Management Institute (2020) the definition of project performance refer to the execution of a collection of activities in a way that maximizes the end result. The final objective of project management is to stay under budget failing to meeting professional standards of quality, performance, objective sustainability, safety, and environmental protection, and failing to meet approvals, design, and occupancy deadlines. (Karwitha & Kihinji, 2019).

Any economy's growth and development is dependent on road infrastructure projects' performance. They also contribute significantly to the economy, both in terms of wealth production and job creation (Munim & Schramm, 2018). Construction projects, particularly highway construction projects, consume a large number of resources both on and off the field, materials, plants, equipment, and human resources, as well as money, time, and space, are all factors to consider. The one-of-a-kind nature of the projects makes resource management problematic since each resource's efficiency is

determined by a large number of working condition parameters. Efficiency is often a result of proper management. According to Reddy et al. (2015), unskilled labor, skilled labor, management, tools, equipment, building supplies, and financing are only a few of the resources needed for a project. The construction industry's success is largely determined by the efficiency with these managed resources (Banobi & Jung, 2019).

#### **1.1.4. Kenya National Highway Authority**

The Kenya National Highways Authority (KeNHA) is a statutory agency created in 2007 by the Kenya Roads Act. It first opened its doors in September of 2008. According to the gazette notice L.N. 18101, KeNHA is in charge of development, renovation, and All National Trunk Roads in Classes S, A, and B, totaling 18,101 kilometers, are under management's responsibility for development, restoration, management, and maintenance (Carter et al., 2020).

According to the Kenyan Constitution of 2010, the National Government (through the Ministry of Transport, Infrastructure, Housing, Urban Development, and Public Works) is responsible for the full supply of a functional road network in Kenya. Policy and regulatory frameworks, liaison, oversight, oversight, liaison with other state organs, and any other services required for the efficient operation of the sub-sectors are all responsibilities of the Department (Kursai, 2018). Road projects in Kenya, like those in many other African countries, have faced several obstacles, including completion delays, associated cost overruns, destruction of residential and commercial structures, as well as abandoned construction projects, are used to fund such projects (Maina, 2018)



## **1.2.Statement of the Problem**

Road infrastructure is a significant aspect in a country's development on a global scale its direct and indirect contribution to economic growth. As outlined in Kenya Vision 2030, successful road construction is a catalyst for economic development (Horvat et al., 2021). The government has committed enormous resources to improve transportation infrastructure and continues to do so, according to the Road Sector Investment Plan (2010-2024). KSh 169.9 billion in 2019/20, up from KSh 154.5 billion in 2018/19, total government road spending is estimated to increase by 10% to KSh 169.9 billion.

To this effect, the Kenya Government committed to timely completion of road projects across the country by putting in to assess the performance of road infrastructure projects, a number of metrics have been put in place. Despite the initiatives, road infrastructure projects in Kenya continue to confront a number of obstacles, resulting in poor project performance (KPMG Report, 2014). For instance, according to the Kenya Highways Authority (KeNHA) (2020), a number of road construction projects in Nairobi City County have fallen behind schedule, owing to the coronavirus and a dusk-to-dawn curfew, which has caused workers to stay at home.

Furthermore, Measures to combat the spread of the coronavirus have resulted in a reduction in the number of casual workers on active building projects, which has hampered progress. These factors, combined with a reduction in the development budget, are expected to delay the completion of critical infrastructure projects (Ebekoziem & Aigbavboa, 2021), particularly in Nairobi City County. Project halts and delays are mostly due to interruptions in global supply chains, as well as lockdowns

and travel restrictions imposed on foreign staff, particularly Chinese workers who are regularly employed on road construction projects.

Road construction delays have had a negative influence on Kenya's social and economic gains that would have accrued if the projects had been completed on time. In the sub-sector of roads, the extent of cost and time overruns in the overall portfolio is high. In Kenya information held by KeNHA of a few sampled road constructions in Kenya show that road development projects are taking longer than expected to finish (K' Akumu & Gateri, 2022). In many projects done in Nairobi such as Nairobi Expressway, and Nairobi Western Bypass which were commissioned in 2019 are way behind schedule. Other projects such as Museum Hill - Athi River (Dual), Museum Hill – James Gichuru (Dual), Outering Road Junction - Kamulu (B63) Road and Bomas - Kiserian (B19) Road which were to be completed between 2020 and March 2021 (Appendix III) are yet to be completed (K' Akumu & Gateri, 2022).

This has resulted in time and cost overrun. Despite the government's continued investment in road construction, According to Macharia (2016), approximately 55% of the country's road construction projects face various challenges that prohibit them from being completed on schedule, incurring cost overruns, or failing to satisfy quality standards. According to studies in Kenya, the number of public road development projects has been steadily increasing. However, completing projects within the stipulated cost budget and timetable has become difficult (Waithera & Susan, 2019). Scope creep, cost overruns, poor craftsmanship, and project time delays are all factors in the few projects that are completed (Waithera & Susan, 2019).

As a result of the formation of white elephant projects, a great deal of money is spent, business prospects are lost, customers are dissatisfied, and overall progress is slowed,

among other things. According to Ondara (2017), Kenya's construction sector has a poor reputation for dealing with construction risks such as poor resource management, and as a result, cost overruns, timetable delays, and other issues and low-quality production continue to occur, resulting in poor performance over time, money, and quality. In that case, the present study sought to evaluate how resource management influences performance of building projects in the Kenya National Highway Authority (KeNHA)

### **1.3. Objective of the study**

#### **1.3.1 General objective**

Investigate the influence of resource management on the performance of construction projects by Kenya National Highway Authority (KeNHA) in Nairobi City County.

#### **1.3.2 Specific Objective**

- i. To assess how human management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County.
- ii. To assess the influence of finance management on the performance of construction projects by Kenya National Highways Authority in Nairobi City County.
- iii. To evaluate how materials management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County.
- iv. To investigate how machinery and equipment management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County.

#### **1.4 Research Question**

- i. How does human management influence performance of construction projects by Kenya National Highways Authority in Nairobi City County?
- ii. How does financial management have on the performance of construction projects by Kenya National Highways Authority in Nairobi City County?
- iii. How does influence of materials management on performance of construction projects by Kenya National Highways Authority in Nairobi City County?
- iv. How does do management of equipment and machinery have on the performance of construction projects by Kenya National Highways Authority in Nairobi City County?

#### **1.5 Significance of the Study**

Project resource management is becoming an increasingly important area of management in firms all around the world. It is also seen as a part of management that will continue to increase in importance and will be used more and more frequently (Kerzner, 2018). This study will contribute valuable knowledge on project management in developing countries, especially in Africa and Kenya in specific. The findings of this study will be used by project management professionals in all categories to improve the success rates of road construction projects through adequate planning and management.

Project managers, engineers, and architects in the construction business, as well as those involved in road construction, will benefit from the recommendations derived from the findings of this study. Through good personnel and resource management, the knowledge acquired from this study may lead to a more effective project management culture and enhanced infrastructure project delivery in Kenya.

The outcomes of this study could make a substantial contribution to the subject's theoretical literature of infrastructure project management as well as provide advice on how to increase project success rates. This study's findings and recommendations could be used in other research projects in different parts of the world.

The current study's findings are expected to be used to enhance project completion times and budgets, which would not only contribute to Kenya's economic growth and development but also raise the country's standard of life for people and residents. Policymakers in both the public and private sectors will benefit from the study's findings. Policymaking based on research is becoming increasingly popular, and research findings are a significant input for policymakers. Governments are especially interested in research projects that are related to their operations. Policies that are well-informed in terms of research data are more likely to accomplish the desired outcomes than policies that are not supported by research.

## **1.6 Scope of the Study**

This research looked at the impact of project resource management on a construction project's performance in National Highway Authority of Kenya (KeNHA). Thus, only those projects undertaken by KeNHA within Nairobi City County were investigated.

## **1.7 Limitations of the Study**

Limitations, according to Best and Kahn (1998), are circumstances outside the researcher's control that may limit the study's conclusion and application to other scenarios.

Some respondents may not have been completely honest about the issues that were being investigated by the study. Respondents were assured of the confidentiality and

anonymity of the information they would disclose to overcome this limitation. Moreover, the researcher was faced with the challenge of accessing relevant public works documents and records. In order to overcome this, the researcher engaged with the relevant authorities and assure their fears by assuring them that the documents would only be used for this study.

Some project contractors did not maintain a current record of the project's actual and budgeted expenses and completion dates. In such cases, the researcher would sought guidance from road construction experts to help with cost estimates. Furthermore, the research was limited to a single county. This could have an impact on the study's generalizability across the country. In this regard, extrapolating the study's findings to other Kenyan counties with similar characteristics to the aforementioned counties should be approached with caution. Because the researcher is self-funded, the study is likely to be hampered by budgetary constraints. To overcome this, the researcher adhered strictly to the research budget and work plan.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The chapter reviewed literature on project resource management. This literature review is carried out to aid in the gathering of data from prior research that provide more light on the subject under investigation. The goal of this review was to identify knowledge gaps that the study will fill.

#### **2.2 Theoretical Review of Literature**

According to Kothari (2017) a theory is a cohesive set of tested assertions that may be utilized as principles of explanation and prediction for a class of occurrences. The study was based on the Theory of Constraints (ToC), Institutional Theory, Stakeholders Theory and Resource-Based View Theory. As a result, this research paved the way for a discussion of these theories.

##### **2.2.1 Theory of Constraints (ToC)**

Goldratt and Cox in 1984 developed this theory that shows that the concept of project management that any series, whether it is a process or a program, is only as strong as its weak link (Melendez et al., 2018). Its goal is to assist businesses in achieving their objectives, which is to increase project performance. It identifies four major roadblocks that prevent projects from succeeding. Project scope, project costs, project quality, and time it takes to complete a project are obstacles. Cost overruns due to poor planning and corruption are two instances of these constraints. The concept emphasizes the need of identifying project management constraints that can stymie project performance and attempting to address such constraints immediately (Melendez et al., 2018).

According to this theory, a system is bound by restrictions that prevent it from attaining its goals. Production, planning, quality control, project management, logistics, accounting, performance evaluation, and other business lines that may have been affected the performance are some of the limiting agents. Constraints, according to this idea, define a system's output, whether accepted or not. The goal of top management is to develop acceptable solutions to reduce a system's the organization's limitations in this method, the company will be able to meet its objectives and maximize revenues. The causes of system constraints are described in this theory, as well as the best approaches to deal with these constraints (Ikeziri et al., 2019). Theory of constraints is applicable in this study since the management, scheduling, allocation and monitoring of project resources are constraints that face project teams when carrying out road infrastructure projects.

Within this study, this theory guides not only the overall study objectives but also the specific ones as well. First, this theory is crucial in addressing the dependent variable which is project performance. In order to road projects undertaken by KeNHA to perform well, it is necessary to lessen the constraints that can otherwise diminish the project outcomes such as the quality of roads constructed. These constraints may pertain to how the project resources are managed in terms of their planning, scheduling, allocation and monitoring among others. This theory underlines the necessity of the project management to identify these project constraints that are likely to limit the projects' performance and taking the necessary measures on solving these constraints

In this study, the theory is crucial since it highlights the constraints that hinder road infrastructure projects from achieving their full potential. Human resource management, financial resource management, material resource management, and machinery and equipment management are all restrictions that affect the performance



of road building projects. The best method to deal with such limits is to figure out how to overcome them so that construction projects can go smoothly. The feedback loop proposed in the last stage of TOC ensures efficient and effective management of constraints by continuous reduction of the constraints hence ensuring that the overall constraints are gradually and continuously reduced. This theory was applied in a study on "evaluation of the factors of housing project execution in Kenya" (Githenya & Ngugi, 2014).

### **2.2.2. Institutional Theory**

William Richard Scott established the institutional theory in 1995, emphasizing the need of having processes and procedures in place to help companies achieve their objectives. The institutional theory, according to Scott (1995), cited in (Drori, 2019), refers to the function of regulatory policy in exercising control over industries, which is carried out through formal and legal features of government infrastructure. The idea looks at how government infrastructure and authority come together to produce an authoritative guideline for institutional and social behavior(Drori, 2019).

Construction companies must follow the norms and belief systems that are in charge of their environment in order to thrive and gain legitimacy. The government's participation in the construction industry, as both a facilitator and a regulator, has a significant impact on corporate performance. The government's normative influence, which is extended through the backing and sanction of industry actors, maintains fairness and fosters constructive competition. Industry-centric variables are created when social, technological, economic, political, environmental, and legal aspects are influenced through the legislative apparatus (Teece, 2018)

As a result, enterprises who choose to utilize opportunities in these market niches gain a competitive advantage. Understanding the systems and procedures used to handle road construction projects, such as contracts, is critical (Teece, 2018). Project monitoring and assessment, as well as contractor payment, to ensure that road repairs are completed on time and on budget. While such methods and processes are advantageous. They must not add to the amount of red tape and bureaucracy.

### **2.2.3. Resource Based View Theory**

Wernerfelt in 1984 developed this theory which is based on a company's ability to employ a collection of valued tangible and intangible resources to gain a competitive advantage over competitors (Davis & DeWitt, 2021). It underlines the importance of vital concrete and intangible resources in enabling the organization to complete projects on time, within budget, and quality you want (Miller, 2019)

According to RBV theory, a company with sufficient resources is more likely to win the competition and outperform its competitors. According to Robert and Bradley (2013), a firm must first examine its own resources in order to attain remarkable performance, determine its value, and ultimately determine how best to use those resources to offer the organization with a competitive edge. The resources a company has, such as capital, equipment, personnel talents, and patents, can help it execute tasks swiftly, according to Robert and Bradley. Furthermore, such a business may easily generate projects that meet the needs of customers.

According to Miller (2019), the RBV theory produces resource-based inter-firm competition. Project performance is influenced by the resources available to an organization. This hypothesis is important for this study because it describes the financial, material, and technical resources needed to improve the performance of a

road projects. RBV theory's inventors, envisioned the project management setting as fitting within this theory (1984). Because any construction company's purpose when it comes to completing a job successfully, efficiency becomes a vital factor (Assensoh-Kodua, 2019).

#### **2.2.4. Stakeholders Theory**

In 1983, Edward Freeman proposed the stakeholder hypothesis, which asserts that a number of parties affect an organization's activity. One of the proponents of stakeholder theory is Freeman (2004) as cited in (Galant, 2017), who claims that there are two perspectives on stakeholder theory: strategic and moral. According to the moral viewpoint, companies' actions may have an impact on people, and those who are impacted have a right to information that allows them to demand certain operating standards, such as benefits and interests. According to Freeman (2004), the stakeholder theory's strategic approach focuses on how businesses are able to achieve their objectives, which define benefits (Galant, 2017).

Alsbaity (2018) for example, are proponents of this theory, argue that an organization's stakeholders must be included and their interests must be considered. According to the theory, organizations that can consider the interests of the majority of stakeholders have a better chance of succeeding in their goals. Understanding the many sorts of stakeholders in an organization, as well as their impact on it, is required for this theory to work. The idea aided this study in understanding that there are many participants need to be considered by road contractors and other parties when performing construction work (Alsbaity, 2018).

As a result, the organization should be able to change its strategy to fit the needs of its constituents while still achieving the ultimate aim of accomplishing the assigned tasks.

Significant factors that influence project performance include stakeholder engagement and assessment of the social impact. Furthermore, the study emphasizes the need of including stakeholders in road construction projects to guarantee that they are properly implemented and completed (Alsbaity, 2018).

## **2.3 Empirical Review of Literature**

Other scholars' reports on related literature were discussed in this section and is relevant to the study's variables. The study's factors include: human management, finance management, material management and machinery and equipment management.

### **2.3.1. Human Management and Project Performance**

Stone et al. (2020) looked into the issues that road infrastructure companies in Sub-Saharan Africa have in delivering high-quality projects. Project managers and contractors were given 100 questionnaires to fill out the study examined the impact of outsourcing technical human resources. It revealed that, in compared to international construction firms, local construction firms experienced a variety of obstacles, recruiting technical professionals with the necessary competency abilities to finish projects is very difficult.

Research has also found that each company has a limited number of operational resources. Because of this, the main task of the project manager was to figure out how to effectively implement the program while working given the restrictions of available resources. Projects involving road infrastructure involve careful resource management, that includes bringing together a team of skilled workers to carry out organizing additional resources, such as tools and equipment, as well as project activities (McClean & Collins, 2019)

Wright and Ulrich (2017) examined project success variables with a focus on human resource management's role. Their findings demonstrated that there was a strong link between project success and the personnel component, indicating that the two factors are linked.

According to Jatarona (2018) 70 percent of Malaysian transportation due to financial challenges faced by developers, contractors, local and national governments, stakeholders such as donors, and others, construction projects have been abandoned. Durdyev and Hosseini (2019) reported that between 1999 and 2007, up to 71 percent of road and other construction projects that failed in Malaysia and Madagascar, took longer than intended, or modified the start dates more than once due to strained financial allocation and contractual time arrangements.

Wambua (2013) looked at the impact of HRM actions on organizational performance focused on project research. The study found that having a beneficial impact on an organization's performance, depending on the level of practice practiced, according to the study. Mugira (2014) conducted a similar analysis of workers' activities and their impact on the implementation of the Ripples International project. The recruitment and selection of Ripples International, performance appraisals, and collaborations all contributed to the project's performance, according to the findings.

Research has shown that the training and development provided by the project's performance is unaffected by the organization. Wanyoike, Kipngok, and Kemboi (2014) intended to know what factors influence the key implementing agencies, GDC and KenGen, in implementing geothermal development projects in Kenya. Human capacity is crucial for the execution of geothermal projects in Kenya, according to

survey data, with the expected power generation against optimal staff revealing a significant scarcity of educated technical workers.

### **2.3.2. Finance Management and Project Performance**

Majanja (2012) looked on the financial constraints of infrastructure projects in Kenya. The study looked into a total of 87 construction firms. Two distinct factors were used to assess budgetary constraints. The first was based on the severity of financial constraints that businesses face, while the second was based on the use of bank loans by enterprises, the first was based on the use of bank loans by individuals. Respondents were asked to rate the availability of finances as a barrier to project implementation in order to determine the perceived financial limit. Financial limitations have been identified as a major stumbling block for building enterprises. Local construction firms were discovered to be having major challenges, which impacted their capacity to fund their projects.

In their study of the factors of housing project performance in Kenya, Most local firms engaging in infrastructure projects, according to Githenya and Ngugi (2014), are usually constrained by a lack of sufficient financial resources. The project was constantly constrained by a budget, which was a major stumbling block. While the combined resources enough to accomplish the task, there will be challenges due to the way it is organized, according to research. In view of the limited resources available, many activities were scheduled to take place simultaneously.

Hyari and Kandil (2009) have endeavored to establish feasibility assessments for Jordan's infrastructure projects. They aimed to analyze the reasons for infrastructure investments in the country. The study's goal was to clarify infrastructure projects by weighing expected benefits against projected project costs. In his analysis, Abbas

(2006) pointed out that the financial assistance required for public projects is generally time consuming, whether from government sources or donor funds. Therefore, the author also stresses that the implementation schedules should be evaluated rigorously in order to counter any kind of delay.

According to Raphael and Phillip (2016), one of the key customer criteria while assessing construction projects in Kenya was project financing. Project delays and cost overruns in the public sector are claimed to be common could increase the level of disbursements in and out of the sector, diminishing the investment's efficacy. Infrastructure is often understood to include the capital required to provide economic services, as well as being crucial to boosting economic activity (Chandra, 2002). It is predicted that if Kenyan contractors are unable to raise sufficient finances to fund their programs, they would continue to rely on external sources for funding to expand.

### **2.3.3. Materials Management and Project Performance**

The impact of project material level on project performance was explored by Hoegl, Weiss, and Gibbert (2010). As part of the research, a survey of construction companies was done. According to descriptive analysis, the majority of the cost savings via JIT happened when inflation rose, resulting in considerable increases in the cost of carrying inventory. According to the report, businesses must be able to concentrate their planning simply on the supplies needed and when they are needed.

The impact of asset planning on project performance was explored by Kress (2014) using the research design of a few construction businesses. Research focuses on London's incomplete construction projects. The primary goal of project management, according to the findings, is to meet or exceed the project's implementation sponsors' expectations. These anticipations are commonly portrayed by three groups, according to research: The project achieves the expected outcome with very few errors, the project

produces the desired result with very few errors, and the project creates the desired result with very few errors. Cost: The aim of the project is to achieve the desired result at the lowest possible cost. Plan: The purpose of a project is to achieve the intended outcome within a set time frame.

Material management, according to Jeruto Keitany and Richu (2014), is a way to improve customer service performance while also increasing profitability by lowering costs and maximizing available resources. The study's major goal was to assess the impact of building materials management on a business's success. The study's goal was to see how asset management approaches differed and lead time affect business performance.

Inventory control systems, according to the assessments, had a vital impact in organizational performance. As a result, in order to achieve superior organizational performance, Inventory control systems must play a substantial role in material management activities, according to firms. There was also a 0.884 coefficient link between inventory control systems and organizational performance, according to the studies.

According to Jusoh et al. (2018), poor management during construction site operations it is an important factor that affects the performance of a project. The difficulty of managing objects is exacerbated by shortages of goods, supply delays, price changes, damage and waste, and a lack of storage space. In addition, paper-based reports are commonly used to record and disseminate information about a supply chain's materials component, which is wasteful, error-prone, and troublesome.

#### **2.3.4. Machinery and Equipment Management and Project Performance**

A study A research of the construction equipment management technique for contractor companies in Saudi Arabia was conducted by Aljohani et al. (2017). The essential



information was gathered from contractors through questionnaires, and the survey showed the preferred building equipment practice. They found that while only one third of the contractors had established policy in place, the management practices of all the contractors were uniform. This suggests that a management policy exists, even if it is not recorded adequately. It is evident from the fact that contractors claim profit from the resale of their equipment

Mohane and Ambre (2019) conducted a case study on road construction equipment management in Malaysia, concluding that implementing solutions based on profit module minimization will aid in optimal decision making. A similar study by Muianga et al. (2015) in Mozambique identified factors which they classified into eleven categories namely government relations, contract matters, organization, management, funding, design and documentation, schedule and control, scope changes, environment and economic and human resources and resources.

Using statistical analysis, they attached values of importance to each factor with a relevance average set at 2.5. While undertaking critical review of empirical literature on cost overruns covering different countries Aljohani et al. (2017) reports poor material management in fifteen out of seventeen surveys with some of the countries as one of the main causes of cost overruns like in Vietnam, Saudi Arabia, Indonesia, Nigeria, and Ghana. Poor material management result in shortage of material which are then obtained at higher price leading to time and cost overrun.

### **2.3.5. Project Performance of Construction Projects**

The construction project involves a number of partners, multiple processes, various phases and phases of work, and large public-private partnerships, all with the ultimate goal of successful completion. The level of performance of the various administrative,

financial, technical, and organizational groups, as well as related risk management, business environment, and economic and political stability, are all important factors in the development of building projects. Construction projects frequently experience delays, cost overruns, and quality flaws. Construction projects frequently experience delays, cost overruns, and quality flaws (Takim & Akintoye, 2002).

The most common metric for judging if the construction project is successful it would have been completed on time, on budget, according to technical requirements, and to the client's satisfaction (Al-Hajj & Zraunig, 2018). The success criteria, on the other hand, are much broader, taking into consideration stakeholder performance, analyzing their contributions, and knowing their expectations (Tayeh, Al Hallaq, Alaloul, & Kuhail, 2018). Participant is an individual or interest group in or ability to influence the construction project's performance, whether they are internal or external to the project. In response to Egan's 1998 study, working groups at UK's Key Performance Indicators (KPIs) developed 10 parameters for measurement projects (Mansour, Aminudin, Omar, & Al-Sarayreh, 2020). While most of these indicators, such as construction costs, construction time, errors, customer satisfaction with product and service, profitability, and productivity, encourage results-oriented thinking, project cost and time forecasting, and construction cost forecasting. and time, and safety, promotes systematic thinking.

Given that performance is defined as an individual's contribution to the completion of a construction project's work (Mansour et al., 2020), each participant's performance should be measured, reviewed, and prioritized in each step of the project phases to determine project success.

Performance indicators, performance measurements, and performance measurement were defined by Mbugua et al. (1999) and Love and Holt (2000). Performance

indicators, according to Mbugua et al. (1999), the measurable data needed to show that a planned effort resulted in an expected outcome. To put it another way, when signs can be properly measured and without ambiguity, they are referred to as measurements. However, when accurate measurement is not possible, performance indicators are frequently used.

Performance measures are defined by Sinclair and Zairi (1995) as numerical or quantitative indicators. On the other hand, performance measurement is a systematic way of analyzing inputs and outputs of industrial activities or construction activities that can be used to improve them over time. (Mbugua et al., 1999). Numerous performance measurements have arisen in management literature in response to calls for continual performance improvement. Several examples include financial measures (Love & Holt, 2000). Performance measurement is defined by Cordero (1990) in terms of the method utilized and the region covered. Technical performance, commercial performance, and total performance are all ways to measure performance.

The measuring categories include planning and design, marketing, and production, among others, while the overall performance is measured at the company or strategic business unit level. Additionally, he presents a paradigm for measuring performance at multiple levels, in terms of outputs and resources are assessed to see whether the least amount of resources are needed to generate outputs, whereas outputs are evaluated to see if they are effective in attaining objectives (efficiency).

Cordero (1990), on the other hand, neglected to incorporate the interests, requirements, and expectations of stakeholders into his model. To remain competitive in the long run, construction organizations must build and improve their understanding of their relationships with customers, suppliers, employees, lenders, and the broader

community, as Love and Holt (2000) recommend. As a result, performance measurement must take the interests of stakeholders into account, both economically and morally.

#### 2.4. Summary and Gap

Table 2.1 covers a number of previous studies, along with their area of study, main findings, and research gap.

**Table 2.1: Summary and Gap**

Name	Title	Observation	Gaps	Present study focus
Carter (2012)	It explored the challenges faced by road infrastructure companies in Sub-Saharan Africa.	Established that the local construction firms face challenges compared to foreign ones in locating technical personnel with the necessary competencies skills to complete projects.	The study fails does not incorporate variables such as Finance management, material management and machines & equipment.	Current study extends the scope by incorporating additional variables.
Mcrael (2013)	In the administration of European infrastructure projects, managerial skills are critical.	Management skills training would improve the quality and time taken to execute project performance of construction businesses	The study fails to address financial management and material management and their implication on projects management	The purpose of this study was to see how project resources were used, financial management, and asset management affected the completion of a construction project.

Naqvi <i>et al.</i> (2011)	stakeholder communication on project performance	Stakeholder communication and project outcomes are inextricably linked.	The study does not incorporate other variables such as human and material management	Influence of resource management on the completion of construction projects.
Belout & Gauvreau (2014)	Assessed factors influencing project success	It was discovered that there is a strong link between the project's success and the personnel component.	The study fails to address financial management implication on projects management	The study evaluated the effect of financial management on project planning
Majanja (2012)	A study on infrastructure project finance limitations in Kenya	The results show that the funding constraints constitute a major hurdle for construction enterprises	It fails to address human management, material and equipment management	The current study extends to incorporating additional variables.
Gitenya and Ngugi (2012)	an investigation into the characteristics that determine the success of Kenyan housing projects	It noted that the lack of adequate financing resources sometimes hinders the majority of local companies participating in infrastructure projects	Does not incorporate variables such as human management and material management	The current study extends to incorporating additional variables.
Hussin & Omran (2012) and Piper (2011)	Assessed the status of Malaysian transport construction projects	It was discovered that 70 percent of the projects that were abandoned were due to financial difficulties.	The study fails to incorporate variables such as material and human management	The current study extends the scope of investigation by incorporating human and material management
Muya, Kaliba, Sichombo, & Shakantu, 2013	Road construction projects in Zambia	The most significant cause elements for project failure were determined	The study fails to Address the human and material	The current study extends the scope of investigation by

		to be insufficient and inconsistent funding releases.	management variables	incorporating human and material management
Wambua (2013)	Human resource elements and project performance	HRM has been found to influence the execution of the project	The study fails to incorporate variables such as financial management and material management	The current study extends the scope of investigation by incorporating financial and material management
Mugira (2014)	concentrated on human resource practices and their impact on project implementation	Training and development did not significantly impact on the implementation of the project.	The study fails to incorporate variables such as financial management and material management	The current study extends the scope of investigation by incorporating financial and material management
Wambui, Ombui & Kagiri, 2015	Focused on factors influencing road projects	It was determined that the use of modern equipment and technical skills by project managers greatly aided in the completion of road projects.	Does not incorporate financial management variable	The current study extends the scope of investigation by incorporating financial management
Moor (1999)	Saudi Arabian contractors' construction equipment management practices were investigated.	established that all contractors have a uniform management practice.	Financial management and human management variables are not addressed	The current study extends to incorporating additional variables
Manikandan <i>et al.</i> (2018)	investigated construction equipment management in order to boost productivity..	It has been demonstrated that increasing productivity is crucial to enhancing construction system performance. High availability	The study fails to incorporate variables such as financial management and material management	The current study extends to incorporating additional variables

		of equipment, which is determined by the equipment's reliability and maintainability, will result in increased productivity.		
Aljohani et al., (2017)	Investigated material management	Established that material management as one of the major causes of cost overrun	Financial management and human management variables are not addressed	The current study extends to incorporating additional variables

**Source: Researcher (2020)**

## 2.5. Conceptual Framework

### Independent Variables

#### Variable

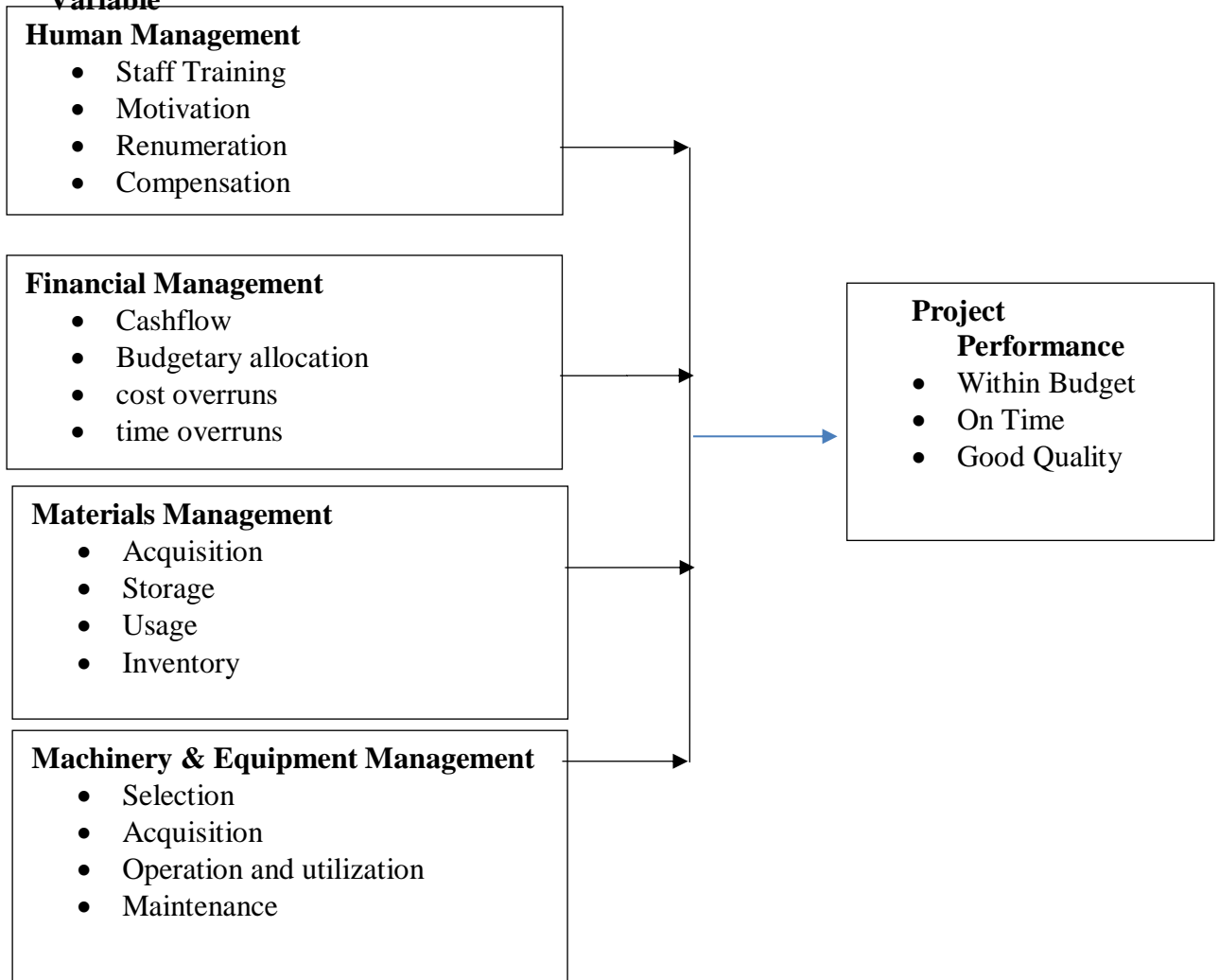


Figure 2.1: Conceptual Framework Diagram

Source: Researcher, (2020)



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The chapter discusses the design, the population, the sample size, and the sampling technique are all presented in this chapter. Pilot testing, validity, and reliability. Tools of collecting data, methods of analysis and presenting data and ethical concerns.

#### **3.2. Research Design**

Because the data to be collected was expected to be quantitative and qualitative in character, the study used descriptive survey research and explanatory research techniques. The purpose of collecting both forms of data was to ensure that this study included in-depth analysis and explanations of the topic matter. Cooper and Schindler (2014) show that research design is a strategy as well as an implementation plan which the procedures and methods for collecting, measuring, and interpreting data are detailed in this document.

The reasoning for the application of several research designs is that neither the qualitative nor the quantitative methodologies themselves are enough to capture a situation's patterns and features. When quantitative and qualitative methods are utilized together, They are complementary to one another and allow for a more robust study that makes use of each method's strengths.

#### **3.3 Target Population**

The study's population was made up of road construction projects in Nairobi City County undertaken by the KeNHA since 2019. During this period, the Kenya National Highway Authority (KeNHA) under the National Government undertook road infrastructure

improvement program as part of the flagship project within the city. The ongoing and completed construction projects served as the unit of analysis.

According to KeNHA (2020) report, there were 10 ongoing road projects in Nairobi City County (See annex. The target population comprised of workers employed to work in KeNHA funded projects. Workers targeted included those working on the ground where the initiatives were being implemented in order to adequately monitor project performance. These included site engineers, project managers and their project teams. Daily casual workers engaged in the construction projects were excluded as they are not permanent staff of the construction companies undertaking the projects. Therefore, the target population comprised of 175 respondents made up of project managers, site engineers and project teams.

**Table 3.1: Target Population**

Category	Population	Percentage
Project Managers	50	28.6
Contractors	25	14.3
Project Team	100	57.1
<b>Total</b>	<b>175</b>	<b>100</b>

**Source: Researcher, (2021)**

### **3.4 Sample Size and Sampling Technique**

This study's sampling unit was completed questionnaires and ongoing projects undertaken by the Kenya National Highways Authority (KeNHA) in Nairobi City County. A combination of proportionate stratified, systematic and purposive sampling method was used to obtain the sample for this study. The sample size for each ongoing project was achieved through the use of proportionate sampling technique. In addition,

systematic sampling was applied into sampling the number of project teams from each project.

Purposive sampling was used to identify key informants who were the project managers and site engineers. 35 project managers and 17 site engineers were purposefully chosen as participants, while stratified sampling was employed to choose 70 project team members from the 10 ongoing projects. The proportionate sampling was employed in picking respondents from each project who took part in the study.

A list of project team members was obtained from the respective construction companies that were undertaking the construction projects based on the number that was proportionately sampled. Project team members were then systematically sampled to participate in the study. The project managers and site engineers were excluded during systematic sampling. According to Sekaran and Bougie (2016), systematic sampling from a homogeneous group decreases sampling mistakes and produces a more representative sample. Creswell and Clark (2017) also notes that purposive selection of participants helps the researcher understand the problem of the research question by enable him or her gain more insights.

The sample size formula by Taro Yamane's (1973) was made use of in determining the size of the sample from 175 respondents, as shown below;

$$n = \frac{N}{1 + N(e)^2} = \frac{175}{1 + 175(0.05)^2}$$

$$n=122$$

Where:

n = Sample size

N = Population size

e = the error of Sampling

The sampling error in this study was set at 0.05. As stated in Table 3.2, the sample was 122 respondents, representing 69.7% of the target population.

**Table 3.2: Sample Size**

<b>Category</b>	<b>Population</b>	<b>Sample Factor</b>	<b>Sample Size</b>
Project Manager	50	0.697	35
Site Engineers	25	0.697	17
Project Team	100	0.697	70
<b>Total</b>	<b>175</b>		<b>122</b>

**Source:** Researcher (2021)

### **3.5 Data Collection Instruments**

A questionnaire was used as the major data gathering tool for this investigation. Questionnaires were preferred because they are simple to create, distribute, and collect the necessary data (Gray, 2004). Questionnaires can also reduce bias by removing the interaction between the interviewer and the respondents. Quantitative and qualitative questions were included in the questionnaire. The open-ended qualitative questions were designed to capture the genuine facts about the subject matter. For the quantitative questions prepared in conjunction with the study's objectives, a Likert scale were used.

### **3.6. Pilot Testing**

Piloting is the process of pre-testing data collection equipment before they are used to collect data to ensure that they are clear, well structured, specific and aligned to the study objectives. Kothari (2004), note that before using the questionnaires to collect data, it is always a good idea to do a pilot research. This helps to expose the questions' flaws (if

any), and the knowledge gathered can be used to enhance the surveys. Pilot research was undertaken with a small group of people who shared the same characteristics as those under inquiry and were left out of the main study, to ensure that resources are valid, words are well understood and all questions are interpreted in the same way by all respondents. Accordingly, 5 project managers, 5 contractors and 5 project team members were used.

### **3.6.1. Validity**

An instrument's validity is determined by how effectively it balances what it claims to measure. For the instruments, two aspects of validity will be determined: face validity and content validity. To determine the readability, translations, and contextual appropriateness of questions, questionnaire length, formatting, and tool flow of draft data gathering instruments, with the supervisors, a discussion of the items in the instruments was held, and their evaluations incorporated into the instruments via comments and suggestions for improvements (Sekaran & Bougie, 2016).

Supervisors also assessed content validity by examining the things in the instrument carefully and thoroughly to check that the instruments are in good working order had appropriate qualities expected to measure the domain under study. Their suggestions were taken into account, and in this case, the instruments were updated.

### **3.6.2. Reliability**

The degree to which a questionnaire leads to consistent results over time is considered reliable. Internal and external reliability are the two types of reliability. External reliability relates to how easily the results can be duplicated, whereas internal reliability refers to how consistent the data collection, processing, and interpretation are. Internal consistency Cronbach Alpha was used to measure the reliability of the items in the questionnaire of this study. The average correlation between all of the scale's items is shown by this statistic (Sekaran & Bougie, 2016). A dependability of 0.7 or greater is

suggested for most research objectives since it implies that the research instrument is trustworthy.

### **3.7. Data Collection Procedure**

The process of collecting data to provide or prove certain facts is called data collection (Cooper & Schindler, 2014). Before embarking on data collection, an application letter was made through the school of graduate studies to facilitate the issuance of research authorization permit. The permit allowed the essential data to be collected from the sampled respondents. Authorization to undertake the research was made possible by using NACOSTI. Participants in the study were asked for their permission to gather data.

The researcher distributed and collect the research equipment once they were filled. When the questionnaire was administered, respondents were told that any information they provide will be kept confidential and used solely for research reasons. The study employed the "drop and pick later" strategy. This method provides respondents with well-thought-out responses as they have enough time to reflect on the questions.

### **3.8. Data Analysis**

The activities involved in data analysis include; cleaning, coding, categorizing, ordering, systematic organization, summarizing and synthesizing the data with the aim of generating meaning from the results (Polit & Beck, 2008). Descriptive analyses used to summarize and organize data according to research objectives and research questions. Cross-checking was done after all of the questionnaires had been collected from respondents in order to identify any data that is erroneous, incomplete, or inappropriate. This was addressed by correcting errors and omissions that had been discovered. The data was coded according to the study's objectives.

Descriptive statistics was computed to generate frequencies, mean, median, and standard deviation, whereas inferential statistics is calculated using correlation and regression analyses. Correlation analysis was conducted in order to find out if there are possible associations between the variables under study (Cohen, West, & Aiken, 2014). Pearson correlation coefficients (r) were applied in establishing the strength, direction and significance of the associations between the dependent and the independent variables of the study.

Regression analysis was undertaken to determine the link between resource management and performance of road construction projects undertaken by KeNHA. In multiple linear regression analysis, there was quantification of each resource management practice upon the performance of road construction projects undertaken by KeNHA. Multiple linear regression aims to investigate the effects and magnitude of multiple variables independent of a single reliable variable (Kerlinger & Lee, 2000). It leads to the formation of a figure in which each independent variable (predictor) has its own equality and the variable (effect) variable is predicted by multiplying all variables by their coefficients and the remainder term (Field, 2009). Because this study involved independent and dependent variables, the following retrospective model was presented below: -

$$Y = \alpha + \beta_1 HM_1 + \beta_2 FM_2 + \beta_3 MM_3 + \beta_4 MEM_4 + \varepsilon$$

Where, Y = Performance of construction projects

$\alpha$  = Constant

$\beta_1 \dots \beta_4$  = A one-unit variable's slope effect on an independent variable.

HM<sub>1</sub> = Human Management

FM<sub>2</sub> = Finance Management

MM<sub>3</sub> = Material Management

MEM<sub>4</sub>= Machinery and Equipment Management

$\varepsilon$  = error

### **3.9. Ethical Consideration**

Throughout the duration of the investigation, ethical considerations must be observed. The researcher sought approval from the appropriate authorities before beginning the data gathering portion of the project. In addition to a research permission from the NACOSTI, A university's introductory letter was also sought.

Before involving the respondents, the researcher described the study's purpose to them. The researcher also sought permission from all respondents before using them in the study. This ensured that no respondent was compelled or obliged to disclose information against his or her wish for this study. To gain respondents' trust, the researcher guaranteed their anonymity and the secrecy of any sensitive information they divulge. The respondents were entitled to remain anonymous and or refuse to answer some questions if they so wish. In addition, To avoid plagiarism, the researcher took great care to ensure that all sources of information used to construct this work were properly credited.



## CHAPTER FOUR

### RESEARCH FINDINGS AND DISCUSSION

#### 4.1 Introduction

The results of the study instruments on the influence of resource management on the performance of building projects in Kenya are presented in this chapter, which includes data analysis, presentation, interpretation, and discussion (KeNHA). The offered findings are based on quantifiable data that was examined in accordance with the study's objectives. Tables with frequency, percentage, mean, and standard deviation were employed in presenting the data analysis. Findings were evaluated in light of the literature that had been studied.

#### 4.2 Response Rate

A total of 122 questionnaires were distributed to respondents where a total of 105 questions were received with 11 being excluded owing to missing information, leaving 94 questionnaires for analysis, or an 89.5 percent response rate. Based on the advice of the Sekaran (2018), this was deemed suitable for the study because the author argues that any response rate above 75% is considered adequate for analysis.

11 questionnaires (10.5 percent) were found to have significant outliers, while 17 questionnaires were not returned accounting for 13.9%. It is therefore on the basis of the questionnaires fit for analysis that was analyzed, and the results were given.

**Table 4.1: Response Rate**

Description	Number	Percentage
Distributed Questionnaire	122	100%
Returned Questionnaire	105	86.1%
Rejected Questionnaire	11	10.5%

Questionnaires fit for Analysis	94	89.5%
Unreturned Questionnaire	17	13.9%

---

Source: Field Data, 2021

### 4.3. Reliability Statistics

Flexibility of the scale is called fidelity. Internal metal consistency can be measured using object-to-whole correlation, half-split reliability, Kuder-Richardson coefficient, and Cronbach's alpha, (Haele & Twycross 2015). The value of alpha has a range between 0 to 1, the most generally utilized test of instrument internal consistency, was used in this investigation. The values in Table 4.2 showed the reliability statistics

**Table 4.2 : Reliability Analysis**

Construct	Value of Alpha	Items	Conclusion
Human Management	0.714	10	Reliable
Finance Management	0.710	6	Reliable
Material Management	0.737	8	Reliable
Machinery & Equipment Management	0.718	11	Reliable
Performance of Projects	0.767	6	Reliable

---

Source: Researcher, 2021

### 4.4. Demographic Profile of Respondents

The demographic characteristics were drawn from the responses to the items in section A of the questionnaires. This knowledge was considered important because these features may have had confounding effects on this connection, in examining how resource management influences construction project's performance in Kenya National Highway Authority (KeNHA). Additionally, this information was critical to comprehend the nature of the respondents who took part in the research.

#### 4.4.1. Gender

**Table 4.3 : Gender**

<b>Variable</b>	<b>Gender</b>	<b>Frequencies</b>	<b>Percent (%)</b>
<b>Gender</b>	Male	67	71.3
	Female	27	28.7

Source: Field Data, 2021

The gender of the respondents, as shown in Table 4.2, it suggested that the majority of respondents were male participants 67(71.3%) while females accounted for 27(28.7%). As a result, despite the fact that males made up the majority of respondents, females made up more than one-third of the sample population. This indicated that both groups' data were reflected in the analysis. As a result, the study included the perspectives of both groups.

#### 4.4.2. Age Bracket of Respondents

Age is an important demographic profile in research as it shapes respondents' perception of the subject matter of investigation. The age bracket of this study's respondents is represented as follows.

**Table 4.4: Age Bracket**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Age</b>	21-30	8	8.5
	31-40	22	23.4
	41-50	51	54.3
	Over 50	13	13.8

Source: Field Data, 2021

Table 4.4 shows that 8 (8.5 percent) of respondents were between the ages of 21 and 30, 22 (23.4 percent) were between the ages of 31 and 40, 51 (54.3 percent) they were between 41 and 50 years old, and 13 (13.8 percent) were over 50 years old. As a result, the findings suggest that most of the study participants were of age appropriate.

#### 4.4.3. Level of Education

The researcher was also of interest about the respondents' educational backgrounds. Professional training has a direct impact on project implementation and performance, which was essential to the researcher.

**Table 4.5: Level of Education of Respondents**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Education Level</b>	Undergraduate Degree	53	56.4
	Postgraduate Degree	41	43.6

Source: Field Data, 2021

The level of education has an impact on how people react to differing viewpoints. As shown in Table 4.5, it was shown that 53 (56.4%) respondents had a degree in qualification and 41 (43.6%) of the respondents had postgraduate degree qualification. Therefore, we make the general conclusion that the respondents well-educated and, as a consequence, had a clear understanding on how resource management influences construction project's performance in Kenya National Highway Authority (KeNHA).

#### 4.4.4. Length of Service in the Road Construction Industry

For the research study, the length of service was crucial. This was due to the fact that genuine field exposure to the road building sector was required to comprehend the issues under investigation. The findings on the length of service in the road construction industry are summarized in Table 4.6.

**Table 4.6: Length of Service in the Road Construction Industry**

<b>Variable</b>	<b>Category (Years)</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Length of Service</b>	Below 5	7	7.4
	6 to 10	12	12.8
	11 to 15	45	47.9
	16 to 20	30	31.9

Source: Field Data, 2021

The results for the length of service in the road construction industry According to Table 4.6, 7(7.4%) of the respondents had less than five years of experience, 12 (12.8%) of the respondents had between 6 to10 Years of experience; 45 (47.9%) had between 11 to 15 Years and 30 (31.9%) of respondents had between 16-20 Years of experience. This indicates that the data was obtained from appropriate target censuses, readily available information, and that the data was reliable for analysis and had knowledge of on what was being asked in relation to their place of work, hence give out the correct information.

#### **4.5 Descriptive Statistic for the Study Variables**

All techniques of quantitative analysis, according to Garson (2012), assume accurate measurement that is largely free of coding errors. As a result, it's a good idea to perform descriptive statistics on your data to ensure that the data is typically as expected in terms of means and standard deviations. Descriptive statistics analysis was performed on all variables. The descriptive statistics performed include mean and standard deviation.

##### **4.5.1. Human Management**

These variables are variables based on this study, and they were evaluated using 10 items on a 5-point Likert scale and 5 indicating strong consensus, 4 agreeing with the statement, 3 showing neutral 2 disagreeing and 1 showing strong disagreement with the statement). The findings of the analysis are summarized as follows.

**Table 4.7: Human Management**

	N	Mean	Std. Dev
The human resource department plays a significant role in the planning process.	94	3.82	1.077
Human resource training programs are developed and implemented in accordance with the overall purpose.	94	4.03	.782
The function of human resource management is given a significant amount of weight.	94	3.91	.969
Training was done to project team members	94	4.14	.923
Project managers were involved in planning stage	94	4.35	.839
There is proper supervision that ensures timely completion of projects	94	4.40	.807
All our project members are highly skilled and qualified to implement quality projects	94	4.21	.788
Our members are competitively recruited based on their qualifications	94	4.11	.910
Our members are fairly remunerated and motivated through bonus	94	2.94	1.096
The project team members coordinate activities	94	4.35	.876
<b>Aggregate Value</b>		<b>4.03</b>	<b>0.907</b>

Source: Field Data, 2021

The items value of mean score and deviation for human management and construction project performance are found in Table 4.7. The mean response on a scale of 5 done in the questionnaire approximates a mean of 4.03 (Agree), indicating that respondents were generally in agreement with the items on human management. The overall standard deviation (SD= 0.907) is also low, meaning that the responses are restricted to a small range around the overall mean response. Further, the findings of the analysis are shown in the table, which show that the majority of respondents shared the same viewpoint

(undecided) that human resource department is majorly involved in the process of planning (M= 3.82; SD =1.077).

In response to the question about develop and implement staff training programs that are consistent with the overall purpose, the majority of respondents agreed on this opinion (M= 4.03; SD =0.782). The respondents were split on whether or not the human resource management function should be given a high priority (M = 3.91; SD =0.969).

Further, the study sought to establish respondents' views on training of project team members, project manager's involvement in planning stage; proper supervision that ensures timely completion of projects and project members' skills and qualifications to implement quality projects all posted a high mean of between 4.14 to 4.40 implying that they were in agreement in regard to human management. On the item of fair remuneration, views of the respondents showed that they generally disagreed (M = 2.94; SD =1.096).

In general, the findings of the Kenya National Highways Authority (KeNHA) in Nairobi County on the influence of human management on the performance of construction projects found that the majority of respondents agreed that human management influenced the performance of construction projects. This means that the human management resources tasked with delivering a project have a significant impact on its success. These findings were backed up by Umulisa, Mbabazize, and Shukla (2015), who agreed that the project's performance was influenced by human capital management techniques.

#### **4.5.2. Finance Management**

The aim of the study was to determine the impact of financial management on the success of construction projects. Table 4.8 summarizes the study's findings.

**Table 4.8: Finance Management**

	N	Mean	Std. Deviation
Financial resources to fund road project activities are availed on time	94	4.14	.770
The government has immediately disbursed project cash.	94	4.13	.751
Project cost is well estimated	94	4.30	.685
The budgeted funds were enough to complete the project	94	4.28	.724
The project manager was able to forecast expenses	94	4.47	.813
There are a lot of bureaucracies involved in fund disbursements	94	2.90	1.312
<b>Aggregate Mean and Standard Deviation</b>	<b>94</b>	<b>4.04</b>	<b>0.84</b>

Source: Field Data, 2021

The items value of mean score and deviation for finance management are shown in Table 4.8. On the 5-point scale employed in the survey, the aggregate mean response approximates 4.04 (Agree), indicating that respondents were generally uncertain. The overall standard deviation for finance management is equally low (SD=0.84), showing that responses are constrained to a small range around the overall mean response.

According to the survey results, respondents agreed on the importance of being on timely availability of financial resources to fund road construction projects activities (M = 4.14; SD =0.770) respectively. In regard to the item on project funds being disbursed promptly by the Government (M=4.13; SD=0.751), the respondents were in agreement. Respondents' views showed that they agreed on project cost being well estimated (M=4.30; SD=0.685) respectively. Respondents' views showed agreement on the item about budgeted funds being enough to complete the project with mean and standard deviation of (M=4.28; SD=0.724).



Views about project manager being able to forecast expenses generally revealed an agreement among respondents ( $M = 4.47$ ;  $SD = 0.813$ ). Respondents disagreed on views regarding a lot of bureaucracies involved in fund disbursements ( $M = 2.90$ ;  $SD = 1.312$ ). The aggregate mean of the findings on the impact of finance management on the performance of construction projects revealed that respondents agreed that finance management has an impact on the completion of construction management. The findings support prior studies by Odeyinka et al., (2003) and Windapo and Cattell (2011), who claimed that a company's financial management techniques influence project success and performance. The proper allocation of financial resources guarantees that no project activity slows, allowing the project to be completed in the shortest time possible and on time.

#### 4.5.3. Materials Management

The third objective of the study was to determine the impact of material management on the performance of construction projects. To do so, respondents' opinions were collected using a 5-Likert scale.

**Table 4.9: Materials Management**

	N	Mean	Std. Dev
There is an inventory control policy on how materials are managed and controlled	94	3.59	1.041
There is efficiency in the management of material through improvements in material flow and so, shorten lead times	94	4.34	.665
Controlling over-ordering and purchasing supervision in usage of materials	94	4.29	.697
The procurement process of materials is good	94	4.41	.679
		4.66	.578

material transportation system is well managed	94	4.30	.685
Material receiving and verification in the construction project sites is handled properly	94	4.70	.460
There is stock and waste control system in place	94	3.81	.833
<b>Aggregate Mean and Standard Deviation</b>	<b>94</b>	<b>4.26</b>	<b>0.70</b>

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Source: Field Data, 2021

The items value of mean score and deviation for materials management are shown in Table 4.9. The aggregate score approximates 4.26 (Agree), indicating that respondents were generally uncertain. The overall standard deviation for finance management is equally modest ( $SD= 0.70$ ), meaning that the responses are constrained to a small range around the overall mean response.

The study findings revealed that respondents were undecided in regards to availability of an inventory control policy on how materials are managed and controlled. This is depicted by the mean and standard deviation of ( $M = 3.59$ ;  $SD = 1.041$ ) respectively. Respondents' views on efficiency in the management of material through improvements in material flow and so, shorten lead times showed that generally, they were in agreement ( $M = 4.34$ ;  $SD = 0.665$ ).

The respondents also agreed that there was control of over-ordering and purchases with a mean and standard deviation of ( $M = 4.41$ ;  $SD = 0.679$ ). They further agreed that there was supervision in the usage of materials ( $M = 4.41$ ;  $SD = 0.679$ ). Views of respondents showed agreement on the opinion that procurement process of materials was good ( $M =4.66$ ;  $SD =0.578$ ).

Respondents' opinion on whether material transportation system is well managed showed a general agreement as depicted respectively ( $M =4.30$ ;  $SD =0.685$ ). Further, views of respondents regarding whether material receiving and verification in the construction project sites was handled properly revealed a general agreement ( $M = 4.70$ ;

SD = 0.460). Finally, respondents' views on stock and waste control system in place reveal that they were undecided that it was in place (M = 3.81; SD= 0.833).

Material management has an impact on the performance of construction projects, according to the findings of the study. This is consistent with prior research findings, such as Gakobo and Sila's (2021) emphasis on the need of managing limited material resources to ensure that the project's long-term success. Poor material management has been linked to project failure and abandonment, according to study. Similarly, Donyavi and Flanagan (2009) point out that building materials can reach up to 70% of a project's construction costs, therefore any methods for reducing waste and increasing efficiency will save money and time.

#### 4.5.4. Machinery and Equipment Management

The aim of the study was to determine the impact of machine and equipment management on the performance of a construction project.

**Table 4.10: Machinery and Equipment Management**

	N	Mean	Std. Deviation
There is a clear written standards, guidelines and manuals procedures to manage road construction equipment	94	4.05	.860
We replace road construction equipment when obsolete	94	4.34	.727
Equipment utilization record is properly maintained	94	4.17	.771
Operator record daily report	94	4.50	.635
There exists a road construction equipment inventory system	94	3.74	.732
There is adequate equipment for the road project implementation	94	4.12	.701
We have ready access to the material of right quality and quantity	94	4.22	.706

There is good will from suppliers who are ready to advance material and equipment on credit	94	3.74	1.286
Using rental or leasing strategy for infrequently utilized equipment	94	3.05	1.020
The project equipment used in road building projects has an impact on the quality of the work.	94	4.16	.807
Machinery & machinery influences road construction projects Completion	94	4.47	.667
<b>Aggregate Mean and Standard Deviation</b>	94	<b>4.05</b>	<b>0.81</b>

Source: Field Data, 2021

The items value of mean score and deviation for machinery and equipment management are shown in Table 4.10. The overall mean response approximates 4.05 (Agree), indicating that respondents generally were in agreement with the items asked in relation to machinery and equipment management. Further, It's also worth noting that the overall standard deviation for the equipment and machinery management is low (SD= 0.81) meaning that the responses are restricted to a narrow range around the overall mean response.

The study findings revealed that respondents were in agreement that there is a clear written standards, guidelines and manuals procedures to manage road construction equipment (M = 4.05; SD =0.860). Views of respondents in relation to replacement of road construction equipment when obsolete revealed that they agreed that the equipment should be replaced (M = 4.34; SD = 0.727). Analysis of responses on item about equipment utilization record being properly maintained revealed that the respondents were also in agreement (M = 4.17; SD = 0.771).

Respondents' views regarding operator recording daily report depict that they were in agreement that records being kept by the operator (M = 4.50; SD = 0.635) respectively. It is worth noting that in relation to the existence of a road construction equipment inventory system; there being good will from suppliers who were ready to advance

material and equipment on credit and use of rental or leasing strategy for infrequently utilized equipment, the respondents were undecided.

The study’s findings revealed that machinery and equipment management had an influence on project performance. The findings lend support to previous findings by other researchers such as Lincy (2019) who notes that Construction companies must be able to handle their equipment effectively in order to complete projects successfully. Inadequate manual equipment management processes and decisions frequently result in significant losses in construction companies. Similarly, Ranjithapriya and Arulselvan (2020) state that construction equipment is one of the most essential resources of modern-day construction on construction sites, and that it is a must for project completion.

#### 4.5.5. Road Construction Project Performance

The goal of the study was to evaluate the effectiveness of road development projects. The opinions of respondents were gathered using a 5-Likert scale.

**Table 4. 11: Road Construction Project Performance**

	N	Mean	Std. Deviation
The quality of service provided is a measure of a project's success.	94	4.15	.892
Project performance is determined by the timely delivery of the project delivery.	94	4.30	.716
The absence of reworks or job modifications is a significant factor of overall project satisfaction.	94	4.36	.670
Successful projects are those that are completed on time and on budget.	94	4.28	.516
Adherence to quality standards and specifications for road projects	94	4.33	.966

user satisfaction is an indication of good project performance	94	4.44	1.043
<b>Aggregate Mean and Standard Deviation</b>	94	<b>4.31</b>	<b>0.80</b>

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Source: Field Data, 2021

The items value of mean score and deviation for road construction project performance are shown in Table 4.11. The overall mean response approximates 4.31 (Agree), indicating that respondents generally were in agreement with the items asked in relation to performance of road construction projects. The majority of respondents believed that the level of quality service delivery is a critical indicator of project success (M = 4.15; SD = 0.892).

On the statement regarding the performance of a project is determined by the timely delivery of project deliverables, respondents' views revealed that they were in agreement that the timely delivery of project deliverables has an impact on project performance (M= 4.30; SD = 0.716) and (M= 4.30; SD = 0.716) respectively. The respondents agreed with the assertion that the lack of reworks or work revisions is a significant factor of overall satisfaction with the project (M = 4.36; SD = 0.670). The respondents were also in agreement when it came to the statement that projects delivered on time and on budget indicate successful projects (M = 4.28; SD =0.516).

The respondents' views on the level of adherence to defined quality standards and road project specifications indicate that they were in accord, as evidenced by the fact that the respondents were in agreement (M = 4.33; SD = 0.966). Respondents views regarding user satisfaction is an indication of good project performance, the respondents were also in agreement (M = 4.44; SD = 1.043).

#### **4.6. Inferential Analysis of Findings**

Inferential analysis, according to Kothari (2014), is concerned with the estimation of population values. The task of interpretation (that is, the task of making inferences and

conclusions) is mostly accomplished by inferential analysis. The aim was determining how variables are linked using inferential analysis.

#### 4.6.1. Correlation Analysis

In each research project, correlation analysis is crucial. It is a measurement of the relationship that exists between the independent factors or variables and the dependent factor or variable, as well as between the independent factors. Correlation analysis can be used to determine the amount and direction of an existing link, as well as whether or not that variables studied are linearly related. The Pearson Correlation coefficient is commonly used to measure the correlations between variables when using scale measures. The correlation coefficient ranges from negative 1 to a positive 1, with a closer value at negative 1 showing a weaker relationship and value closer to positive 1 indicating a strong association and values close to 0 indicating a weak relationship in both cases.

Table 4.13 shows the Pearson correlation data.

**Table 4.12: Correlation Analysis**

	Performance	Human Management	Financial Management	Material Management	Machine Management
Performance	1				
Human Management	.144	1			
Financial Management	.124	.023	1		
Material Management	.232*	.352**	.043	1	
Machinery Management	.185	.106	.630**	.026	1
	.074	.310	.000	.805	
	.94	.94	.94	.94	.94

Source: Field Data, 2021

Human management ( $r = 0.144$ ;  $p\text{-value} = 0.165$ ), financial management ( $r = 0.124$ ,  $p\text{-value} = 0.232$ ), material management ( $r = 0.232$ ,  $p\text{-value} = 0.025$ ), and machinery management ( $r = 0.185$ ,  $p\text{-value} = 0.074$ ) all showed a positive association in 4.13. A positive relationship indicates that there is a link between these variables and road construction project performance, with material management having the greatest influence, followed by machinery and equipment management, human management, and financial management having the least influence on road construction project performance. The study variables were positively associated, according to the Pearson correlation coefficient.

#### **4.6.2. Regression Analysis**

The dependent variable in this study is project performance, which is subjected to four independent variables (human management, finance management, material management and machinery and equipment management). Regression is a set of statistical techniques for analyzing the connection between multiple independent variables and a single dependent variable (Barbara & Linda, 2007).

The goal of multiple regression analysis, according to Pharm (2008), is to generate a prediction about the dependent variable based on its covariance with all of the independent variables. When the goal of the investigation is to make a forecast, regression is frequently used. The purpose of regression is to find a set of regression coefficients (B values) for the independent variables that get the predicted Y values as near as feasible to the measured Y values.

The computed regression coefficients reduce the sum of squared variances between expected and obtained Y values and improve the correlation between them for the data set (Barbara & Linda, 2007).



**Table 4.13: Model Summary**

<b>Model Summary</b>									
					Change Statistics				
Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Estimate of St. Error	Change in R <sup>2</sup>	F Change	df1	df2	Sig. F Change
1	.297 <sup>a</sup>	.088	.047	.51056	.088	2.150	4	89	.081

a. Predictors: (Constant), Machinery Management, Material Management, Human Management, Financial Management

Source: Researcher, 2021

The value of the adjusted R<sup>2</sup>, or rather multiple determinations of coefficient is the level at which dependent variable value varies due to the influence of the independent variable either individually or collectively. As a result, the four independent variables are as follows: (human management, finance management, material management and machinery and equipment management) According to the modified R square, these factors account for 47 percent of performance of the project.

As a result, other elements that were not investigated in this study account for 53% of the project's success. The results also reveal a substantial R square change of 0.088 and F-change of 2.150, indicating that the prediction has improved significantly. At 0.081 p-value, more than 0.05, shows that the model was insignificant.

**Table 4.14: Analysis of Variance**

ANOVA <sup>a</sup>						
		Sum of				
Model		Squares	df	Mean Square	F	Sig.
1	Regression	2.242	4	.560	2.150	.081
	Residual	23.200	89	.261		
	Total	25.442	93			

Source: Researcher

The value of 0.081, being more than 0.05, shows insignificance of the model forecasting how human management, finance management, material management and machinery and equipment management influenced the performance projects. At 5% level of significance, the F was calculated to be 2.150. The whole model was negligible because  $F_{\text{calculated}}$  is smaller than the  $F_{\text{critical}}$  (p value = 2.242).

**Table 4.15: Regression Coefficient**

Coefficients <sup>a</sup>						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.619	1.048		1.544	.126
	Human Management	.103	.212	.053	.485	.629
	Financial Management	.009	.151	.008	.059	.953
	Material Management	.251	.130	.208	1.922	.050
	Machinery Management	.286	.222	.169	1.287	.202

a. Dependent Variable: Performance

The regression coefficients result of the overall model are as shown in table 4.15. The results presented showed a positive and insignificant association between human management and project performance ( $\beta = 0.1.3$ ;  $\rho$ -value = 0.629) which is more than  $\alpha = 0.05$  hence it was concluded that human management had a positive effect on project performance. The null hypothesis derived from the first objective of the study postulates that:

**H<sub>01</sub>:** *Human management has no effect on the performance of construction projects by Kenya National Highways Authority in Nairobi City County.*

Therefore, based on these results, the study fails to reject the null hypothesis.

The second objective of the study sought to assess the influence of finance management on the performance of construction projects by Kenya National Highways Authority in Nairobi City County. To test the outcome of this objective, the following null hypothesis was postulated:

**H<sub>02</sub>:** *Finance management has no effect on the performance of construction projects by Kenya National Highways Authority in Nairobi City County.*

The results presented in table 4.15 showed a positive and insignificant association between finance management and performance of construction projects ( $\beta = 0.009$ ;  $\rho$ -value = 0.953) which is more than  $\alpha = 0.05$ . Therefore, based on these results, the study fails to reject the null hypothesis.

The third objective of the study sought to evaluate how materials management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County. To test the outcome of this objective, the following null hypothesis was postulated:

**H<sub>03</sub>:** *Material management has no effect on the performance of construction projects by Kenya National Highways Authority in Nairobi City County.*

The results presented in table 4.15 showed a positive and significant association between material management and project performance. ( $\beta = 0.251$ ;  $\rho$ -value = 0.050). The study therefore rejects the null hypothesis.

The fourth objective of the study investigate how machinery and equipment management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County. To test the outcome of this objective, the following null hypothesis was postulated:

**H<sub>04</sub>:** Machinery and equipment management *has no effect on the performance of construction projects by Kenya National Highways Authority in Nairobi City County.*

The results presented in table 4.15 showed a positive and insignificant association between material management and project performance. ( $\beta = 0.286$ ;  $\rho$ -value = 0.202). which is more than  $\alpha = 0.05$ . Therefore, based on these results, the study fails to reject the null hypothesis.

The regression model that was proposed was as follows;

$$Y = \alpha + \beta_1 HM_1 + \beta_2 FM_2 + \beta_3 MM_3 + \beta_4 MEM_4 + \varepsilon$$

Where, Y = Performance of construction projects

$\alpha$  = Constant

$\beta_1 \dots \beta_4$  = A one-unit variable's slope effect on an independent variable.

HM<sub>1</sub> = Human Management

FM<sub>2</sub> = Finance Management

MM<sub>3</sub> = Material Management

MEM<sub>4</sub> = Machinery and Equipment Management

$\varepsilon$  = error

Therefore, from the regression findings, the research model becomes;

$$Y \text{ (Performance of construction projects)} = 1.619 \text{ (Constant)} + 0.103 \text{ (Human Management)} + 0.009 \text{ (Finance Management)} + 0.251 \text{ (Material Management)} + 0.286 \text{ (Machinery \& Equipment Management)}.$$

From the above regression model, holding all the independent variables studied constant, performance of construction projects by Kenya National Highways Authority in Nairobi City County would be 1.619. As shown in table 4.15 human management, finance management, material management and machinery and equipment management had a positive effect on performance of road construction projects by Kenya National Highways Authority in Nairobi City County as indicated by the positive t-values.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATION**

#### **5.1 Introduction**

The chapter gives that research summary, concluding remarks, suggest possible recommendations and further studies.

#### **5.2 Summary of the Study**

The study aimed at examining how resource management affects performance of construction projects in Kenya National Highway Authority (KeNHA). Specifically, it sought to determine the influence of human management, finance management, materials management and machinery and equipment management on project performance. Three theories namely the theory of constraints, institutional theory and the resource-based view theory were used. A comprehensive empirical review in relation to the study's goals was undertaken with the aim of identifying knowledge gap which the study sought to fill. A diagrammatic representation of the study variable was highlighted in the conceptual framework

The first objective of the study sought to assess how human management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County. The results revealed a positive effect of human management on construction projects by Kenya National Highways Authority in Nairobi City County.

The second objective of the study sought to assess the influence of finance management on the performance of construction projects by Kenya National Highways Authority in Nairobi City County. The results revealed a positive effect of finance management on construction projects by Kenya National Highways Authority in Nairobi City County.

The third objective of the study sought to evaluate how materials management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County. The results revealed a positive effect of material management on construction projects by Kenya National Highways Authority in Nairobi City County.

The fourth objective of the study sought to investigate how machinery and equipment management influences the performance of construction projects by Kenya National Highways Authority in Nairobi City County. The results revealed a positive effect of machinery and equipment management on construction projects by Kenya National Highways Authority in Nairobi City County.

### **5.3. Conclusion**

The success of road infrastructure projects is critical to a country's economic prosperity. The ability of a project to be completed within the predicted cost and timeline determines its success. The projects must also meet the client's expectations in terms of quality. Kenya's Vision 2030 aims to build a well-developed road and other vital infrastructure network. As a result, the results of road infrastructure projects created by Kenya National Highways Authority (KeNHA) is critical to achieving Vision 2030. Additionally, improved delivery of road construction projects will greatly contribute to Kenya's economic progress and growth.

According to the findings, human management improved the way road construction projects done by Kenya National Highways Authority (KeNHA) in Nairobi County performed. Globally competitive organizations including construction industry to obtain a competitive advantage, companies rely on the uniqueness of their human resources and effective human resource management systems. Human resource management include not only the drivers and primary value generators of the knowledge industry's output, but also intellectual capital and infrastructural investments such as road construction projects.

Financial management improved the performance of road construction projects, according to the study's findings. Availability of adequate financial resources is critical in the delivery of construction projects. Proper management of finance in construction projects ensures that the projects are delivered efficiently, timely and within the stipulated budget.

Further, it is the conclusion of this study road infrastructure project's performance will improve with efficient material management. The material management objectives are to assure an uninterrupted supply of raw materials, maintain a high inventory turnover, provide cost-effective purchasing and waste minimization, reduce overall acquisition costs, and maintain a high level of cooperation and coordination.

The study concludes that machinery and equipment management led to enhanced performance of road construction projects. Construction equipment is a critical component in completing the project successfully. Its use is critical to the effective completion of building projects; as a result, it represents a large capital expenditure for the road construction sector.

#### **5.4. Recommendation**

Based on the outcomes of this investigation, the following recommendations are made:

For successful delivery of road construction projects, given the role that human management plays, it is critical that qualified, experienced and competent human resource be engaged in road construction projects done by KeNHA. This will help to ensure that road construction projects timely completed, within the stipulated budget and timeframe.

The national government in collaboration with county government should ensure that adequate financial resources be availed and prudently managed. This will ensure that the county gets value for money. The national government should enhance its budgetary



allocation to the road construction industry to guarantee that construction projects are implemented and delivered successfully.

The Kenya National Highways Authority should ensure that they stock adequate construction material, equipment and machinery contract with dependable vendors for long-term supply of construction material, machinery and equipment on time to ensure timely delivery and completion of road construction projects.

Finally, Government agencies charged with road construction and maintenance should develop provide a policy guideline on road construction activities this will enhance the expansion of the road construction business, which will result in the expansion of the country's economy

### **5.5. Suggestion for Further Research**

Future researchers should explore replica studies in other counties to identify any differences in findings. This study looked at the impact of resource management on the performance of building projects in Kenya National Highway Authority (KeNHA) in Nairobi County. It would be fascinating to see how the findings differ when the methodologies used in this study are applied in other settings, such as other counties.

Future researchers may also consider other independent variables not considered in this study so as to expand the scope of investigation and build upon already available empirical research related to this field of research. Other Kenyan Road bodies, such as the Kenya Rural Roads Authority (KeRRA) and the Kenya Urban Roads Authority, should conduct similar investigations (KURA). This would lead to verification of this study findings.

Other infrastructure projects that contribute considerably to the country's economic development can also be investigated further. Furthermore, research can be conducted on

infrastructure projects that are supported by donors, like World Bank, African Development Bank (AfDB) among others.

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## **APPENDICIES**

### **Appendix I: Letter of Transmittal**

Dear Respondent,

#### **RE: REQUEST FOR PARTICIPATION IN A RESEARCH SURVEY**

I am a postgraduate student at Kenyatta University's School of Business, pursuing a Master's degree in Business Administration (project management). As part of the course's requirements, I'm conducting a research project titled "Resource Management and Performance of Road Construction Projects; A Case of Kenya National Highways Authority, Nairobi County, Kenya". You have been chosen to participate in this study and will be asked to complete the questionnaire provided. All of the information you supply will be used just for academic purposes, and your name will be kept completely private.

Thank you for your assistance.

Sincerely yours,

**Justine K. Kemboy**

**Researcher**



## Appendix II: Respondents' Questionnaire

### **Instruction**

Please check the applicable boxes and fill in the blank spaces provided for those questions that require more detailed replies. On the questionnaire, please do not provide your name. Participation will be entirely voluntary, and the information collected will be used solely for research purposes. Please take the time to respond as honestly and objectively as possible.

### **Section A: Background information**

1. What is your gender?

Male                        Female     

2. What is your age bracket?

21-30 years                 

31 – 40 years                 

41 -50 years                 

Over 50 years                 

3. What is your highest education status?

Secondary  

College     

Undergraduate  

Postgraduate

Other? (indicate):

4. State the period of involvement in the road construction projects?

Below 5 year

6-10 year

11-15 Year

16-20 Years

More than 20 Year

**Section B: Influence of Human Management**

5. Is there a human management policy in place at your organization?

Yes  No

If yes, please explain

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6. The following are statements about how human management practices influences road construction project's performance. Indicate the extent of your agreement with the statements.

Key: SA-Strongly Agree, A-Agree, U-Undecided, D-Disagree, SD-Strongly Disagree

Statements	SA	A	U	D	SD
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The human resource department plays a significant role in the planning process.					
Human resource training programs are developed and implemented in accordance with the overall purpose.					
The function of human resource management is given a significant amount of weight.					
Members of the project team were given training.					
During the planning stage, project managers were involved.					
There is proper supervision that ensures timely completion of projects					
All our project members are highly skilled and qualified to implement quality projects					
Our members are competitively recruited based on their qualifications					
Our members are fairly remunerated and motivated through bonus					
The project team members coordinate activities					

Any other? Please Specify

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### Section C: Finance Management

7. Is there a well-developed financial policy in place at your organization?

Yes  No

If yes, please explain

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8. The following are statements about the influence of finance management practices on the performance of road construction projects. Indicate the extent of your agreement with the statements.

<b>Statements</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
Financial resources for road project activities are made available on a timely basis.					
The government has immediately disbursed project cash.					
The project's budget is accurate.					
The finances allocated to the project were sufficient to accomplish it.					
The project manager was able to estimate costs ahead of time.					
There are a lot of bureaucracies involved in fund disbursements					

Any other? Please Specify

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**Section D: Materials Management**

9. Is there a well-developed materials management policy in place at your organization?

Yes  No

If yes, please explain

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10. The following are statements relate to how material management practices influences road construction project’s performance. Indicate the extent of your agreement with the statements.

<b>Statements</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
There is an inventory control policy on how materials are managed and controlled					
There is efficiency in the management of material through improvements in material flow and so, shorten lead times					
Controlling over-ordering and purchasing supervision in usage of materials					
The procurement process of materials is good					
material transportation system is well managed					

Material receiving and verification in the construction project sites is handled properly					
There is stock and waste control system in place					

Any other? Please Specify

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**Section E: Machinery and Equipment Management**

11. Is there a well-developed machinery and equipment management policy in place at your organization?

Yes  No

If yes, please explain

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12. The following are statements about machinery and equipment management practices influence on road construction project’s performance. Indicate the degree of your agreement on the statements.

Statements	SA	A	U	D	SD
There is a clear written standards, guidelines and manuals procedures to manage road construction equipment					
We replace road construction equipment when obsolete					
Equipment utilization record is properly maintained					
Operator record daily report					
There exists a road construction equipment inventory system					
There is adequate equipment for the road project implementation					
We have ready access to the material of right quality and quantity					
There is good will from suppliers who are ready to advance material and equipment on credit					
Using rental or leasing strategy for infrequently utilized equipment					
The project equipment used in road building projects has an impact on the quality of the work.					
Machinery & machinery influences road construction projects Completion					

Any other? Please Specify

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## Performance of Road Construction Projects

<b>Statements</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
The quality of service provided is a measure of a project's success.					
The performance of a project is determined by the timely delivery of project deliverables.					
The absence of reworks or job modifications is a significant factor of overall project satisfaction.					
Successful projects are those that are completed on time and on budget.					
Adherence to quality standards and specifications for road projects					
user satisfaction is an indication of good project performance					








### Appendix III: Ongoing Road Projects in Nairobi City County

KENHA ONGOING PROJECTS IN NAIROBI CITY COUNTY							
Ref No.	Project Name	Road Length (Km)	County Traversed	Contractor	Contract sum (Kshs)	Start Date	End Date
1.	Nairobi Expressway (ongoing)	27	Nairobi-Machakos	CALE Infrastructure Construction Company	62 bn	July, 2020	June 2022
2.	Nairobi Western Bypass (Ongoing)	17	Nairobi	China Road and Bridge Corporation	17.3 Bn	February 2019	January 2022
3.	Uplands - Githunguri - Ruiru	47	Nairobi-Kiambu	M/s China Guansu International	3.9 Bn	July 2017	September, 2021
4.	Museum Hill - James Gichuru (Dual) (Ongoing)	5	Nairobi	M/s Liberty Group EA Limited	97.3 Mn	February 2019	February 2022
5.	Southern Bypass (Ole Sereni - Ngong Road Interchange) (ongoing)	15	Nairobi	M/s Bomelli GroupLtd	94.7 Mn	May 2019	May 2022
6.	Southern Bypass, (Ngong Road Interchange - Kikuyu) (ongoing)	14	Nairobi-Kiambu	M/s Shawasha Company Ltd	84.3 Mn	May 2019	May 2022
7.	Nairobi - Thika: Section 1 - [Nairobi - Ruiru] (ongoing)	33	Nairobi-Kiambu	Debrosso Construction Co. Ltd	1.03 Bn	April 2019	March, 2022
8.	Nairobi - Thika: Section 2 - [Ruiru - Thika] (ongoing)	22	Nairobi-Kiambu	Interways Works Ltd.	1.1 Bn	March 2019	February 2022
9.	Maintenance of Outering Road Jn - Kamulu (B63) Road (ongoing)	24.9	Nairobi	M/s Saxon Investments Limited	904.6 Mn	April 2019	March 2021
10	James Gichuru – Rironi Road	40	Nairobi-Kiambu	M/s China Wu Yi	16.3 Bn	August 2017	August 2021

Source: KeNHA, (2020)

## Appendix IV: Research Authorization

 REPUBLIC OF KENYA	 <b>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b>
RefNo: <b>597644</b>	Date of Issue: <b>15/November/2021</b>
<b>RESEARCH LICENSE</b>	
	
<b>This is to Certify that Mr.. Justine Kipchirchir Kemboi of Kenyatta University, has been licensed to conduct research in Nairobi on the topic: Resource Management and Performance of Road Construction Projects: A Case of Kenya National Highways Authority, Nairobi City County, Kenya for the period ending : 15/November/2022.</b>	
License No: <b>NACOSTLP/21/14185</b>	
597644 <b>Applicant Identification Number</b>	 <b>Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b>
<b>Verification QR Code</b>	
	
<b>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</b>	

## Appendix V: Research Permit



KENYATTA UNIVERSITY  
GRADUATE SCHOOL

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 28<sup>th</sup> October, 2021

TO: Kemboi Justine Kipchirchir  
C/o Management Science Dept.

REF: D53/OL/CTY/26431/2018

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 29<sup>th</sup> September, 2021 entitled "Resource Management and Performance of Road Construction Projects: A case of Kenya a National Highways Authority, Nairobi City County, Kenya"

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking and Progress Report Forms per semester. The forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

A handwritten signature in black ink, appearing to be 'EM'.

ELIJAH MUTUA  
FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Department of Management Science

Supervisors:

1. Dr. Caleb Kirui  
C/o Department of Management Science  
Kenyatta University

EM/2021