CRITICAL FACTORS AND THEIR INFLUENCE ON PERFORMANCE OF ROAD CONSTRUCTION PROJECTS IN KIAMBU COUNTY, KENYA

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MAY, 2019
DECLARATION

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

Signature: ..........................................................  Date...............................................

Joseph Musyoki Kisavi

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

Signature: ..........................................................  Date...............................................

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DEDICATION

This research project is dedicated to my family: wife – Christine and children Celestine, Glorious and Geoffrey, for their perseverance, support and understanding during the entire duration of my study for this course. May the Lord bless them immensely.
ACKNOWLEDGEMENT

I wish to express my sincere gratitude to my project supervisor Dr. Lucy Ngugi for her immense support, guidance and dedication during the preparation of this project report. I am sincerely grateful. Further, I do thank all the lecturers who taught me in different units for instilling in me the knowledge and especially that is required to undertake a research project.

I also acknowledge and greatly appreciate the input of the various stakeholders in road construction in Kiambu County—officers from the county government, KeNHA, KURA, KeERRA as well as representatives of the contractors implementing the road construction projects. This project would not have been successful without their cooperation in responding to the questionnaires in a timely manner. For that, I am truly grateful.

I would also like to thank my classmates for their encouragement and support in different forums. I learnt immensely from their interactions and discussions and for that I am truly thankful.
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ABBREVIATIONS AND ACRONYMS

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<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AfDB</td>
<td>African Development Bank</td>
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<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
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<td>CDF</td>
<td>Constituency Development Fund</td>
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<td>ESIA</td>
<td>Environment Social Impact Assessment</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GNP</td>
<td>Gross National Product</td>
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<td>ID</td>
<td>International Development</td>
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<tr>
<td>KeNHA</td>
<td>Kenya National Highway Authority</td>
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<td>KeRRA</td>
<td>Kenya Rural Roads Authority</td>
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<tr>
<td>KM</td>
<td>Kilometre</td>
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<tr>
<td>KRB</td>
<td>Kenya Roads Board</td>
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<tr>
<td>KSh</td>
<td>Kenya Shillings</td>
</tr>
<tr>
<td>KURA</td>
<td>Kenya Urban Roads Authority</td>
</tr>
<tr>
<td>LATF</td>
<td>Local Authority Transfer Fund</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>NACOSTI</td>
<td>National Commission for Science, Technology and Innovation</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Environment Management Authority</td>
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<tr>
<td>PDU</td>
<td>President’s Delivery Unit</td>
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<tr>
<td>PPP</td>
<td>Public Private Partnerships</td>
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<tr>
<td>SIA</td>
<td>Social Impact Assessment</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
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<tr>
<td>VIF</td>
<td>Variance of Inflation Factor</td>
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# OPERATIONAL DEFINITION OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td><strong>Contractor capacity</strong></td>
<td>Ability of a contractor to undertake a project under given constraints including resources and external circumstances</td>
</tr>
<tr>
<td><strong>Critical factors</strong></td>
<td>Elements that cause the greatest influence on the schedule, cost and quality of the project and include project planning, stakeholder involvement, project funding, contractor’s capacity and project monitoring and evaluation.</td>
</tr>
<tr>
<td><strong>Project</strong></td>
<td>A temporary endeavour to achieve an objective within a given timeframe and fixed budget</td>
</tr>
<tr>
<td><strong>Project planning</strong></td>
<td>Preparations and scheduling of activities to guide in undertaking projects within budget, timelines and to required quality standards.</td>
</tr>
<tr>
<td><strong>Project funding</strong></td>
<td>Financing the activities of the road construction project</td>
</tr>
<tr>
<td><strong>Project monitoring and evaluation</strong></td>
<td>Checking and appraising the project activities for adherence to schedule, budget and quality</td>
</tr>
<tr>
<td><strong>Project objectives</strong></td>
<td>Goals that a project aims to achieve within estimated costs, time and to the set quality standards</td>
</tr>
<tr>
<td><strong>Project performance</strong></td>
<td>An indication or measure of how well the project is being or has been undertaken so as to meet its target objectives of attaining quality standards, meeting set budgets and being completed within the specified time.</td>
</tr>
<tr>
<td><strong>Road construction project</strong></td>
<td>An undertaking of building roads by use of materials and machine so as to make the ground firm and easily passable by motorists and other road users.</td>
</tr>
<tr>
<td><strong>Stakeholders</strong></td>
<td>Parties affected or influenced by a construction project</td>
</tr>
<tr>
<td><strong>Stakeholder involvement</strong></td>
<td>Engaging the parties affected or influenced by a project</td>
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ABSTRACT

Improvement of road infrastructure was identified by the Kenyan Government in its Vision 2030 as one of the critical drivers of the country’s economic transformation. Whereas the Government has continued to invest heavily towards road construction, the challenge of delays in completion of road construction projects and cost overruns continue to hamper accelerated road improvement in the country. More than 50 percent of all road construction projects in Kenya are completed late with significant cost overruns. The study sought to evaluate the critical factors and their influence on performance of road construction projects in Kiambu County, Kenya. The research adopted a descriptive research design. Data was collected from a census of 9 road construction projects in the county. The target population was the 158 officers, who worked in the Kiambu regional offices for KURA, KeRRA, KeNHA and the county’s Ministry of Public Works as well as representatives of the contractors undertaking the road construction projects that were ongoing as at the time of the study. A stratified sample of 82 respondents was chosen from which data was collected using self-administrated questionnaires. The collected data was analysed using descriptive statistics and inferential statistics. Inferences of the study were made using regression analysis. The findings of the study were presented in the form of charts and tables. The study found out that performance of road construction projects in Kiambu County, Kenya was affected by project funding, contractor capacity, project planning and project monitoring and evaluation. It was therefore recommended that financiers of road construction projects need to ensure that contractors with strong capacity are selected. In addition, adequate and timely financing of road construction projects ought to be undertaken as well as regular project monitoring and evaluation. Moreover, it is imperative for proper project planning to be undertaken for successful performance of road construction projects. Stakeholders’ involvement however was not found to have any significant influence on performance of road construction projects.
1.1 Background of the Study

Road constructions are usually major infrastructural projects that take a long period of time to be completed and commanding significant investments. Further, according to Khadaroo and Seetanah (2010), they are considered critical due to their direct and indirect contribution towards economic development. As such, it is quite unfortunate where such investments are not implemented successfully. This problem is even significant in developing countries whose road network is poor. Mohammed (2012) observes that there are a number of factors that inhibit successful implementation of road construction in developing countries. Investors in this sector require being certain about project time and cost and thereby delays could cause the contractor incur monetary liabilities. The question of performance of road construction projects is thereby a universal concern that affects a number of parties in a construction project. It is therefore in the best interest of the project management to address the critical factors that influence completion of road construction projects.

Chandra (2006) argues that effective project performance in terms of meeting the set objectives is very critical for any project. This involves effective and efficient mobilization of resources to meet the project purpose. An appreciation of the critical factors that influence performance of a project is therefore imperative so as to provide project managers with an idea regarding where to lay focus on.

Bourne (2006) defines a project as a schedule of activities that are meant to provide a certain product. The researcher argues that effective project management requires that materials and human resources deployed in a project are directed and coordinated
throughout its lifecycle so as to achieve predetermined objectives in terms of scope, quality, time and cost. Ideally, construction projects are expected to be undertaken following the predetermined schedule and cost estimates. However, Meeampol and Ogunlan (2006) observe that most construction projects often suffer delays in completion and often the actual cost surpass the contracted sum. At times, cost overruns or delays in completion could actually result to total project abandonment. The responsibility of ensuring that construction projects are completed successfully lies with the project manager as well as other stakeholders. There should also be mechanisms to discourage parties in a project from laxity that often lead to abandonment or delays.

The World Bank (2016) observed that transport connectivity is a critical factor towards the achievement of sustainable and inclusive growth in developing countries such as Kenya and thereby road density and road condition are useful variables in assessing the Rural Access Index. This is against the backdrop of the fact that the Kenya Vision 2030 (GoK, 2007) identified road infrastructural developments as a key pillar towards social and economic transformation of the country. Thereby, construction delays are quite unfortunate and a deterrent to the ability of the country to achieve its Vision 2030 goals. According to the World Bank Survey, South Africa has an average road density of 62KM per 100 square kilometres of land compared to the Africa’s average density of 20.4KM. Other African countries such as Kenya should borrow a leaf from South Africa and ensure that their road construction projects are completed in good time.

Mbogo (2011) observes that road construction plays a pivotal role in Kenya’s development which could explain the fact that it is one of the largest industries in the country contributing about 10 percent of the gross national product (GNP). Macharia
(2006) laments that most of these road construction projects are completed late for example the Thika Superhighway was delayed by more than a year whereas its actual cost exceeded the budget by Kenya Shillings 7 billion. Major causes of the delays, poor service delivery and cost overruns characteristic of road construction projects according to Manowang and Ogunlana (2010) include lack of community involvement, lack of capacity on the part of contractors and availability of finances. On the other hand, Njenga (2014) argues that issues arising from monitoring and evaluation of road construction projects such as the efficiency and effectiveness also have a significant impact on performance of such projects.

1.1.1 Project Performance

Project Management Institute (2004) defines project performance as an undertaking of a set of activities in a manner that optimizes outcome. On the other hand, Desai (2013) views project performance as achievement of multiple and usually conflicting project objectives in terms of output, quality and cost. Therefore, project performance involves implementation and review of a project with a main objective of ensuring successful completion within the budgeted time, applying the resources expected as well as achieving the intended results.

According to Flanagan and Norman (2013), the ultimate importance of project performance is achieved through avoiding the project’s failure to keep within cost budget, failure to keep within time stipulated for approvals, design, occupancy and failure to meet the required technical standards for quality, functionality, fitness for purpose, safety and environment protection. Kululanga and Kuotcha (2010) assert that project performance ensures that enterprises maximize on profitability, minimize the consequences of risky
and uncertain events in terms of achieving the project’s objectives and seizes the chances of the risky events from arising. Yu et al (2011) emphasizes that project performance can be assessed using various performance indicators that could be linked to the following dimensions: time, cost, quality, client satisfaction, and health and safety, with the critical performance measures applied by firms to examine performance of road projects including quality, cost and time.

Effective involvement of all the stakeholders in construction projects such as project owners, contractors, engineers as well as consultants is also critical in ensuring that their projects are completed within schedule and where possible with minimal or no cost escalations. The profitability of any project will mainly be dependent on whether quality standards are met using the most economical approach. Marando (2012) argues that efficiency in delivery of a project is critical as it ensures that a construction project or any other form of project utilizes minimal resources. On the other hand, assessment of effectiveness of a project involves a review of how well the project’s objectives were met. However, achieving these twin objectives is a very rare occurrence in practice and particularly in the construction industry given the fact that they appear as conflicting objectives. There is therefore need to understand the factors that determine the success or failure of project completion in the construction industry and most importantly road construction projects that form the bulk of construction projects.

Delays in the construction industry are common across the globe and a number of studies have been undertaken to assess their causes. For instance, Haseeb et al. (2011) observed that delays in project completion, cost overruns and poor service quality in Pakistan was a rampant problem and particularly in the construction industry. They lamented that such
challenges were very expensive for all the stakeholders in the projects and often resulted to clash that was detrimental to project quality, litigations and at times even total project desertion.

Faridi and El-Sayegh (2006) lament that construction delay, quality issues and cost overruns are prevalent challenges facing the construction industry in the UAE with 50 percent of all projects being completed beyond their scheduled dates. They observed that such delays adversely affected the projects in terms of quality, safety, time and cost. The impact of this challenge is quite significant in the UAE given the fact that the construction industry’s contribution to the UAE’s economy is estimated at 14 percent of the GDP. The researchers noted that despite the importance of the construction industry to the UAE’s economy, its inefficiencies were very costly and hampered economic growth and development.

Developing countries such as those in the Sub-Saharan Africa are not immune to the challenge of performance. For example, Kaliba, Muya and Mumba (2009) observed that road construction in Zambia was often characterized by delays and quality issues which often ended up resulting in cost escalations. They posited that road construction in a number of African countries such as Zambia accounted for a significant proportion of the construction industry. As such, most of the country’s development budget was geared towards road construction projects. Aibinu and Jagboro (2002) observe that Nigeria’s experiences in the construction industry are similar to those of Zambia. The researchers found out that construction delays had become endemic in the country which negatively impacted on project delivery. Out of the 61 building projects that they studied, construction challenges were very significant in most of them with ramifications on time and project completion cost.
Kikwasi (2013) documented similar experiences in Tanzania where the researcher found out that delays and disruptions in construction projects were very common causing cost and time overrun, disputes, high idle time and negative social impact. The script was the same in Uganda as indicated by Alinaitwe, Apolot and Tindiwensi (2013). They found out that construction delays affected most of the public construction projects in the country. This was despite the fact that the country suffers from poor road network. Contrastingly, South Africa appears to have achieved significant progress in avoiding road construction delays according to Ugwu and Haupt (2005). This could help to explain the fact that the country is the only region in Africa with a relatively good road infrastructure.

Seboru (2015) noted that delays in road construction are a common feature in Kenya. He observed that a majority of the road construction projects in the country rarely get completed within schedule. Significant costs are incurred by the country even as infrastructural developments are delayed.

1.1.2 Critical Factors

Factors that influence project performance according to Ogwueleka (2010) relate to inputs to a management system that have a direct or indirect impact on the success or lack of it in a project. According to Adnan, Sheriff and Saleh (2009) critical factors in project performance are those that cause the greatest influence on the schedule, cost and quality of the project. Bourne (2006) observes that it is crucial for project managers to ensure that all the factors that influence performance of construction projects are taken into account. Aziz and Asmaa (2016) observed that performance of road construction projects in Egypt was mainly influenced by financing factors such as late payment by the financier, delays
in client approval, improper selection of contractors, poor planning, geological problems on site, unrealistic contract prices, staffing issues, and disagreements with the stakeholders.

On the other hand, Saraf (2013) as well as Adnan, Sheriff and Saleh (2009) observed that improper planning, poor site management and shortage of resources were major causes of delay or failure in construction. These factors were also identified by Otim and Alinaitwe (2015) who noted that most of the road construction projects in Uganda suffered from change of scope, environmental issues as well as scarcity of resources. The researchers identified poor project management as a critical contributor towards these challenges. A study by Muturi and Oguya (2016) on factors influencing performance of road construction projects in Arid and Semi-Arid areas in Kenya reached similar conclusions indicating that contractor’s competency, finances and conflicts explained 82.7 percent of the variance in the dependent variable.

Major causes of the delays, poor service delivery and cost overruns characteristic of road construction projects according to Manowang and Ogunlana (2010) include lack of community involvement, lack of capacity on the part of contractors and availability of finances. On the other hand, Njenga (2014) argues that issues arising from monitoring and evaluation of road construction projects such as the efficiency and effectiveness also have a significant impact on performance of such projects. Successful completion of road construction projects can be assessed in terms of timely completion, adherence to the budgeted costs as well as meeting the set-out quality standards.
Al-Momani (2000) undertook a study on the causes of construction delays that the researcher noted to include user changes, inadequacy of skilled manpower, weather conditions, delayed deliveries, increase in quantity, designer factors as well as economic conditions. Whereas the study majored on public projects that might have similar aspects as those of road construction, it lacked the focus on road construction. In addition, the study merely focused on one objective of successful road project completion which is timely completion of the project without considering the issue of quality and adherence to budgeted cost.

Based on a review of past studies in this subject, researchers tend to focus on selective projects such as those financed by specific development partners for example AfDB. The other major limitation from past studies is their focus on a single indicator of successful completion of construction projects such as cost or timely completion such as studies by Sambasivan and Soon (2007), Oraro (2012) and Choge & Muturi (2014). Minimal focus has been made on the question of whether the projects met the quality standards set as well as whether the three metrics were actually met altogether. A number of past studies have also been quite general by reviewing construction projects without a focus on road construction. This study seeks to bridge this research gap by taking a focused approach on road construction projects and considering all the three main indicators of successful completion namely time, cost and quality.

Limitations of studies from Kenya are quite similar to those from other countries; they also suffer from either failure to focus on road construction projects or using either cost or delays as the only indicators of successful completion of construction projects. For instance, Macharia (2016) left out cost which is an important variable in indicating
successful completion of road construction projects. On the other hand, Seboru (2015) and Choge and Muturi (2014) were only interested in the issue of adherence to cost estimates whereas Ngacho and Das (2014) merely studied development projects with a particular interest on Constituency Development Fund (CDF) construction projects and thereby giving no attention to road construction projects. Ondari and Gekara (2013) were keen to study the factors that influence completion of road construction projects in Kenya though with a limited consideration of the independent variables. Their study though broad in scope, only considered the impact of capacity issues on the part of the Government to implement road construction projects in the country.

Based on the results of the past studies, most of the researchers generally seem to have identified similar factors that generally influence performance of road construction projects, for instance, Aziz and Asmaa (2016) observed that performance of road construction projects in Egypt was mainly influenced by financing factors such as late payment by the financier, delays in client approval, improper selection of contractors, poor planning, geological problems on site, unrealistic contract prices, staffing issues, and disagreements with the stakeholders. Saraf (2013) as well as Adnan, Sheriff and Saleh (2009) observed that improper planning, poor site management and shortage of resources were major causes of delay or failure in construction. Similar factors were also identified by Otim and Alinaitwe (2015) who noted that most of the road construction projects in Uganda suffered from change of scope, environmental issues as well as scarcity of resources. A study by Muturi and Oguya (2016) on factors influencing performance of road construction projects in Arid and Semi-Arid areas in Kenya reached similar conclusions indicating that contractor’s competency, finances and conflicts explained 82.7 percent of the variance in the project performance. Major causes of the delays, poor
service delivery and cost overruns characteristic of road construction projects according to Manowang and Ogunlana (2010) include lack of community involvement, lack of capacity on the part of contractors and availability of finances.

This study seeks to assess the factors that have been identified in past studies as being of critical influence on performance of road construction projects in Kiambu County, Kenya where the Government has invested more than Kenya Shillings 258 billion towards road projects of about 114KM (KRB, 2016) aimed at increasing access throughout the county. The study uses a focused approach by narrowing down to Kiambu County, Kenya while incorporating a number of independent variables that have been noted to be critical in influencing road construction project performance namely; project planning, stakeholder involvement, project funding, contractor’s capacity and project monitoring and evaluation.

1.1.3 Road Construction Projects in Kiambu County

Kiambu County is located in the former Central Province, Kenya and boarders the capital city of Kenya, Nairobi to the North. The county has a population of more than 1.6 million people with 40 percent rural dwellers and 60 percent urban residents (Thugge, Heller and Kiringai, 2012). Ntale, Litondo and Mphande (2013) observed that the county has a significant contribution to Kenya’s wealth. The county’s major towns include Kiambu, Thika, Ruiru, Kikuyu, Limuru and Karuri.

Kiambu County, Kenya is one of the fastest growing regions in the country given its proximity to the capital city, Nairobi, according to Bundervoet, Maiyo and Sanghi (2015) and therefore infrastructural developments are very critical. It is also known for its
agricultural activities such as growth of tea, coffee, diary, horticulture and poultry farming though according to Gathoni and Karanja (2016), this is currently changing with the upsurge of real estate developments in the area and a number of its towns such as Kiambu and Ruiru have become a suburban of Nairobi City. The Government underscores the contribution of the county to the economy and thus in the financial year 2016/2017, an investment of over Kenya Shillings 100 million was earmarked for road development in the county (Thugge, Heller and Kiringai, 2012). The planned road construction works were to be undertaken by both KeRRA and KURA. See Appendix III for a list of the ongoing road construction projects in the County.

The state of roads in the county according to Maichuhie (2017) has been poor which has seen the residents from the various sub-counties hold protests from time to time, and as Gathoni and Karanja, (2016) lament, most of the construction projects undertaken in the County using the Constituency Development Funds (CDF) were either poorly completed (30%) or not completed at all (50%) and only 20 percent were complete and performing. This has been identified as a deterrent to farmers transporting their produce to the markets. The County according to the World Bank Group Report by Bundervoet, Maiyo and Sanghi (2015), is the richest county in Kenya with a Gross Domestic Product (GDP) of $1,785 and is the second largest contributor to Kenya’s wealth. Whereas the county has generally good road network with a total of 2,033.8KMs of roads with bitumen standards, gravel surface roads of 1,480.2KMs and 430.1KMs of earth surface (Kiambu County Government, 2017), there is significant need for improving the road network in the county since most of the roads become impassable particularly during the rainy season.
Some of the major ongoing construction projects in the county include the construction of a 60KMs road connecting major towns such as Ruaka, Banana, Thogoto, Gikambura, Mutarakwa, and Limuru. Further, there a KSh. 5.1B construction project connecting Thika Road to Gatundu town as well as the upgrading to Bitumen standards of Githurai-Kimbo phase II at a cost of KSh. 423.2M. It is hoped that the ongoing road construction projects will be completed on time, adhering to quality standards as well as within the set budgets. This study is therefore useful in assessing the critical factors that influence performance of road construction projects.

1.2 Statement of the Problem

Successful road construction is an impetus to economic development for Kenya as enumerated in the Kenya Vision 2030 (GoK, 2007). Consequently, the Government has invested heavily in the road construction. For example, in financial year 2016/2017 KeNHA planned to construct 13,138.72 KMs of roads at a projected cost of KSh. 20,459,228,001 whereas KeRRA had a budget of KSh. 10,893,617,021 to maintain 28,243 KM of roads. On the other hand, KURA had a forecast of maintaining 2,338KMs of roads at a cost of 5,106,382,979 (KRB, 2016). Despite the significant investment that the Government continues to make towards road construction, Macharia (2016) laments that around 55 percent of all road construction projects in the country suffer a myriad of challenges hindering their completion within schedule, experiencing cost overruns or fail to meet the requisite quality standards. Additionally, Gathoni and Karanja, (2016) lament that most of the construction projects undertaken in the County using the Constituency Development Funds (CDF) were either poorly completed (30%) or not completed at all (50%) and only 20 percent were complete and performing.
Choge and Muturi (2014) also observed that very few road construction projects in Kenya were completed within the budget cost estimates due to a number of challenges. A number of factors were identified as significant determinants of cost adherence such as ground conditions, poor planning and unrealistic initial requirements. Another study was conducted by Seboru (2015) and focused on the factors that result to delays in road construction projects in Kenya. The researcher noted that these factors ranged from project funding, project monitoring and evaluation, poor planning, contractor capacity and slow decision making. However, similar to Choge and Muturi (2014) who did not look at the other indicators of performance – quality and time but only focussed on cost, this research only focused on projects that suffered delays(time) in completion and thus did not address the issue of quality oversights and also cost overruns. Macharia (2016) undertook a study to assess the factors that influence completion of road construction projects in Embakasi, Nairobi County and identified factors such as resources, competency of staff, stakeholder participation and procurement procedures. The results of this study can however not be replicated to other counties based on its narrow scope and focus on urban roads only.

There has been no past study on the factors that influence performance of road construction projects in the county despite the importance of these developments and the fact that road infrastructure in the county is generally poor and particularly the lack of feeder roads connecting the mushrooming estates to the major highways as noted by Gathoni and Karanja, (2016) that most of the construction projects undertaken in the County using the Constituency Development Funds (CDF) were either poorly completed (30%) or not completed at all (50%) and only 20 percent were complete and performing. The road construction projects in the county have suffered delays, failed to meet quality
standards with a number exceeding their budget estimates which is worrying though there lacks empirical research. It is against this background that this research sought to study the critical factors and their influence on performance of road construction projects with a focus on Kiambu County, Kenya, by considering the three main indicators of performance – quality, time and cost, since most of the other studies seem to have focussed only on a selected performance indicator.

1.3 Research Objectives

1.3.1 General Objective

The study sought to assess the critical factors influencing performance of road construction projects in Kiambu County, Kenya.

1.3.2 Specific Objectives

The specific objectives of this study were;

i. To investigate the influence of project planning on the performance of road construction projects in Kiambu County, Kenya

ii. To assess the influence of stakeholders’ involvement on the performance of road construction projects in Kiambu County, Kenya

iii. To determine the influence of project funding on performance of road construction projects in Kiambu County, Kenya

iv. To establish the influence of a contractor’s capacity on the performance of road construction projects in Kiambu County, Kenya

v. To assess the influence of project monitoring and evaluation on the performance of road construction projects in Kiambu County, Kenya
1.4 Research Questions

The research was guided by the following research questions;

i. To what extent does project planning influence the performance of road construction projects in Kiambu County, Kenya?

ii. To what extent does involvement of the stakeholders influence performance of road construction projects in Kiambu County, Kenya?

iii. To what extent does project funding influence performance of road construction projects in Kiambu County, Kenya?

iv. To what extent does contractor’s capacity influence the performance of road construction projects in Kiambu County, Kenya?

v. To what extent does project monitoring and evaluation influence the performance of road construction projects in Kiambu County, Kenya?

1.5 Significance of the Study

The findings of this study are expected to be of benefit to the county Government of Kiambu, Kenya. The County Government is in charge of development of the access roads in the county. Consequently, the conclusions of the study are hoped to provide insights that could be applied in improving road construction in the county.

The findings of the study would also help the relevant central Government institutions such as the Kenya Roads Board (KRB) which is the body responsible for road development in the country and Kenya Rural Roads Authority (KeRRA) being the Government institution in charge of improvement of rural roads in conjunction with the various county Governments. The study will therefore provide useful ideas in improving
efficiency and effectiveness in the management of road construction not only in Kiambu County, but hopefully across the country, Kenya.

Road construction companies are likely to find the findings of this study useful as they are likely to gain a deep understanding of the various strategies that could be applied to ensure successful completion of road construction projects. Thereby, such companies are likely to enhance their competitiveness through effective and efficient implementation of road construction projects. The study is also expected to interest researchers and academicians mainly in the subject of road construction projects and particularly on the critical factors that influence performance of road construction projects thereby contributing to the body of research in road construction.

1.6 Scope of the Study
The research study was limited to road construction projects in Kiambu County, Kenya. It targeted a population of 158 officers working in nine road construction projects in Kiambu County, Kenya. These officers included; engineers, technical auditors, technical consultants, surveyors, project managers and county Government officials employed by the Kiambu regional offices for KURA, KeERRA, KeNHA and the county’s Ministry of Public Works. Further, data was collated from the contractors engaged in the construction of roads in the County. Data used for analysis was collected over a period of two weeks from the identified respondents.

1.7 Limitations of the Study
There was a challenge of some respondents not willing to participate in the research or give honest responses perhaps due to suspicion. To overcome this suspicion and increase
the response rate, an introduction letter from the University and a research permit from the National Commission for Science, Technology and Innovation (NACOSTI) (refer to appendices I & V respectively) were sought and the respondents were guaranteed that the responses received will be treated with utmost confidence. Also, given the nature of the work of the target respondents, it was a challenge to meet the respondents during data collection. To overcome this limitation, arrangements were made with the respondents on the most convenient day and time to deliver the data collection questionnaires. The researcher dropped the questionnaires at the respondents’ offices with an arrangement to collect them at an agreed later date.

1.8 Organization of the Study

The project report comprises of five chapters where the first chapter provides an introduction and background of the study, statement of the problem, specific objectives of the study, research questions, significance of the study, scope as well as the limitations of the study. On the other hand, the second chapter undertakes a review of relevant literature on the subject matter. The third chapter focuses on the research design, population and population sample, data collection and analysis and addresses ethical issues. The fourth chapter provides the analysis of data, results and discussions. Lastly, chapter five provides the study findings, conclusions and recommendations.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter focuses on a review of past studies that have focused on the critical factors that influence performance of road construction projects in Kiambu County, Kenya. The findings of the various researchers regarding the research objectives have been presented so as to set the foundation for the study. Specifically, the review identifies the previous research views on both the dependent and independent variables. A conceptual framework has also been constructed explaining the relationship between the dependent and independent variables.

2.2 Theoretical Review

According to Lucia and Lepsigner (2009), theoretical review involves identifying a set of statements or principles devised to provide an explanation regarding a group of facts or phenomena that has been tested repeatedly or is widely accepted. This section offers an insight into the various theories relevant to the study. The theories that were reviewed in this study are; resource dependency, stakeholder theory, and institutional theory.

2.2.1 Resource Dependency Theory

Resource dependency theory was developed by Pfeffer and Salancik in 1978, and its main proposition was that success of an organization is usually affected by availability of external resources (Fapohunda and Stephenson, 2010). The theory posits that, the capacity of an organization in terms of resources is a critical determinant of successful implementation of tasks and projects. Proponents of the theory such as Mohammed (2012) argue that it is imperative for an organization to have adequate resources that are necessary for implementation of a project or achievement of set objectives. The
researcher identifies some of the resources that are pivotal to achievement of corporate objectives such as finances, competent human resources, materials as well as equipment.

There are however those who criticize the theory such as Fapohunda and Stephenson (2010) who argue that there are organizations that have succeeded even without resources indicating the need to consider other factors such as effectiveness of management, organizational culture and implementation of appropriate strategies. However, even though such critiques are justifiable given the broad propositions of the theory, it is imperative to note that the having requisite resources need to be coupled with other enablers such as having a supportive working environment and an effective strategy.

The resource dependency theory is very relevant to this study as it provided the theoretical understanding that ability of an organization such as a contractor to perform a project, in this case road construction projects, is influenced by the availability of resources. Some of the identified critical resources that determine successful implementation of road construction projects include finances, competence of human resources and availability of materials and equipment. The experience of a contractor is also considered as an indicator of capacity in handling road construction projects. Experienced contractors are expected to have critical resources that would help reduce turnaround time for completion of road construction projects, effective planning and evaluation of projects as well as having competent staff. Similarly, where the Government has the requisite resources in terms of manpower and technical capacity to undertake effective and efficient monitoring and evaluation of road construction projects, this will contribute to successful completion of such projects.
2.2.2 Stakeholder Theory

The stakeholder theory, developed by Edward Freeman in 1983, posits that an organization has a number of parties who have an influence on its operations. Supporters of this theory such as Atkin and Skitmore (2008) observe that it is imperative for an organization to involve its stakeholders and consider their interests. The theory postulates that organizations that manage to consider the interests of most of the stakeholders are likely to be successful in their endeavours. This theory requires an appreciation of the type of stakeholders in an organization as well as their influence on an organization.

Opponents of this theory such as Manowong and Ogunlana (2010) argue that this theory lacks specificity and therefore its operationalization in a manner that would allow scientific inspection is difficult. Further, the theory does not adequately guide decision making such as to minimize the conflict of interest that often arise in meeting the diverse needs of the various stakeholders in an organization. Nevertheless, the theory has been applied in emphasizing the need to consider interest of stakeholders in corporate decision making.

The theory helped this study to appreciate that there are a number of stakeholders that road contractors and other parties should take into consideration while undertaking construction projects in order to attain success. An organization should therefore be in a position to adjust its mode of operation to suit the needs of its stakeholders and at the same time ensuring that the overall objective of accomplishing the set tasks is achieved. Engagement of stakeholders as well as consideration of the social impact of the road construction projects are identified as critical factors that determine performance of such
projects. Moreover, the study appreciates the importance of negotiations to be undertaken with stakeholders to ensure successful implementation of road construction projects.

2.2.3 Institutional Theory

The institutional theory was developed by William Richard Scott in 1995 and stresses the need for organizations to have processes and procedures that guide achievement of set goals. Researchers who support this theory such as Choge and Muturi (2014) underscore the importance of organizations to act ethically and in observance of its norms, routines and rules. Adoption of fair practices in achievement of the organizational goals will for instance ensure minimal friction with the stakeholders such as the construction workers or the society. However, Brammer, Jackson and Matten (2012) criticize this theory arguing that following the recommendation of the theory does not guarantee success in an activity or project. Therefore, it is imperative not only to have processes and procedures in place, but also to ensure that such processes are geared towards successful completion of tasks.

The theory could be applied by contractors who should use their experience to come up with appropriate procedures for undertaking a project in a manner that will ensure smooth implementation and guarantee success. On the other hand, there is need to understand the processes and procedures that the Government employs in management of road construction projects such as during the award of tenders, monitoring and evaluation of projects and in payment of contractors so as to ensure that the projects are delivered successfully. Whereas such processes and procedures are useful, it is important to ensure that they do not create unnecessary bureaucracy and red tape.
2.3 Empirical Review

2.3.1 Project Planning and Performance of Projects

Wambugu (2013) studied the factors that affect completion of rural electrification projects in Kenya. He noted that poor planning had an adverse effect on the timely closure of the rural electrification projects in Kenya. Other than the delayed completion of the named projects, the researcher noted that the quality of the projects was also affected by poor planning. The researcher found out that with proper planning, a contractor gains a thorough understanding of the project since the scope is clarified. Consequently, there are minimal variations in the scope of works during the construction phase and thus project implementation is not disrupted.

Gonzalez, Gonzalez, & Molenaar (2013) analysed causes of delay and time performance in construction projects where they noted that one of the root-causes of failure to meet construction project time lines was poor planning. Frequent changes in project plans were also noted to be a contributor to project delays. The major gap of this study was however the fact similar to that by Marzouk and Tarek (2014), where the researchers were only interested in project delays.

Marzouk and Tarek (2014) analysed the causes of delays in Egyptian construction projects. The researchers noted that construction delays were very common in Egypt and most of them were due to lack of prioritization of project tasks. Further, the researchers observed that there were a number of design changes as well as scheduling problems that exacerbated the problem of delays. The researchers however only focused on causes of delays without considering whether there were cost overruns as well.
A report by the World Bank (2014) documented that poor planning is one of the major inhibitors for infrastructure development in Kenya. Whereas the report indicates that most of the infrastructure projects in Kenya have well documented plans, it was noted that there is usually minimal reliance on the same during actualisation and thereby about 50 percent of the projects in the country end up being delayed in completion. Moreover, the projects ended up not meeting quality standards. As such, it is not only important to have plans in place, but also to ensure that they are actually implemented. According to the World Bank (2014), implementation of large infrastructure projects requires contractors with significant experience regarding planning and execution of similar projects. This ensures that project scoping is appropriately undertaken by the contractor and that no obstacles will come up during the tenure of the project that could lead to cost escalation or even blocking the project altogether.

Wambui, Ombui and Kagiri (2015) studied the factors that affect completion of road construction projects in Nairobi City County, Kenya. They found out that most of the projects that were being implemented by KURA either failed to have reliable plans or even where the plans were available, they were rarely followed during implementation causing delays in project implementation. The study was focused on Nairobi County, Kenya and thus the need to assess whether the experiences of other counties such as Kiambu County, Kenya would have different results.

2.3.2 Stakeholders’ Involvement and Project Performance

Chinyio (2009) argues that stakeholders have different responsibility and influence on a project and thereby the need for a contractor to identify the appropriate stakeholders. According to the Project Management Institute (2004), failure to identify the right
stakeholders is likely to cause significant challenges to a project. It is also critical to appreciate the fact that stakeholders could either have positive or negative control of a project. Whereas stakeholders who oppose a project are often ignored, this could be detrimental to the success of a project. Atkin and Skitmore (2008) underscore the need to win the support of the negative stakeholders where possible so as to increase the chances of success of a project. Project managers should therefore try to ensure that all the interests of the stakeholders are catered for and undertake negotiations to at least meet the minimal requirements.

Manowong and Ogunlana (2010) noted the need to involve all stakeholders in a project and defined a stakeholder as a person who is affected by the decision of another party and thereby stakeholders in a road construction project could include the host community and Government agencies. The researchers found out that there was need to consider the interests of the stakeholders in a road construction project for effective implementation. Given the significant impact of such constructions in terms of the environment and disruption of other infrastructure such as power lines and public water pipes, it is critical to ensure that stakeholders are involved.

Maina (2013) studied the influence of stakeholders’ participation in education projects in Nakuru County, Kenya. Based on the study, the researcher noted that involvement of stakeholders is critical in projects through a proactive approach. However, the researcher observed that use of a reactive approach where stakeholders are involved only when problems have arisen is likely to be counterproductive. This mainly occurs where stakeholders are not involved on time for complex situations that have far reaching impacts. In that case, a project is likely to face delays as the problems are resolved.
whereas this could be avoided if consultations are undertaken in the course of the project. With regular consultations, a contractor is in a position to foresee challenges in the project and plan accordingly thereby ensuring that activities run smoothly.

Davis (2014) noted that where there is disagreement amongst the key stakeholders, there is often minimal room for a project’s success. The researcher identified key stakeholders to include senior management, project team, and project recipient stakeholder groups. The major challenge that was found to affect the projects was lack of agreement amongst the stakeholders regarding the project success factors resulting to discontinuity between them.

Zhang, Wu, Shen, and Skitmore (2014) studied the sustainability of construction projects. They observed that the social impacts of a project need to be considered well before the project starts. A justification needs to be made for instance regarding the impact of a road construction project on the social amenities such as water. The researchers noted that most of the times, for a construction to be undertaken, there will be some interruption of essential services and thus the need to engage the affected community so as to negotiate aspects of the project such as scheduling. They recommended that contractors should be required by the community to bear the cost of rehabilitating the environment once the project is complete such as tree planting.

Macharia (2016) studied road construction project in Embakasi, Nairobi County, Kenya where the researcher observed that where stakeholders are engaged before a road construction project, there is likelihood that an appropriate impact analysis will be undertaken. Concerns of all stakeholders will be taken into account during the planning
phase of the project and thereby avert any possible collision that might occur during implementation. For instance, she noted that wide consultations were made before the Nairobi Outering Road was constructed with a view to capture the concerns of stakeholders and parties that had interest in the project. This involved workshops with stakeholders and public meetings during the drafting of the Environment Social Impact Assessment (ESIA) report. Stakeholders during these forums included community representatives, small scale traders’ associations, Government institutions such as water regulatory bodies, KeNHA and KURA among others. During these sessions, agreements were reached on how the project could be implemented so as to provide maximum benefits to the stakeholders. Consequently, during the project implementation, there was minimal resistance from the stakeholders due to their continuous involvement.

2.3.3 Project Funding and Performance of Projects

KeNHA (2017) has recorded that Kenya’s road network is approximately 177,800 kilometres though only 63,575 KM is classified. About 44,100 KM is considered to be in good condition whereas the other roads require reconstruction and rehabilitation. There has been a significant investment by the Government in the road industry with a development of around 600KM per annum since independence. According to KRB (2016), the Government was projecting to spend in excess of KSh. 60 billion towards road development in the country in the financial year 2016/2017.

In the budget statement for financial years 2017/2018 (GoK, 2017), a number of significant investments in road construction were identified. For instance, the Government indicated that KSh. 63.6 billion had been earmarked towards road construction projects that were ongoing whereas KSh. 44.3 billion would be utilized in
foreign co-financed roads. Low volume seal roads were allocated KSh. 27 billion while KSh. 49.3 billion was directed towards road maintenance with the expectation that this would be sourced from Road Maintenance Levies. The significant investment in road construction by the Government is testament to the fact that road improvement had been identified as one of the critical pillars for the country’s economic development. The need for successful completion of road construction projects can therefore not be gainsaid.

Ahsan and Gunawan (2010) studied the schedule and cost issues affecting international development (ID) projects. They undertook an empirical analysis of 100 projects sponsored by the Asian Development Bank in a number of Asian countries. Their study identified that most of the projects that were completed late suffered from cost overrun. Project funding was noted as a critical factor that determine whether a project is successful or not.

According to Olatunji (2010), projects need to be viewed as strategic activities that are started to generate economic value and competitive advantage. As such even before initiating a road construction project, financiers should ensure that a project is sustainable. This could be achieved through raising funds from a variety of sources such as donations, venture capitalist, public-private partnerships (PPPs), debt or equity among others. Road construction projects should only be initiated where a significant portion of the budget and where possible, all the requisite resources are secured.

Hussin and Omran (2011) studied the project completion in Malaysia where they found out that about 70 percent of the projects in the country were not completed owing to challenges in their financing. Thereby where the Government or donors financing a road
construction project delays in disbursing project funds, inevitably, delays will be experienced in completion of the project. Delays in project completion could also be attributable to changes in project timelines such as where the inception dates of the road construction project are reviewed after a contract is awarded. This is also likely to occur where the initial project timelines were unrealistic.

Once finances for a road construction project are secured, Ngesa (2012) argues that it is important to ensure that the financier follows the agreed disbursement schedule. The researcher noted that where the financier fails to pay a contractor on time, this will have a negative impact on the project as the contractor is unable to meet the project cost. Such a contractor will for instance be unable to procure the materials required for construction as and when needed given the resultant cash flow challenges. Olatunji (2010) noted that project finance is one of the challenges in road construction projects that are often beyond the control of the parties in a road construction project though it has a significant impact on the smooth flow of a project’s schedule of activities. Where payment for a road construction project is slow, some contractors minimize the amount of resources committed or only avail such resources when payment is received. This creates unnecessary disruptions to the project thus causing delays in project completion.

Chepkoech (2012) argued that financing of road construction projects in Kenya is also impacted by political factors. While studying the Kericho-Kisumu Road, the researcher observed that whereas the project was planned to be completed in the year 2002, it took an extra 30 months to completion where the completion was actually achieved in June 2005. The researcher noted that this was attributable to political dynamics where funds allocated to the project were diverted on political grounds. Desai (2013) noted a similar
scenario when studying road construction projects in the coast region of Kenya. The researcher observed that at times donors had pulled out of road construction projects due to heated political alignments. This resulted to limitation of resources for road construction projects that led to project delays and abandonment.

Thugge, Heller and Kiringai (2012) laments that absorption of development budgets for a number of Government institutions are a critical concern since it results to a situation where funds that ought to have been utilized to improve the economy being diverted. For instance, Wafula (2017) noted that part of the funds that the Government allocates towards road maintenance end up being misappropriated and even where such funds are applied accordingly, delays in disbursements hurts the pace of development. The quality of roads is also affected due to delays or diversion of funds indicating that rehabilitation of roads become more often than it should be. Whereas the expectancy life of the roads in Kenya is around 8 years, Macharia (2016) observes that the actual life span is actually far shorter than this due to quality issues. In assessing the successful implementation of road construction projects, an evaluation of both the quantity and quality of road network is therefore critical.

To appreciate successful completion of road construction projects, it is imperative to note that it takes a number of steps to build a road. The first step in road construction involves undertaking a feasibility study so as to build a business case for the project. There has to be clear objectives before any road construction project is initiated which according to Mohammed (2012) forms part of justification of the project. Secondly, the project should undergo the project design phase in which resources and finances required are allocated and the project schedule determined. The final stage involves execution of the road
A study carried out by the Government of Kenya (GoK, 2012) reviewed the major road construction projects in the East Africa region where it was noted that Uganda and Kenya had most of their projects affected. According to the report, at least 45 percent of all road construction projects were either abandoned or suffered delays in completion. Some of the challenges that were identified by the report include inefficiencies in project monitoring and evaluation and poor financial management. According to Kagai (2012), the Thika Superhighway in Kenya whose initial completion date was July 2011 was completed albeit after a delay of close to two years in November 2012. In addition, the cost escalated to Kenya Shillings 31 billion up from the initial budget of Kenya Shillings 27 billion. Delays in payment of the contractors were a significant contributor to the failure to meet the project schedule. According to Mbogo (2012), the contractors were at some point using their own finances to fund the road construction works given the challenges that they were faced with in receiving payments from the Government on time.

Road construction projects often take a long period of time before completion (Hamzah, 2012). Thereby, World Bank (2014) observes that progress payments are expected from the financier, in most cases a Government institution. For instance, in Kenya most of the road construction projects are managed by KRB, KeRRA, KeNHA, and KURA. These institutions are required to make continuous payments to road contractors based on a progress billing model. Unfortunately, Gaba (2013) found out that it is very difficult to have a clear understanding of a road construction project from inception to completion.
and therefore the risk of road construction project management is quite significant. This challenge is compounded by the fact that the Government’s budget runs for 1 year whereas most road construction projects will take more than this period for completion. Challenges in having effective financial plans for road construction projects are therefore likely to be encountered. According to Laryea (2010), this results to delays in disbursement of funds to the road contractors and at times even lack of funds to sustain a project.

The World Bank (2014) recorded that time and money were significant determinants of performance of road construction projects. This was based on its review of the reconstruction of roads in USA, Tennessee valley after the Tsunami that hit the country. Road contractors are keen to put an investment in a project provided they will earn a return within a certain period of time. Consequently, where there are delays in a road construction, there is likely to be cost overruns.

2.3.4 Contractor’s Capacity and Performance of Projects
Performance of road construction projects could also be dependent on the capacity that a contractor has in terms of finances, technical expertise as well as materials and equipment. Planning and implementation of a road construction project squarely lies on the contractor and thereby, Kaming, Olomolaiye, Holt and Harris (2012) argue that a contractor needs to identify the best plan for applying resources and delivering a project within the expected period. Kaming et al. (2012) observed that knowledge gap as well as inadequacy of competent and experienced contractors in most of the less developed countries necessitated outsourcing of external experts mainly from China, Israel and Japan in more than 85 percent of the road construction projects. Major road construction
projects in Kenya have also been implemented by foreign contractors sourced from developed countries and mainly China.

Mastery of experience in project management is therefore critical for a contractor to successfully implement the project. Experienced contractors according to Fapohunda and Stephenson (2010) are able to foresee possible challenges that might be encountered in a project and thereby undertake necessary plans to proactively deal with such. This is critical to ensure that there are no delays in the course of the project implementation resulting to disputes that could occur owing to some aspects that might not have been ironed out. Moreover, the more experienced a contractor, the more likely that realistic cost estimates will be provided for the project. With realistic cost estimates, minimal delays are likely to arise for instance in negotiation for cost overruns. The financier of such a project will also not face challenges in financing a project since the budget will be adhered to. It is also imperative for contractors to have an appreciation of the various strategies and best practices in mitigation of risks in implementation of long-term contracts.

Hussin and Omran (2011) found out that technical experience of a contractor is a significant determinant of performance of road contracts in the construction industry in respect to adherence to time and cost estimates. The researchers noted that contractors who had past experience in similar engagements rank among the main considerations for bid evaluation for road construction projects. They noted that inexperienced contractors are likely to face challenges when it comes to site management, distribution of labour and technical expertise. This will not only have an impact on the project’s time and cost, but also a significant bearing on the quality of the work undertaken. Thwala and Mvubu
(2008) actually noted that inexperienced contractors not only delay in completion of construction projects, but also undertake shoddy work.

Most of the large contractors have the requisite resources to undertake quality work and at the same time apply experienced work force. This helps to ensure that a project is implemented in an efficient and effective manner. Oraro (2012) established that there was a significant relationship between the experience of a contactor and adherence to cost and time estimates. He noted that experienced contractors were more disciplined in cost and time management thereby putting in place controls to avert any delays or cost overruns. Similar findings were found by Waihenya (2011) who observed that where a contractor with questionable experience is chosen, then there is a likelihood of cost escalations and delays in project completion.

It is also imperative for employment of individual staff members who are competent to undertake the project. Hamzah (2012) argues that the ability of a contractor to execute the project will depends on the quality of workforce that is employed. A project team should therefore have the mist of skills that are required from time to time. A number of activities are undertaken in a road construction project and thus the need to engage a variety of professionals. Marando (2012) emphasizes the need to hire skilled personnel who are entrusted with execution of some aspects of the project including continuous developing of their capacity through training. Contractors should also ensure that the team employed in a project is well motivated through fair remuneration and appropriate working conditions. Other incentives could include providing room for growth and promotion for good performers as well as recognition.
Wambugu (2013) observed that one of the common causes of delays in a construction project is the scheduling of materials delivery. The researcher found out that there were instances where suppliers to a construction project failed to meet the requisite quality standards and thereby the material ended up being rejected. This caused undue delays in the delivery of materials which had a ramification on the project’s completion time. Material outages in a construction site also results to increased idle time for labour and machinery and consequently an upsurge in a project’s cost. Similar observations were made by Olatunji (2010) who noted that between 32 percent and 56 percent of projects in Nigeria and DRC suffered delays in completion which was attributable to lack of materials.

Saraf (2013) argues that award of road construction projects is mainly based on the capacity of a contractor as well as the bid price. An evaluation is usually undertaken of the contractors to assess their reputation and track record in completion of projects on time and meeting the specifications set. According to Nyamwaro (2011), a trade-off is often made between experience and price where choice of contractors who provide the lowest bids might not always result to a project being completed on time and in adherence to budget. Choice of contractors with poor capacity could lead to delays in project completion as some contractors have gone into bankruptcy during the construction period. Others have simply abandoned the projects either due to delayed payments or resource constraints on their end. Such projects end up experiencing significant delays and cost escalations since fresh contractors are often engaged to complete the work.

Seboru (2015) observes that the quality of a construction project requires application of the appropriate equipment and resources most of which are expensive. Contractors
endowed with the requisite materials and equipment are likely to implement road construction projects successfully and in conformance with the set quality standards. Applying the right technology in road construction according to Thwala and Mvubu (2008) goes a long way in reducing the project turnaround time and at the same time ensuring that quality work is performed. Consequently, contractors who lack the necessary equipment and materials requisite for road construction will unlikely perform road construction projects meeting the set objectives.

2.3.5 Monitoring and Evaluation and Performance of Projects
The Government plays a pivotal role in financing social economic development and mainly to alleviate market failures. According to Khadaroo and Seetanah (2010), market failures exist where the economic benefits of a project cannot be justified for an investment to be undertaken by the private sector. This is mainly associated with supply of public goods since they are non-rivalrous and non-excludable. For example, a public good such as a road is difficult for it to be supplied by the private sector since restriction of use is a challenge. Road investments are generally public goods and thus the private sector cannot be relied upon to finance the same.

According to Atkin and Skitmore (2008), improved efficiency on the part of the Government in handling road construction projects is likely to attract more professionals in the sector as well as investments by the private sector which will yield increased competition. With intensified competition in the road construction industry, there is likely to be a reduction in the cost of road construction as well as improved quality of projects with minimal delays. This will go a long way in helping the Government achieve its objective of achieving accelerated road infrastructure development.
Khadaroo and Seetanah (2010) observes that Government spending can provide most of the public goods such as roads since there might be no motivation for the private sector to invest in such projects. Unfortunately, Kwatsima (2017) laments that the Government is often coupled with bureaucracy and red tape. The process of monitoring and evaluation of road contracts is quite lengthy which might cause some good contractors shy away from bidding for these jobs. In addition, Mahamid et al. (2011) observe that the Government is quite slow in approving certificate of works which slows disbursement to contractors. Contractors are therefore often engaged in laborious exercise of following up the Government to award certificate of completion so that progress payments could be released.

Ondieki (2011) studied the factors that influence performance of Local Authority Transfer Fund (LATF) projects in Kisii County, Kenya. The researcher found that it was critical for continuous monitoring and evaluation of road construction projects particularly by the stakeholders. This was found to create project ownership by the host community and at the same time put pressure for accountability upon the contractor.

Contracting parties should be keen to ensure that a regular review is undertaken to ensure that the project schedule is continuously updated based on the actual performance. Hussin and Omran (2011) argued that it is more beneficial for stakeholders to be proactive while managing road construction projects. For instance, if variance analysis is undertaken during the early stages of a road construction project as well as progressively throughout the construction period, it will be possible to identify some of the challenges well in advance. Thereby, continuous review of performance of road construction projects will help to generate solutions for any challenges as and when they are identified.
2.4 Summary of Literature Review and Research Gaps

Table 2.1 below provides a summary of the literature reviewed and the research gaps.

Table 2.1: Summary of literature review and research gaps

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Summary of findings</th>
<th>Study gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alinaitwe, Apolot and Tindiwensi (2013)</td>
<td>They found out that construction delays affected most of the public construction projects in the country.</td>
<td>Study focused on delays in completion and did not assess whether the projects adhered to the set quality standards or were within budget. The study was undertaken in Uganda and not in Kiambu, Kenya.</td>
</tr>
<tr>
<td>Al-Momani (2000)</td>
<td>The researcher noted that the causes of construction delays include user changes, inadequacy of skilled manpower, weather conditions, delayed deliveries, increase in quantity, designer factors as well as economic conditions.</td>
<td>The study majored on public projects but lacked the focus on road construction. In addition, the study merely focused on timely completion of the project without considering the issue of quality and adherence to cost.</td>
</tr>
<tr>
<td>Chepkoech (2012)</td>
<td>Found that financing of Kericho-Kisumu Road delayed in completion mainly due to limitation of resources</td>
<td>The study was narrow in scope as it reviewed only a single road construction project</td>
</tr>
<tr>
<td>Gonzalez &amp; Molenaar (2013)</td>
<td>Analysed causes of delay and time performance of construction projects and noted that poor planning was the root cause.</td>
<td>The researchers did not consider the causes of failure to complete construction projects within budget and in conformance to quality standards</td>
</tr>
<tr>
<td>Hussain and Omran (2011)</td>
<td>The study found out that about 70% of the projects were not completed owing to challenges in financing and particularly delays in disbursements</td>
<td>The study was based in Malaysia and thus the context is different</td>
</tr>
<tr>
<td>Kikwasi (2013)</td>
<td>The researcher found out that delays and disruptions in construction projects were very common causing cost and time overrun, disputes, high idle time and negative social impact.</td>
<td>Study focused on delays in completion and cost overruns of projects and did not assess whether the projects adhered to the set quality standards. The study was undertaken in Tanzania and not in Kiambu, Kenya.</td>
</tr>
<tr>
<td>Kwatsima (2017)</td>
<td>Found that bureaucracy in the Government causes monitoring to be slow as well as funds disbursement causing closure of projects to take long</td>
<td>The study only reviewed factors that contributed to delays in closure of road construction projects</td>
</tr>
<tr>
<td>Macharia (2016)</td>
<td>The researcher found out that timely completion of road construction projects in Embakasi, Nairobi County was impacted by involvement of stakeholders. The researcher also found out that monitoring and evaluation was critical in meeting quality standards.</td>
<td>The focus of the study was for a different county and only considered timely completion of road construction projects.</td>
</tr>
<tr>
<td>Maina (2013)</td>
<td>Found that stakeholders’ participation in education projects in Nakuru County, Kenya created a proactive approach towards resolving issues.</td>
<td>Study was on education projects and focused on Nakuru County, Kenya</td>
</tr>
<tr>
<td>Marzouk and Tarek (2014)</td>
<td>Construction delays in Egypt were caused by lack of proper planning</td>
<td>Study only focused on delays in completion of projects and did not assess whether the projects were completed within budgets and the set quality standards. Further, the study was specific to Egypt.</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Meeampol and Ogunlan (2006)</td>
<td>Observe that most construction projects often suffer delays in completion and often the actual cost surpass the contracted sum. At times, cost overruns or delays in completion could actually result to total project abandonment.</td>
<td>Study focused on delays in completion and cost overruns of projects and did not assess whether the projects adhered to the set quality standards.</td>
</tr>
<tr>
<td>Muturi and Oguya (2016)</td>
<td>The researchers found out that contractor’s competency, finances and conflicts explained 82.7 percent of the variance in project performance.</td>
<td>Study focused on road construction projects in Arid and Semi-Arid areas in Kenya.</td>
</tr>
<tr>
<td>Olatunji (2010)</td>
<td>The researcher noted that project finance is a significant factor that causes delays in completion of road construction projects in Nigeria.</td>
<td>The study was undertaken in Nigeria.</td>
</tr>
<tr>
<td>Wambugu (2013)</td>
<td>Studied the factors that affect completion of rural electrification projects in Kenya where planning was found to be critical in timely closure of the projects.</td>
<td>The study focused on rural electrification projects and not road construction projects. Further, only causes of delays were studied.</td>
</tr>
<tr>
<td>Wambui, Ombui and Kagiri (2015)</td>
<td>Found out that performance road construction projects in Nairobi City County, Kenya failed to be completed on time due to poor planning.</td>
<td>The study focused on Nairobi County, Kenya and only considered delays in completion of road construction projects and no other metrics or performance.</td>
</tr>
<tr>
<td>Thwala and Mvubu (2008)</td>
<td>The researchers noted that inexperienced contractors not only delay in completion of construction projects, but also undertake shoddy work.</td>
<td>Focus was on quality and delays in completion of construction projects with no review of whether projects adhered to budgets.</td>
</tr>
<tr>
<td>Seboru (2015)</td>
<td>Noted that delays in road construction are a common feature in Kenya. He observed that a majority of the road construction projects in the country rarely get completed within schedule.</td>
<td>Study only focused on delays in completion of projects and did not assess whether the projects were completed within budgets and the set quality standards.</td>
</tr>
</tbody>
</table>

**Source:** Researcher (2018)
2.5 Conceptual Framework

The conceptual framework helps to outline the dependent, independent as well as the moderating variables aimed at providing guidance to the study. According to Sigmund, Babin, Carr and Griffin (2013), a conceptual framework is useful in portraying the relationship between dependent and independent variables under study. This study focuses on factors that influence the performance of road construction projects as the dependent variable. The identified independent factors include project planning, stakeholder involvement, project funding, contractor’s capacity and project monitoring and evaluation. The conceptual framework for the study is depicted in figure 2.1 below.
Independent variables

- Project Planning
  - Tasks scheduling
  - Resources estimation
  - Formulating policies and procedures
  - Strategy to handle risk

- Stakeholder involvement
  - Project social impacts
  - Negotiation

- Project funding
  - Availability of funds
  - Speed of disbursement
  - Approval of overruns

- Contractor’s capacity
  - Technical expertise
  - Experience
  - Materials and equipment

- Monitoring and evaluation
  - Provision of M&E reports
  - Progress certificates
  - Remedial activities undertaken

Dependent variable

- Project Performance
  - Timely completion
  - Adherence to budget cost
  - Meeting quality standards

Figure 2.1: Conceptual framework
Source: Researcher (2018)
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction
The chapter provides a summary of the research approach that was adopted for the study. This includes an explanation of the research design, target population as well as the data collection strategy. In addition, a discussion of the data analysis technique has been provided.

3.2 Research Design
According to Sigmund, Babin, Carr and Griffin (2013), research design is the plan, outline or scheme that is applied in a study with a view to get answers to certain research problems. The study adopted a descriptive research design which according to Kumar (2010) helps the researcher to describe, record, analyse and report conditions that exist or existed. Use of descriptive research involves collation of data and analysing it to provide inference including presentation, organization and interpretation.

3.3 Target Population
Kuada (2012) defines a population as the total number of elements for which a researcher is seeking to make some inferences. The target population for this study is the 158 officers working in nine road construction projects in Kiambu County, Kenya (See appendix III). The target population included 35 officers from Government representatives in the Kiambu County, Kenya; 18 officers from the regional offices for KeNHA, 22 from KURA offices; 30 from KeRRA as well as 54 representatives of the contractors implementing the ongoing road construction projects. Table 3.1 below provides a breakdown of the target population.
Table 3.1: Target population

<table>
<thead>
<tr>
<th>Agency/ Organization</th>
<th>Officer Role/Function</th>
<th>Road Engineers</th>
<th>Technical Auditors</th>
<th>Project Manager</th>
<th>Surveyors</th>
<th>Consultants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>County Government</td>
<td></td>
<td>10</td>
<td>5</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>KeERRA</td>
<td></td>
<td>18</td>
<td>8</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>KURA</td>
<td></td>
<td>12</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>KeNHA</td>
<td></td>
<td>10</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Contractors</td>
<td></td>
<td>18</td>
<td>9</td>
<td>9</td>
<td>18</td>
<td>0</td>
<td>54</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>68</strong></td>
<td><strong>34</strong></td>
<td><strong>18</strong></td>
<td><strong>34</strong></td>
<td><strong>5</strong></td>
<td><strong>158</strong></td>
</tr>
</tbody>
</table>

**Source:** Kiambu County Government (2011)

3.4 Sampling Design

A stratified random sampling technique was employed in this study. Respondents comprised of staff working in all these agencies/organization with a sample size of 50 percent of the total respondents, which brings the total sample size to 82 from the total of 158 respondents, due to rounding off from the strata. According to Borg and Gall (2003) a sample size of at least 30 percent is representative. Table 3.2 below provides an analysis of the sample size.
Table 3.2: Sample size

<table>
<thead>
<tr>
<th>Agency/Organization</th>
<th>Population Size</th>
<th>50 Percent</th>
<th>Sample Size</th>
<th>Sample Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>County Government</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Engineers</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>6.1</td>
</tr>
<tr>
<td>Technical Auditors</td>
<td>5</td>
<td>2.5</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Project Managers</td>
<td>9</td>
<td>4.5</td>
<td>5</td>
<td>6.1</td>
</tr>
<tr>
<td>Surveyors</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Consultants</td>
<td>5</td>
<td>2.5</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>KeRRA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Engineers</td>
<td>18</td>
<td>9</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Technical Auditors</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4.9</td>
</tr>
<tr>
<td>Project Managers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Surveyors</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>Consultants</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>KURA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Engineers</td>
<td>12</td>
<td>6</td>
<td>6</td>
<td>7.3</td>
</tr>
<tr>
<td>Technical Auditors</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Project Managers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Surveyors</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>Consultants</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>KeNHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Engineers</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>6.1</td>
</tr>
<tr>
<td>Technical Auditors</td>
<td>5</td>
<td>2.5</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Project Managers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Surveyors</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Consultants</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Contractors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road Engineers</td>
<td>18</td>
<td>9</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Technical Auditors</td>
<td>9</td>
<td>4.5</td>
<td>5</td>
<td>6.1</td>
</tr>
<tr>
<td>Project Managers</td>
<td>9</td>
<td>4.5</td>
<td>5</td>
<td>6.1</td>
</tr>
<tr>
<td>Surveyors</td>
<td>18</td>
<td>9</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Consultants</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td><strong>158</strong></td>
<td><strong>79</strong></td>
<td><strong>82</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Kiambu County Government (2011)

3.5 Data Collection Instruments

Primary data was collected through the use of questionnaires (refer to appendix II) that were administered to the sample in Kiambu County, Kenya. The questionnaire was aimed at assessing the perceptions of the respondents on the various factors that were identified as critical influencers of performance on road construction projects. The questionnaire comprised of both structured and unstructured questions.
The questionnaire was divided into two parts with Part A focused on capturing general information regarding the respondents whereas Part B had a focus on the independent variables that influence performance of road construction projects. This part offered the respondents an opportunity to identify variables that they perceived as having influence on completion of road construction projects and rate them on a Likert Scale from 5 (Strongly Agree) to 1 (Strongly Disagree). The open-ended questions allowed the respondents to share their opinions, recommendations and comments.

3.5.1 Pilot study

The questionnaire was tested on a small pilot sample of respondents with similar characteristics as the study respondents. The pilot sample was selected using a random sample of 10 staffs involved in road construction. The piloting was done in Nairobi County, ensuring that pilot respondents were not involved in the final research.

3.5.2 Validity of the instruments

According to Kuada (2012), the validity of a data collection instrument refers to the extent to which it measures what it claims to. To ensure content validity, the instrument applied in this study was reviewed by research supervisors and other research experts to ensure that it was broad and adequately covered the research area. Additionally, construct validity to ensure that the instrument is suitable for measuring the phenomenon under study was attained by designing questions that were easily understandable by the respondents and free from ambiguity. Most of the questions were structured to ensure that responses are in line with the research objectives.
3.5.3 Reliability of the instruments

Reliability of instruments according to Kuada (2012) refers to the degree to which a research instrument yields results that are consistent after a number of trials. To ensure reliability, simple language, clear and systematic questions were used. Cronbach’s Alpha was used to test the reliability of the research instrument. A construct composite reliability co-efficient (Cronbach Alpha) of 0.8 or above, for all the constructs, was considered to be adequate for this study. According to Kumar (2010), a value of 0.8 is an acceptable reliability coefficient and thus this formed the benchmark for this study.

3.6 Data Collection Procedure

Data was collected through the use of questionnaires that were administered to the target sample in Kiambu County, Kenya mostly through drop-and-pick-later method. Follow-ups via telephone calls and email reminders to improve the response rate and viability of the study were then done after a reasonable amount of time. The questionnaires were based on the specific objectives of the study with both close ended and open-ended questions. Data was collected over a period of two weeks.

3.7 Data Analysis and Presentation

Data analysis involves data coding, data entry and analysis so as to make it possible for interpretation to be undertaken. The research generated both qualitative and quantitative data which was analysed. Qualitative data was read and categorized into distinct themes as shown by the responses of the respondents. Responses with common themes or patterns were grouped together into coherent categories. Quantitative data was also coded and entered into Statistical Package for Social Sciences (SPSS version 17) and analysed using descriptive statistics as described above. Descriptive statistics used included
frequencies, percentages, mean and standard deviation. Multiple regression model was used to establish the relationship between dependent and independent variables. Regression analysis was used to provide the relationship between performance of projects and the independent variables such as project planning, stakeholder’s involvement, project funding, capacity of the contractors, project monitoring, and evaluation.

The regression model that was used is as follows:

\[ PR = \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \beta X_5 + \varepsilon \]  

Equation 3.1

Where:

- **PR** = Performance of road construction project.
- \( \beta \) = Coefficient of regression,
- \( X_1 \) = Project Planning
- \( X_2 \) = Stakeholders Involvement.
- \( X_3 \) = Project Funding
- \( X_4 \) = Contractor’s Capacity
- \( X_5 \) = Project Monitoring and Evaluation.
- \( \varepsilon \) = the error term normally distributed about a mean of 0 and for the purpose of computation is assumed to 0.

### 3.8 Model Diagnostic Tests

Zikmund, Babin, Carr and Griffin (2013) observe that it is imperative to test a number of assumptions of the linear regression. The tests that were undertaken in this study include the test for normality, non-multicollinearity, homoscedasticity of variance and independence of errors. The normality of the model was tested using the Shapiro-Wilk test which helps to evaluate whether the distribution is normal. On the other hand, non-multicollinearity was tested using Variance of Inflation Factor (VIF) followed by the examination of tolerance values, where a VIF of more than 10 and/or a tolerance value of less than 0.1 indicates existence of a multicollinearity problem. Further, Levene test was used to assess whether there is homoscedasticity of variance in which case the independent variables would be similar, while Durbin Watson test was applied in testing independence of errors.
3.9 Ethical Considerations

Kombo and Tromp (2006) note that researchers whose subjects are people or animals must consider the conduct of their research, and give attention to the ethical issues associated with carrying out their research. Information gathered from the study was purely used for academic purposes. The identity of the respondents was also not disclosed and at the same time, no respondent was coerced to fill in the questionnaire.
CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter provides a summary of data analysis, presentation as well as the interpretation of the research findings. The study applied primary data that was collected using semi-structured questionnaires. A total of 82 questionnaires were administered to the study population of 158.

4.2 Response Rate

A total of 52 questionnaires were received translating to a response rate of 63 percent as summarized in table 4.1 below.

<table>
<thead>
<tr>
<th>Response rate</th>
<th>Number</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responded</td>
<td>52</td>
<td>63%</td>
</tr>
<tr>
<td>Did not respond</td>
<td>30</td>
<td>37%</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Survey data (2018)

According to Kuada (2012), a response rate of at least 50 percent is considered adequate for conclusions to be drawn from a study. The response rate of 63 percent was therefore good and representative. The questionnaires that were not returned were due to unavailability of the respondents even after a number of follow ups.

4.3 Demographics of the Respondents

Part A of the questionnaire sought to determine the demographics of the respondents in terms of their employer, role in projects, and experience. Refer to table 3.1 for details on the demographics of the respondents.
4.3.1 Respondents per institution

The respondents were classified based on the institution of employment. Most of the respondents were from contractors where the population of interest was also high. However, the response rate for each institution was between 60 and 70 percent indicating that the responses were representative. Table 4.2 below provides a summary of the response rates across the various institutions from which data was collected.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>KeNHA</td>
<td>6</td>
<td>12%</td>
</tr>
<tr>
<td>KURA</td>
<td>7</td>
<td>13%</td>
</tr>
<tr>
<td>KeERRA</td>
<td>9</td>
<td>17%</td>
</tr>
<tr>
<td>Kiambu County Government</td>
<td>13</td>
<td>25%</td>
</tr>
<tr>
<td>Contractor</td>
<td>17</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>52</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: Survey data (2018)

4.3.2 Roles of the respondents

The study sought to collect responses from the various professionals that were involved in road construction projects in Kiambu County, Kenya. The professionals targeted by the study included; project managers, engineers, technical auditors, surveyors and consultants. Table 4.3 below provides a summary of the respondents’ roles.

<table>
<thead>
<tr>
<th>Role</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager</td>
<td>7</td>
<td>13%</td>
</tr>
<tr>
<td>Engineer</td>
<td>22</td>
<td>42%</td>
</tr>
<tr>
<td>Technical Auditor</td>
<td>11</td>
<td>21%</td>
</tr>
<tr>
<td>Surveyor</td>
<td>10</td>
<td>19%</td>
</tr>
<tr>
<td>Consultant</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>52</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: Survey data (2018)
The response rates for consultants and project managers were the lowest at 4 percent and 13 percent respectively which was attributed to the fact that the consultants are majorly field staff while the project managers are usually very busy and thus a significant percentage were not available during the data collection period. Additionally, both professionals are not attached to a single project and thus are usually running up and down addressing all the projects. On the other hand, engineers ranked the highest in terms of response rate with a rate of 42 percent.

4.3.3 Experience of respondents

The respondents were classified in terms of experience and the results are provided in figure 4.1 below.

![Experience of the respondents](image)

**Figure 4.1: Experience of the respondents**

**Source:** Survey data (2018)

Twenty four percent of the respondents had experience of between 3 and 5 years, 31 percent between 5 and 10 years and 21 percent had more than 10 years’ experience, while only 6 percent, 12 percent and 8 percent had experience of less than 1 year, between 1 and 2 years and between 2 and 3 years respectively. Most of the respondents therefore have served in the road
construction projects for more than 3 years and therefore considered to have adequate experience to offer valuable feedback regarding the critical factors that influence performance of road construction projects in Kiambu County, Kenya.

4.4 Project Planning

Respondents were required to indicate the influence of the various indicators of planning on performance of road construction projects. The focus of the study was on the influence of having systematic work plans and schedules, adherence to the developed work plans and schedules, having clear communication channels, formulation of policies and procedures for undertaking the project, budgeting, and development of risk management strategies. Table 4.4 below provides a summary of results.

<table>
<thead>
<tr>
<th>Work plans</th>
<th>Adhere to work plans</th>
<th>Clear communication</th>
<th>Policies &amp; procedures</th>
<th>Budgeting</th>
<th>Risk management</th>
<th>Aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>21%</td>
<td>27%</td>
<td>31%</td>
<td>40%</td>
<td>29%</td>
<td>40%</td>
</tr>
<tr>
<td>Disagree</td>
<td>35%</td>
<td>29%</td>
<td>33%</td>
<td>31%</td>
<td>42%</td>
<td>44%</td>
</tr>
<tr>
<td>Neutral</td>
<td>37%</td>
<td>27%</td>
<td>27%</td>
<td>25%</td>
<td>19%</td>
<td>13%</td>
</tr>
<tr>
<td>Agree</td>
<td>8%</td>
<td>15%</td>
<td>8%</td>
<td>4%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>0%</td>
<td>2%</td>
<td>2%</td>
<td>0%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Mean</td>
<td>2.31</td>
<td>2.37</td>
<td>2.17</td>
<td>1.92</td>
<td>2.13</td>
<td>1.79</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>0.90</td>
<td>1.10</td>
<td>1.02</td>
<td>0.90</td>
<td>1.03</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Source: Survey data (2018)

Only a small section of the respondents (mean score 2.31) held the view that work plans and schedules were put in place in road construction projects, while the respondents indicated with a mean score 2.37 that those work plans were adhered to and followed in those projects. On the
other hand, most of the respondents disagreed (only mean score of 2.17 agreed) with the view that clear communication channels within the project team and other stakeholders had been set out during road construction projects. Most of the respondents (mean score 3.08) were of the view that policies and procedures for undertaking road construction projects were not formulated whereas only a small fraction of the respondents (mean score 2.13) supported the view that appropriate budgets were formulated before commencement of projects. Regarding management of risks for the projects, a majority disagreed with the view that this was done with those supporting the view accounting for a paltry mean score of 1.79. Generally, most of the respondents were of the view that road construction projects in Kiambu County, Kenya were poorly planned as evidenced by the below average aggregate mean score of 2.12 of the respondents. This was in agreement with a report by the World Bank (2014) that documented that whereas most of the infrastructure projects in Kenya have well documented plans, there is usually minimal reliance on the same during actualisation and thereby about 50 percent of the projects in the country end up being delayed in completion. Moreover, the projects ended up not meeting quality standards.

4.5 Stakeholder Involvement

The respondents were requested to indicate their views regarding the level of involvement of stakeholders in performance of road construction projects in Kiambu County, Kenya. Their responses are summarized by table 4.5 below.

<table>
<thead>
<tr>
<th>Table 4.5: Involvement of stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Strongly disagree</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Neutral</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Strongly agree</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Std. Dev</td>
</tr>
</tbody>
</table>

**Source:** Survey data (2018)

A good number of respondents (mean score of 3.38) were in agreement that social impact assessment was often done during the performance of road construction projects in Kiambu County, Kenya. This could be attributable to the fact that this is actually a legal requirement in Kenya. Before any construction project is undertaken, necessary approvals are a requirement one of which is from the National Environmental Management Authority (NEMA). Before approval from NEMA is obtained, a formal Social Impact Assessment (SIA) is required and thus most of the respondents noted that SIA was undertaken for the projects. However, there was minimal active engagement (mean score 2.13) with the stakeholders to negotiate the impact of these projects (mean score of 2.19).

With an aggregate mean score of 2.57, the respondents slightly agreed that various stakeholders were engaged by the contractors and government in various stages of the projects and that negotiations were undertaken with them regarding the impact of road construction projects thus minimising collisions and misunderstanding during projects execution. This supports a study by Macharia (2016) on road construction projects in Embakasi, Nairobi County, Kenya where the researcher observed that the concerns of all stakeholders were taken into account during the planning phase of the project and thereby avertting any possible collision that could have occurred during implementation. She noted that wide consultations were made before the Nairobi Outering Road was constructed with a view to capture the concerns of stakeholders and parties that had interest in the project. This involved workshops with stakeholders and public meetings during the drafting of the Environment Social Impact Assessment (ESIA) report.
Stakeholders during these forums included community representatives, small scale traders’ associations, Government institutions such as water regulatory bodies, KeNHA and KURA among others. During these sessions, agreements were reached on how the project could be implemented so as to provide maximum benefits to the stakeholders.

### 4.6 Project Funding

The study sought responses regarding various perspectives of project funding including; their views regarding availability of funds from the government to finance the projects, speed of disbursement of funds to the contractors, whether bureaucracies were experienced in approval of overruns, and whether the retention rates were low. The descriptive statistics of the responses received are provided in table 4.6 below.

**Table 4.6: Project funding**

<table>
<thead>
<tr>
<th></th>
<th>Funds availability</th>
<th>Disbursement speed</th>
<th>No overruns approval</th>
<th>Low retention rates</th>
<th>Aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>42%</td>
<td>56%</td>
<td>17%</td>
<td>56%</td>
<td>43%</td>
</tr>
<tr>
<td>Disagree</td>
<td>37%</td>
<td>13%</td>
<td>13%</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td>Neutral</td>
<td>15%</td>
<td>13%</td>
<td>10%</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Agree</td>
<td>4%</td>
<td>10%</td>
<td>25%</td>
<td>6%</td>
<td>11%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>2%</td>
<td>8%</td>
<td>35%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Mean</td>
<td>1.87</td>
<td>2.00</td>
<td>3.46</td>
<td>2.00</td>
<td>2.33</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>0.95</td>
<td>1.34</td>
<td>1.51</td>
<td>0.40</td>
<td>1.46</td>
</tr>
</tbody>
</table>

**Source:** Survey data (2018)

Most of the respondents (mean score 3.46) indicated that they had experienced bureaucracies as they sought approval of overruns from the financier (government) indicating that overrun
approvals is the major inhibitor in funding projects. There was also a common view that the government did not have sufficient funds to finance the road construction projects (mean score 1.87), which could explain why there are delays in executing road construction projects in cases where the contractors do not have their own funds to undertake the projects as they wait for the government to pay them. On the other hand, the pace of disbursement of funds was noted not to be slow (mean score 2.00). Further, the respondents decried the level of retention rates with a majority noting that the rates were too high (mean score of 2.00). Based on the responses, it is discernible that undertaking road construction projects in Kiambu County, Kenya suffered a number of financing issues (aggregate mean score of 2.33) that affected their performance. This is in line with a study by Kagai (2012), that the Thika Superhighway in Kenya whose initial completion date was July 2011 was completed after a delay of close to two years in November 2012, with cost escalating to Kenya Shillings 31 billion up from the initial budget of Kenya Shillings 27 billion. Delays in payment of the contractors were a significant contributor to the failure to meet the project schedule. Additionally, according to Mbogo (2012), the contractors were at some point using their own finances to fund the road construction works given the challenges that they were faced with in receiving payments from the Government on time.

4.7 Contractor Capacity

The study assessed the capacity of the contractors in terms of experience and resources necessary to effectively undertake road construction projects in Kiambu County, Kenya. The descriptive statistics for the responses collated are summarized using table 4.7 below.
Respondents indicated with a mean score of 2.58 that contractors had their own resources to undertake projects, while a number of them (mean score 2.42) were dependent on resources from the financier to undertake the road construction projects since they did not have adequate requisite resources to carry out these projects in the events where there were delays in getting funding from the financier. As such, they did not have the requisite resources to carry out the project. However, most of them (mean score 3.96) had the requisite experience to carry out the road construction projects successfully. This could be informed by the qualification reviews that are undertaken during the tender award process. They however lacked skilled workers (mean score 1.98), which could indicate that most contactors engage a good percentage of unskilled labourers to undertake various project activities which could impact of the speed of work and quality. Further, most of the respondents disagreed that the appropriate materials were available (mean score 2.48) and also disagreed that the equipment required was available (mean
score 2.50). Overall, the respondents were in agreement (mean score 2.7) that the contractors engaged in undertaking the projects in the county had the capacity to do so.

4.8 Project Monitoring and Evaluation

The study reviewed the process of project performance right from the process of award of tenders to project completion including monitoring and evaluation. The objective was to evaluate whether there were factors that influenced performance of the road construction projects throughout the project cycle. Table 4.8 below provides a summary of the descriptive statistics.

Table 4.8: Project monitoring and evaluation

<table>
<thead>
<tr>
<th></th>
<th>Timely tender award</th>
<th>M&amp;E reports</th>
<th>Remedial action</th>
<th>Progress certificates</th>
<th>Aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>63%</td>
<td>83%</td>
<td>62%</td>
<td>60%</td>
<td>67%</td>
</tr>
<tr>
<td>Disagree</td>
<td>10%</td>
<td>4%</td>
<td>10%</td>
<td>15%</td>
<td>38%</td>
</tr>
<tr>
<td>Neutral</td>
<td>10%</td>
<td>8%</td>
<td>10%</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>Agree</td>
<td>8%</td>
<td>4%</td>
<td>12%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>10%</td>
<td>2%</td>
<td>8%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Mean</td>
<td>1.90</td>
<td>1.38</td>
<td>1.94</td>
<td>1.87</td>
<td>1.77</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>1.39</td>
<td>0.93</td>
<td>1.38</td>
<td>1.27</td>
<td>1.27</td>
</tr>
</tbody>
</table>

Source: Survey data (2018)

The respondents noted that tender award process was not concluded within reasonable time (mean score 1.90) with most of the respondents disagreeing with the view that tenders were awarded timely. In addition, there was no close monitoring and supervision by the financier (mean score 1.38), remedies pointed out from M&E reports were also not effectively implemented (mean score 1.94), and completion/progress certificates were not issued on time...
(mean score 1.87). The process of project monitoring and evaluation was therefore noted to be poor, as a majority of the respondents strongly disagreed with the view that there were strong indicators for effective project monitoring and evaluation, with only an aggregate mean score of 1.77 indicating that there was effective project monitoring and evaluation. This can be supported by a report by Kwatsima (2017) who laments that the Government is often coupled with bureaucracy and red tape.

4.9 Project Performance

Views were sought from the respondents regarding the performance of road construction projects in Kiambu County, Kenya in terms of completion within the set budget cost, timelines as well as whether there was conformance to the quality specifications. The responses were analysed using descriptive statistics whose results are presented in table 4.9 below.

<table>
<thead>
<tr>
<th>Label</th>
<th>Value</th>
<th>Indicator (Percent)</th>
<th>Aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Timely completion</td>
<td>Budget adherence</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>1</td>
<td>59.61</td>
<td>69.22</td>
</tr>
<tr>
<td>Slightly disagree</td>
<td>2</td>
<td>11.54</td>
<td>3.85</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
<td>7.69</td>
<td>9.62</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>5</td>
<td>11.54</td>
<td>7.69</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>2.00</td>
<td>1.83</td>
</tr>
<tr>
<td>Std. Dev</td>
<td></td>
<td>1.22</td>
<td>1.37</td>
</tr>
</tbody>
</table>

Source: Survey data (2018)

Based on the responses collated, 59.61 percent of the respondents strongly disagreed with the view that road construction projects in Kiambu County, Kenya were completed in time with an additional 11.54 percent of the respondents slightly disagreeing. Only 7.69 percent of the respondents agreed that projects were completed within time whereas 11.54 percent of the
respondents strongly agreed to this. A majority of the respondents were therefore of the view that road construction projects in Kiambu County, Kenya experienced delays in completion.

Regarding conformance to laid down budget estimates, seventy three percent of the respondents were in disagreement (69.23 percent strongly disagreed while an additional 3.85 percent slightly disagreed) with the view that road construction projects in Kiambu County, Kenya, adhered to the initial cost budgets. Only a paltry 9.62 percent agreed and 7.69 strongly agreed with the view that the projects were undertaken in adherence to allocated cost budgets. This is an indication that these projects required additional financing from the government as the contractors claimed for cost overruns. This could be partially explained by the fact that very few of the projects were completed within the scheduled time.

Over sixty one percent of the respondents strongly disagreed with the view that road construction projects in Kiambu County, Kenya conformed to the quality specifications with an additional eleven percent slightly disagreeing with this view. However, 13.46 percent of the respondents were in strong agreement with this view, with an additional 9.62 percent of the respondents agreeing with the view. The majority of the respondents therefore felt that the quality of road construction projects in the County was poor.

Overall, the results indicated that most of the respondents were of the view that road construction projects in Kiambu Country, Kenya, were not completed on time (mean score 2.00), did not adhere to the set budgets (mean score 1.83) and failed to conform to the set standards (mean score 2.02). There was therefore a general view that projects in Kiambu County were not performed effectively and efficiently, as only a small fraction of the
respondents (mean score 1.95) felt that the projects were undertaken within the stipulated time, were completed within budget and that they were done to the required quality standards.

4.10 Multiple Regression Analysis

Multiple regression analysis was used in this study to determine existence of a relationship between the dependent variable and the independent variables. The strength of the relationship between the predictor and response variables was also evaluated using coefficient of determination. Composite index for the various indicator variables for project planning, stakeholder involvement, project funding, contractor capacity, and monitoring and evaluation were developed using mean scores.

4.10.1 Diagnostic tests for multiple regression

Kuada (2012) observes that in order for one to undertake a multiple regression analysis, a number of assumptions must be analysed. These assumptions include; test for normality, non-multicollinearity, homoscedasticity of variance and independence of errors. These tests were carried out as follows.

4.10.1.1 Normality of distribution

Normality of distribution is usually tested using either Kolmogorov-Smirnov or Shapiro-Wilk test, to check whether the data followed normal distribution or not. As such, the Shapiro-Wilk test was used to evaluate normality of distribution in this study. This test states that if the significance value was greater than 0.05, the data is normal and if it’s below 0.05, then the data significantly deviates from normal. Based on the Shapiro-Wilk test as shown in table 4.10 below, the significance value obtained was 0.602, and therefore the data was normally distributed for regression analysis to be undertaken.
Multicollinearity was tested using Variance of Inflation Factor (VIF) and examination of tolerance values which is a measure of how much the variance of the estimated regression coefficients is inflated as compared to when the predictor variables are not linearly related. They are used to describe how much multicollinearity or correlation between predictors exist in a regression analysis. VIF of more than 10 and/or tolerance value of less than 0.1 indicates a problem of multicollinearity. Based on the results of the analysis as shown in table 4.11 below, no variable had a VIF of more than 10 nor tolerance of less than 0.1 and hence there was no multicollinearity of variables.

### Table 4.10: Normality of distribution

<table>
<thead>
<tr>
<th>Source: Survey data (2018)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Df</th>
<th>Sig.</th>
<th>Statistic</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project performance</td>
<td>.176</td>
<td>51</td>
<td>.162</td>
<td>.546</td>
<td>51</td>
</tr>
</tbody>
</table>

*a. Lilliefors Significance Correction*

### Table 4.11: Tests for multicollinearity

<table>
<thead>
<tr>
<th>Source: Survey data (2018)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VIF</td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
</tr>
<tr>
<td>(constant)</td>
<td></td>
</tr>
<tr>
<td>Project planning</td>
<td>2.760</td>
</tr>
<tr>
<td>Stakeholder involvement</td>
<td>0.270</td>
</tr>
<tr>
<td>Project funding</td>
<td>1.823</td>
</tr>
<tr>
<td>Contractor capacity</td>
<td>1.833</td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>1.875</td>
</tr>
</tbody>
</table>

### 4.10.1.3 Homoscedasticity

Homoscedasticity of variance refers to residuals at each level of the independent variable being similar. This was tested using Levene’s test and since the Levene’s test statistic was
insignificant at p>0.05 for all of the variables, then the assumption of homogeneity of variance between the groups is accepted. Kumar (2010) observes that homoscedasticity of variance is related to the assumption of normality. As such, the assumption of normality was met and the assumption of homoscedasticity was consequently met.

Table 4.12: Test of homogeneity of variances

<table>
<thead>
<tr>
<th>Source: Survey data (2018)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project planning</td>
<td>12.555</td>
<td>1</td>
<td>51</td>
<td>0.575</td>
</tr>
<tr>
<td>Stakeholder involvement</td>
<td>7.034</td>
<td>1</td>
<td>51</td>
<td>0.322</td>
</tr>
<tr>
<td>Project funding</td>
<td>21.952</td>
<td>1</td>
<td>51</td>
<td>1.006</td>
</tr>
<tr>
<td>Contractor capacity</td>
<td>7.963</td>
<td>1</td>
<td>51</td>
<td>0.365</td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>8.335</td>
<td>1</td>
<td>51</td>
<td>0.382</td>
</tr>
</tbody>
</table>

4.10.2 Coefficient of determination

Coefficient of determination measures the strength of the relationship between the predictor and responsive variables in a regression analysis. Thus, it determines the extent to which changes in predictor variables explain the variation in the responsive variable. Regression analysis was undertaken to assess the influence of the independent variables on the performance of road construction projects. Table 4.13 below provides a summary of the coefficient of determination (R Square) for the regression analysis.

Table 4.13: Model summary

<table>
<thead>
<tr>
<th>Source: Survey data (2018)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.89</td>
<td>.79</td>
<td>.77</td>
<td>.72</td>
</tr>
</tbody>
</table>

The adjusted coefficient of determination (adjusted R Square) was 0.77 indicating that the independent variables helped to explain 77 percent of performance of road construction projects.
in Kiambu County, Kenya. It can therefore be inferred that only 23 percent of changes in the response variable were caused by factors not studied in this study.

**Table 4.14: ANOVA**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>4</td>
<td>6.54</td>
<td>1.64</td>
<td>3.97</td>
<td>0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>47</td>
<td>19.35</td>
<td>0.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>25.89</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Survey data (2018)

The significant value was 0.01, lower than 0.05, while the calculated F value is 3.97, greater than F Critical (1.86). As such, this is an indicator that the model is statistically significant.

**4.10.3 Multiple Regression Results**

Multiple regression analysis was undertaken to assess the nature and statistical significance of the relationship between each of the predictor variables and the dependent variable (performance of road construction projects). This was performed using data collected from the field and tested at 5% significance level. The results of the test are summarised in table 4.15 below.

**Table 4.15: Regression analysis**

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t Stat</th>
<th>P-value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.63</td>
<td>0.72</td>
<td>-0.88</td>
<td>0.38</td>
<td>-2.08</td>
<td>0.81</td>
</tr>
<tr>
<td>Project planning</td>
<td>0.23</td>
<td>0.20</td>
<td>1.12</td>
<td>0.01</td>
<td>-0.18</td>
<td>0.63</td>
</tr>
<tr>
<td>Stakeholder involvement</td>
<td>0.15</td>
<td>0.10</td>
<td>1.49</td>
<td>0.14</td>
<td>-0.05</td>
<td>0.35</td>
</tr>
<tr>
<td>Project funding</td>
<td>0.15</td>
<td>0.21</td>
<td>0.72</td>
<td>0.00</td>
<td>-0.27</td>
<td>0.58</td>
</tr>
<tr>
<td>Contractor capacity</td>
<td>0.68</td>
<td>0.22</td>
<td>3.16</td>
<td>0.00</td>
<td>0.25</td>
<td>1.12</td>
</tr>
<tr>
<td>Project monitoring and evaluation</td>
<td>0.32</td>
<td>0.08</td>
<td>0.62</td>
<td>0.00</td>
<td>0.31</td>
<td>1.21</td>
</tr>
</tbody>
</table>

**Source:** Survey data (2018)
The regression analysis model can therefore be presented as below;

\[ \text{Project performance} = -0.63 + 0.23 \times X_1 + 0.15 \times X_2 + 0.15 \times X_3 + 0.68 \times X_4 + 0.32 \times X_5 \]

The above equation implies that holding all other independent variables constant, changing the variable under consideration by a single unit leads to a change in project performance by the indicated coefficient, with a positive sign indicating positive relationship while negative sign indicates a negative relationship between that particular independent variable and project performance. The exact coefficient value of +1 means perfect positive relationship, the exact value of -1 indicates a perfect negative relationship while the exact value of 0.00 indicates no relationship exists between the two variables. Thus a coefficient closer to +/-1 would indicate a strong relationship while values close to 0 mean weak relationships between the variables.

Regarding the first objective of the study which is to investigate the influence of project planning on the performance of road construction projects in Kiambu County, Kenya, it can be deduced from the regression analysis presented in table 4.15 above that project planning has a significant influence on the dependent variable, since its value is 0.01 which is less than \( p \)-value of 0.05. Additionally, the two variables are positively related (positive coefficient), meaning that holding all other independent variables constant and changing project planning by a single unit would lead to a change in project performance by 0.23 units, as per the model above. This is in line with the findings by Wambugu (2013) who studied the factors that affect completion of rural electrification projects in Kenya. He noted that poor planning had an adverse effect on the timely closure of the rural electrification projects in Kenya as well as the quality of the projects so undertaken. The researcher found out that with proper planning, a contractor gains a thorough understanding of the project since the scope is clarified. Marzouk and Tarek (2014) also analysed the causes of delays in Egyptian construction projects, and noted that construction
delays were very common in Egypt and most of them were due to lack of prioritization of project tasks.

On the objective of assessing the influence of stakeholders’ involvement on the performance of road construction projects in Kiambu County, Kenya, it will be noted that the study did not find any significant influence of stakeholders’ involvement on the performance of road construction projects in the county, since p is greater than 0.05 (p=0.14). This however contrasted findings by Maina (2013) who studied the influence of stakeholders’ participation in education projects in Nakuru County, Kenya. Based on the study, the researcher noted that involvement of stakeholders is critical in projects through a proactive approach. However, the researcher observed that use of a reactive approach where stakeholders are involved only when problems have arisen is likely to be counterproductive. This mainly occurs where stakeholders are not involved on time for complex situations that have far reaching impacts. In that case, a project is likely to face delays as the problems are resolved whereas this could be avoided if consultations are undertaken in the course of the project.

On the issue of establishing the influence of project funding on the performance of road construction projects in Kiambu County, Kenya, it was noted that project funding had a strong significance (p=0.00) on performance and was also found to be positively related to the dependent variable, meaning that holding all other independent variables constant, a unit increase in project funding would result in an improvement in project performance by 0.15 units. This finding was similar to that made by Olatunji (2010) who noted that project finance is one of the challenges in road construction projects that are often beyond the control of the parties in a road construction project though it has a significant impact on the smooth flow of a project’s schedule of activities. Where payment for a road construction project is slow, some
contractors minimize the amount of resources committed or only avail such resources when payment is received. This creates unnecessary disruptions to the project thus causing delays in project completion.

With regard to the objective of assessing the influence of contractor capacity on the performance of road construction projects in Kiambu County, Kenya, the study found that contractor capacity had a strong significance (p=0.00) and was also found to be positively related to project performance, meaning that holding all other independent variables constant and increasing contractor capacity by a single unit would result in an improvement in project performance by 0.68 units as presented in the regression model above. Similar findings were made by Fapohunda and Stephenson (2010) who noted that experienced contractors are able to foresee possible challenges that might be encountered in a project and thereby undertake necessary plans to proactively deal with such. Similarly, Hamzah (2012) argues that the ability of a contractor to execute the project will depend on the quality of workforce that is employed. A project team should therefore have the mist of skills that are required from time to time. A number of activities are undertaken in a road construction project and thus the need to engage a variety of professionals.

Regarding the objective of assessing the influence of project monitoring and evaluation on the performance of road construction projects in Kiambu County, Kenya, the study found that project monitoring and evaluation had a strong significance (p=0.00) and is positively related to the dependent variable, meaning that holding all other independent variables constant and increasing project monitoring and evaluation by a single unit would result in an improvement in project performance by 0.32 units as presented in the regression model. This was in agreement with a study by Ondieki (2011) who studied the
factors that influence performance of Local Authority Transfer Fund (LATF) projects in Kisii County, Kenya. The researcher found that it was critical for continuous monitoring and evaluation of road construction projects particularly by the stakeholders. This was found to create project ownership by the host community and at the same time put pressure for accountability upon the contractor.
CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter focuses on the summary of the findings from the study, as well as discussions and conclusions. Further, it provides recommendations from the findings of this study including suggestions for areas for further research.

5.2 Summary

The study assessed the critical factors that influence performance of road construction projects in Kiambu County, Kenya. The study identified critical factors from previous studies as project planning, stakeholders’ involvement, project funding, contractor capacity and project monitoring and evaluation. It sought to identify how these factors influenced the performance of road construction projects in terms delivery of construction projects within the allocated time, and whether they affected the budget cost and also the quality of the projects so undertaken in Kiambu County, Kenya. This was necessary so as to understand why road infrastructure in the county is generally poor and particularly the lack of feeder roads connecting the mushrooming estates to the major highways as noted by previous studies, despite the county’s proximity to the city and its critical role in the country’s economy.

5.2.1 Project Planning and Project Performance

Based on the first objective of the study which was to investigate the influence of project planning on the performance of road construction projects in Kiambu County, Kenya, it was found out from the regression analysis (refer to table 4.15) that project planning has a significant influence on the performance of road construction projects, since its value is 0.01 which is less than p-value of 0.05. Additionally, the two variables are positively related
(positive coefficient), meaning that holding all other independent variables constant and changing project planning by a single unit would lead to a change in project performance by 0.23 units as presented in the regression analysis model. Generally, it was found out that project planning for road construction projects in Kiambu County, Kenya was poorly done (aggregate mean score 2.12), which affected the performance of the projects.

5.2.2 Stakeholder Involvement and Project Performance

On the objective of assessing the influence of stakeholders’ involvement on the performance of road construction projects in Kiambu County, Kenya, respondents scored a weak aggregate mean of 2.57 that various stakeholders were engaged by the contractors and government in various stages of the projects and that negotiations were undertaken with them regarding the impact of road construction projects. The results of the regression analysis on the impact of stakeholders’ involvement on performance identified no significance, since p was greater than 0.05 (p=0.14).

5.2.3 Project Funding and Project Performance

With regard to investigating the influence of project funding on performance of road construction projects in Kiambu County, Kenya, it was noted that project funding had a strong significance (p=0.00) on performance, and was also found to be positively related to the dependent variable. Consequently, holding all other independent variables constant, a unit increase in project funding would result in an improvement in project performance by 0.15 units. With an aggregate mean score of 2.33, the respondents indicated that undertaking road construction projects in Kiambu County, Kenya, suffered a number of financing issues that affected their performance.
5.2.4 Contractors Capacity and Project Performance

The fourth objective was to investigate the influence of a contractor’s capacity on the performance of road construction projects in Kiambu County, Kenya. The study found that contractor capacity had a strong significance (p=0.00) on project performance, and was also found to be positively related to the dependent variable. As a result, holding all other independent variables constant and increasing contractor capacity by a single unit would result in an improvement in project performance by 0.68 units. The respondents were in agreement (mean score 2.7) that the contractors engaged in undertaking the projects in the county had the capacity to do so.

5.2.5 Project Monitoring and Evaluation and Project Performance

Regarding the objective of assessing the influence of project monitoring and evaluation on the performance of road construction projects in Kiambu County, Kenya, the study found that project monitoring and evaluation had a strong significance (p=0.00) on performance of road construction projects in the county. Additionally, the predictor variable was also found to be positively related to the dependent variable, meaning that holding all other variables constant and increasing project monitoring and evaluation by a single unit would result in an improvement in project performance by 0.32 units. With a paltry aggregate mean score of 1.77, respondents indicated that the process of project monitoring and evaluation was noted to be poor, as a majority of the respondents strongly disagreed with the view that there were strong indicators for effective project monitoring and evaluation.

5.3 Conclusions

Project planning was noted to have a significant impact on performance of road construction projects. In addition, the study found out that road construction projects in Kiambu County,
Kenya were generally completed late and did not adhere to the set budgets. Further, the said projects failed to adhere to be set quality standards and were often completed late. This could explain the poor state of the roads in the county despite its proximity to the city as cited by several studies.

Project funding in terms of availability and adequacy of funds, speed of their disbursement and speed of approval of any overruns was also noted to positively influence the performance of road construction projects in Kiambu County, Kenya. Where the financier provides funds to the contractor in good time and promptly approves overruns, the contractor is able to effectively undertake the projects and complete them in good time and to the required quality standard as they are able to acquire the right materials, equipment and skilled labour force.

The capacity of contractors was assessed in terms of its influence on performance of road construction projects in Kiambu County, Kenya. The study found out that a contractor’s capacity has a significant influence on project performance. This is because contractor’s capacity would mean that they have the resources, skilled labour, experience and expertise and with such, they would be able to prepare realistic budgets and work plans and also be able to adjust and use own resources in case there are delays in disbursements by the financier, greatly enhancing project performance and delivery.

Project monitoring and evaluation was noted to have a significant influence on performance of road construction projects in Kiambu County, Kenya. Further, the study found out that for budgets to be adhered to, project managers should ensure that appropriate remedial actions are
taken to close any gaps identified from the monitoring and evaluation reports. Where continuous monitoring and evaluation by the Government and construction managers are prompt to implement corrective action to cure the deficiencies noted from M&E reports, there will be significant improvement in performance of road construction projects in Kiambu County, Kenya.

The study did not find any significant influence of stakeholders’ involvements on performance of road construction projects in Kiambu County, Kenya.

5.4 Recommendations of the Study
Based on the study findings, the study recommends that appropriate project plans should be developed with clear task schedules, realistic resource estimates and guiding policies and procedures before a project is undertaken to guide road construction projects. Such would ensure that adequate preparations are made to reduce inefficiencies throughout the project cycle.

Project funding was found to be very critical towards performance of road construction projects. It is therefore recommended that financiers such as the Government should ensure that financing is undertaken on a timely basis and approvals for overruns where necessary are speedily done.

The study found out that engagement of contractors with the requisite capacity has an impact on performance of road construction projects. The Government should therefore be keen to ensure that appropriate evaluation of contractors is undertaken before issuance of tenders.
Project monitoring and evaluation was found to have significant influence on performance of road construction projects. The Government should undertake timely and continuous monitoring and evaluation of the projects to ensure that quality specifications set are met. In addition, it is important for contractors to ensure that the gaps identified in the monitoring and evaluation reports are addressed through appropriate remedial actions. Team work should therefore be maintained between the Government and contractors for successful project implementation to be achieved.

5.5 Suggestions for Further Research

The study was based on Kiambu County, Kenya and further studies could be undertaken in other Counties to assess their experience on this subject. Further, future studies could collate views from the general public regarding performance of road construction projects. Similarly, the study could still be undertaken with other variables not considered in this study, such as the influence of political factors.
REFERENCES


Oraro, E. J., (2012), Determinants of Delays in Construction of Community Water Projects in Rachuonyo District; a case of GOK UNICEF Wash Programme


World Bank (2016, November). New rural access index: Main determinants and correlation to poverty. The World Bank Group


INTRODUCTION LETTER

24\textsuperscript{th} May 2018

Joseph Musyoki Kisavi  
Kenyatta University  
NAIROBI

Dear Respondent,

\textbf{Re: Critical factors and their influence on performance of road construction projects in Kiambu County, Kenya}

I am a Masters of Business Administration (Project Management Option) Student at Kenyatta University.

As a partial fulfilment of the requirements of the stated degree course, I am required to submit a research project report on some management problem. My research topic is entitled: \textit{Critical factors and their influence on performance of road construction projects in Kiambu County, Kenya.}

I would highly appreciate if you could kindly spare some time to complete the questionnaire attached, which has been designed to gather relevant information to address the research objective of the study.

The results of the report will be used solely for academic purposes and will be treated with utmost confidence and the study outcomes and reports will not include reference to any individuals.

Thank you in advance,

Yours faithfully,

Joseph Musyoki Kisavi
Appendix II: Questionnaire

Instructions

This study is a requirement for the partial fulfilment of Masters of Business Administration (Project Management Option) at Kenyatta University. The questionnaire is aimed to gather research information in order to investigate the critical factors and their influence on performance of road projects in Kiambu County, Kenya.

The questionnaire comprises of two sections that requires your honest responses. This is an academic exercise and all information collected will be treated with strict confidentiality.

Part A: DEMOGRAPHICS
Kindly answer the following questions by ticking (√) against your appropriate choice (s).

1. Which organization do you work for?
   a) KeNHA (   )
   b) KURA (   )
   c) KeRRA (   )
   d) Kiambu County Government (   )
   e) Contractor (   )

2. Please indicate your role in the organization
   a) Project Manager (   )
   b) Engineer (   )
   c) Technical Auditor (   )
   d) Surveyor (   )
   e) Consultant (   )
   f) Any other? Please specify …………………………………………………………………………………………

3. How long have you been involved in the road construction projects within Kiambu County, Kenya?
   a) Less than 1 year (   )
   b) 1-2 years (   )
   c) 2-3 Years (   )
Part B: Critical factors and their influence on performance of road projects in Kiambu County, Kenya

On a scale of 1-5, where:

5 – Strongly Agree  4 – Agree  3 – Neutral  2 – Disagree  1 – Strongly Disagree

Kindly respond to the below questions by ticking/circling the number closest to your view/opinion.

Project Planning

Please indicate the extent to which you think the following has been effected and applied in road construction projects undertaken in Kiambu County, Kenya.

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Development of systematic work plans and schedules</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>ii. Adherence to developed work plans and schedules</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>iii. Setting out communication channels within the project team</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>and other stakeholders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. Formulation of policies and procedures for undertaking road</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v. Undertaking resources estimation and budgeting before project</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>commencement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vi. Development of strategy to deal with any risks that may</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>arise</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Any other? Please specify …………………………………………………………………….
**Stakeholder Involvement**

In your own opinion, to what extent do you think the following has been applied pertaining stakeholders in road construction projects in Kiambu County, Kenya?

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Engaging project stakeholders throughout the road construction projects</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ii. Negotiations with stakeholders in a bid to build consensus</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>iii. Undertaking a project environment social impact assessment so as to understand the impact of the project on host community</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Any other? Please specify .....................................................

**Project Funding**

The following statements relate to provision of requisite funds for project activities. Please indicate the extent to which you agree/disagree with each of the statements regarding road construction projects undertaken in Kiambu County, Kenya.

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Financial resources to fund project activities have been availed</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ii. Project funds have been disbursed promptly by the Government or financier</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>iii. Bureaucracies in approving overruns have been experienced</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>iv. The proportion of project money retained by the financier has been kept to the minimum</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Any other? Please specify .....................................................
## Contractor Capacity

Please indicate how much you think the following regarding the capacity of the contractor influence road construction projects in Kiambu County, Kenya.

<table>
<thead>
<tr>
<th>i. Possession of adequate resources by the contractor to cater for possible financial delays from financier</th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii. The experience of the contractor in the construction industry</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>iii. The availability of skilled workers to the contractor</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>iv. The availability and adequacy of right quality materials to the contractor</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>v. The availability and adequacy of right quality equipment to the contractor</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
</tbody>
</table>

Any other? Please specify .................................................................

## Project Monitoring and Evaluation

How much do you concur with the following statements related to project monitoring and evaluation of road construction projects in Kiambu County, Kenya?

<table>
<thead>
<tr>
<th>i. The tender award process is undertaken within reasonable time</th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii. The Government closely monitors and supervises projects undertaken by contractors and other entities</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>iii. Periodic monitoring and evaluation reports are produced</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>iv. Remedies pointed out from monitoring and evaluation reports are implemented accordingly</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>v. The issuance of completion/partial completion certificates to the contractor is done without undue delays</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
</tbody>
</table>

Any other? Please specify .................................................................
Project Performance

Please indicate the extent to which you agree/disagree with the following statements regarding performance of road construction projects undertaken in Kiambu County, Kenya.

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Projects undertaken are completed within the stipulated time period</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>ii. Projects are usually undertaken within budgeted costs</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>iii. Projects are delivered to the right quality standards as stipulated</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
</tbody>
</table>

Any other? Please specify ………………………………………………………………..

Thank you for your cooperation
# Appendix III: Ongoing Road Construction Projects in Kiambu County, Kenya

| 1. | Ruaka - Banana - Limuru & Thogoto – Gikambura - Mutarakwa (Phase III) – KSh 2.9B |
| 3. | Gatukuyu – Matara – KSh 1.5B |
| 4. | Muigai Inn Brister Girls Star of Hope Loop – KSh 373.1M |
| 5. | Gatundu-Karinga-Flyover – KSh 1.6B |
| 6. | Indian Bazaar - Ndumberi - Ting'ang'a – Riabai – KSh 717.7M |
| 7. | Upgrading to Bitumen standards of Githurai -Kimbo Phase II – KSh 423.2M |
| 8. | Flyover bridge across the Northern bypass and approaches at Kahawa – KSh 403.4M |
| 9. | Periodic Maintenance of Thika - Kithimani - Mwingi - Ukasi (A3) Road – KSh 430.4M |

Source: PDU (2017)
Appendix IV: Research Approval

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

Internal Memo

FROM: Dean, Graduate School

DATE: 27th August, 2018

TO: Joseph Musyoki Krisavi
C/o Management Science.

REF: D53/OL/CTY/26602/2015

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 25th July, 2018 entitled “Critical factors and their influence on performance of road construction projects in Kiamiru 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 Supervisor Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University’s Website under Graduate School webpage downloads.

Thank you,

ELIJAH MUTUA
FOR: DEAN, GRADUATE SCHOOL

Cc: Chairman, Department of Management Science

Supervisors:

1. Dr. Lucy Ngugi
   C/o Department of Management Science
   Kenyatta University
Appendix V: Research Permit

THIS IS TO CERTIFY THAT:
MR. JOSEPH MUSYOKI KISAVI of KENYATTA UNIVERSITY, 0-100
Nairobi, has been permitted to conduct research in Kiambu County
on the topic: CRITICAL FACTORS AND THEIR INFLUENCE ON PERFORMANCE OF ROAD CONSTRUCTION PROJECTS IN KIAMBU COUNTY, KENYA
for the period ending: 20th September, 2019

Applicant's Signature

National Commission for Science, Technology & Innovation

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013
The grant of Research License is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS
1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

National Commission for Science, Technology and Innovation
P.O. Box 30623 - 00180, Nairobi, Kenya
TEL: 020 400 7080, 0713 788787, 0735 404245
Email: dgc@nacostl.go.ke, registry@nacostl.go.ke
Website: www.nacostl.go.ke

Serial No.A 20767
CONDITIONS: see back page
Appendix VI: Antiplagiarism Report

CRITICAL FACTORS AND THEIR INFLUENCE ON PERFORMANCE OF ROAD CONSTRUCTION PROJECTS IN KIAMBU COUNTY, KENYA

<table>
<thead>
<tr>
<th>SIMILARITY INDEX</th>
<th>INTERNET SOURCES</th>
<th>PUBLICATIONS</th>
<th>STUDENT PAPERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>16%</td>
<td>4%</td>
<td>10%</td>
</tr>
</tbody>
</table>

PRIMARY SOURCES

1. Submitted to University of Salford  
   Student Paper  
   3%

2. Submitted to Mount Kenya University  
   Student Paper  
   2%

3. erepository.uonbi.ac.ke  
   Internet Source  
   1%

4. asrjetsjournal.org  
   Internet Source  
   1%

5. citeseerx.ist.psu.edu  
   Internet Source  
   1%

6. www.ijecm.co.uk  
   Internet Source  
   1%

7. chss.uonbi.ac.ke  
   Internet Source  
   <1%

8. www.saibw.co.za  
   Internet Source  
   <1%

Submission date: 07-Dec-2018 12:14PM (UTC+0200)  
Submission ID: 1052584194  
File name: Joseph_Kisavi_Project-Report_nov_2018.doc (1.18M)  
Word count: 21571  
Character count: 128912