CONTRACTOR'S CAPACITY AND IMPLEMENTATION OF PERFORMANCE BASED ROAD MAINTENANCE CONTRACT PROJECTS ON CLASS A ROADS IN KENYA: A CASE OF CLASS A2 ROAD BY KENYA NATIONAL HIGHWAYS AUTHORITY

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A Research Project Report Submitted in Partial Fulfillment of the Requirements for the Presentation of the Degree of Master of Arts in Project Planning and Management of the University of Nairobi

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DECLARATION

This research project report is my original work and hence has not been submitted for any award in any other university or institution of learning.

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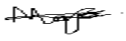
This research project report has been submitted for examination with my approval as the university supervisor

Dr. Mary Mwenda  Date: 14-09-2022

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DEDICATION

My dedication is to my mother Rosemary Nyagaya and siblings Denis and Junior for the support during the research duration.

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LIST OF ABBREVIATIONS AND ACRONYMS

BOQ	Bill of quantities
CPM	Critical Path Method
EACC	Ethics and Anti-Corruption Commission
JICA	Japan International Cooperation Agency
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KURA	Kenya Urban Roads Authority
KRB	Kenya Roads Board
KWS	Kenya Wildlife Service
ODEL	Open Distance and E- learning
OPRC	Output and Performance-based Road Contract
PBC	Performance Based Contracts
NACOSTI	National Commission of Science and Technology Council
SPSS	Statistical Package for Social Sciences
VRIN	Valuable, Rare, Inimitable and Non-Substitutable

ABSTRACT

Kenya is implementing Performance Based maintenance contracts to enhance quality of roads and reduce overall construction costs. Kenya National Highways Authority has ensured that all Class A Roads by Kenya are under a PBC maintenance project. However, most projects are not implemented within time, budget and schedule due to various contractor related factors. Previous studies were conducted on contractor related factors affecting construction contracts in general without focusing on PBC maintenance projects. It is from this knowledge gap that this research was to determine how contractor's capacity influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya, a case of Class A2 Road by KeNHA. The objectives of the study were to investigate how contractor's construction experience, (b) contractor's financial capacity (c) contractor's technical capacity and (d) contractor's leadership capacity influence implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. The research was limited to PBC road maintenance projects on Class A2 Road in Kenya due to international importance of the road for trade and movement of people between Kenya and Ethiopia. The study was guided by resource-based theory and theory of constraints. The survey design adopted was descriptive design. Target population was 106 comprising of 8 contractors, 8 road managers, 8 site supervisors, I Resident Engineer, 2 Assistant Resident Engineers, 9 Engineers, 15 road inspectors, 5 finance officers, 5 procurement officers and 45 road users. Taro Yammane formula was used to arrive at a sample size of 84. Contractors, road managers, site supervisors, Resident and Assistant Resident Engineers were selected by purposive sampling. Sampling for Engineers, road inspectors, finance and procurement officers was done by simple random sampling and road users by stratified sampling. A pilot study was conducted on Turbi – Moyale which is one of the PBC maintenance projects of along Class A2 Road to check the validity of the questionnaires. Content validity was confirmed by my study supervisor. Cronbach alpha method tested Reliability of the instrument which gave reliable alpha values at above 0.9 for all variables. The research instrument was open and close ended questionnaire. Pearson's product moment correlation analysis showed the relationships between variables. Multiple regression analysis was used to find out how independent variables affect the dependent variable. Research model was tested using F statistics at 95% confidence level. The findings were contractor's construction experience account for 84.5% influence on implementation of PBC contracts on Class A Roads in Kenya, contractor's financial capacity 90.2%, contractor's technical capacity 79.2% and contractor's leadership capacity 78.5%. Combined influence of all variables was 39.7% influence on implementation of PBC contracts on Class A Roads in Kenya. In conclusion, contractors' capacity influence implementation of PBC contracts on Class A Roads in Kenya. Recommendations were made to government to allocate adequate funds for road maintenance. Road agencies were advised to adopt these results for continuous contractors training on what PBC road contracts entails, requirements and their implementation.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Good roads support a country's economic progress. They provide an important link between different parts of a nation while enabling movement of goods and services. Good road transports in Africa performs the following core functions: provide access to jobs, link up production to distribution, provide access to healthcare and provide access to markets (Eureka Africa, 2018). Many countries have construction of new roads as the main aspect of their roads plan with minimal funding allocations towards maintenance. The result is increased cost associated with repairs and eventually high construction costs. This necessitated the need for development of Performance Based Contracts entail payment of a fixed lump sum for attaining and maintaining service levels per kilometer of the road rather than for the input work done. Unlike traditional contracting, the Contractor cannot abandon the site as work is paid based on continuous maintenance activities.

The development of PBCs commenced in late 1980s and early 1990s in British Columbia, Canada and Argentina. Argentina's performance levels for maintenance works and services included a fine for failing to correct problems within a set time limit (Asian Development Bank, 2018). Gradually, other countries including and Brazil have adopted this concept as part of their road maintenance strategy. The main driving force for this contact type in developing countries is to guarantee long term road finance, better quality roads and cost savings.

Uganda was the first Eastern African country to implement a PBC on its roads funded by the World Bank. The section covered was the 340km trunk road linking South Sudan, through DRC, and Uganda to end at to the port of Mombasa in Kenya. The contract lasted 9 years and results were measured against World Bank PBC standards (OPRC) concept. The traditional approach was to construct new roads with little or no attention given to maintenance. Consequently, most roads ended up in deplorable state with consequences to the economy and wellbeing of road users. This necessitated the implementation of maintenance activities post construction.

Performance Based Contract (PBC) maintenance of roads was introduced in Kenya in 2010. KeRRA pioneered the implementation followed by KURA, KWS and County Governments. In

2014, 55 Contractors were selected for PBC from a pool of 600 bidders (Japan International Cooperation Agency, 2016). Over the years, the number of Contractors and total road Kilometers has increased tremendously. KeNHA has all Class A roads under a maintenance Contractor. GoK is committed to a safe and reliable transport network through funding of road construction and maintenance projects. The Budget allocation by KRB for maintenance has also increased over the years from Kshs. 24,370,450,000 during the 2012/2013 to in the financial year 2020/21 Kshs. 76,259,000,000 to road agencies for maintenance projects (Kenya Roads Board, 2019).

A view of Kenya roads indicates most are in either poor or failed condition with 30% in good condition and about 20% in maintainable condition. There is an urgent need for rehabilitation to restore it to maintainable conditions (Kenya Roads Board, 2016). This necessitates need for continuous maintenance of roads to reduce further deterioration and high cost of constructing new roads. The State Department of Infrastructure coordinates development and maintenance of road infrastructure through various road agencies. These agencies are responsible for maintenance contracts under their jurisdictions.

The capacity of a Contractor in implementation of a PBC project is important. Contractor related aspects such as construction experience, financial capacity, technical capacity and leadership capacity affect their execution of such projects. It is not uncommon to find road projects that are not complete or have been done to poor standards due to Contractor related factors. These damages cost the road users in terms of increase travel time, increased vehicle maintenance costs and in some extreme cases loss of lives and property. The overall cost associated with maintaining such an abandoned road increased greatly and a new road may need to be constructed altogether.

Class A Roads in Kenya are important to Kenya and her neighbours for trade purposes. They ensure easier movement of goods, people and services between countries. Class A2 is part of the great North road that links Kenya and Ethiopia. Its construction and continuous maintenance are resulting in improved trading activities between the two countries. There is need for continuous maintenance of this road. The road currently has various PBC Contractors for its maintenance. The capacity of the Contractors in implementation of these projects is paramount.

1.2 Statement of Problem

Roads promote movement of people, goods and services through domestic and international trade. Previously road construction projects ended at the construction phase with little or minimal maintenance towards maintenance. This resulted in deterioration of these roads. It is not uncommon to find a once well-constructed road full of potholes and with missing road signs and road markings. In other cases, the Contractor does not have necessary contract management skills to adequately plan for activities on site leading to prolonged construction periods. Overall, the objectives of the contract are not met and the clients suffer through prolonged travel times, loss of incomes and in extreme cases loss of lives.

It is for these reasons that the concept of continuous road maintenance was introduced through Performance Based Contracts. These contracts differ from traditional construction ones since the Contractor is paid a fixed lump sum for constant maintenance of the road rather than as per Bill of Quantities. Worldwide countries like China, Korea, India, Morocco and Ghana have adopted this concept as a way to maintain roads and ultimately reduce costs associated with new roads construction. The Government of Kenya through its road agencies KeNHA, KURA and KERRA are mandated to plan, develop, construct and maintain road networks in Kenya.

Road maintenance has in the past been undertaken by non-qualified contractors who lack technology, experience, personnel and financial capacity to undertake the work (Kenny, 2017). Some Contractors have ended up abandoning the construction site due to low cashflows. Others use low quality materials on the road that in the long run end up destroying the road even further. Many Contractors lack necessary technical skills and leadership capacity to successfully manage people, machine, resources and materials to achieve the project objectives.

In PBC, risks and responsibilities are borne by the Contractor therefore the client should select a qualified one with clear understanding about the operations of this contract and capable of handling uncertainties (Riazi, 2016). The type of Contractor chosen should be able to implement this maintenance projects successfully. Unqualified Contractors related factors lack construction experience, financial capacity; technical capacity and leadership capacity to successful implement these contracts. The road agency in this case KeNHA should be keen during the evaluation stages of tender process to select a Contractor with necessary capacity execute the contract.

Previous studies focused on the influence of Contractor related factors affecting road construction focused on traditional form of road tenders and a mix of factors both internal and external to the Contractor (Wairimu,2016: Osedo,2017). The studies done on Contractor related factors affecting PBC implementation in Kenya focused on all class of roads namely A, B, C, D and E (M'arimi, 2019). This study was tailor made to these factors in relation to PBC contracting which is a new type of road contracts. The study also narrowed down to Class A roads only because of their regional role in promoting domestic and international trade. These challenges informed the decision to study how Contractor's capacity influences implementation of Performance Based Road Contracts on Class A Roads in Kenya.

1.3 Purpose of the Study

The purpose of the study was to determine how Contractor's capacity influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya, a case of Class A2 Road in Kenya.

1.4 Research Objectives

The study was guided by the following objectives:

i. To determine how Contractor's construction experience influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.
ii. To establish how Contractor's financial capacity influence implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.
iii. To establish how Contractor's technical capacity influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.
iv. To determine how Contractor's leadership capacity influence implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.

1.5 Research Questions

The research sought to answer these questions:

i. How does Contractor's construction experience influence implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?
ii. How does Contractor's financial capacity influence implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?

iii. How does Contractor's technical capacity influence implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?
iv. How does Contractor's leadership capacity influence implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?

1.6 Research Hypothesis

i. Contractor's construction experience does not have significant influence on implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.
ii. Contractor's financial capacity does not have significant influence on implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.
iii. Contractor's technical capacity does not have significant influence on implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.
iv. Contractor's leadership capacity does not have significant influence on implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.
v. There is no significant relationship between independent variables and implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.

1.7 Significance of the Study

Government may adopt finding from this analysis to formulate policies and regulations that will ensure capacity building of Contractors towards achieving safe and efficient road networks. Road agencies may use these results to improve on policies to ensure Contractors are awarded tenders based on skills, capacity and experience. Contractors may use findings from this study to gain understating of factors inhibiting their performance and take necessary steps to acquire finances, skills and experience to improve on their productivity and profitability. The results may help researchers to come up with data that will enhance policy formulation. The results of this research may add to academia by providing data for comparison with similar factors studied in other road agencies and contracts.

1.8 Delimitation of the Study

The research focused on PBC contracts being implemented along Class A2 Road because of the extensive network of Class A Roads in Kenya. Class A2 Road was selected since KeNHA is implementing road maintenance projects along the entire road length. The 8 projects selected were all ongoing PBC road maintenance projects with contract durations that would cover the

study period. Population of the study covered main stakeholders involved in implementing PBC road maintenance projects including contractors and their staff and supervision team including Engineers and their staff, Procurement officers, Finance officers and road users.

The study narrowed down to four variables that were contractor's construction experience, contractor's financial capacity, contractor's technical capacity and contractor's leadership capacity as the independent variables.

1.9 Limitations of the Study

One challenge was respondents were unwilling to provide data with the notion that it would be used negatively against them. This was overcome by providing an approval letter from NACOSTI and the University confirming that the investigation was purely for academic purposes. Another limitation would be low return rate of questionnaires especially from respondents in far locations and with poor internet connectivity. This was overcome by ensuring all questions could be answered in one sitting and they could be easily filled via Adobe reader and transmitted via WhatsApp applications that are found on most mobile handsets.

1.10 Assumptions of the Study

The research assumed Class A2 Road represented all Class A Roads in Kenya with major international significance in terms of trade and movement of people. It's a major international road linking Kenya to Ethiopia making it unique in terms of need for continuous maintenance and improvement to ease movement between the two countries. It was selected because the whole road length is under PBC contracts with 8 different contractors. Another assumption was target population would not change and affect sampling. This was guaranteed by the population being involved in PBC contracts that would cover the duration of the study.

1.11 Definition of Significant Terms Used in the Study

Contractor's capacity: Refers to the ability of a Contractor to implement a PBC project successfully. It entails ensuring contract deliverables are achieved throughout the contract period and in turn he receives payments for work done. It is based on experience, financial, technical and leadership capacities in relation to project completion.

Construction experience: The Contractor to a PBC contract should have executed a similar contract in the past. This will enable him to understand the best combination of labour, materials and equipment mix and appropriate risk mitigation measures for execution of such a contract.

Leadership capacity: It is the ability of a Contractor to look at operational and financial terms of the contract through monitoring deliverables, deadlines and obligations to ensure project objectives are met within constraints of time, cost and quality.

Financial capacity: The Contractor should have enough cashflow to meet project demands of labour, materials, equipment, and ability to secure funds and manage financial risks.

Technical capacity: These are the technical skills that a Contractor will need to be able to execute the contract successfully and will include technical, financial, people, communication and risk management skills. In case of a PBC Contractor, additional technical knowledge can be attained through undertaking a formal PBC training.

Performance Based Road Contract Projects: Road maintenance contracts in which the Contractor is reimbursed a fixed lump sum for attaining and maintaining agreed upon contract deliverables per kilometer of the road rather than for the actual input work done. It's a new road maintenance concept being implemented by road agencies to ensure roads don't deteriorate and reduce the actual cost of constructing a new road in the long run.

1.12 Organization of the Study

This research was categorized in five Sections. Chapter one entailed an introduction which highlighted abstract, background of the study, statement of the problem, purpose, objectives, research questions, significance, delimitations and limitations. Chapter two presented a literature review of the variables. Chapter two subsections comprised of introduction, variables review, theoretical framework and conceptual framework and knowledge gap. Chapter three entailed an introduction, research design, target population, sample size and sampling procedure, research instruments, data collection procedures, data analysis techniques, ethical considerations and operationalization of variables. Chapter four covered an introduction, questionnaire return rate, data analysis, presentation, interpretation and discussion for the dependent and independent variables. Chapter five entailed summary of findings, conclusions and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Thsegment focused on studies done by other researches on contractor related factors influencing implementation of Performance Based Road Contracts on Class A Roads in Kenya. Previous analyses regarding research objectives were reviewed to form a foundation of the study. The examination focused on the previous works regarding dependent and independent variables. Theoretical and conceptual frameworks and research gaps from other researchers were part of this section.

2.2 Implementation of Performance Based Road Contract Projects

Projects need to be delivered on time, to budget, and meeting the desired quality. Project management triangle is based on achieving three main aspects namely scope, time and cost (Eby, 2017). The project success will be determined by how the project manager is able to balance these three aspects to achieve objectives set during project planning stage. Project implementation for a PBC road contract is the actual execution of the scope of works. This step usually involves detailed design, tendering, and construction of the infrastructure. In complex construction projects, implementation is done through a formal contract (Dillon, 2019). This is the stage at which the Contractor has formally been handed the site and will commence work depending on the project scope of work.

During this stage, it is critical that the project manager ensure everything is done according to plan and corrective actions taken on any deviations. Throughout the project implementation, tasks and activities geared toward achievement of project objectives are carried out. Progress is reported through reports discussed at team meetings. Through these forums, the project manager measures performance against set targets (Neenu, 2019). Such deviations may result from increase in scope of work, increase in contract costs and force majeure emergencies not predicted earlier. Corrective measures for deviations may include variations of original contract.

PBC contracts differ from other road maintenance contracts since they are based on specified payment amounts per km of the road. Payments are made only when set service levels are achieved. Failure to meet targets leads to deductions that reduce the monthly payments to the

Contractor (JICA, 2019). However, most PBC contracts in Kenya are hybrid type incorporating both construction and maintenance works. The Contractor is reimbursed on a cost-plus fixed profit basis for construction works and a fixed lump sum for maintenance works. Some benefits realized through this contracting include lower maintenance costs, implementation of appropriate technology, accountability for road users and road agencies and high quality roads (Muta, 2018).

A successfully implemented PBC contract is when the Contractor has achieved set service levels including clean carriageway, free flowing drains, vegetation clearance from the road reserve and maintenance of all road furniture such as road signs and guardrails. Every non-compliance to a service level, attracts a percentage deduction is made from the lump sum Kilometer – Month payment rate set out in the contract. The Contractor should strive to achieve as much service levels as possible to gain maximum benefits from the contract. In cases of continuous non - performance, the contract may be terminated all together.

However, according to (Shenhar & Wideman, 2020) there are no approved definitions for success of a project and project management, virtual project teams focus on internal indicators such as trust, open communication, commitment, fun, and communication skills while the project teams pay attention to more external type of success indicators like top management support, and client consultation (Delisle, 2012). Different factors affect different projects uniquely and therefore success cannot be pegged on the three aspects of time, cost and quality only. The macro viewpoint seeks to answer if the original concept is still relevant.

Road users, government and other stakeholders analyze construction projects from macro viewpoint. The micro viewpoint focuses on construction parties. Implementing authorities and Contractor view development accomplishment from the micro viewpoint (Mohamed, 2020). In this regard, success ultimately depends on whether the view point is from the construction parties or from other stakeholders involved in the contract. The contracting authority and the Contractor are interested in achieving the scope set out in the contract in terms of items in the BOQ. Other stakeholders such as road users are interested in a good quality road that is motorable, safe and easily accessible for public use.

2.3 Contractor's Construction Experience and Implementation of Performance Based Road Contract Projects

A Contractor's role during project implementation should be guided by ensuring time, quality and budget are adhered to. A Contractor with relevant construction experience will know how to balance these three aspects to ensure project objectives are met. Experience in project tracking is essential since skill like quality control, materials, labour and machinery management and health and safety concerns are needed throughout this stage. Contractors with good track records on project implementation have the capacity to address emerging issues effectively. According to IPMA global survey done in 2019, 19% of organizations complete projects, about 30% of on time, 36% on budget, 44% as per business need and 46% satisfy stakeholders expectations (Lim, 2021). These can be attributed to lack of construction experience that eventually affects delivery of project goals.

In Kenya contracts are awarded to the lowest bidder. However, the lowest bidder may not be the one with the necessary experience to carry out the construction work. This results in poor quality work, cost and time overruns. Execution progresses for public projects awarded to lowest bidders reveal 14.8% average performance rate (Woo, 2016). PBC road contract tender and evaluation process in Kenya award points for construction experience. Contractors are required to submit as part of their bid document certificates for previously successfully completing similar projects. Since PBC contracts are different from traditional contracts in that payments are based on achieved service levels and not actual work input, the Contractor should have experience in executing such a contract. They should know how to plan work inputs to achieve service levels and gain maximum amounts for that particular month. This gives such a Contractor an edge over the other bidders.

Otieno (2019) states that proficiency of project managers impact accomplishment of highway construction developments positively. A Contractor with prior experience in a similar contract knows how to manage matters arising from site, labour, materials equipment needs and managing risks of the project. Inexperienced Contractors end up with poor quality work, time and cost overruns. The study focused on road Contractors who have implemented road projects previously. This study covered new Contractors who may be implementing a road maintenance project for the first time.

Abidali (2018) concluded that Contractor experience has an influence on construction projects. Contractor experience and design team experience strongly influence the quality of the performance on construction projects. Since PBC contracts are different from traditional contracts in that payments are based on achieved service levels and not actual work input, the Contractor should have experience in executing such a contract. They study area was based in the Middle East part of the world and the results may not be reciprocated in Kenya. This study focused on Contractors implementing maintenance projects within Kenya.

A Contractor with prior experience in a similar contract knows how to manage matters arising from site, labour, materials and equipment needs of the project. An experienced project manager can successfully manage risks, ensure proper communication on site, plan activities properly and manage relationships with other stakeholders in the project. Lack of construction experience may cost the Contractor in terms of cost overruns, wasted time and poor-quality work that ultimately affects their reputation too.

2.4 Contractor's Financial Capacity and Implementation of Performance Based Road Contract Projects

Financial capacity of a Contractor refers to the ability to meet financial needs of the projects. Financial needs may include capital costs of equipment and machinery and recurrent costs to pay for labour, materials and other overheads. Indicators of financial capacity of a Contractor may include financial ratios, liquidity ratios, total assets, total liabilities and profits before and after tax over a certain number of years. According to KeNHA's guidelines on registration of Contractors for road maintenance works for the period ending 30th September, 2020 a Contractor should fill application form 4 for financial capability of the Contractor with details of complete banker information, audited balance sheet and a summary of actual assets and liabilities for the last five years. A sound financial capacity will enable the Contractor to meet his financial needs when they arise without much difficulty. Poor financial capacity and management will result in cost overruns, delayed project milestones, bad relationship with suppliers and overall failure of projects to be complete.

Financial requirements may also be tailor made to fit the specific contract terms. In case of PBC contracts in Kenya, financial compliance also requires compliance with relevant statutory provisions. For compliance with statutory regulations, deductions from the total score are done

for failure to adhere to statutory requirements within Kenya. According to Republic of Kenya, Supervision and Contractor's Evaluation Manual for Road Works, some of the necessities include Tax compliance (VAT registration, PIN registration) Income Tax Act Cap.470 (PAYE), Values Added Tax Act C 476 and Stamp Duty Cap. 486 (JICA, 2016).

According to Wuala and Rarasati (2020), inadequate monetary capability and late payments by employer were the main Contractor related factors for delays in construction projects. Inadequate capacity of the Contractor leads to shortage of materials and machinery on site, insufficient labour and poor quality of work. A delayed payment to the Contractor by the owner influences cashflow of the Contractor. The study narrowed down to time effect of finances on execution of a road project and not on the cost or worth of work. This justified the research on financial capacity of a Contractor and its effect on quality, time and cost project implementation.

Kisavi (2019) conducted a study on critical factors affecting construction projects and found that a Contractor with adequate finances can execute a project to completion with minimal delays. Project funding was analyzed in terms of availability of budget allocation, payout of funds, approval of overruns, and retention rates. The focus was on financial capacity of all classes of Contractors with varying amounts of project costs. This study was based on class A roads Contractors since they have larger contract sums that need bigger financial capacity for a successful implementation.

According to Onana (2018), access to credit, cash flow management and types of finance influence how Contractors execute projects. He also found mismanagement of contract funds; delays in payments by employers, late settlements of claims, changes in materials prices and labour availability affect Contractors' cash flow and ultimately productivity. The attention was on performance of road Contractors in terms of finishing the scope of work only. This research studied if the Contractors finished the works on time and within the allocated budget.

Timothy and Yona (2018) concluded that Contractors with access to loans, who have adequate assets and a strong profit and loss statement, pass for good financial capacity. This Contractor can implement a road construction project successfully. Contractors who can secure credit and loans can manage project costs. Access to funds guarantees financial security during project execution. The study focused on construction projects that are paid as per bill items with no

attention to maintenance projects. This study focused on maintenance projects that are currently under a different contract type known as PBC.

Poor cash flow management has made Contractors abandon road projects before completion in Kenya. Contractors with sufficient monies can execute work without relying on periodic payments. Adequate finances will guarantee continuous execution of works. This in turn reduces effect of time overruns and poor quality.

2.5 Contractor's Technical Capacity and Implementation of Performance Based Road Contract Projects

Methodological capacities are important for a Contractor to successfully implement an assignment. The Contractor must have the necessary knowledge and skills for execution of the specific contract. Knowledge and skills in this case relates to civil and structural engineering, tendering process, construction and project management and financial management. Some important skills needed in construction include office management skills, design and planning skills, adherence to legal requirements and management skills. During the design and implementation stages, specific skills are required such as interpreting technical drawings, issuing site instructions, project management, construction reporting, cost estimations, quality control and assurance (Doyle, 2020). Other technical skills that the Contractor may require include negotiating contract terms and conditions, payment terms and collections, communicating contractual rights and obligations, construction management, supervising workers/subcontractor and subcontractor management. Contractors' technical skills ensure successful project management.

Oprong (2020) ascertained that Contractors' technical capacity affects positively implementation of road assignments. Technical capacity entailed qualified personnel, machinery, past experience in construction, better construction methods and use of technology in construction. However, other factors such as financial capacity and experience also affect the ability of the Contractor to implement a project successfully. Adequate technical capacity will ensure the Contractor uses the qualified personnel, quality materials, adopts latest construction technology to deliver a quality road. Contractors' capacity covered financial, technical and experience in general. This research narrowed down to technical, financial and construction experience as different independent variables.

M'arimi (2019), settled that moderate correlation exists between staff proficiency and implementation of PBC road maintenance contracts. Staff expertise was studied in terms of technical skills of Engineers and supervisors, staff experience on the road, staff training on PBC implementation and timeliness in completion of PBC maintenance tasks. The study focused on technical capacities of both Contractor and employer staff. This study focused on technical capacity from the Contractor's perspective since they are the ones implementing the project.

Asiedu (2016) sought to answers causes of management of delays in construction projects and found that poor supervision of work on site and poor site management as causes of deferrals in road projects. Poor skills, competence and experience of Contractor staff as a project management strategy affect project implementation. A Contractor who lacks technical skills will cause the project cost overruns, result in poor quality work and in extreme cases abandonment of the project altogether. The study did not study effect of adoption of appropriate technology as part of technical capacity of the Contractor. This research added the incorporation of necessary technology by the Contractor and its influence on their performance.

Technical skills affect construction of road projects. They should not be limited to Contractors but also road maintenance personnel and regulatory authorities linked to road constructions construction and maintenance so as to improve road construction projects quality and performance. This is important since all these parties play different roles in implementation of the contract and each role will require specific skills set.

2.6 Contractor's Leadership Capacity and Implementation of Performance Based Road Contract Projects

During the execution phase of a PBC road project, adherence should be on time, cost and quality for the project to be a success. Leadership capacity entails managing contract deliverables so that project objectives are realized. It involves ensuring parties to the contract understand and execute their roles effectively (Designing Buildings Wiki, 2020). Some of the skills required include risk management, resolving disputes, maintaining the audit trail, contract termination, contract performance audits, review and evaluations meetings, contract reporting and contract close out (Bong, 2018). For successful implementation of a road maintenance contract, the Contractor must have a necessary skills and experience in contract management. Quality control, monitoring and evaluation and risk management should be a continuous process throughout the duration of

the contract period. Effective leadership will ensure smooth flow of contract tasks and ultimately achievement of contract objectives.

A study done by Aoko (2019) on factors influencing cost of projects established that a Contractor should be able to understand all contract terms, keep records of work done and follow up on payment certificates. It concluded that frequency of design changes by the engineer during projects implementation, adequacy of supervision by Engineers teams assigned to the project and scope changes by the client during project implementation were the main indicators of project management. Technical aspects of contract management and not leadership capacity of the Contractor in general were studied. This study detailed leadership capacity into finer details of decision making, conflict resolution and risk management.

According to Gitahi (2019), all project threats should be identified and proper risk response formulated and implemented on time. Uncertainties identified included technical, scheduling and health & safety on project performance. Contract management has a positive significant relationship on project performance. A competent project manager will schedule activities on site using techniques such as CPM to reduce on time lags and cost of idle labour and machinery. The Contractor should be able to manage financial risks arising from delayed payments, increased cost of inputs and emergency costs. The study focused on contracting risks aspect of leadership. However, leadership entails more than just risk management and this research studied dispute resolution, scheduling techniques and contract management as part of leadership skills.

Banyenzaki (2016) sought to answer how contract management practices affect road infrastructure projects. Contract management variables were monitoring strength, risk administration and appraisal. All of these variables had a positive effect on road construction works. The researcher did not consider decision making and conflict resolution skills which are needed during implementation of a road project.

2.7 Theoretical Framework

This study was premised on resource-based and theory of constraints. Resource based theory was selected since it outlines how an organization can organize key resources to achieve competitive advantage. Some possessions that Contractors can leverage on include unique natural assets, strategic positioning, skilled labour, technology, pricing and marketing strategies (Corporate Finance Institute). The Contractor can leverage on the capabilities and competitive advantage to

save on time and cost of the maintenance project while ensuring good quality work in implementing PBC road maintenance projects successfully. Theory of constraints was identified as it helps organization identify factors that limit achievement of their goals and possible solution such as inadequate capital, lack of experience and poor project management techniques. For a contractor implementing PBC road maintenance projects, some solutions to these challenges include financial management techniques and contract management methods.

2.7.1 Resource Based Theory

This was founded by Wernerfelt in 1984. It argues that to gain competitive advantage, one must develop or acquire superior resources. Organization's superiority will arise from having internal assets that are treasured, unusual, imperfectly imitable and not interchangeable (VRIN criteria). It assumes that all firms within an industry have the same resources available to them. It also implies that capitals of an enterprise are available persistently over the years and are not easily transferrable. These resources are always scarce and hence the best strategy must be applied to utilize them efficiently. The project manager should match resources to tasks when needed.

Organizations can outperform their competitors by doing unique things. This can be achieved by focusing on their strategies, creating unique firm-specific core competencies and utilizing resources effectively (Almarria, 2017). It is not just adequate for the contractor to have resources but he must use them to gain a competitive advantage. A contractor implementing a PBC project has to gather and utilize resources of finances, labour, materials and machinery. Relevant construction experience, adequate financial capacity and experience with contract management will enable the enable the contractor have an edge over other bidders during the bidding process and achieve the project as planned.

The theory helped the study by guiding contractors on how to exploit resources for their competitive advantage. A contractor can mobilize firm's resources, incorporate appropriate technology, project management techniques, and proper contract management skills to effectively complete a PBC project. The theory guides contractors to determine influence of various resources available them such as construction experience, financial capacity, skills and knowledge and contract management and how they influence their overall performance.

2.7.2 Theory of Constraints

This management philosophy was founded by Eliyahu M. Goldratt in 1984. It helps organizations identify aspects that need to be changed within the company, how to implement the adjustments and develop a conducive environment for success. It adopts that organizations are limited by finances, processes and inventory. Other inhibiting elements outside scope of the company are unskilled labour, mental health of employees, policies, laws and regulations (Wikipedia, 2021).

Eliyahu (2009) identified financial limitation as a constraint to achieving projects within a set budget. Others include organizational process assets and environmental factors that affect construction (Rothwell, Hohne and King, 2018). Financial capacity of a contractor determines the ability to meet cashflow requirements of the contract. Finances are needed to pay for labour, materials and equipment. A good cashflow will ensure continuous operations of the contractor without delays and unnecessary stops in the cause of work. Based on budgets, financial limitations and completion of projects, the theory was relevant to this research.

Supporters of this theory believe that to gain an edge over competition, one should capitalize on using internal resources prudently. These may include experience, trained personnel, technology and contract management. When these assets are deployed effectively by a PBC contractor, projects will be attained within the triangle of project management of scope, time and quality.

Critics to this theory argue that an organization must adopt continuous improvements in resources utilization and processes in order to maintain temporary advantages (Fiol, 2001). Most resources when used individually do not guarantee maximum returns. Coordination of capitals from various departments and categories within the organization will offer maximum benefits to the form. In addition to resources, a contractor needs to continually identify other capabilities and competitive advantages that will ensure successful project implementation such as capital, labour, materials, technology and machinery.

The theory guided this study in identifying factors that may inhibit performance of a contractor such as contractor experience, financial, technical and leadership capacities. It guides a contractor to focus on what's vital by finding individual restrictions to implementation of a PBC project. The theory suggests a way for identifying the restraining factors in achieving an objective and then finding solutions to eliminate the impediment. Some ways the contractors can achieve this is by investing in training of personnel, acquiring right equipment and technology,

identifying and mitigating risks on time. The contractor should be able to identify possible solutions to these hindrances so as to achieve project goals.

Supporters of this theory include the lean manufacturing process. It borrows heavily from this theory by focusing on increasing profits through continuous improvement. The goal is to identify resources that are limiting the optimal performance of a process and looking for alternatives to improve on them. Contractors can achieve this by engaging in continuous improvement of their processes to ensure they implement projects successfully.

Critics argue that the theory of constraints does not mean change in one big phase, but in small increments of daily and constant improvements (Boogaard, 2021). For a contractor implementing a PBC project, limiting elements to his performance such as inadequate capital, inexperienced staff and technology changes can never be improved in exhaustively. Continuous improvements have to be done as the nature of the construction industry also evolves.

2.8 Conceptual Framework

This portrayed relationship between variables. The dependent variable was Implementation of Performance Based Contract projects on Class A Roads in Kenya. The independent variables were construction experience, financial capacity, technical capacity and leadership capacity.

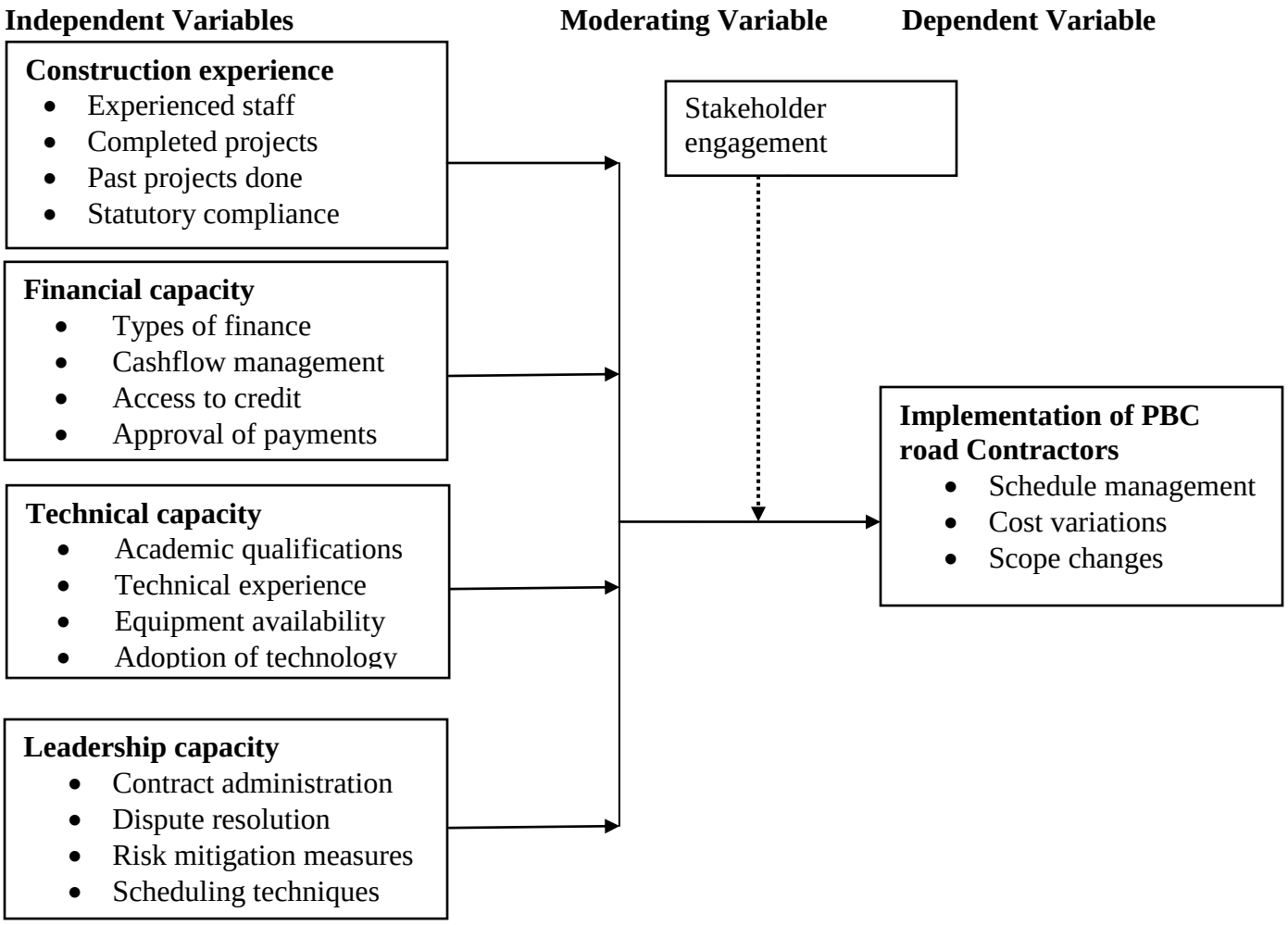

Figure 1: A conceptual framework showing relationship between dependent and independent variables

2.9 Summary of Literature Review

Few studies focused on Contractor factors and implementation of road projects. From literature review, many studies focused on a wide range of factors from Contractor related, financial related, risk management and even causes of failure of road construction projects. Studies by Onana (2018), Timothy and Yona (2018), Otieno (2019) and Abidali (2018) concluded that technical skills and financial capacity influence implementation of road construction projects. Contractor related factors were among other independent variables considered in these studies.

From the literature review, studies on Contractor's knowledge and skills as an independent variable focused on a wide range of skills. These skills include technical, managerial, risk management and contract management. A study by Asiedu (2016) on management of delays in

construction projects identified poor supervision of work on site and poor site management by site manager as main reasons for suspension of works. A study by Gitahi (2019) on management of contracting risks in construction found that prudent administration of various threats affecting projects eventually leads to the success of the endeavor.

Studies done in Kenya focused on every type of infrastructural development. PBC road contracts maintenance as part of road construction projects had not been studied to a great extent. M'arimi (2019) investigated factors influencing implementation of PBC road maintenance projects focused on funding method, staff competence, public participation and government policies. Contractor related factors were not considered in this study. Also, the study focused on PBC contracts in general for all road classes. It did not focus on Class A roads that ease movement of people and enhance local and regional economic growth.

2.10 Research Gaps

These are the gaps that have been observed as a result of a comprehensive literature review.

Table 2. 1: Knowledge gap matrix

Variable	Author	Study Title	Findings	Knowledge Gap	Focus of Current Study
Contractor's experience	Abidali (2018)	Factors affecting the Performance of Contractors in construction Project Bagdad, Iraq	Contractor's experience affects performance of contractors in construction Project Bagdad, Iraq	The study focused on contractor's experience as part of contractor related factors in general and not as a variable on its own	Contractor's experience was studied in finer details as staff experience, adoption of technology, equipment availability and past projects completed
Contractor's experience	Otieno (2019)	Influence of Contractor preparedness on completion of road construction projects, a case of selected road Contractors in Nairobi County Kenya	Contractor's experience influence completion of road construction projects, a case of selected road contractors in Nairobi County, Kenya	Findings were limited to contractors within Nairobi	Reserach narrowed down to contractors outside Nairobi County that may face challenges unique to their location
Contractor's financial capacity	Onana (2018)	Factors influencing the performance of Contractors on road projects in Gabon	Access to credit, cash flow management and types of finance were the main financial factors affecting the contractor performance	The study population was based on only professionals involved in construction industry. It did not consider other stakeholders like road users	The study population covered professionals involved in construction industry and other stakeholder such as rod users, finance and procurement officers involved in bidding process

Contractor's financial capacity	Timothy and Yona (2018)	Influence of Contractors' financial capacity on performance of road construction in Kakamega County	Financial capacity determines completion of construction projects	Study did not assess whether projects were completed within budget and time given	Implementation of PBC road maintenance projects covered schedule management and level of cost overruns
Contractor's Technical Capacity	Oprong (2020)	Influence of contractors' capacity on implementation of road infrastructure projects in Meru County, Kenya	Contractors' technical capacity has a weak positive influence on implementation of road infrastructure projects	The study adopted a correlational research design which only covers the relationship between variables without showing how one variable influences the other	This investigation employed a descriptive survey design that covered how the independent variables influenced the dependent variables
Contractor's Technical Capacity	Asiedu (2016)	Management of delays in construction projects in Bia West District, Nigeria	Poor supervision of work on site and poor site management by site manager causes a delay in construction projects	The study adopted qualitative research that identified causes and ranked management of delays in construction projects	Quantitative data established the relationship between variables. Qualitative data was used to supplement information about quantitative data.
Contractor's Leadership Capacity	Aoko (2019)	Factors influencing cost of road construction projects within selected urban areas in Kenya	Frequency of design changes adequacy of supervision and scope changes by the client influence cost of road	The study looked at leadership capacity mainly from the supervising authority's side with little	The study focused on leadership capacity of the contractor

			construction within urban areas	attention to the contractor's side.	
Contractor's Leadership Capacity	Gitahi (2019)	Management of contracting risks on performance of construction projects in Kilifi County, Kenya	Management of all types of threats affect project performance	The study focused on construction of all types of infrastructure	The study narrowed down to PBC as a form of road maintenance contract

From the literature review on factors influencing implementation of road contracts, the main factors identified were Contractor's experience by Abidali (2018) and Otieno (2019), financial capacity by Onana (2018) and Timothy and Yona (2018) and contract management by Aoko (2019) and Gitahi (2019) have been identified as Contractor related factors affecting implementation of road projects. Technical capacity of Contractors had little influence on implementation of road contracts Oprong (2020).

These studies focused on Contractor related factors affecting road construction in general. PBC contracts for road maintenance in Kenya are relatively new and most road agencies including KeNHA are implementing it on their roads. This study focused on PBC contracts on Class A roads due to international importance of these roads for movement of people and economic development, locally and internationally. Contractor related factors affecting PBC contracts focused on all road classes in Kenya and not on Class A Roads.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section explained research methods that were used in answering the research questions. The research methodology covered an introduction, research design, target population, sample size and sampling procedure, data collection procedures and analysis techniques. The chapter also detailed ethical considerations observed during the study.

3.2 Research Design

A research design is a procedure for data collection, measurement, analysis and combining to give useful information (Sacred Heart University, 2020). This research adopted a descriptive survey design. Descriptive survey was chosen since the aim of the study was to find features, frequencies, trends and categories (McCombes, 2022). Surveys allowed for gathering of large amount of figures about the variables under investigation. The study implemented data collection, analysis and determining relationship between variables. The method also gave an advantage of collecting information from a dispersed population easily using questionnaires.

3.3 Target Population

The study population comprised key personnel involved in PBC projects and users affected by the project. They included Contractors and their staff tasked with implementing the project, supervision staff from Engineer's office and road users. A target population of 106 respondents was arrived at as follows; 8 Contractors, 8 Road managers and 8 Site supervisors. From the Engineer's office, 1 Resident Engineer, 2 Assistant Resident Engineers, 9 Engineers and 15 Road Inspectors, 5 procurement officers and 5 finance officers were chosen and 45 road users were also selected.

Table 3. 1: Target Population

Category	Frequency
Contractors	8
Road managers	8
Site supervisors	8

Resident Engineer	1
Assistant Resident Engineers	2
Engineers	9
Road Inspectors	15
Finance Offices	5
Procurement officers	5
Road users	45
Total	**106**

Source: KeNHA Corridor C Region

3.4 Sample Size and Sampling Procedure

3.4.1 Sample Size

The Taro Yamane formula (Yamane 1976) was sued to calculate the study sample as shown. A confidence level of 95% and P= 0.05 were assumed as shown;

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

$$n = \frac{106}{1+106(0.05)^2} = 84$$

n= Size of the sample

N= Size of the population e = acceptable error given as 0.05

Table 3. 2: Sampling Matrix

Category	Population	Sample size	Percentage
Contractors	8	8	9.52
Road managers	8	8	9.52
Site supervisors	8	8	9.52

Resident Engineer	1	1	1.19
Assistant Resident Engineers	2	2	2.38
Engineers	9	9	10.72
Road Inspectors	15	15	17.87
Finance Offices	5	2	2.38
Procurement officers	5	2	2.38
Road users	45	29	34.52
Total	106	84	100

3.4.2 Sampling Procedure

Sampling involves selecting a manageable magnitude from a population and making generalizations about the population from the sample (Allen, 2017). The cost of collecting data from each member of the population would be costly and impractical hence the need for sampling. (Oso and Onen, 2011), define purposive sampling as that which predicts the end beforehand, then selecting samples based on end result while discarding others that don't fit the purpose. Intentional selection was done for all contractors, road managers, site supervisors, Resident and Assistant Resident Engineers involved in all 8 ongoing PBC road maintenance projects on Class A2 Road since they were a constant number for all these projects. Many Engineers and finance and procurement officers were involved in PBC road maintenance projects on Class A2 Road. To ensure equality during the selection, simple random sampling method arrived at 9 Engineers, 15 Road inspectors, 2 finance and 2 procurement officers. Stratified sampling was used to select road users by subdividing the road user population according to vehicle types. Main vehicle categories considered was heavy good vehicles such as trailers and commercial buses because they impact the heaviest loads on the road hence resulting in greatest cost of road maintenance. The road users selected were drivers of these vehicles since they are frequent users of the road. Research assistants were then engaged at major stop over

towns along the Class A2 Road where they shared with them the questionnaires and ensured feedback was received immediately via WhatsApp application or email.

3.5 Research Instrument

Data collection was done using semi structured questionnaires. They offered an objective means of data collection by enabling the users to select from multiple choice answers as well as give their comments on the questions asked. The sample from which data was collected was large and widely distributed across geographical locations. Questionnaires were used since the same questions were used for different respondents making the process faster and economical, could be sent electronically to respondents in far location and the questions are repetitive making analysis of similar data easier (Ndukwu, 2020). The questionnaires could be completed in one sitting hence generating a large amount of data with respondents using minimal resources and time. With the restrictions imposed by the Government of Kenya during Covid-19 pandemic on minimal use of hardcopy work, electronic questionnaires were incorporated. Data collection using this method was fast and it was easier to follow up on non-responsive respondents. Foe respondents in arrears with poor network connectivity, the questionnaires could also be filled easily using Adobe reader and transmitted via WhatsApp applications that are available on most mobile phones.

The questionnaires used were divided into two sections: the close ended questions that restricted respondent to given multiple-choice answers and the open-ended type which gave room for the respondents to provide independent answers on the questions with narrations allowed to also gather more data on the questions. Each questionnaire had six sections. Part one covered respondents age, gender, academic qualification and years of experience at work. The second portion entailed dependent variable which was implementation of PBC road maintenance projects on Class A Roads in Kenya. Section three featured construction experience as the first independent variable, section four financial capacity as the second independent variable, section five technical capacity as the third independent variable and section six leadership capacity as the fourth independent variable. Sections three to six each had 4 questions where the respondent's opinions were given or a Likert Scale.

3.5.1 Piloting of Instrument

A pilot study helps test study design, appropriateness of questions and detects any ambiguities and errors before conducting the actual study. (Enago Academy, 2020). This was conducted on one of the 8 ongoing PBC projects on Class A2 Road namely Turbi - Moyale. The pilot study included 1 contractor, 1 road manager, 1 site supervisor, 1 Assistant Resident Engineer, 2 Engineers, 3 Road inspectors a finance and a procurement officer. The samples from the study were people involved in this project. The respondents in the pilot had similar characteristics as those in the actual study since they are parties involved in a normal PBC project. The pilot study helped in understanding how to conduct the actual research, estimate resources required and detect any errors in the research instrument. Grammatical errors were noted in the questionnaires during this process and corrections were adjusted before the real study was done.

3.5.2 Validity of Instrument

(Li, 2016), refers to validity of instrument as how accurately it measures what is intended. Content validity was reviewed by a research expert who is also my supervisor at the University. Face validity of questions asked in questionnaires was confirmed by my supervisor who is the Assistant Resident Engineer in charge of PBC road maintenance projects along Class A2 Road in KeNHA and a part of the sample respondents. The purpose was to eliminate any ambiguous questions, grammatical errors and misinterpretation of the questions by the respondents. The pilot study assisted in confirming soundness of research tool.

3.5.3 Reliability of Instrument

Reliability of research instrument was ensured through logical and standardized questions. Questions were arranged in a logical and systematic manner and they were linked to the independent variables. Cronbach alpha test that measuresured internal consistency and alpha coefficients that were obtained were interpreted as; 0.9 excellent, above 0.8 reliable, above 0.7 good, and above 0.6 adequate. (Taber, 2018). The formula adopted was as shown below;

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

N = the number of items

$\bar{c}$ = average covariance between item-pairs

$\bar{v}$ = average variance

Table 3. 3: Reliability of Research Instrument

Variable	Cronbach Alpha
Contractor's construction experience	0.97
Contractor's financial capacity	0.94
Contractor's technical capacity	0.98
Contractor's leadership capacity	0.98

From the data in Table 3.3, the coefficient of alpha for all variables was above 0.9. It therefore infers the instrument was consistent and needed no adjustments.

3.6 Data Collection Procedure

Prior to collection of data, a research permits were obtained from NACOSTI to authorize the study. A letter authorizing the research from the University also guaranteed the respondents that research was for solely for academic reason. These were also accompanied by consent forms for respondents who needed them before participating in the study.

Due to hard copy restrictions imposed by the Government of Kenya during Covid -19 pandemic, questionnaires were administered via email to respondents. The use of emails was also economical and time saving since respondents could easily respond at their convenient time. For respondents in far locations and with poor internet connectivity, questions could be answered in one sitting and they could be easily filled via Adobe reader and transmitted via WhatsApp applications that are found on most mobile phones.

Data collection was done from staff from Engineers office, contractors and his representatives and road users. An email was sent to them with the questionnaires attached which they would fill and return at their own time. This method ensured filing of questionnaires did not interfere with schedule of the respondents. For the sampled road users, research assistants were engaged at major stop over towns along the Class A2 Road where they shared with the respondents

questionnaires and ensured they gave immediate feedback via WhatsApp application or email. The entire process took two months to finish.

3.7 Data Analysis Techniques

Data analysis involves collecting and analyzing statistics so that information that can aid in decision making is obtained (Wikipedia, 2021). The data that was generated from the field was both qualitative and quantitative. The questionnaires form the field were evaluated for completeness and accuracy. Data was then categorized into similar categories. Values were attached to each class to enable input into the SPSS software version 26.

Descriptive statistics for each variable was computed including means, percentages and standard deviations. The mean values represented the average response for each indicator in the variables. Standard deviation provided an indication of how far individual responses deviated from the average response. The results were then displayed in tabular form.

Inferential data analysis involved regression and correlation computations. Pearson's correlation values were used to gage the association among dependent and independent variables. The figures were interpreted as follows: (r) of -1, 0 and +1, the relationships were interpreted as perfect negative relationship, zero relationship and perfect positive relationships respectively.

The following regression equation was adopted;

$Y=B0+B1X1+B2X2+B3X3+B4X4+e$ where

Y= Implementation of PBC road maintenance projects

B0= Constant

B1,B2,B3,B4 = Regression coefficients

X1=Construction experience

X2=Financial capacity

X3=Technical capacity

X4=Leadership capacity

e =error term

3.8 Ethical Considerations

The following strategies were adopted to ensure that ethical considerations were adhered to when collecting data and that research data was used for the intended purpose only. First an approval from the University informed the respondent the research was purely for academic reason. This was also confirmed by permit from NACOSTI confirming research was for academic purposes only. Secondly, respondent signed consent letters before providing data to guarantee confidentiality. Third, they were free to withdraw from taking part in the survey including the right not to respond to questions if they were unwilling to. Also, the research questions were in a clear and simple language so that respondents could understand and use minimum time and resources to provide the data. Ethical principles during research such as confidentiality, consent, clear understanding and objectivity were adhered to when collecting the data.

3.9 Operationalization of Variables

Table 3. 4: Operationalization of Variables

OBJECTIVE	VARIABLE	INDICATOR	MEASURE SCALE	TYPE OF ANALYSIS	TOOLS OF DATA ANALYSIS
To determine how contractor's construction experience influence implementation of PBC road maintenance contracts on Class A Roads in Kenya	**Independent** Construction experience	Experienced staff Completed projects Past projects done Statutory compliance	Nominal Nominal Nominal Ordinal	Descriptive statistics Inferential statistics	Frequency, mean, percentage, standard deviation Pearson's correlation coefficient (r), multiple regression
To establish how contractor's financial capacity influence implementation of PBC road maintenance contracts on Class A Roads in Kenya	**Independent** Financial capacity	Types of finance Cashflow management Access to credit Approval of payments	Nominal Ordinal Ordinal Ordinal	Descriptive statistics Inferential statistics	Frequency, mean, percentage, standard deviation Pearson's correlation coefficient (r), multiple regression

OBJECTIVE	VARIABLE	INDICATOR	MEASURE SCALE	TYPE OF ANALYSIS	TOOLS OF DATA ANALYSIS
To establish how contractor's technical capacity influence implementation of PBC road maintenance contracts on Class A Roads in Kenya	**Independent** Technical capacity	Academic qualifications Technical experience Equipment availability Adoption of technology	Nominal Nominal Nominal Ordinal	Descriptive statistics Inferential statistics	Frequency, mean, percentage, standard deviation Pearson's correlation coefficient (r), multiple regression
To determine how contractor's leadership capacity influence implementation of PBC road maintenance contracts on Class A Roads in Kenya	**Independent** Leadership capacity	Contract administration Dispute resolution Scheduling technique Risk mitigation measures	Ordinal Ordinal Ordinal Ordinal	Descriptive statistics Inferential statistics	Frequency, mean, percentage, standard deviation Pearson's correlation coefficient (r), multiple regression
Implementation of PBC road maintenance contracts on Class A Roads in Kenya	**Dependent** Implementation of PBC road maintenance contracts	Schedule management Cost variations Scope changes	Ordinal Ratio Ordinal	Descriptive statistics Inferential statistics	Frequency, mean, percentage, standard deviation Pearson's correlation coefficient (r), multiple regression

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter detailed data analysis, presentation, interpretation and discussion of findings of the study. The results were presented by outlining questionnaire response rate, demographic information, interpreted, discussed descriptive and inferential statistics on the dependent and independent variables and the relationships between them.

4.2 Questionnaire Return Rate

84 questionnaires were sent to be received electronically via Google forms. From the questionnaires distributed, 70 were returned by respondents representing 83.33% of all questionnaires administered. Foe statistical analyis, Mugenda and Mugenda (1999) established that, response rate above 50% is considered satisfactory, 60% good and above 70% is excellent (Ekal, 2016). Therefore 83.33 per cent return rate in this study was excellent for conclusive arguments. The findings were as shown below.

Table 4. 1: Questionnaire Return Rate

Questionnaires	Frequency	Percentage
Retained	14	16.67
Received	70	83.33
Total	84	100.00

The return rate of the questionnaires is 83.33 per cent. This was attained by having clarity of questions in a logical manner that could be filled using a few minutes. The questionnaires administered via Google forms enabled respondents to complete them irrespective of their geographical locations. This high return rate was helpful to the study as it confirmed reliable representation of the targeted population.

4.3 Demographic Information of the Respondents

This entailed respondents gender, age, academic qualification, years of experience and job description in organization. The information gathered was useful in establishing whether respondents could be engaged in various positions in a PBC contract.

4.3.1 Distribution of Respondents by Gender

The findings from the analysis of the respondent's gender were as presented.

Table 4. 2: Respondents Gender

Demographic Information		Frequency	Percentage
Gender	Male	37	52.9
	Female	33	47.1
	Total		

From the analysis, out of participants, (fifty two point nine percent) were male and (forty seven point one percent) were female. These findings are in line with the belief that the construction industry is a male dominated field since men are more suitable for technical jobs compared to their female colleagues.

4.3.2 Distribution of Respondents by Age

Age of respondents had a correlation to number of years of experience with PBC contracts.

Table 4. 3: Respondents Age

Demographic Information		Frequency	Percentage
Age (Years)	Below 30	33	47.1
	30 – 40	22	31.4
	40 – 50	12	17.2
	50 – 60	3	4.3
	Over 60	0	0.0
	Total	70	100

From the 70 participants of the study, (47.1 percent) were aged below 30 years, (31.4 percent) between 30 to 40 years, (17.2 percent) from 40 to 50 years, (4.3 percent) range 50 and 60 years and (0.0 percent) above 60 years. The age of the respondents was important to study since successful implementation of a PBC contract depends on experience of contractor's staff. In addition to academic qualification, staff engaged in these contracts should have relevant practical experience. The age range between 30 – 40 years represented staff with over 5 year experience needed for successful implementation of the contract. Majority of the staff were below 30 years

showing most contractors engaged staff who were fresh graduates or who had little experience in road construction posing a risk to the success of the project.

4.3.3 Distribution of Respondents by Academic Qualification

Respondents were asked to indicate their education background to determine their understanding of PBC road maintenance projects.

Table 4. 4: Respondents Academic Qualification

Demographic Information		Frequency	Percentage
Highest academic qualification	Diploma/ Higher National Diploma	39	55.7
	Undergraduate	20	28.6
	Postgraduate	4	5.7
	Others (Certificate)	7	10.0
	Others (KCSE)	0	0
	Total	70	100

An analysis of the highest academic level qualifications obtained revealed that out of the study participants, (5.7 percent) had postgraduate, (28.6 percent) had undergraduate, (55.7 percent) had diploma or higher national diploma, (10.0 percent) had other qualifications such as certificates in various courses classified as others and (0.0 percent) had KCSE as the highest academic level achieved. PBC road maintenance projects should be executed by staff with necessary skills and experience. Relevant academic qualification equates to better understanding of PBC contracts and successful execution. Academic qualification is also needed to qualify for various positions in a PBC contract. Since majority of the participants had diploma or higher diploma as the highest academic qualification, they could understand basic PBC concepts and be engaged by contractors as skilled or semi-skilled labour at various job descriptions.

4.3.4 Distribution of Respondents by Experience

Participants indicated their level of experience and participation in PBC road maintenance projects.

Table 4. 5: Respondents Experience

Demographic Information		Frequency	Percentage
Years of experience (Years)	Below 5	31	44.3
	5 – 10	26	37.1
	10 - 20	10	14.3
	20 - 30	2	2.9
	Over 30	1	1.4
	Total	70	100

An analysis of the respondents' experience with PBC road maintenance projects showed that (44.3 percent) had below 5 years, (37.1 percent) between 5 and 10 years, (14.3 percent) from 10 to 20 years, (2.9 percent) ranging 20 to 30 years and (1.4 percent) over 30 years of experience. Relevant experience is necessary when executing a PBC contract. It's not enough to possess academic qualification only but staff engaged in these contracts should have field experience too. Majority of the respondents had less that 5 year experience posing a risk during implementation of a PBC contract. The years of experience also dictate the job description with a road manager or site supervisor roles requiring at least 5 year of PBC contracts experience.

4.4 Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

The dependent variable was PBC road maintenance projects are implemented successfully on Class A Roads in Kenya. The results were analyzed according to the indicators for this variable. The results from descriptive statistics were as shown.

Table 4. 6: Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

Indicator	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean	SD
PBC road maintenance projects have appropriate	8(11.4%)	10(14.3%)	16(22.9%)	19(27.1%)	17(24.3%)	3.39	1.31

schedule management							
PBC road maintenance projects are implemented with no cost overruns	9(12.9%)	12(17.1%)	21(30%)	15(21.4%)	13(18.6%)	3.16	1.28
Scope changes occur during implementation of PBC road maintenance projects	9(12.9%)	10(14.3%)	12(17.1%)	19(27.1%)	20(28.6%)	3.44	1.38
All service level criteria are adhered to during implementation of PBC road maintenance projects	10(14.3%)	10(14.3%)	17(24.3%)	13(18.6%)	20(28.6%)	3.33	1.40
Composite Mean, Composite SD						3.33	1.22

The data in Table 4.6 can be discussed and interpreted in the following ways;

The computed means for the indicators in relation to the composite mean show that most respondents agree these factors influenced positively implementation of PBC projects on Class A Roads in Kenya. Scope changes and schedule management were identified as the main indicators of a successfully implemented Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya while cost overruns was the least indicator. The low values of standard deviation values confirm that the computed means were close to the actual responses by the respondents.

4.5 Contractor's Construction Experience and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

The first objective was how contractor's construction experience influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. Responses were given in a in Likert ascending 5 - 1 scale where; 1- Strongly disagree, 2- Agree, 3 – Not sure, 4- Agree and 5 – Strongly agree.

Table 4. 7: Contractor's Construction Experience and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

Indicator	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean	SD
Contractors have experienced staff on site	7(10%)	8(11.4%)	17(24.3%)	17(24.3%)	21(30%)	3.53	1.30
Contractors have implemented PBC road maintenance projects in the past	9(12.9%)	11(15.7%)	16(22.9%)	15(21.4%)	19(27.1%)	3.34	1.37
Contractors have completed PBC road maintenance projects in the past	9(12.9%)	9(12.9%)	11(15.7%)	22(31.4%)	19(27.1%)	3.47	1.36
Contractors comply with statutory requirements for implementing PBC road maintenance projects	7(10%)	9(12.9%)	14(20%)	20(28.6%)	20(28.6%)	3.53	1.30
Composite Mean, Composite SD						3.47	1.28

The findings in Table 4.7 can be discussed and interpreted in the following ways;

The computed means for the indicators in relation to the composite mean show that most respondents agree all the listed aspects of contractor's construction experience influenced positively implementation of PBC contracts on Class A Roads in Kenya. Experienced staff and compliance with statutory regulations had the greatest influence while past experience with PBC road maintenance projects had the least influence. The low values of standard deviation values confirm that the computed means were close to the actual responses by the respondents.

From these findings, it can be inferred that aspects of contractors construction experience such as experienced staff, past projects done and compliance to statutory issues determine success of a PBC contract. These findings concur with Gudah, Omboto and Tubey (2017) who concluded contractor selection criteria affected implementation of housing projects. Contractors' selection process covered relevant experience as a pre-qualification for selection.

4.5.1 Relationship between Contractors' Construction Experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Pearson's correlation analysis was used to determine the correlation between independent variable (Contractors' construction experience) and dependent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya).

Table 4. 8: Correlation Analysis of Contractors' Construction Experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Variable		**Contractors' construction experience**	**Implementation of PBC road maintenance projects on Class A Roads in Kenya**
Contractors' construction experience	Pearson' Correlation	1	0.885
	Sig(2-tailed)		0.000
	N	70	70
Implementation of PBC road maintenance	Pearson' Correlation	0.885	1

projects on Class A	Sig(2-tailed)	0.000	
Roads in Kenya	N	70	70

Correlation is significant at 0.05 level (2 - tailed)

Correlation analysis results showed a significant as well as strong positive relationship between Contractors' construction experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya ($r = 0.885$, $p<0.05$). This means the more contractors have construction experience the better the implementation of PBC road maintenance projects on Class A Roads in Kenya. Again, the association is significant indicating that contractors' construction experience can be experienced positively in Implementation of PBC road maintenance projects on Class A Roads in Kenya.

4.5.2 Regression Analysis of Contractor's Construction Experience and Implementation of PBC projects on Class A Roads in Kenya

Contractor's construction experience was regressed against Implementation of PBC road maintenance projects on Class A Roads in Kenya as shown.

Table 4. 9: Model Summary of Contractor's Construction Experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	R	R - Square	Adjusted R - Square	Standard Error of Estimate
1	0.885[a]	0.783	0.779	0.57372

a. Predictor: (Constant) Contractor's Construction Experience

Analysis from Table 4.9 show that $R^2=0.783$ which means a unit increase in contractor's construction experience would lead to 78.3 percent influence in implementation of PBC contracts projects on Class A Roads in Kenya all other factors held constant.

4.5.3 Regression ANOVA Analysis of Contractor's construction experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya

ANOVA regression analysis determined the association between independent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya) and dependent variable (Contractor's construction experience).

Table 4. 10: ANOVA Analysis between Contractor's Construction Experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model		Sum of Squares	Df	Mean Squares	F	Sig.
1	Regression	80.561	1	80.561	244.755	0.000[b]
	Residuals	22.382	68	0.329		
	Total	102.943	69			

a. Dependent variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

b. Predictors:(Constant); Contractor's Construction Experience

ANOVA analysis from table 4.10 shows that F= 244.755 and p=0.000 is below 0.05 the alpha level. This implies that on its own, contractor's construction experience influence on implementation of PBC road maintenance projects on Class A Roads in Kenya is significant. Therefore, we reject the null hypothesis that contractor's construction experience has no influence on implementation of PBC contracts on Class A Roads in Kenya.

4.5.4 Regression Coefficients of Contractor's Construction Experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Regression Coefficients analysis evaluated the degree of association between contractor's construction experience and implementation of PBC road maintenance projects on Class A Roads in Kenya and results were as presented.

Table 4. 11: Regression Coefficients Analysis between Contractor's Construction Experience and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	Unstandardized coefficient		standardized coefficient	t	Sig.
	B	Std. Err	Beta		
(Constant)	0.397	0.200		1.990	0.051

Contractor's Construction Experience	0.845	0.054	0.885	15.645	0.000

Dependent variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

Predictors: (Constant) Contractor's Construction Experience

The value of t=15.645>2, the critical value. This means that on its own, contractor's construction experience influence on implementation of PBC road maintenance projects on Class A Roads in Kenya is significant at 95% confidence level.

Beta coefficient analysis showed that implementation of PBC road maintenance projects on Class A Roads in Kenya would remain constant at 0.397 if Contractor's construction experience was not factored. A unit increase in Contractor's construction experience influences 0.885 implementation of PBC road maintenance projects on Class A Roads in Kenya, other factors being held constant.

4.6 Contractor's Financial Capacity and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

This was the second objective of the study. It was to determine how contractor's financial capacity influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. The responses were given in a in Likert ascending 5 - 1 scale where; 1- Strongly disagree, 2- Agree, 3 – Not sure, 4- Agree and 5 – Strongly agree. The results were as depicted.

Table 4. 12: Contractor's Financial Capacity and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

Indicator	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean	SD
Contractors have working capital to sustain implementation of	9(12.9%)	8(11.4%)	16(22.9%)	19(27.1%)	18(25.7%)	3.41	1.34

PBC road maintenance projects							
Contractors manage cashflow during implementation of PBC road maintenance projects	7(10%)	10(14.3%)	13(18.6%)	21(30%)	19(27.1%)	3.50	1.30
Contractors have access to credit for implementation of PBC road maintenance projects	8(11.4%)	11(15.7%)	13(18.6%)	17(24.3%)	21(30%)	3.46	1.37
Contractors request for payments are approved and received on time	8(11.4%)	8(11.4%)	14(20%)	17(24.3%)	23(32.9%)	3.56	1.36
Composite Mean, Composite SD						3.48	1.23

The figures presented in Table 4.12 can be discussed and interpreted in the following ways;

The computed means for the indicators in relation to the composite mean show that most respondents agree all the listed aspects of contractor's financial capacity influenced positively implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. Management of cashflows and approval of payments had the greatest influence while availability of working capital had the least influence. The low values of standard deviation values confirm that the computed means were close to the actual responses by the respondents.

From these findings, contractors with adequate cashflows, access to credit and who receive and manage their finances prudently don't face financial obstacles during implementation of PBC road maintenance projects. These findings concur with the findings of Oyallo (2019) who found out that financial management contribute to 27.9% changes in value of road projects. Contractors' financial systems covered delayed payments, mismanagement of funds, lack of credit and bureaucracy in payments by employer.

4.6.1 Relationship between Contractors' Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Pearson's correlation determined the strength and direction of the correlation between independent variable (Contractors' financial capacity) and dependent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya). The following are correlation analysis results.

Table 4. 13: Correlation Analysis of Contractors' Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Variable		**Contractors' financial capacity**	**Implementation of PBC road maintenance projects on Class A Roads in Kenya**
Contractors' financial capacity	Pearson' Correlation	1	0.908
	Sig(2-tailed)		0.000
	N	70	70
Implementation of PBC road maintenance projects on Class A Roads in Kenya	Pearson' Correlation	0.908	1
	Sig(2-tailed)	0.000	
	N	70	70

Correlation is significant at 0.05 level (2 - tailed)

Correlation analysis results shows a significant as well as strong positive association between Contractors' financial capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya ($r = 0.908$, $p < 0.05$). Moreover, this simply means, the more contractors have financial capacity the better the implementation of PBC road maintenance projects on Class A Roads in Kenya. Again, the association is significant indicating that contractors' financial capacity can be experienced positively in implementation of PBC road maintenance projects on Class A Roads in Kenya.

4.6.2 Model Summary of Contractor's Financial Capacity and Implementation of PBC projects on Class A Roads in Kenya

Contractor's financial capacity was regressed against Implementation of PBC road maintenance projects on Class A Roads in Kenya as shown;

Table 4. 14: Model Summary of Contractor's Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	R	R - Square	Adjusted R - Square	Standard Error of Estimate
1	0.908[a]	0.825	0.822	0.51508

a. Predictor: (Constant) Contractor's Financial Capacity

Analysis from Table 4.14 show that R^2=0.825 which means an increase in contractor's financial capacity increases implementation of PBC road maintenance projects on Class A Roads in Kenya by 82.5 percent all other factors held constant.

4.6.3 Regression ANOVA Analysis of Contractor's Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

ANOVA regression tested degree of association between independent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya) and dependent variable (Contractor's financial capacity). Results were presented as shown.

Table 4. 15: ANOVA Analysis between Contractor's Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model		Sum of Squares	Df	Mean Squares	F	Sig.
1	Regression	84.902	1	84.902	320.021	0.000[b]
	Residuals	18.041	68	0.265		
	Total	102.943	69			

c. Dependent Variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

d. Predictors:(Constant); Contractor's Financial Capacity

ANOVA analysis from table 4.15 shows that F = 320.021 and p=0.000 is below 0.05 the alpha level. This implies that on its own, contractor's financial capacity influence on implementation of PBC on Class A Roads in Kenya is significant. Therefore, we reject the null hypothesis that contractor's financial capacity has no influence on implementation of PBC contrcats on Class A Roads in Kenya.

4.6.4 Regression Coefficients of Contractor's Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Regression evaluated the degree of association between Contractor's financial capacity and implementation of PBC road maintenance projects on Class A Roads in Kenya and results were presented below.

Table 4. 16: Regression Coefficients Analysis between Contractor's Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	Unstandardized coefficient		standardized coefficient	t	Sig.
	B	Std. Err	Beta		
(Constant)	0.187	0.186		1.003	0.319
Financial capacity	0.902	0.050	0.908	17.889	0.000

Dependent variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

Predictors: (Constant) Contractor's Financial Capacity

The value of t=17.889>2 the critical value. This means that on its own, contractor's financial capacity influence on implementation of PBC road maintenance projects on Class A Roads in Kenya is significant at 95% confidence level.

Beta coefficient analysis showed that implementation of PBC road maintenance projects on Class A Roads in Kenya would remain constant at 0.187 if contractor's financial capacity was not factored. Contractor's financial capacity increases implementation of PBC road maintenance projects on Class A Roads in Kenya by 0.908, other factors being held constant.

4.7 Contractor's Technical Capacity and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

This was the third objective was to determine how contractor's technical capacity influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. The responses were given in a in Likert ascending 5 - 1 scale where; 1- Strongly disagree, 2- Agree, 3 – Not sure, 4- Agree and 5 – Strongly agree. The results were as follows;

Table 4. 17: Contractor's Technical Capacity and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

Indicator	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean	SD
Contractor's staff have necessary academic qualifications for implementation of PBC road maintenance projects	8(11.4%)	12(17.1%)	12(17.1%)	18(25.7%)	20(28.6%)	3.43	1.37
Contractor's staff have necessary technical experience for implementation of PBC road maintenance projects	7(10%)	11(15.7%)	13(18.6%)	16(22.9%)	23(32.9%)	3.53	1.36
Contractors have necessary equipment for implementing PBC road maintenance projects	8(11.4%)	10(14.3%)	13(18.6%)	21(30%)	18(25.7%)	3.44	1.33

Contractors are adopting appropriate technology in implementing PBC road maintenance projects	10(14.3%)	9(12.9%)	11(15.7%)	19(27.1%)	21(30%)	3.46	1.41
Composite Mean, Composite SD						3.46	1.32

The findings shown in Table 4.17 can be discussed and interpreted in the following ways;

The computed means for the indicators in relation to the composite mean show that most respondents agree all the listed aspects of contractor's technical capacity influenced positively implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. Technical experience and adoption of appropriate technology had the greatest influence while equipment and academic qualification had the least influence. The low values of standard deviation values confirm that the computed means were close to the actual responses by the respondents.

From these findings, academic qualification, relevant field experience, use of appropriate equipment and adoption of latest technology in construction affect implementation of PBC road maintenance projects. These findings are in line with M'arimi (2019) who determined that technical knowledge, staff competence on road work and staff training on PBC concepts influence success of such a project. She also added that it's not just enough for contractor's staff to have technical capacity but continuous improvement of these skills through training and exposure to field experience will boost their performance.

4.7.1 Relationship between Contractors' Technical Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Pearson's correlation determine the strength and direction of the correlation between independent variable (Contractors' technical capacity) and dependent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya). The following were correlation analysis results;

Table 4. 18: Correlation Analysis of Contractors' Technical Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Variable		Contractors' technical capacity	Implementation of PBC road maintenance projects on Class A Roads in Kenya
Contractors' technical capacity	Pearson' Correlation	1	0.854
	Sig(2-tailed)		0.000
	N	70	70
Implementation of PBC road maintenance projects on Class A Roads in Kenya	Pearson' Correlation	0.854	1
	Sig(2-tailed)	0.000	
	N	70	70

Correlation is significant at 0.05 level (2 - tailed)

Correlation analysis results shows a significant as well as strong positive relationship between contractors' technical capacity and implementation of PBC road maintenance projects on Class A Roads in Kenya ($r = 0.854$, $p < 0.05$). Moreover, this simply means, the more contractors have technical capacity the better the Implementation of PBC road maintenance projects on Class A Roads in Kenya. Again, the association is significant indicating that contractors' technical capacity can be experienced positively in implementation of PBC road maintenance projects on Class A Roads in Kenya.

4.7.2 Model Summary of Contractor's Technical Capacity and Implementation of PBC projects on Class A Roads in Kenya

Contractor's technical capacity was regressed against Implementation of PBC road maintenance projects on Class A Roads in Kenya and results were presented as shown.

Table 4. 19: Model Summary of Contractor's Technical Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	R	R - Square	Adjusted R - Square	Standard Error of Estimate
1	0.854[a]	0.729	0.725	0.64082

a. Predictor: (Constant) Contractor's Technical Capacity

Analysis from Table 4.19 show that R^2=0.729 which means a unit increase in contractor's technical capacity would lead to 72.9 percent influence in implementation of PBC road maintenance projects on Class A Roads in Kenya all other factors held constant.

4.7.3 Regression ANOVA Analysis of Contractor's Technical Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

ANOVA regression examined the degree of association between independent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya) and dependent variable (Contractor's technical capacity). Results were presented as below.

Table 4. 20: ANOVA Analysis between Contractor's Technical Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model		Sum of Squares	Df	Mean Squares	F	Sig.
1	Regression	75.019	1	75.019	182.683	0.000[b]
	Residuals	27.924	68	0.411		
	Total	102.943	69			

e. Dependent variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

f. Predictors:(Constant); Contractor's Technical Capacity

ANOVA analysis from table 4.20 shows that F=182.683 and p=0.000 is below 0.05 the alpha level. This implies that on its own, contractor's technical capacity influence on implementation of PBC road maintenance projects on Class A Roads in Kenya is significant. Therefore, we reject the null hypothesis that contractor's technical capacity has no influence on implementation of PBC road maintenance projects on Class A Roads in Kenya.

4.7.4 Regression Coefficients of Contractor's Technical Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Regression coefficients assessed the degree of association between contractor's technical capacity and implementation of PBC road maintenance projects on Class A Roads in Kenya and results were presented as shown.

Table 4. 21: Regression Coefficients Analysis between Contractor's Technical Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	Unstandardized coefficient		standardized coefficient	t	Sig.
	B	Std. Err	Beta		
(Constant)	0.584	0.217		2.692	0.009
Contractor's Technical Capacity	0.792	0.059	0.854	13.516	0.000

Dependent variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

Predictors: (Constant) Contractor's Technical Capacity

The value of t=13.516>2 the critical value. This means that on its own, contractor's technical capacity influence on implementation of PBC road maintenance projects on Class A Roads in Kenya is significant at 95% confidence level.

Beta coefficient analysis showed that implementation of PBC road maintenance projects on Class A Roads in Kenya would remain constant at 0.584 if contractor's technical capacity was not factored. A unit increase in contractor's technical capacity would lead to a 0.854 increase in implementation of PBC road maintenance projects on Class A Roads in Kenya, other factors being held constant.

4.8 Contractor's Leadership Capacity and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

This was the fourth objective of the study. It was to determine how contractor's leadership capacity influences implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. The responses were given in a in Likert 5 – 1 ascending scale

where; 1- Strongly disagree, 2- Agree, 3 – Not sure, 4- Agree and 5 – Strongly agree. The results were;

Table 4. 22: Contractor's Leadership Capacity and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

Indicator	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean	SD
Contractors have contract administration skill in implementation of PBC road maintenance projects	9(12.9%)	11(15.7%)	11(15.7%)	20(28.6%)	19(27.1%)	3.41	1.38
Contractors can handle disputes in implementation of PBC road maintenance projects	8(11.4%)	12(17.1%)	14(20%)	18(25.7%)	18(25.7%)	3.37	1.34
Contractors have scheduling techniques in implementation of PBC road maintenance projects	8(11.4%)	10(14.3%)	14(20%)	20(28.6%)	18(25.7%)	3.43	1.33
Contractors have risk mitigation measures in implementation of PBC road maintenance projects	9(12.9%)	12(17.1%)	16(22.9%)	16(22.9%)	17(24.3%)	3.29	1.35
Composite Mean, Composite SD						3.38	1.31

The data results tabulated in Table 4.22 can be discussed and interpreted in the following ways;

The computed means for the indicators in relation to the composite mean show that most respondents agree all the listed aspects of contractor's leadership capacity influenced positively implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in

Kenya. Scheduling techniques and contract management skills had the greatest influence while dispute resolution had the least influence. The low values of standard deviation values confirm that the computed means were close to the actual responses by the respondents.

From these findings, contract management skills, dispute resolution, scheduling techniques and risk mitigation measures affect implementation of PBC road maintenance projects. Oprong (2020) concluded that contractor's management structure influences implementation of infrastructure projects in Meru County. She also added that it's not just enough to have senior leadership commitment to the project but success of a project will also proper decision making, organization and communication.

4.8.1 Relationship between Contractors' Leadership Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Pearson's correlation analysis assessed the strength and direction of the correlation between independent variable (Contractors' leadership capacity) and dependent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya). The following were correlation analysis results;

Table 4. 23: Correlation Analysis of Contractors' Leadership Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Variable		Contractors' leadership capacity	Implementation of PBC road maintenance projects on Class A Roads in Kenya
Contractors' leadership capacity	Pearson' Correlation	1	0.844
	Sig(2-tailed)		0.000
	N	70	70
Implementation of PBC road maintenance projects on Class A	Pearson' Correlation	0.844	1
	Sig(2-tailed)	0.000	

Roads in Kenya	N	70	70

Correlation is1significant at 0.05 level (2 - tailed)

Correlation analysis results shows a significant as well as strong positive relationship between Contractors' leadership capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya ($r = 0.844$, $p<0.05$). Moreover, this simply means, the more contractors have leadership capacity the better the Implementation of PBC road maintenance projects on Class A Roads in Kenya. Again, the association is significant indicating that contractors' leadership capacity can be experienced positively in Implementation of PBC road maintenance projects on Class A Roads in Kenya.

4.8.2 Model Summary of Contractor's Leadership Capacity and Implementation of PBC projects on Class A Roads in Kenya

Contractor's leadership capacity was regressed against Implementation of PBC road maintenance projects on Class A Roads in Kenya as follows;

Table 4. 24: Model Summary of Contractor's Leadership Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	R	R - Square	Adjusted R - Square	Standard Error of Estimate
1	0.844[a]	0.712	0.707	0.66062

a. Predictor: (Constant) Contractor's leadership Capacity

Analysis from Table 4.24 show that $R^2=0.712$ which means a unit increase in contractor's leadership capacity would lead to 71.2 percent influence in implementation of PBC road maintenance projects on Class A Roads in Kenya all other factors held constant.

4.8.3 Regression ANOVA Analysis of Contractor's Financial Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

ANOVA regression analysis examined the degree of association between independent variable (Implementation of PBC road maintenance projects on Class A Roads in Kenya) and dependent variable (Contractor's financial capacity). Results were presented as shown below.

Table 4. 25: ANOVA Analysis between Contractor's Leadership Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model		Sum of Squares	Df	Mean Squares	F	Sig.
1	Regression	73.266	1	73.266	167.879	0.000[b]
	Residuals	29.677	68	0.436		
	Total	102.943	69			

g. Dependent Variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

h. Predictors:(Constant); Contractor's Leadership Capacity

ANOVA analysis from table 4.25 shows that F=167.879 and p=0.000 is below 0.05 the alpha level. This implies that on its own, contractor's leadership capacity influence on implementation of PBC road maintenance projects on Class A Roads in Kenya is significant. Therefore, we reject the null hypothesis that contractor's leadership capacity has no influence on implementation of PBC road maintenance projects on Class A Roads in Kenya.

4.8.4 Regression Coefficients of Contractor's Leadership Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Regression coefficients analysis examined the degree of association between Contractor's financial capacity and implementation of PBC road maintenance projects on Class A Roads in Kenya and results were presented in Table 4.26

Table 4. 26: Regression Coefficients Analysis between Contractor's Leadership Capacity and Implementation of PBC road maintenance projects on Class A Roads in Kenya

Model	Unstandardized coefficient		standardized coefficient	t	Sig.
	B	Std. Err	Beta		
(Constant)	0.679	0.219		3.095	0.003
Contractor's	0.785	0.061	0.844	12.957	0.000

Leadership Capacity

Dependent variable: Implementation of PBC road maintenance projects on Class A Roads in Kenya

Predictors: (Constant) Contractor's Leadership Capacity

The value of t=12.957>2 the critical value. This means that on its own, contractor's leadership capacity influence on implementation of PBC road maintenance projects on Class A Roads in Kenya is significant at 95% confidence level.

Beta coefficient analysis showed that implementation of PBC road maintenance projects on Class A Roads in Kenya would remain constant at 0.679 if contractor's leadership capacity was not factored. A unit increase in contractor's leadership capacity would lead to a 0.844 increase in implementation of PBC road maintenance projects on Class A Roads in Kenya, other factors being held constant.

4.8.5 Regression analysis

Regression analysis was used to determine the effect of the independent variables on the dependent variables. The study regression model used the following equation;

Y=0.397+0.845X1+0.90X2+0.792X3+0.785X4+e

Y= Implementation of PBC road maintenance projects

B0= Constant, *e* =error value

B1,B2,B3,B4 = Regression coefficients

X1=Construction experience

X2=Financial capacity

X3=Technical capacity

X4=Leadership capacity

Table 4.27: Multiple Regression Coefficients

Variable	Unstandardized coefficients	Standardized coefficients	T	Sig

	B	Std. Error	Beta		
Constant	0.397	0.200		1.990	0.000
Contractor's construction experience	0.845	0.054	0.885	15.645	0.000
Contractor's financial capacity	0.902	0.050	0.908	17.889	0.000
Contractor's technical capacity	0.792	0.059	0.854	13.516	0.000
Contractor's leadership capacity	0.785	0.061	0.844	12.957	0.000

From table showed that if all variables are assumed not be significant, implementation of PBC road maintenance contracts on Class A Roads in Kenya will change by 0.397. It further showed that a unit increase in contractor's construction experience will result in a change of 0.845 which is significant since 0.000 less than 0.005 the critical value. A unit change in contractor's financial capacity will result in an increase of 0.902 in implementation of PBC road maintenance contracts on Class A Roads in Kenya which is significant because 0.000 is less than 0.005. One increase of contractor's technical capacity would increase implementation of PBC road maintenance contracts on Class A Roads in Kenya by 0.792 which is significant at 0.000<0.005. For every unit increase in contractor's leadership capacity would increase implementation of PBC road maintenance contracts on Class A Roads in Kenya by 0.785 and be significant since 0.000 is less than 0.05.

In conclusion, contractors related factors affecting implementation of PBC road maintenance contracts on Class A Roads in Kenya were ranked as financial, construction experience, leadership and technical capacities in descending order of influence.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter covered the summary of study findings and conclusions based on the data collected and analyzed. Suggestions to the government and contractors on issues that need to be addressed to ensure successful implementations of PBC road maintenance projects were included in this section. Areas and suggestions for more research on implementation of PBC road maintenance contracts were also detailed under this chapter.

5.2 Summary of Findings

The research was sought to investigate contractor related factors and their influence on implementation of PBC road maintenance contracts on Class A Roads in Kenya. From the findings, contractor's construction experience influenced implementation of PBC contracts on Class A Roads in Kenya. Aspects of construction experience covered were contractor having experienced staff on site, having participated and completed PBC road maintenance projects in the past and compliance to statutory issues. A contractor with adequate construction experience was more likely to implement a PBC project successfully.

The research established contractor's financial capacity positively influenced implementation of PBC maintenance contracts on Class A Roads in Kenya. Indicators of financial capacity considered were availability of working capital, management of cashflows, access to credit and approval of payments by employer. A contractor with adequate financial capacity was more likely to implement a PBC road maintenance contract successfully.

The research established contractor's technical capacity positively affected implementation of PBC maintenance contracts on Class A Roads in Kenya. Variable indicators considered were academic qualifications, technical experience, necessary equipment and adoption of appropriate technology. A contractor with adequate technical capacity was more likely to implement a PBC road maintenance contract successfully.

The research established contractor's leadership capacity had a positively relation on implementation of PBC maintenance contracts on Class A Roads in Kenya. Indicators of leadership capacity considered were contract administration skills, dispute resolution, scheduling

techniques and risk mitigation measures. A contractor with adequate leadership capacity was more likely to implement a PBC road maintenance contract successfully.

5.3 Discussion of Findings

Target population comprised Engineers, contractors, road managers, procurement and finance officers and road users. They represented the major parties involved in implementation of PBC road maintenance contracts form contractor's side, the supervision team and users of the road. From a sample size and 84 questionnaires administered, 70 were returned representing a questionnaire return rate was 83.33%. Mugenda and Mugenda (1999), stated that questionnaire response rate over 70% is considered excellent during a study; hence the response rate was acceptable.

Analysis of respondents by gender showed 52.9% were male and 49.1% were female. This was in line with the belief that construction industry is male dominated. Many respondents had over 30 years (47.1%) and between 50 -60 years with (4.3%). Age of the respondents related to years of experience which was an important factor for staff involved in PBC road maintenance projects. Many respondents attained Diploma and Higher Diploma as their top academic certification (55.1%). Academic qualification is required to hold various positions in PBC road maintenance projects with at least a Diploma in Civil Engineering as the minimum qualification. Academic qualification also meant respondents could understand issues concerning implementation of PBC road maintenance projects.

The study findings showed significant strong positive association between contractor's construction experience and implementation of PBC projects on Class A Roads in Kenya. This was consistent with Otieno (2019) who also found that a contractor with prior experience in a similar contract knows how to manage matters arising from site, labour, materials equipment needs and managing risks of the project. Abidali (2018) concluded that contractor experience and design team experience strongly influence the quality of the performance on construction projects.

The research concluded a significant strong positive association between contractor's financial capacity and implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya. Wuala and Rarasati (2020) concluded that inadequate monetary capability and late payments by employer were the main contractor related factors for delays in

construction project. Timothy and Yona (2018) agreed that access to funds equates to timely accomplishment of construction projects.

A significant strong positive association existed between contractor's technical capacity and implementation of PBC road projects on Class A Roads in Kenya. Oprong (2020) supported this by concluding that adequate technical capacity will ensure the Contractor uses the qualified personnel, quality materials, adopts latest construction technology to deliver a quality road. Asiedu (2016) further supported this conclusion by his study that found poor supervision of work on site and poor site management as causes of deferrals in road projects. He also stated that poor skills, competence and experience of contractor staff as a project management strategy affect project implementation.

The study concluded a significant strong positive association between contractor's leadership capacity and implementation of PBC maintenance projects on Class A Roads in Kenya. This argument was supported by Gitahi (2019) research that resolved contract management is a major component during project performance. Contract administration in this study involved risk management, scheduling techniques and safety issues on site. Banyenzaki (2016) analyzed contract management variables in terms of monitoring intensity, risk management and evaluation. Further they all had a positive effect on road construction projects.

5.4 Conclusions of the Study

Implementing authorities to engage contractors with relevant construction experience to ensure PBC road projects are implemented successfully. This can be done through proper training of contractors on best practices and implementation methods for these contracts. Improving financial capacity of contractors will ensure seamless implementation of PBC road projects. Road agencies should allocate adequate budget for each contract and pay contractors on time. Contractors to undergo training on proper utilization of project find to avoid wastage. Contractors with adequate technical capacity can implement PBC road maintenance contracts efficiently. They should employ qualified personnel, use appropriate machinery and adapt to latest technologies in the construction industry. Contractors with leadership capacity will implement PBC road projects effectively. They can achieve this by putting in place proper risk identification and mitigation strategies, project scheduling and implementation tools and training on leadership skills.

5.5 Recommendations of the Study

The following suggestions were made to Government, road agencies and contractors to improve on delivery of PBC road maintenance projects on time, schedule and within budget;

i. On Contractor's construction experience, road agencies to adhere to procurement principles on engaging qualified contractors such as technical and financial capabilities. The Government to allocate adequate funds for continuous road maintenance activities in the country so as to reduce the amount of funds needed long term in the rehabilitation of roads.
ii. Concerning financial capacity of contractors, the government should expand adequate and alternative funding mechanisms like access to affordable credit and reduction on tax burdens to boost contractors' financial capacity. Contractors should undergo training on financial management. Contractors to utilize techniques like earned value management to track project budget.
iii. On technical capacity of contractors, the government to ensure constant capacity building of Contractors. This can be achieved through continuous contractors training on PBC contracts details and requirements. Contractors can also benchmark with best practices on latest technology, equipment and materials in the construction industry.
iv. In relation to contractor's leadership capacity, contractors should adhere to key aspects of contract management such as risk, schedule and scope issues. This can be achieved through proper processes that guarantee any disconnects re identifies and rectified on time.

5.6 Suggestion for Further Studies

These areas may be explored in further studies;

i. This study was based on contractor's capacity and implementation of PBC on road projects. Similar studies could be done on other road construction contracts such as Public Private Partnerships.
ii. A comparative analysis to be done on methods being employed by contractors to ensure successful implementation PBC road projects.

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APPENDICES

Appendix I: Transmittal Letter

Dear Sir/Madam,

RE: REQUEST FOR INFORMATION

I am a student in Masters of Arts in Project Planning and Management student at the University of Nairobi. My research project is titled **Contractor Capacity and Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya: A case of Class A2 Road in Kenya National Highways Authority.**

I am requesting your time and consent in providing the necessary data to assist in this survey. You will provide the data by filling out questionnaires. The facts provided will help in drawing conclusions about this study. Hence, information collected will be held in confidence. I am requesting you avail time and answer these questions.

Thank you.

Yours sincerely,

L50/36955/2020

Appendix II: Questionnaire for data collection

Questionnaire for data collection for Contractor's Capacity and Implementation of Performance Based Road Maintenance Contract Projects on Class A Roads In Kenya: A Case of Class A2 Road by Kenya National Highways Authority

Instructions

Kindly provide data by ticking or giving an explanation or reason where applicable.

This questionnaire is divided into 5 sections. Kindly respond as appropriate.

Section A: Demographic Information

1. Gender
    i. Male [ ]
    ii. Female [ ]
2. Age
    i. Below 30 years [ ]
    ii. Between 30 – 40 years [ ]
    iii. Between 40 – 50 years [ ]
    iv. Between 50 – 60 years [ ]
    v. Over 60 years [ ]
3. Highest academic qualification
    i. Diploma/Higher National Diploma [ ]
    ii. Undergraduate [ ]
    iii. Post graduate [ ]
    iv. Others (Please stipulate)
4. Level of experience
    i. Under 5 years [ ]
    ii. 5 – 10 years [ ]
    iii. 10 – 20 years [ ]
    iv. 20 – 30 years [ ]
    v. Over 30 years [ ]
5. Name of your Organization
6. Position held in the organization

7. Kindly provide information on PBC road maintenance projects you have been involved in the past

S/No.	PROJECT NAME	POSITION HELD	LOCATION
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Section B: Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya

Kindly select the appropriate answer to the statements using the following scale; 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Statement	**1**	**2**	**3**	**4**	**5**
PBC road maintenance projects have appropriate schedule management					
PBC road maintenance projects are implemented with no cost overruns					
Scope changes occur in implementing PBC road maintenance projects					
All service levels criteria are adhered to during implementation of PBC road maintenance projects					

Do you think Performance Based Road Contract Maintenance Projects are being implemented successfully on Class A Roads in Kenya? Give reasons for your answer.

……

……

……

What is the biggest Contractor related factor that influences Implementation of PBC projects in Kenya?

……

……

……

Section C: How does Contractor's Construction Experience Influence Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?

Kindly chose an appropriate response to these indicators using the following scale; 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Statement	**1**	**2**	**3**	**4**	**5**
Contractors have experiences staff on site					
Contractors have implemented PBC road maintenance projects in the past					
Contractors have completed PBC road maintenance projects in the past					
Contractors comply with statutory requirements for implementing PBC road maintenance projects					

Kindly explain any other aspects of Contractor's Construction Experience that may influence PBC contracts in Kenya.

……

……

……

……

How should these traits be integrated during implementation of these contracts?

……

……

……

……

……

Section D: How does Contractor's Financial Capacity Influence Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?

Kindly indicate a suitable response to these statements using the following scale; 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Statement	**1**	**2**	**3**	**4**	**5**
Contractors have working capital to sustain implementation of PBC road maintenance projects					
Contractors manage cashflow during implementation of PBC road maintenance projects					
Contractors have access to credit for implementation of PBC road maintenance projects					
Contractors request for payments are approved and received on time					

Kindly explain any other aspects of Contractor's Financial Capacity that may influence execution of PBC road contracts.

……

……

……

……

How should these characteristics be assimilated in road maintenance Kenya?

……

……

……

Section E: How does Contractor's Technical Capacity Influence Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?

Kindly answer the questions below appropriately using the following scale; 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Statement	**1**	**2**	**3**	**4**	**5**
Contractors staff have necessary academic qualifications for implementation of PBC road maintenance projects					
Contractors staff have necessary technical experience for implementation of PBC road maintenance projects					
Contractors have necessary equipment for implementing PBC road maintenance projects					
Contractors are adopting appropriate technology in implementing PBC road maintenance projects					

Kindly explain any other aspects of Contractor's Technical Capacity that may affect maintenance of a PBC Roads in Kenya.

……

……

……

……

How should these parts be fused throughout the contract duration?

……

……

Section F: How does Contractor's Leadership Capacity Influence Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya?

Kindly rate the reply for the indicators using the following scale; 5 – Strongly agree, 4 – Agree, 3 – Not sure, 2 – Disagree, 1 – Strongly disagree.

Statement	**1**	**2**	**3**	**4**	**5**
Contractors have contract administration skill in implementation of PBC road maintenance projects					
Contractors can handle disputes in implementation of PBC road maintenance projects					
Contractors have scheduling techniques in implementation of PBC road maintenance projects					
Contractors have risk mitigation measures in implementation of PBC road maintenance projects					

Kindly explain any other aspects of Contractor's Leadership Capacity that may influence Implementation of Performance Based Road Contract Maintenance Projects on Class A Roads in Kenya.

……

……

……

How should these aspects be merged during execution of a road maintained under PBC?

……

……

……

THANK YOU

Appendix III: Approval Transmittal

UNIVERSITY OF NAIROBI
COLLEGE OF HUMANITIES & SOCIAL SCIENCES
FACULTY OF BUSINESS AND MANAGEMENT SCIENCES

Telephone: 4184160-5 Ext 215
Telegrams: "Varsity" Nairobi
Telex: 22095 Varsity

P.O. Box 30197
Nairobi, KENYA

15 October 2021

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

INTRODUCTORY LETTER FOR RESEARCH
ROSE FIONA AKINYI – REGISTRATION NO.L50/36955/2020

This is to confirm that the above named is a bona fide student in the Master of Project Planning and Management degree program in this University. She is conducting research on ***"Contractor Capacity and Implementation of Performance Based Road Contract Projects on Class A Roads in Kenya. A Case of Class A2 Road in Kenya National Highways Authority."***

The purpose of this letter is to kindly request you to assist and facilitate the student with necessary data which forms an integral part of the research project. The information and data required is needed for academic purposes only and will be treated in **Strict-Confidence**.

Your assistance will be highly appreciated.

Thank you.

Jane Muturi
For: MSc. Human Resource Management Co-Ordinator,
Faculty of Business

WN/jkm

Appendix IV: NACOSTI Consent

REPUBLIC OF KENYA

Ref No: **248944**

NATIONAL COMMISION FOR SCIENCE,

TECHNOLOGY &INNOVATION

Date of Issue: **27/October/2021**

RESEARCH LICENSE

This is to Certify that Miss.. ROSE FIONA AKINYI of University of Nairobi, has been licensed to conduct research in Isiolo, Laikipia, Marsabit, Meru, Nairobi, Nyeri on the topic: CONTRACTOR CAPACITY AND IMPLEMENTATION OF PERFOMANCE BASED ROAD CONTRACT PROJECTS ON CLASS A ROADS IN KENYA: A CASE OF CLASS A2 ROAD IN KENYA NATIONAL HIGHWAYS AUTHORITY for the period ending : 27/October/2022.

License No: **NACOSTI/P/21/13753**

248944

Director General

NATIONAL COMMISION FOR SCIENCE , TECHNOLOGY & INNOVATION

Applicant Identification Number

Verification QR Code

Appendix V: Schedule of Performance Based Road Contract Maintenance Projects along KeNHA Corridor C

S/No.	PROJECT NAME	LENGTH (Km)	CONTRACT NO.	CONTRACT SUM (Kshs)	CONTRACTOR	START DATE	END DATE
1.	PBC maintenance of Nairobi - Ruiru (A2) Road	32	KeNHA /RD/RA&CM/2794/2019	1,035,706,605.40	M/s Debrosso Ltd	04/04/2019	03/04/2022
2.	PBC maintenance of Ruiru - Thika (A2) Road	22	KeNHA /RD/RA&CM/2720/2018	1,101,507,135.43	M/s. Interways Ltd	01/03/2019	28/02/2022
3.	PBC maintenance of Marua - Nanyuki (A2) Road	55	KeNHA /RD/RA&CM/3156/2020	227,889,802.60	M/s. Raken Ltd	28/07/2021	27/07/2024
4.	PBC maintenance of Nanyuki – Lewa (A2) Road	51	KeNHA /RD/RA&CM/3156/2020	379,418,250.35	M/s. Global Link EA Ltd	28/07/2021	27/07/2024
5.	PBC maintenance of Lewa – Isiolo (A2) Road	30	KeNHA /RD/RA&CM/3156/2020	164,530,234.32	M/s. Nomads Construction Ltd	29/07/2021	28/07/2024
6.	PBC maintenance of Merille - Marsabit (A2) Road	122	KeNHA /RD/RA&CM/2370/2018	158,644,906.00	M/s. Barchbarcho Ltd	18/02/2019	17/02/2022
7.	PBC maintenance of Marsabit - Turbi (A2) Road	122	KeNHA /RD/RA&CM/2744/2018	173,433,514.00	M/s. Northern Frontier Ltd	18/02/2019	17/02/2022
8.	PBC maintenance of Turbi – Moyale (A2) Road	120	KeNHA /RD/RA&CM/3155/2020	175,381,545.00	M/s. Liberty EA Ltd	27/12/2020	27/12/2023