

**COMPARATIVE ANALYSIS OF FORCE ACCOUNT MECHANISM AND
CONTRACTING IN IMPLEMENTATION OF ROAD PROJECTS IN
CENTRAL UGANDA**

BY

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DECLARATION

I, Gamubaka Fred Cedric, registration number **17/U/14625/GMET/PE** declare that, With the exception of instances where appropriate recognition has been made in the text and reference list, this work has been completed entirely by me and has never been submitted anywhere for consideration for a similar award. It is now prepared for submission for review.

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Signature..... Date.....

APPROVAL

As a partial fulfilment of the requirements for the award of a degree of Masters of Science in Construction Technology and Management of Kyambogo University, we, the undersigned, confirm that we have read the dissertation titled "*Comparative Analysis of Force Account Mechanism and Contracting in the implementation of Road Projects in Uganda*" and hereby recommend its acceptance by the university.

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Date: -----

DEDICATION

This dissertation is devoted to Milly Wasagali, my wife, without whose spiritual support, comprehension, patience, inspiration, and motivation, this effort would not have been possible. Just so I could focus on my academics, she had to take up some of my responsibilities.

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God bless you everyone, and I thank you all.

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AICD	Austrian Institute of Company Directors
ASIST	Advisory Support information services and Training
DUCAR	Districts Urban and Community Access Roads
DDEG	Discretionary Development Equalization Grant
EADB	East African Development Bank
IGG	Inspector General of Government
ILO	International Labour Organization
KPMG	Klynveld Peat Marwick Goerdeler
LG	Local Government
MOWT	Ministry of Works and Transport
OAG	Office of the Auditor General
PPDA	Public Procurement and Disposal of Assets
UNRA	Uganda National Roads Authority
URF	Uganda Road Fund
WB	World Bank
FAM	Force account Mechanism

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ABSTRACT

A well-maintained road network is critical to the transformation of a country's economic development. This study compared the unit costs for implementing road improvements in Uganda using the force account mechanism versus contracting. Both quantitative and qualitative research designs were used in the study. The use of questionnaires with closed-ended questions helped collect quantitative data, and interview guides helped collect qualitative data. Stata (V13) was used to analyze the primary data that were gathered from the field, while Excel spreadsheets were used to analyze the secondary data. The findings on the influences for effective implementation of force account mechanism on implementation of road projects found that the cost per unit of the road was the most important, followed by employee skills, the availability of road equipment, and human resource costs. The study also found that the biggest barriers to the effective implementation of FAM were a lack of equipment, accountability for funds, and insufficient funding for road upgrades. The findings further, on comparison of the Unit cost for FAM and Contracting revealed that the unit cost incurred under contracting was five times higher than that incurred under force account mechanism. While on the strategies, the most significant strategy was adherence to public procurement laws followed by establishment of a supervision committee. In conclusion, FAM has saved the implementation costs of road projects in local governments though it still faces challenges most especially funding and equipment that the government has to solve. The study recommends that the government doubles the funding for implementation, buy enough equipment for districts, outfit the areas without workshops, evaluate the procedures for routine manual maintenance, conduct personnel training, and raise worker pay. **Keywords:** Force account Mechanism, Contracting, implementation, Road Project

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Currently, even developed nations such as the United States, Belgium, and the United Kingdom use force account mechanisms in the construction of their road systems (Stephen, 2021). For developed countries, good infrastructure aids productivity and service provision (Tekka, 2018). Any country's economic development depends heavily on its road infrastructure, and maintaining a good road network is critical to improving the standard of living (Byaruhanga, 2017). Due to the high costs of contracting, inappropriate practices in construction projects limit the growth of the

national economy (Tekka, 2018). A study by (Aziz & Hakam, 2016) revealed that 153 out of 175 construction projects in central Uganda contracted experienced delays that ranged from 6 months to over 12 months.

Poor performance in road construction projects has been noted mostly in developing countries. For example, (Kaliba et al, 2019) observed the subpar performance of road construction projects under contracting in regards to contract delays of approximately 227 percent of the initial schedule in Zambia, while delays had climbed to 240 percent in Ghana (Amoatey et al, 2017). Countries like Kenya, Ethiopia, and Benin have used the force account technique frequently (Mugurusi & Mbabazi, 2019).

In many developing nations, especially those in Asia and Africa wherein private contractors continue to be in their infancy, the employment of force account mechanisms in the public sector is still widespread (Engelbert, Kaltenborn, & Reit-Born, 2016). Effective force account mechanism increases local economic development particularly in areas where road projects are underway (Mugurusi & Mbabazi, 2019). Kenol-Ngoleni-Kaani / Mutituni–Kaseve road was launched in the 2016/2017 financial year but only 7.71 percent of the road had been worked on since the launch date with no construction work carried out in the 2016/2017 financial year (Mayende & Wandiri, 2020). The adoption of the Force Account Mechanism for building construction has been stressed by the Tanzanian government since it aims to reduce costs and achieve the greatest return on investment (Allan & Ndyanabo, 2020).

In Uganda, the government has ordered that the force account method be implemented in all 22 stations of the Uganda National Roads Authority (UNRA) and all 22 districts

(BMAU, 2015). In order to prevent early deterioration, give the roads a longer service life, and spare the agencies the significant rehabilitation expenses associated with contracting, the force account technique was introduced (MoWT, 2016). However, this overarching goal hasn't been accomplished. For instance, the percentage of the road network in fair to good condition decreased from 65% in the fiscal year 2012/13 to 47% in the fiscal year 2014/15. (MoWT, 2016). The procurement procedures involved in contracting have always caused the start of numerous road projects to be delayed. For instance, the Kyetume-Katosi-Nyenga Road, Mubende-Kakumiro-Kagadi Road, Kigumba-Kabwoya Road, Kamudini -Kafu, and Kiryandongo Road renovations and Kiryandongo road improvements were all delayed (OAG, 2016).

A study by (Mbabazi and Mugurusi, 2019) asserted that there are irregularities in the implementation of force account mechanism which included; frequent budget cuts for road maintenance, delayed release of funds, delays in the implementation of projects, poor remuneration of the workforce and failure to provide sufficient accountabilities of materials. Public procurement compliance reports approved by the Public Procurement and Disposal of Public Assets Authority have repeatedly indicated that force account implementation and administration are still not fully understood by the designated agencies given the emphasis and regulatory framework on force account mechanisms in Uganda. Some regions in the central part of Uganda were chosen for the case study because it receives the most network traffic for the same amount of funding. In order to determine the most affordable method of carrying out road projects, the study examined the force account system and contracting in the implementation of roads in Uganda.

1.2 Statement of the Problem

The Ugandan Road Sector (URS) underwent reforms in 2006 with the intention of enhancing service performance. A key component of the reforms was the creation of the Uganda National Roads Authority, a semi-autonomous entity tasked with selecting contractors to construct and maintain national roads (Booth, 2019). For the last fifteen years, districts and urban roads maintenance was being carried out through contracting, but given the non-flexibility of contracting and its being less responsive to emergency interventions, created the need for force account mechanism as an alternative (Mugurusi & Mbabazi, 2019). The Ugandan government switched its policy from contracting to utilize the force account mechanism in June 2012. This was done to extend the service life of the roadways and prevent early deterioration. Despite the shift, there have been irregularities in implementation of force account mechanism that include poor maintenance of the road equipment, delayed response by the regional mechanical workshops on mechanical breakdowns, inadequate funding, failure to follow the procurement process and failure to provide sufficient accountabilities of materials. Moreover, it was noted that performance reports in the road sector showed no signs of abating, with the government continuing to lose billions of shillings in construction and servicing (IGG Report, 2020). The study assessed and developed strategies for improving the force account mechanism's implementation in Uganda in response to the aforementioned challenges with the system.

1.3 Objectives of the Study

1.3.1 Main Objective

The main objective of the study was to conduct a comparative analysis of force account mechanism and contracting in the implementation of road projects in Central Uganda.

1.3.2 Specific objectives

The specific objectives of the study were:

- i. To determine the effect of the influence factors in the implementation of force account mechanism in the implementation of road projects in central Uganda.
- ii. To identify the barriers for effective implementation of force account mechanism in Central Uganda.
- iii. To establish a unit cost for FAM and Contracting in implementation of road projects in Central Uganda.
- iv. To develop strategies for improvement in the use of force account in implementation of road projects in Central Uganda.

1.4 Research questions

The study was guided by the following research questions:

- i. What are the influence factors for implementation of force account mechanism in implementation of road projects in Central Uganda?
- ii. What are the barriers to force account mechanism in the implementation of road projects in Central Uganda?
- iii. What is the most cost-effective method for implementation of road projects in Central Uganda?

- iv. What are the strategies for improvement of force account mechanism in implementation of road projects in Central Uganda?

1.5 Justification of the Study

The development and competitiveness of Uganda's economy depend on its road network. According to surveys, Ugandan businesses suffered a productivity disadvantage of up to 58 percent due to infrastructure limitations. Implementing force accounts effectively boosts local economic growth and wealth creation for the populace, especially in places where road construction is in progress (World Bank AICD Report, 2018). In order to enhance delivery of the much-needed infrastructure, the public procurement rules were amended in 2003, introducing force account mechanism as remedy to the challenges that were being faced in the road sector. In line with efficiency in service delivery, Government instructed all Local Governments to execute road works through force account mechanism. In spite of the reforms and call by government, maintenance of road projects under the force account mechanism is still associated with inadequate funding and frequent equipment breakdown. This is because since the inception of force account mechanism, the Government has spent vast resources through the districts to address the inherent bottlenecks in the road sector. Premised on the principles of accountability and governance of the FAM, this study was therefore justified.

1.6 Significance of the Study

The findings of this study are advancing knowledge of force account mechanisms and contracts in the execution of road projects in Uganda. The study findings are crucial to other researchers who are involved in the creation of policies and who contribute to

the literature by providing more information on the variables that affect the force account mechanism in the construction sector. This study can be combined with others conducted in different countries or areas to compare force account mechanisms and contracting, facilitating research on techniques to enhance the performance of road building projects on a global scale.

1.7 Scope of the Study

1.7.1 Content Scope

The study concentrated on the comparative analysis of the force account mechanism and contracting in the implementation of road projects in Uganda, paying particular attention to the influences on the force account mechanism, the formation of a unit rate for the FAM and contracting in the implementation of road projects, the barriers to the force account mechanism, and generating recommendations for the improvement of road projects. The research concentrated on the independent variables—road construction project implementation—and the dependent variables—force account mechanism influencing factors and force account implementation barriers. The dependent variables were based on the principal important implementation indicators, which included timely delivery, availability of funds and equipment, cost, quality of work, and customer satisfaction. The independent variables were found through a review of the literature and expert interviews.

1.7.2 Geographical Scope

The study was carried out in Uganda's central region. The districts under study in the central region included Kyankwanzi, Mukono, Entebbe MC, Kiboga, Mityana, Luwero, Buikwe, Nakaseke, and Wakiso with the exception of Jinja district. The

Central region was selected because it has the largest road network and receives the biggest traffic volume thus maintenance of the road network should start with the central region before spreading out. The central region was also selected because of the challenges it has been experiencing in realizing value for money as indicated in the (auditor general report ,2014) including but not limited to frequent equipment breakdowns, Poor quality works undertaken which impacts on value for money, violation of the rules and procedures especially in regard to public procurement of road works.

1.7.3 Time Scope

The research study began in October 2018 and lasted in January 2023 in order to successfully acquire data related to force account mechanism.

1.8 Conceptual Framework

The conceptual framework was created to demonstrate the relationship between the moderating variables intended to guide the study and the independent variables (force account mechanism and contracting) as well as the dependent variables (implementation of road projects). A conceptual framework is helpful in depicting the link between the independent and dependent variables under consideration, claim Kisavi et al. (2019). This study focused on factors influencing performance of projects implemented under force account mechanism and contracting as the independent variables. The identified independent factors included; procurement factors, equipment, funding, skill and project stake holders' factors. A linkage between the independent variables and dependent variables is illustrated by the conceptual framework in Figure 1.1 below.

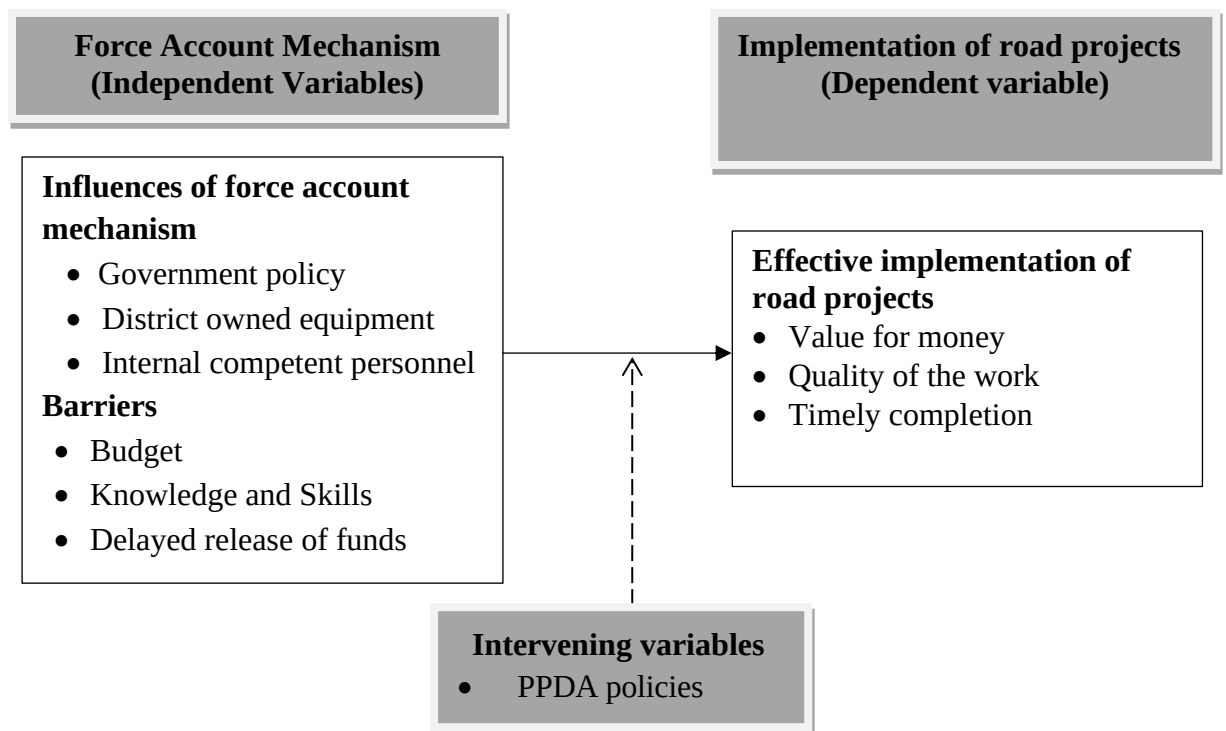


Figure 1.1: Relationship between the dependent and independent variables

1.9 Chapter Summary

This chapter made a detailed introduction to the study, which covered a discussion of the background information related to the influencing factors and barriers to the implementation of the force account mechanism in the road construction sector globally, regionally, and specifically in Uganda. The introduction emphasized that despite the force account mechanism being implemented as a directive for all district local governments in Uganda, the majority of road construction projects done under contracting in Uganda are completed with cost overruns, out of quality, beyond the time of completion, and out of scope.

The primary objective of the research study was to compare force account and contracting in the implementation of road works in Uganda, with a focus on identifying

the factors, their unit costs, determining the barriers, and devising improvements for force account mechanisms in the country's road construction projects.

The substantial contribution of this research was to improve on the understanding of force account mechanism and contracting in the road sector, particularly in developing nations like Uganda, was also covered in this chapter. The conceptual framework was created to demonstrate the connection between the force account mechanism (independent variables) and the execution of road construction projects (dependent variables).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Safinil (2018) argue that a systematic identification, location, and analysis of papers providing information relevant to the research subject constitutes a literature review. This chapter reviews theoretical and empirical study on effect of influence factors on the performance of force account mechanism, comparative analysis of Unit cost for

FAM and Contracting in the construction of road works, barriers to contracting and strategies for improvement of force account mechanism.

2.2 Contracting Versus Force Account Mechanism in Road Construction

Governments around the world are putting a lot of attention on infrastructure development, with projected spending on roads ranging from \$40 trillion to \$50 trillion (Byaruhanga & Basheka, 2017). Numerous unanticipated obstacles, including a lack of materials, an expansion of the scope of the project, a delay in the provision of essential services, and modifications to designs, drawings, and bills of quantities, have been blamed for the poor performance of road construction in Argentina and other South American nations (Wambui et al,2015). According to (Nyangwar & Datche,2015), donors like the World Bank provided funding to Sub-Saharan African nations in the 1980s, including Lesotho, Malawi, Mozambique, Kenya, Tanzania, and Zambia. These nations embraced the force account method in construction after realizing the inefficiencies associated with using contractors. In the late 1980s use of force account was recognized to produce good results than use of contracting in road construction works.

As per (Murithi, 2017), Mozambique did not trail behind as in the 1983 almost 100% of the work was done by force account same to Lesotho employed force account in the road maintenance rather than contracting. Though Tanzania was seen to be the pioneer in the force account while nations like as Zambia and Malawi were viewed to make considerable progress in the transformation from contracting.

Due to this, African roads are currently in a deplorable state by international standards. (Oluka, 2019) claims that contractors consistently cause delays in the job due to a lack

of equipment and people. (Mulla &Waghmare, 2015) argued that under contracting, delays in road building are caused by financial indiscretion or dishonesty, an ineffective project team, poor site management, poor site supervision, and improper road construction techniques. In Nairobi, most contracted civil engineering projects encounter delays (Aziz &Hakam, 2016). Without regard to cost, the State of Michigan has built tiny projects using force accounts (Mendez, 2017). The delays frustrate development plans and also impacts negatively on the development due to the associated cost implications (Seboru, 2015). Technical competencies of contractors are specific to a given job (Detsimas et al., 2016). In addition, (Detsimas et al., 2016) stated that contract performance is a key success factor in road construction projects under contracting. Some contractors revealed that clients do not have enough financial stability to run projects on their own (Belay &Torp, 2017).

2.3 Force Account Mechanism

The (PPDA Act, 2012) states that a force account mechanism is constructed using public or semi-public agencies or departments, with the public or semi-public agency using its own staff and resources. According to (Federal Aid, 2018), the force account technique is a non-competitive bid contract in which the project must be completed by a local municipal authority, city, or village with authorization to do so by providing the labor, machinery, and materials under its direct supervision. The advantages of force accounts, according to (PPDA Act, 2012), include efficiency improvements where the entity is able to complete tasks much more quickly, improvement of the procuring entity's internal capacity because tasks are completed and overseen by the procuring entity staff, and cost savings when compared to alternative methods. As instructed by the Ugandan government, the local governments are currently adopting

the force account mechanism. The application of the force account mechanism system by the Japanese, who are well-versed in construction operations, has increased efficiency in the building of roads (Haughey, 2019).

2.4 Influence factors on Performance of Force account Mechanism

2.4.1 Government Policy

These are directives by the central Government to use force account mechanism instead of contracting of external or local contractors. The PPDA distributed Circular No. 3 of 2012, which addresses the usage of the Force Account mechanism, to all Local Government Accounting officers on September 21, 2012. In addition to Circular No. 2 of 2008, the goal of the circular as a policy was to provide more instructions on how to use Force Account, among other things, to make it easier for Local governments to use the road equipment that the Government has given them to maintain roads in the districts (PPDA, 2012). Utilizing force accounts in the execution of various construction projects is being heavily stressed in the public sector in order to ensure cost effectiveness and value for money when allocating limited resources (France, 2019). For instance, the Tanzanian government has been funding building infrastructure upgrades since 2016 by employing force accounts as a procurement strategy (Shengeza, 2017).

2.4.2 District Owned Equipment

Road project construction requires a variety of tasks, including earthwork, excavation, transporting, laying, and compacting. Contractors are unable to afford the costly heavy machinery and staff that are needed for operations. Therefore, choosing the appropriate equipment for the force account mechanism is a crucial step in the building of road

projects. The 2015 budget monitoring report indicated that good equipment was purchased and operators received training, however it was insufficient to allow for efficient management and use of the equipment. Truck drivers rather than operators made up the majority of the employees who were sent for training. (Budget monitoring Report, 2015) indicated that it is simple to borrow equipment from the regional headquarters to repair roads under the force account method if some local governments lack the necessary tools for maintenance operations. The cost for borrowing equipment is always low and machines are always available. (Ali & Wen, 2011) found out that lack of experience and competency of labor, unsuitable construction equipment and poor weather condition are critical to quality work. Availability of funds to acquire materials for road maintenance is also critical for force account mechanism (Tekka, 2018).

2.4.3 Internal Competent Personnel

Competence is the capacity of a person to perform a task correctly. In his study, (Tekka, 2018) found that good supply chain management and training were key influencers on the force account mechanism. According to statistics on the performance of the road industry, the government wastes billions of shillings on subpar construction and service (OAG, 2016). According to the (OAG Report, 2015), flaws in the selection of contractors have caused delays in the start of a number of road projects.

Government competency definitions help employees understand what they must deliver (Dubois & Rothwell, 2018). When skills are clearly defined, local governments

may assess how well personnel behave and contribute to capacity growth (Dubois & Rothwell, 2018).

2.5 Barriers to implementation of Force account Mechanism

2.5.1 Bureaucratic Tendencies

(Wiguna & Scott, 2015) identified a number of factors that contribute to time overruns on large road projects, including bureaucratic tendencies in decision-making, delayed design, design review approvals, delays in processing certificates for executed works, delays in approving material, and sample approvals.

2.5.2 Poor Equipment Maintenance Policy

According to a report by (EPRC, 2016), the majority of the Chinese equipment is outdated, non-functional, in desperate need of repair, or grounded, despite the fact that it was delivered to the district by the government under the force account method. Even while the Government's regional workshops for machine maintenance and repair are still in operation, it takes longer to transport the machines there for repairs. The lower levels of district work have mostly been immobilized as a result of this. One of the main obstacles to infrastructure development in the local governments was seen to be the road equipment's operational state in addition to its age (Kasim, 2019).

Limited funding is one of the challenges in the repair of equipment's and machinery by local governments. Moreover, the district is forced to ground part of its equipment since the expense of transporting the machinery to building sites is too high (Magidu et al., 2019). Paying mechanics' allowances when they are called to the district to perform repairs and replacement parts is expensive (Magidu et al., 2019).

2.5.3 Inadequate Routine Manual Maintenance Activities

In 2009, UNRA failed to grade or mow the grass along the border of some roads, according to an OAG assessment on road maintenance. It was discovered that the grass had grown over the acceptable limit, causing it to funnel storm water onto the carriageway, causing the shoulders and a portion of the carriageway to collapse. On the Ishaka-Katunguru route around Rutoto Hill, at the Igorora Town Board, on the 17 km Ibanda-Mbarara road, and on the 18 km Mbale-Sironko road, this scenario was particularly prevalent. Similar to this, gravel roads were found to have overgrown grass that was reducing their width and blocking vision, increasing the likelihood of accidents. The Kamuli-Namasagali road is an example.

2.5.4 Low Funds Absorption Capacity

As a result, the district auditors gave the absorption of funds a bad rating, demonstrating that the issues with rural road repair are not just tied to financing (OAG, 2012; URF, 2013). According to studies, institutional constraints related to a lack of defined accountability at various decentralized levels for maintenance planning, budgeting, and implementation also contribute to the poor state of Uganda's roads (OAG, 2012; URF, 2013). Furthermore, there is an excessive reliance on large machinery, which is typically operated by staff who are unable to maintain it or fix it when it malfunctions. This explains why the majority of the district's equipment is inoperable (Magidu et al., 2017).

2.5.5 Inadequate Personnel and skills

Some sub-counties in Lira District lack the staff and resources necessary to manage road repair tasks under the force account mechanism, based on the (Budget Monitoring

Report, 2015). In order to plan and oversee the road repair work with the restricted staff, the district engineer and the team must reach out to the sub counties. According to a 2015 budget monitoring report on the force account in Masaka, the district Engineering Department has a restricted capacity to oversee road repair projects. Four engineers are reportedly employed by the municipality. Specifically, the principal engineer, the engineer for works, the engineer for supervision of all works, the electrical engineer, and the engineer for buildings. To oversee the road construction, the department is lacking a road inspector and a road overseer. The district lacks access to the road gangs that are supposed to manage labor-based routine maintenance. The requirement that workers be between the ages of 18 and 45 is another reason for the shortage of labor. The youth don't take part in the road maintenance projects for districts under the force account method since they are unwilling to work for the meager wage.

The majority of project delays, according to a study conducted in Thailand by (Kaming et al., 2018), can be attributed to the contractors. In their 2016 literature review on the reasons of project delays (Majid & McCaffer., 2016) asserted that contractors were to blame for 50% of the delays, which they classified as non-excusable delays. In a study by (Kumaraswamy & Chan 2017), there are six significant factors that are common to both building projects and civil engineering projects: inadequate contractor experience, client-initiated variations, and slow decision-making involving all project teams, and poor site management and supervision.

2.6 Strategies for improving the implementation of force account mechanism

According to (BMAU, 2019), having the equipment available when it is needed is a crucial factor in enabling district local governments to complete the project on schedule. Local governments should be given the inadequate equipment, such as water bowsers and graders, by the ministry of works.

Under FAM, prompt material acquisition is another crucial component. The procuring organization is in charge of acquiring the materials needed to facilitate the process. Lack of material availability causes the contractor to spend more time without producing any value (Shengeza, 2018).

A well-developed procurement system for performing out procurement operations in a particular project is likely to assist effectiveness in operations. The purchasing organization should also have a strong supervision system to allow administration activities since construction underneath FAM organizations retain risk to a considerable extent because payments are made prior to the completion of the project's stated phase and the purchasing organization does not have performance guarantees from the local authority (Must Consultancy Bureau., 2017; BMAU, 2019).

The procuring entities need, among other things, possess clearly stated goals, a capable project manager, senior management support, competent team members, adequate resource allocation (equipment), adequate communication flows, control mechanisms, feedback capabilities, and responsiveness customer (Pinto & Slevin, 1987).

2.7 Summary of Literature Review

In Uganda, force account mechanism is continuously being used in the day today works by various entities like Ministry of Works and Transport, UNRA and district Local Government units. In particular all district local governments are mandated to maintain their road networks through the force account mechanism. However, it is unclear how much the force account method is used in the upkeep and operation of the road system. There is also lack of proper documentation concerning the influences and barriers faced in the use of such operations. Experiences and lessons drawn from countries that have previously used this method and later phased it out indicate equipment, funding, personnel and planning as key indicators to success of force account mechanism. Then, these indicators can be utilized for benchmarking, and they will be a crucial part of any organization's effort to advance best practices and resolve implementation issues in road construction projects. The following chapter covered the research study's procedures and provided clear explanations of how the research was carried out.

CHAPTER THHREE

METHODOLOGY

3.1 Introduction

This chapter consists of research methods that were employed in the study and makes an effort to provide a succinct and clear explanation of the methodologies used to conduct the research. It demonstrates the research design, study population, sample and sampling procedure, data collection tools and procedure, validity and reliability of research instruments and data analysis techniques.

3.2 Research Design and Approach

A cross-sectional research design was used in the study. In a cross-sectional survey design, data are gathered on variables across a specified time period to confirm the existence of a phenomena. Given the short duration of the research project, a cross-sectional research methodology was used. This design was used to generate in depth understanding of the influence factors on maintenance of road works, comparative analysis of Unit cost for FAM and Contracting, barriers to contracting and the strategies of improving the road projects in Uganda. The study employed a triangulation approach with both qualitative and quantitative techniques. The contrast of the force account system and contracting in the implementation of road projects was explored using qualitative methodology. Since the researcher wanted to describe the case under investigation and also conduct multivariate analysis, including rankings, correlations, and regression analysis, the research study also used a descriptive research design. To obtain, examine, and present data, it is a theory-based research design.

3.3 Study Population

Study population, according to (Babbie, 2010), is the collection of components from which the actual sample is drawn. 200 people participated in the study, including 35 councilors, 48 technical staff from the works departments, 20 district engineers, 15 procurement officers, 14 chairpersons of local councils, 27 responders from the finance departments, and 41 members of the contracts committee (MAPU, 2016/2017). Mukono, Kiboga, Kyankwanzi, Luwero, Mityana, Wakiso, Buikwe, Kayunga, Nakaseke, and Entebbe Municipal City were among the districts. Due to the fact that the study was conducted on a limited population, (Krejcie & Morgan., 1970) table was selected in estimating the sample size. It allows the researcher to reduce sampling errors, is advised for usage in investigations that are directed at a known population, according to (Lester, 2023). The study included 30 members from the contract committees in the districts, 48 Technical personnel from the works departments, 10 district engineers, 15 procurement officers, 10 Local council chairpersons, 20 respondents from the finance departments and 25 councilors. These were chosen because they are thought to have the information that suites the study. The central region was selected since the Uganda Road Fund Reports (2018), indicated that these were among the worst performing Districts in Uganda since inception of the Force Account Mechanism.

Table 3.1: Population and Sample Size

S/N	Respondent	Population	Sample	Selection Criteria	Research tool
1.0	Contracts committee members	41	28	Simple random	Questionnaire
2.0	Technical Personnel in Works department	48	42	Purposive	Interview guides
3.0	District Engineers	20	10	Purposive	Interview guides
4.0	Procurement Officers	15	14	Purposive	Interview guides
5.0	LC. V Chairpersons	14	10	Simple random	Interview guides
6.0	Finance departments	27	19	Simple random	Questionnaire
7.0	Councilors	35	24	Simple random	Questionnaire
	Total	200	147		

3.4 Sample Size and Sampling Techniques

3.4.1 Sample Size

A sample is a limited portion of a statistical population whose characteristics are investigated to learn more about the population as a whole. An ideal sample size would be one that is both sufficient and reflective of the larger population. According to Gay et al. (2005) descriptive study of this kind requires a sufficient sample size of 30%. An ideal sample is one that satisfies the criteria for effectiveness, representativeness, dependability, and adaptability (Kothari, 2004). (Amin, 2005) underlined the need for a researcher to choose a sample size that will yield enough information to address the

question at hand. A sample is crucial since it saves money, time, and is very accurate (Amin, 2005).

3.4.2 Sampling Technique

A sampling technique is described by (Kothari, 2008) as a strategy used to choose a sample from a specific population. In order to choose the study participants, both probabilistic and non-probabilistic sampling strategies were employed. Purposive sampling was chosen for non-probability sampling, whereas stratified random and simple random sampling techniques were utilized for probability sampling. Purposive and basic random sampling were both used in this investigation. Members of the contracts committee, staff in the works department, councilors, and staff in the finance department were chosen at random to be respondents. This technique allows each respondent an equal chance to be chosen and reflected in the sample (Amin, 2005). Engineers, district chairs, and personnel from the procurement divisions were all sampled based on purpose. When choosing members of the population to take part in the study, a researcher can use the approach of "purposeful sampling," which gives him the freedom to use his own discretion (Saunders et al., 2012).

3.5 Data Collection Methods and Instruments

3.5.1 Data Collection Methods

In this study, both primary and secondary data were collected. (Kothari, 2011) defined primary data as those that were gathered for the first time and were hence unique. With the help of a semi-structured questionnaire, the primary data were gathered. According to (Mwakajo & Kidombo., 2017), questionnaires are a common way to gather data since researchers can readily gather information and the questionnaire results are

simple to code. The drop and pick approach were used to get the data. Both the document analysis method and the interview method were used to gather secondary data.

3.5.2 Data Collection Instruments

Using a mix of closed- and open-ended questionnaires, primary data were gathered. Because of the questionnaire's straightforward administration and affordable execution, it was chosen. Annual reports, MoWT databases, contract documents, project completion reports, and progress reports of various local government projects were used to gather secondary data. Additionally, the interview guide forms were used to collect the information.

3.6 Validity and Reliability of Instruments

3.6.1 Validity of the Instruments

According to (Ndegwa, 2013), validity is the extent to which a researcher has measured the variables that are intended to be measured. A data collection tool's ability to measure what it is intended to measure is known as its validity (Chitkara, 2005). Numerous techniques, such as construct validity and factor analysis, as well as content validity and face validity, are employed to validate the common questionnaire. In the study, content validity index was used. With the assistance of four judges, inter judge was utilized to determine the content validity index. Each judge offered their assessment using a Relevant (R) and Irrelevant (IR) scoring scale in order to determine the average content validity index (CVI). Items deemed extraneous were removed or replaced with pertinent ones (See Appendix IV). CVI was computed using equation (3.1).

$$CVI = n/N \dots\dots\dots \text{(Equation 3.1).}$$

Where: N is the total number of items in the instrument, and n is the number of items that were deemed relevant. Table 3.2 displays the CVI

Table 3.2: Validity Index

Items	Content Validity Index
Influence factors on the performance	0.8586
Barriers faced in road projects	0.7857
Average Content Validity Index	0.8239

The CVI for the questionnaire was obtained as 0.8239 which was above 0.7 that is considered as the benchmark in a survey (Odiya, 2009). A CVI of 0.70 or higher is necessary for the questionnaire's content to be valid, indicating that the questionnaire's questions were valid and could, thus, produce valid findings.

3.6.2 Reliability of the Instruments

The degree of internal consistency over time is a measure of a research tool's reliability (Johnson, 2014). Cronbach's alpha (α) was used as part of an internal consistency technique to gauge the dependability of data gathering tools. On the other hand, the reliabilities of items in the questionnaire were tested using Cronbach Alpha (α) method provided by Stata (V13). Reliability for the items for the different constructs was attained at the benchmark of $\alpha = 0.70$ and above (Rehman et al., 2017). A general rule of thumb is: 0.9-1.0 Excellent, 0.8-0.9 Good, 0.7-0.8 Acceptable, 0.6-0.7 Questionable, 0.5-0.6 Poor, and 0.0-0.5 Unacceptable. The questionnaire's alpha values were valid at or higher than the industry standard of 0.70. (Amin, 2009). This

suggested that the tool's questions were reliable and could be used to gather reliable data, which in turn would produce reliable results. Table 3.3 below shows the Values of Cronbach's Alpha.

Table 3.3: Values of Cronbach's Alpha

Parameter	Number of items	Cronbach alpha (Average inter item covariance)	Cronbach alpha (standardized items) (Scale reliability coefficient)
Influence factors	7	0.811	0.8383
Barriers (FAM)	17	0.764	0.7664
Strategies	9	0.752	0.8821

3.6.3 Piloting of the instruments

The primary goals of the pilot project were to determine the estimated time needed to complete a questionnaire with one respondent, to pre-test the questionnaires to check their applicability to the expected respondents, and to determine the most effective method of conducting the main survey. Following the pilot survey, various changes were made to the questionnaires, including the addition of new questions, the deletion of some, and the rewording of others to make them more comprehensible. The study participants that took part in the pilot study were excluded from the actual data collection process. The researcher explained to the respondents that the study was only done for academic purposes and that the responses would be kept private in order to ensure that they participated voluntarily. After the questionnaires were given out, data collecting started. The respondents retained the questionnaires which were later collected after three days basing on the decision made during pretesting that allocation of three days was adequate for the respondents to provide their opinions. As for the

interviews, arrangements were made with the selected key informants on the day and date of the interviews. The interviews were recorded, and the responses were written down.

3.7 Data Analysis

3.7.1 Quantitative Data Analysis

This analysis concentrated on numerically expressed data. Stata was used to edit, code, and conduct additional analysis on the data (v13). Data were double-checked for accuracy after submission, and the researcher utilized descriptive statistics to quantify central tendency to explain the data. Quantitative data analysis also uses tables, graphs, and percentages as other ways to show data.

3.7.2 Qualitative Data Analysis

Interviews were done to gather qualitative data, and the field notes were afterwards edited and cleaned up to produce organized data. Following transcription, the data were coded, categorized, and incorporated into the sub-sections of the study's many specialized objectives.

3.8 Achievement of Specific Objectives

3.8.1 Effect of influences on the implementation of force account mechanism

Reading various journal papers, books, reports, and other significant documents found to be present in the road sector was done as part of a review of the literature about the implementation of force account mechanism in the implementation of road projects to determine the factors influencing its implementation. Additionally, utilizing questionnaires to conduct interviews with several regional specialists in the field of study, these factors were further confirmed. These questions were close ended from which the respondents chose the best alternative. The responses were analyzed in Stata (v13) to generate frequency tables, and relative importance index (RII) values of the different factors under review were generated and their average computed. The relative importance index was computed as suggested by (Cheung *et al.*, 2004; Iyer and Jha, 2005; Ugwu and Haupt, 2007), using equation 3.1.

$$RII = \frac{\sum WA}{N} \dots\dots\dots \text{(Equation 3.1)}$$

Where; W is the weight given to each factor by respondents ranging from 1 to 5

A = the highest weight = 5

N = the total number of respondents

Using the RII values computed, the factors were ranked in ascending order and the factors with RII values above the average RII value were taken to be the most significant factors influencing performance of road construction projects. While those factors with their RII values below the average RII value were taken to be insignificant. Therefore, factors with $RII > RII_{AV}$ were taken as significant factors and $RII < RII_{AV}$ were taken as insignificant factors. The findings are presented in chapter four section.

Furthermore, the regression model for the factors was developed to determine and predict the probability of their influence on the implementation of force account mechanism so as to determine the factors that matter the most, which factors can be ignored and how these factors influence each other using a general regression equation 3.3;

$$Z = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + X_6\beta_6 + X_K\beta_K \dots\dots\dots \text{(Equation 3.3)}$$

Where; Y = the dependent variable - implementation of force account mechanism

β_0 = the constant,

$X_1 \dots X_K$ = independent variables (Factors influencing performance),

$\beta_1 \dots \beta_K$ = the estimates of the independent variables. i.e., the coefficients of the independent variables.

3.8.2 Barriers to efficient implementation of FAM

The answers provided by the study participants on the questionnaires, the interviews, and the evaluation of pertinent documents from which the impediments were identified helped to achieve this objective. The researcher also achieved this objective through interacting with the individuals at the top management level in the selected districts in the central region. The findings were analyzed using frequencies and percentages generated in Stata (v13) and relative importance index (RII) values of the different factors under review were generated and their average computed. The relative importance index was computed as suggested by (Cheung *et al.*, 2004; iyer and Jha, 2005; Ugwu and Haupt, 2007), using equation 3.1.

$$RII = \sum W A x N \dots\dots\dots \text{(Equation 3.1)}$$

Where; W is the weight given to each factor by respondents ranging from 1 to 5

A = the highest weight = 5

N = the total number of respondents

Using the RII values computed, the factors were ranked in ascending order and the factors with RII values above the average RII value were taken to be the most significant factors influencing performance of road construction projects. While those factors with their RII values below the average RII value were taken to be insignificant. Therefore, factors with $RII > RII_{AV}$ were taken as significant factors and $RII < RII_{AV}$ were taken as insignificant factors. The findings are presented in chapter four section.

Furthermore, the regression model for the factors was developed to determine and predict the probability of their influence on the implementation of force account mechanism so as to determine the factors that matter the most, which factors can be ignored and how these factors influence each other using a general regression equation 3.3;

$$Z = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + X_6\beta_6 + X_K\beta_K \dots\dots\dots \text{(Equation 3.3)}$$

Where; Y = the dependent variable - implementation of force account mechanism

β_0 = the constant,

$X_1 \dots X_K$ = independent variables (Factors),

$\beta_1 \dots \beta_K$ = the estimates of the independent variables. i.e., the coefficients of the independent variables.

3.8.3 Establishment of a Unit Cost for FAM and Contracting

The objective of establishing a Unit cost for FAM and Contracting in the construction of road works was achieved through collecting data on the unit costs of the road works under contracting and the unit costs under force account mechanism. This data was then used to generate graphs to be used for comparison purposes. Below are the underlying assumptions made for each financial year to come up with the unit rates following the prevailing market rates. The cost of constructing 2km stretch was computed and later converted to rate per km.

Assumptions:

The assumptions were used based on the prevailing market prices for hire of road equipment and materials. The productivity rates were also based on the current productivity for the newly acquired district equipment.

i) Unit rate for road way shaping;

- a. Daily production rate of the grader is 1.5km
- b. Production rate of the roller and water bowser depends on the grader
- c. Fuel consumption rate of the grader is 200litres and roller 80litres/Km
- d. Water bowser consumption rate is 80litres per day
- e. Operator daily allowances for heavy equipment is UGX 50,000
- f. Daily hire rate of the grader is UGX 1,000,000
- g. Roller is hired at UGX 800,000 per day and water bowser is UGX 500,000

ii) Unit rate for offshoot construction:

- a. Production rate of the backhoe is 20 offshoots daily

- b. The average length of each offshoot is 50m, average width and depth of 1m respectively.

iii) Rate for construction of the end structures

- a. 3 Bags of cement per headwall
- b. A ton of hardcore per headwall @ 450,000
- c. 2 tons of sand per headwall @ 90,000
- d. 2 Masons and 2 porters are used to construct each line
- e. 20 Percent is allowed for water, protection works and formwork

iv) Rate for culvert supply and installation:

- a. Cost of culvert installation per line is UGX 150,000
- b. Transport cost per piece is UGX 40,000
- c. Loading and offloading costs are UGX 20,000 per piece
- d. Cost of each culvert is UGX 200,000

v) Rate for gravelling works:

- a. Hire rate for the tippers is UGX 1,000,000
- b. 40 tons tippers are used with capacity of 24 m³
- c. Production rate of the grader and roller depends on the tippers and haulage distances.
- d. Production rate of the per tippers is 180m³
- e. Rollers are hired at UGX 800,000 per day
- f. Daily fuel consumption of each tipper is 100litres
- g. 10% is allowed for lubricants
- h. Roller consumes 80litres per day

- i. Operator daily allowances for each equipment is UGX.50,000
- j. Operator daily allowances for each tipper is UGX 30,000
- k. 30% of the money for gravelling is allowed for plant maintenance
- l. Cost per trip of gravel was UGX 10,000

The costs for the different activities were computed to obtain the total cost for constructing the 2 km stretch and later divided by 2 to obtain the cost per km. The contracting rates for the interconnectivity program for the ministry of works and transport were compared to the cost per kilometer for the several financial years that were under contract. With the exception that machines are not rented and the individuals who carry out the task are employees of the entity, the unit prices for employing the force account mechanism were likewise obtained. The findings are presented in chapter four section 4.8.

3.8.4 Force account improvement strategies in road projects in Uganda

The researcher was able to develop appropriate strategies for improving the implementation of force account in the execution of road projects by taking into account the influences that had a significant impact on the implementation of force account in execution of road projects, as determined by specific objective (i) as well as the significant barriers to effective implementation of force account. These questions were closed ended from which the respondents chose the best alternative. The responses were analyzed using Stata (v13) to generate frequency tables and mean values, which were ranked basing on the level of importance. The variables were explained basing on their rankings.

In this research, Likert scales (ordinal scales) were used in specific objectives; one, two and four as shown in Table 3.1 for ranking or rating data. This normally uses integers in ascending or descending order.

Table 3.4: Ordinal scale used for data measurement

Item	Very high significance	High significance	Medium significance	Low significance	Very Low significance
Scale	5	4	3	2	1

3.9 Chapter Summary

This chapter covered the study's methodology, including the strategies and methods employed to conduct the research. The descriptive study design and examination of both quantitative and qualitative data were mostly used to accomplish this. The methodology of the research study design involves examining each individual target in turn while employing questionnaires as the tools and methods to gather data. Respondents were chosen at random from a population of contracts committee members, district engineers, and district executive members to fill out the questionnaires. The data gathering instruments underwent a preliminary test as a means of piloting the instruments. The instruments were examined and measured to guarantee validity and reliability, respectively. Correlation and regression analyses were utilized to analyze the data using the statistical program Stata 13, and the results were used to draw conclusions and offer advice. The next chapter discusses, presents, and analyses results.

CHAPTER FOUR

RESULTS PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

The findings that the researcher discovered while conducting his investigation are presented in this chapter. The study's objectives included examining the influences of the force account mechanism on the implementation of road projects in Uganda, examining the barriers to improving the force account mechanism, establishing a unit cost for FAM and contracting during the execution of road projects in Uganda, and developing strategies for enhancing the use of force account during the execution of road projects in Uganda. The data are further examined and discussed in respect to the four distinct goals outlined in chapter one. The information offered includes the response rate, demographics of the survey respondents, and results relative to each specific study purpose. The results of the questionnaires were used as the basis for the analysis. In addition to inferential statistics, the researcher employed frequency tables and bar graphs to show the data. The chapter also discusses the results with respect to the views of scholars and researchers who did related work and the contribution of the study for future knowledge extension and understanding.

4.2 Response rate

The ratio of useable surveys to total questionnaires distributed is known as the response rate (RR). The total number of respondents who were interviewed divided by the total number of eligible respondents is the response rate, according to (Meng-JiaWu et al., 2022). In a similar vein, the ratio of respondents with whom contact was made to the total number of completed interviews and questionnaires is known as the

response rate (or the number of all possible contacts who were interviewed). An important criterion for assessing the study's quality is response rate (Krishnan & Poullose., 2016). Rarely does any research instrument, including interviews, receive a 100% response rate unless it is compelled to be used on a captive audience (Krishnan & Poullose., 2016).

Table 4.1: Response Rate

Category	Expected Response	Actual Response	Response rate
Contracts committee members	28	20	71%
Technical Personnel in Works department	42	37	88%
District Engineers	10	10	83%
Procurement Officers	14	10	100%
LC. V Chairpersons	10	7	70%
Finance departments	19	10	53%
Councilors	24	20	83% ^s
Total	147	114	78%

According to Table 4.1, the overall response rate was 78% ($114/147 \times 100$). The high response rate indicates that most respondents were enthusiastic about the survey. Moreover, the study's findings reflect the views and opinions of many of the respondents who were specifically targeted. These views pertain to the status of the comparison of the force account mechanism and contracting in the execution of road projects. The finding is corroborated by (Krishnan & Poullose., 2016) observations, which claim that high response rates suggest larger data samples and more statistical power, increasing the likelihood that the sample is representative of the population.

This suggests that conclusions about the study can be drawn based on the 78% response rate.

4.3 Multi-collinearity Results

The level of collinearity in a multiple regression model was identified and quantified using a statistical method known as the variance inflation factor (VIF). The degree of correlation between the dependent and independent variables in the regression model was determined using multi-collinearity. Before choosing the variables for the regression model, testing is crucial. When the variables in the research are strongly correlated, a change in one variable will result in a change in another, which will lead the model to vary greatly. The association between VIF and rest is larger the higher the value of VIF. The association is thought to be high when the VIF is greater than 10. The results are shown in Table 4.2.

Table 4.2: Multicollinearity test for independent variables

	Independent Variables					
Dependent Variable	Age	Gender	Education	Department	Experience	Average VIF
Influences						
a. Road Unit Cost	1.14	1.23	1.15	1.27	1.13	1.18
b. Duration	1.14	1.23	1.15	1.27	1.13	1.18
c. Human Resource	1.14	1.23	1.15	1.27	1.13	1.18
d. Skills	1.14	1.23	1.15	1.27	1.13	1.18
e. Materials	1.14	1.23	1.15	1.27	1.13	1.18
f. Uganda Road Fund	2.81	2.82	1.31	1.73	1.37	2.01
g. Equipment	1.14	1.23	1.15	1.27	1.13	1.18
Barriers						
a. Lack of equipment	1.1 4	1.23	1.15	1.27	1.13	1.18
b. Unreliable materials	1.1 4	1.23	1.15	1.27	1.13	1.18
c. Unqualified personnel	1.14	1.23	1.15	1.27	1.13	1.18
d. Inadequate man power	1.1 4	1.23	1.15	1.27	1.13	1.18
e. Poor schedule management	1.1 4	1.23	1.15	1.27	1.13	1.18
f. Poor contract management	1.1 4	1.23	1.15	1.27	1.13	1.18
g. Disputes	1.1 4	1.23	1.15	1.27	1.13	1.18
h. Over commitment of the contractor	1.1 4	1.23	1.15	1.27	1.13	1.18
i. Lengthy procurement	1.1 4	1.23	1.15	1.27	1.13	1.18
j. Poor communication	1.1 4	1.23	1.15	1.27	1.13	1.18

k. Political insecurity	1.1 4	1.23	1.15	1.27	1.13	1.18
l. Funding	1.1 4	1.23	1.15	1.27	1.13	1.18
m. Fuel shortages	1.1 4	1.23	1.15	1.27	1.13	1.18
n. Project location	1.1 4	1.23	1.15	1.27	1.13	1.18
Policy challenges						
a. Public service structure	1.14	1.23	1.15	1.27	1.13	1.18
b. Inadequate funds	1.14	1.23	1.15	1.27	1.13	1.18
c. Poor accountability	1.14	1.23	1.15	1.27	1.13	1.18
d. Low remuneration	1.14	1.23	1.15	1.27	1.13	1.18
e. Inadequate training	1.14	1.23	1.15	1.27	1.13	1.18
Strategies						
a. Right procurement	1.15	1.25	1.15	1.29	1.13	1.19
b. Timely funds	1.14	1.23	1.15	1.27	1.13	1.18
c. Recruiting staff	1.14	1.23	1.15	1.27	1.13	1.18
d. Training workshops	1.14	1.23	1.15	1.27	1.13	1.18
e. Quality equipment	1.14	1.23	1.15	1.27	1.13	1.18
f. Increased supervision	1.14	1.23	1.15	1.27	1.13	1.18
g. Public procurement laws	1.14	1.23	1.15	1.27	1.13	1.18
h. Capacity building	1.14	1.23	1.15	1.27	1.13	1.18
i. Supervision committee	1.14	1.23	and 1.15	1.27	1.13	1.18

Table 4.2 reveals that the coefficient of the variable age (1.14) with the influence factors for road unit cost, duration, human resource and materials while Uganda road fund had a collinearity coefficient of (2.81), the coefficient of gender (1.23) indicates a slightly higher collinearity with the influence factors, the department variable has a

(1.27) coefficient with the factors. Looking at the average VIF (1.18) coefficients for the variables, implies that the variables are moderately correlated since $1.18 < 5$. the acceptable VIF is between 0.25 to 5 and since all the variables were between 0.25 and 5 means that the correlation was insignificant and does not require investigation.

4.4 Effect of influence factors in the implementation of FAM in Uganda.

Results in Figure 4.1 show that the majority of respondents (17) suggested a lack of tools and equipment to be used in road construction under the force account mechanism, and (16) suggested an undependable source of materials at local governments, implying that sometimes materials are required to be obtained from other areas and affecting force account implementation in some local governments.

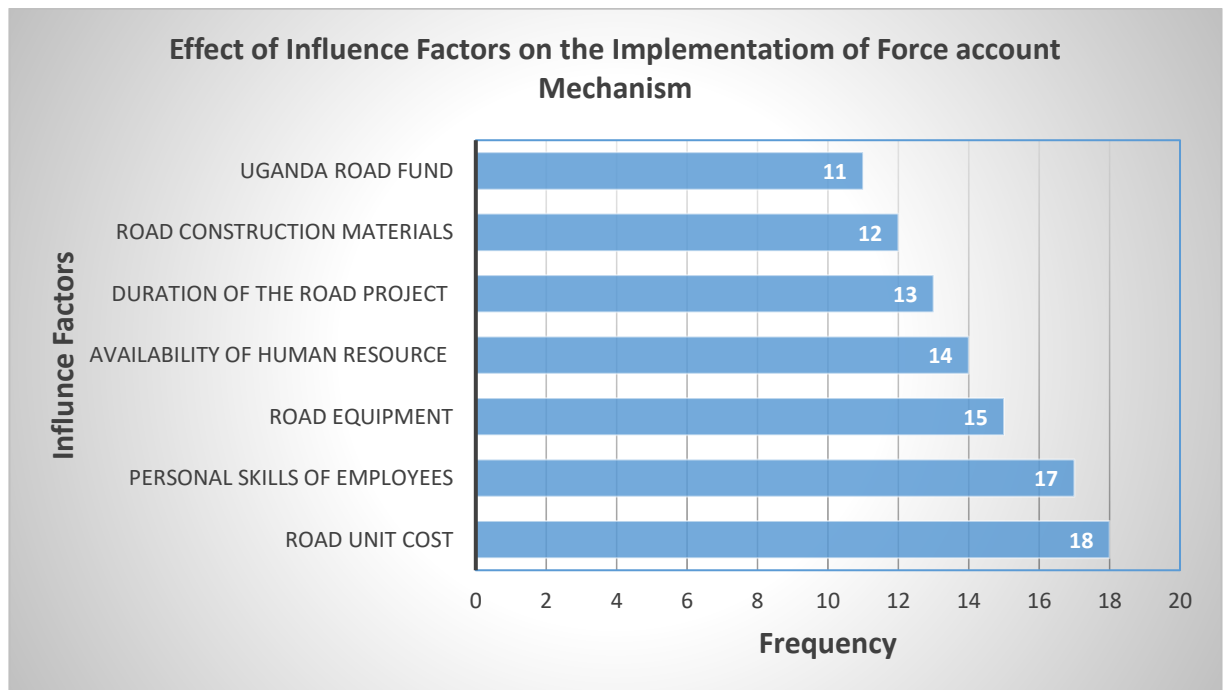


Figure 4.1: Effect of Influence Factors on Force Account Mechanism.

The study findings were consistent with those made by (Mahamid, 2013) and (Aziz & Hakam., 2016), who stated that materials and equipment are among the most

important things that cause construction projects to run late. When contractors don't prepare ahead and don't have enough materials, road construction projects may get delayed (Shanmugapriya & Subramanian, 2013; Aziz & Hakam, 2016). Damage from improper handling of road construction materials causes road construction projects to take longer to complete (Aziz & Hakam, 2016). One of the elements that affects the completion of road construction projects is fluctuation in material pricing (Haseeb et al., 2011). The same study demonstrates that Nairobi contractors fail to obtain project materials on schedule, which has a detrimental effect on the completion of road building projects (Haseeb et al., 2011). According to a study by (Kithinji, 2017) that was conducted in Qatar, rising material costs caused delays in road construction projects.

Additionally, (14) respondents suggested that while using force account mechanisms, local governments lack skilled and experienced personnel to help in carrying out some tasks which hinders the implementation of force account. Thirteen (13) respondents indicated that poor schedule management, inadequate manpower in terms of numbers (12) as well as disputes among parties involved in the project implementation (9). The findings of (Hwang & Ng, 2013), who held that there is a significant and positive relationship between the achievement of a project's success and project management competencies, provide credence to the study's conclusions. Findings showed that district local governments do not take the necessary steps to guarantee that district engineers with the necessary qualifications are employed to carry out the work. It was also evident that proper scheduling and planning is not done before starting projects. Failure to hire qualified project managers can result in poor project implementation

since according to (Henjewele, 2019), project managers play a key role in road construction projects. Contractors must hire qualified project managers to ensure the effective completion of their projects, according to (Alzahrani & Emsley, 2013) and (Yang et al., 2011). Scheduling, planning, and risk management have been identified as three crucial knowledge areas for project managers (Hwang & Ng, 2013). They contend that in order to guarantee that projects are completed on time, project managers must conduct thorough planning before a project begins. Project managers are supposed to have good stakeholder management skills to manage relations with clients.

4.5 Analysis of the influences on the implementation of force account mechanism

The results of the linear regression analysis used to determine which factors had a major impact on how the force account mechanism was implemented in road building projects are shown in Table 4.3 and equation 4.1. It is obvious that the impact levels are affected by the modal coefficients. These regression coefficients constituted a linear equation that can be used for checking their impact on FAM implementation. These factors include; Unit cost denoted as X_1 , Duration as X_2 , Human as X_3 , Skills as X_4 , Materials as X_5 , Funding as X_6 , and Equipment as X_7 . The FAM implementation level was denoted as Z . These generated a regression model linear equation;

$$Z = 2.08 + 0.32X_1 - 0.41X_2 + 0.25X_3 - 0.14X_4 - 0.11X_5 + 0.09X_6 + 0.03X_7 \dots\dots\dots \text{(Equation 4.1)}$$

The generated model should be utilized as an implementation reference, particularly for handling priority and focus in FAM. The same Table 4.3 presents the findings of the statistical analysis of variance and model

fitness as well as the impact of major individual terms on the application of force account on construction projects.

The regression equation and coefficients of determination (R²) were assessed in order to determine the model's fitness. It was determined that the value of R² was 0.508, meaning that the influencing factors suggested in the model are responsible for a variation of 50.8% in the application of FAM to improve production. The relevance of the model developed can only be supported by the value of the adjusted coefficient of determination, which is also rather high (Adjusted R²=0.476) (Khuri and Cornell, 1987; Saqib, N, 2021). The table 4.3 shows simple linear regression model for the influence factors to implementation of the force account mechanism.

Table 4.3: Simple Linear Regression Model of the Influence Factors

Source	SS	df	MS	Number of obs = 115		
Model	59.1781095	7	8.45401564	F(7, 107) = 15.81		
Residual	57.2218905	107	.534784023	Prob > F = 0.0000		
				R-squared = 0.5084		
				Adj R-squared = 0.4762		
Total	116.4	114	1.02105263	Root MSE = .73129		
Implementation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Road unit cost	.3208938	.0760867	4.22	0.000	.1700608	.4717267
Project duration	-.4107877	.1530715	-2.68	0.008	-.714234	-.1073414
Human resource	.2488164	.091541	2.72	0.008	.067347	.4302858
Employee skills	-.141083	.0816581	-1.73	0.087	-.3029608	.0207947
Construction materials	-.1117493	.1262891	-0.88	0.378	-.3621027	.1386041
Funding	.0930503	.0779006	1.19	0.235	-.0613787	.2474792
Road equipment	.0320123	.1760456	0.18	0.856	-.3169776	.3810022
Constant	2.079224	.2330557	8.92	0.000	1.617218	2.54123

Based on the regression results in table 4.3, a unit change in unit cost results in an increase of 0.3208 in the force account mechanism's implementation. Since the absolute T value (4.22) is greater than 2, this suggests that there is a strong significant and positive relationship between unit cost and the implementation of the force account mechanism for road projects.

Similar to this, the coefficient for contract duration (-0.4107) indicates that a unit increase in the contract's duration will typically result in a 0.41 unit decrease in the force account mechanism's implementation. Since the T value (-2.68) absolute is greater than 2, this indicates that the contract's duration has a significant impact on the force account mechanism's implementation.

The project's funding coefficient (0.0931) indicates that, while holding other variables constant, an increase in road maintenance results in an average increase in the force account mechanism's implementation of 0.093. Additionally, because the T value (1.19) absolute is 2, funding has a minimal impact on the force account mechanism's implementation.

These results are corroborated by (Belay & Torp, 2017), who found a link between project finance and the accomplishment of building projects. (Iqbal, et al., 2015) and (Seboru, 2015), who found a positive correlation between project time overruns and delayed payments, also support the findings. (Belay & Torp (2017) contend that project finance issues result from faulty project forecasting and planning at the feasibility stage, therefore part of the contractor's planning should include making sure the contractor has enough money to complete the project before it starts. (Kaliba et al., 2009), who connected delays in construction projects to the slow release of money,

also support the findings. (Aziz, 2013) connected progressive payouts to funding issues. A unit increase in equipment availability will result in a 0.032 increase in the force account mechanism's implementation, according to the equipment coefficient (0.032), and since the T value (0.18) absolute is negative two, it follows that the construction materials have a small but measurable impact on the force account mechanism's implementation.

4.5.1 Ranking of the influence factors to the implementation of the force account mechanism

From the analysis of the factors influencing the implementation of the force account mechanism, it is revealed that road unit cost influences the level of implementation of road projects in Uganda. This is in agreement with research from Long *et al.*, (2004) who remarked that performance problems arise in large construction projects due to many reasons such as; incompetent designers and contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools as contract management issues which affect the performance of road construction projects. This was followed by Personal skills of employees, Road equipment, Availability of human resource, Duration of the road project, Road construction materials, and lastly Uganda Road Fund as revealed in the Table 4.4.

Table 4.4: Simple Linear Regression Model of the influence factors

Item	Factors Influencing force account Mechanism	RII	Rank
1.0	Road Unit Cost	0.892	1
2.0	Personal skills of employees	0.755	2
3.0	Road equipment	0.743	3
4.0	Availability of human resource	0.573	4
5.0	Duration of the road project	0.482	5
6.0	Road construction materials	0.461	6
7.0	Uganda Road Fund	0.423	7
	Average Relative Importance Index (RIIAV)	0.618	

Table 4.4, presents findings which revealed that road unit cost was the most important force account influential factor as it was ranked first, the highest RII value of 0.892, followed by Personal skills of employees with RII value of 0.755, Road equipment with RII value of 0.742. These had their RII values above the average RII value of 0.618 and Availability of human resource with RII value of 0.573, Duration of the road project with their RII values of 0.482. Road construction materials with RII value of 0.461, and lastly Uganda Road Fund had RII value of 0.423, and these are the factors below the average.

Therefore, the significant factors were Road unit cost, personal skills of the employees and road equipment and $RII < RIIAV$ were taken as insignificant factors and these included availability of human resource, Duration of the road project, Road construction materials, and lastly Uganda Road Fund as revealed in the Table 4.4

These results are consistent with those of Shittu et al. (2016), who looked at the length of road projects and workmanship as the main reasons for bad road maintenance work in Minna, Nigeria. They showed that one of the main reasons for low-quality output is inadequate funding for public programs. Similar findings are shown by (Xiao, 2016) who shows that one of the requirements for a successful process and completion of a road projects is competent construction employees.

The findings on personal skills of employees are in accordance with the findings of (Ali & Wen., 2017), who investigated the causes of subpar craftsmanship and discovered that laborers' incompetence and lack of experience were obstacles to road construction projects. The results mirror with (Chen et al.,2013) study, which found that having staff available who are qualified to carry out an operation is a crucial component of successfully completing road projects. Therefore, a lot of the implementation of the Force Account Mechanism is determined by the level of personnel commitment, employee abilities, and level of engagement.

These findings on road equipment are in line with those from (BMAU,2017), which revealed that a complete road unit consists of a motor grader, two dump trucks (tippers), a wheel loader, a back-hoe excavator, a low-bed compactor (roller), and a water browser. It was evident during the field study that majority of the districts lacked the complete set of equipment as enlisted above.in addition, all the local governments visited did not have supervision vehicles, and this hampered the supervision of roads under the force account mechanism.

4.6 Regression analysis of the effect of the barriers to implementation of FAM

The results of a simple linear regression analysis that was used to figure out the effect of force account mechanism implementation barriers on road projects are shown in Table 4.5 and equation 4.2. It is clearly observed that the model coefficients play a role on the impact levels. These model coefficients constituted a linear equation that can be used for checking their impact on FAM contracting. The few significant factors selected include; Inadequate Equipment denoted as Y_1 , Inadequate Manpower as Y_2 , Poor Schedule as Y_3 , Poor Management as Y_4 , Disputes as Y_5 , Over Commitment as Y_6 , Poor Communication as Y_7 , and Low Remuneration as Y_8 . The FAM implementation was denoted as P . These generated a regression model linear equation 4.2.

$$P = 4.61 - 0.18Y_1 - 0.24Y_2 + 0.32Y_3 + 0.88Y_4 - 0.19Y_5 - 0.11Y_6 - 0.25Y_7 - 0.1Y_8 \dots\dots\dots \text{(Equation 4.2)}.$$

This developed model was used to validate the significant barriers to implementation of FAM on road projects with respect to the results obtained from respondents using questionnaire. The same Table 4.5 presents the findings of the statistical analysis of variance and model fitness as well as the effect of major individual terms on the application of FAM on construction projects.

The regression equation and coefficients of determination (R^2) were assessed in order to determine the model's fitness. The value of R^2 was determined to be 0.559, which suggests that the model's suggested obstacles are to blame for a variation of 55.9% in

how FAM is implemented to improve output. In addition, the adjusted coefficient of determination is rather high (Adjusted $R^2 = 0.477$), which is only justified by the significance of the model that was developed (Khuri and Cornell, 1987; Saqib et. al., 2012).

4.7 Analysis of the effects of barriers in implementation of force account mechanism on road projects.

From table 4.5, The analysis of the barriers to force account mechanism revealed that majority of the respondents agreed that local governments receive inadequate funding with the highest RII value of 0.934 which is in line with (BMAU,2017) who reported that most Local Governments do not have adequate funding and equipment for rehabilitation works. Tekka , 2018) stated that the availability of appropriate cash is a crucial component towards implementing force account road projects. The findings are corroborated by (Belay & Torp., 2017), who found a link between project finance and the accomplishment of construction projects. (Iqbal et al., 2015) and (Seboru, 2015) similarly corroborated the findings by demonstrating a positive relationship between project time overruns and delayed payments. It was followed by Lack of Equipment with RII value of 0.930, Accountability for funds with RII value of 0.914, Stakeholder Involvement with RII value of 0.911, Project location i.e. remoteness from busy centers with RII value 0.891, Within FAM remuneration of the road gangs is still low with RII value of 0.885, Unreliable sources of materials on the local market had RII value of 0.847.

Table 4.5: Barriers to implementation of Force Account Mechanism on Road Projects.

S/N	Barriers to force account mechanism	RII	Rank
1	Local governments receive inadequate funds	0.934	1 st
2	Lack of Equipment	0.930	2 nd
3	Accountability for funds	0.914	3 rd
4	Stakeholder Involvement	0.911	4 th
5	Project location e.g remoteness from busy centers	0.891	5 th
6	Within FAM remuneration of the road gangs is still low	0.885	6 th
7	Unreliable sources of materials on the local market	0.847	7 th
8	Use of unqualified and inexperienced personnel	0.772	8 th
9	Poor contract management	0.649	9 th
10	Poor schedule management	0.551	10 th
11	In adequate man power e.g in terms of numbers	0.489	11 th
12	Lengthy procurement	0.465	12 th
13	Disputes amongst parties involved in project implementation	0.364	13 th
14	Political interference	0.361	14 th
	Average Relative Importance Index RIIV	0.741	

The results are consistent with (Kamanga & Steyn, 2013) assertion that a lack of materials including sand, bitumen, and gravel contributed to delays in road construction projects. (Rahman et al, 2013) whose study was done in Malaysia ranked fluctuations in the prices of materials as the most significant project delay factor. The

researchers maintained that the fluctuations were reflected in increased prices of raw materials, machinery, and other ancillary services like steel, and sand. The current study asserts that unreliable sources of construction material as one of the barriers to construction of road projects. Use of unqualified and inexperienced personnel had RII value of 0.772. The findings are consistent with the (CSBAG,2016) report, which found that the use of the Force Account mechanism to carry out road projects was too complex and frequently misunderstood by the implementing agencies, particularly in upcountry stations, particularly in the areas of monitoring and supervising works of the road projects. Some projects lack the technical expertise of the labor force and technical staff to guarantee the quality of the road work being done. The above factors had the average RII value of 0.741 and were considered to be more significant

Poor contract management with RII value of 0.649. The results are supported by the assertion made by (Othman &Ahmed, 2013) on road construction Projects in developing countries face shortages of technical skills and competent human resources. From the findings, it was also evident that districts do not put adequate measures in place to ensure that they hire adequate and qualified staff to manage the road works and routine manual maintenance works.it was followed by Poor schedule management with RII value of 0.551. It has been noted that the majority of responders concur that bad schedule management, poor contract management, and poor communication all contribute to force account projects not being completed on time. Failure to hire qualified district engineers can result in poor project implementation since according to (Henjewe, 2019) project managers play a key role in road construction projects. (Yang et al., 2011) and (Alzahrani & Emsley, 2013) agree that

district local governments need to hire qualified project managers in order for projects to be completed successfully. Three crucial knowledge areas for project managers have been identified as risk, management communication management, scheduling, and planning (Hwang & Ng, 2013). To guarantee that projects are completed on time, according to (Hwang & Ng, 2013), project managers must conduct thorough planning before a project begins. It was also followed by inadequate manpower e.g. in terms of numbers with RII value of 0.489, Lengthy procurement with RII value of 0.465, and Disputes amongst parties involved in project implementation with RII value of 0.36

These findings are supplemented by interview results with the districts technical teams in which one respondent revealed;

(.....The Uganda Road Fund's fixed limit of 27 million as per unit expenses for road projects is insufficient to finance the building of roads under force account mechanisms, and every District completes an average of 30 km of such work in a fiscal year, which typically includes emergencies.....) on the 20th March 2021

Another respondent had this to say;

“.... This funding is completely insufficient, which is why when the graders that were sent to us in 2012 broke down, we were unable to cover the costs of reviving them. We have been working with the Ministry of Local Government on the issue of low funding cuts affecting all Local Governments.” (District Chairperson) on the 22nd March 2021

In consonance with the above, another respondent had this to say in relation to the matter;

“..., there are worries that because of the "poor character of soils" in this area, the equipment will need expensive upkeep to keep it in working order. For instance, the mechanical imprest stipulated in the rule of 15% is insufficient to cover all the expenses associated with the equipment's breakdown. Many graders bought in 2012 were unable to be revived because some local governments realized they were nothing more than liabilities....”

(District chairperson) on the 23rd April 2021

The districts leadership expressed displeasure in the manner of how Government distributes the equipment, basing on the principle of one unit, one District; this brings about issue of equity. This is approved by a response from the respondents that;

“..... There are over 3,000 km of roads in Wakiso alone, making it impossible for one road construction machinery unit to remain sustainable. After taking into account the size of various Districts, the government must examine this additional essential region by providing equipment....” (Wakiso District Chairperson)

on the 23rd April 2021

These results are not dissimilar from those of (Phong,2018), who hypothesized that the inability to transfer materials to remote locations affects operational efficiency since projects must spend a lot of time waiting for supplies to arrive at the work stations. Similar to this, a study by (BMAU,2019) on the difficulties in maintaining

Uganda's national roads found that having adequate and reliable equipment, efficient supply procurement, access to materials, enough labor, effective quality control, and supervision are crucial for implementing the force account construction mechanism. The table 4.6 shows the regression analysis of the effect of the barriers to implementation of the force account mechanism.

Regression of the effect of the Barriers to implementation of Force Account Mechanism.

From Table 4.6 above, the absolute T value (2.25) for stakeholder involvement is greater than 2, this implied that a lack of stakeholder engagement significantly affects the implementation of the force account mechanism by the coefficient for stakeholder involvement (0.185), which states that a unit decrease in stakeholder involvement results in a 0.185 decrease in the force account mechanism's implementation. The coefficient for unreliable construction materials (0.103) indicates that a unit increase in unreliability will typically result in a 0.103 decrease in the implementation of the force account mechanism. Additionally, because the T value (1.38) absolute is greater than 2, it indicates that unreliability of the construction material has a significant impact on the implementation of the force account mechanism.

Table 4.6: Regression of the Effect of the Barriers to implementation of FAM

Source	SS	df	MS		Number of obs		115.00
Model	65.11	18.00	3.62		F(18, 96)		6.77
Residual	51.29	96.00	0.53		Prob > f		0.00
					R-squared		0.56
					Adj R-squared		0.48
Total	116.40	114.00	1.02		Root MSE		0.73
Barriers to Implementation of FAM		Conf	Std. Err.	t	P> t	[95% Conf. Interval]	
Stake holder involvement		-0.19	0.08	-2.25	0.03	-0.35	-0.02
Unreliable materials		-0.10	0.08	-1.38	0.17	-0.25	0.05
Inexperienced persons		0.04	0.10	0.40	0.69	-0.15	0.23
Inadequate manpower		-0.24	0.12	-2.04	0.04	-0.47	-0.01
Poor schedule		0.32	0.11	3.04	0.00	0.11	0.53
Poor management		0.09	0.14	0.61	0.54	-0.20	0.37
Disputes		-0.19	0.08	-2.23	0.03	-0.36	-0.02
Over commitment		-0.11	0.11	-1.04	0.30	-0.32	0.10
Lengthy procurement process		0.01	0.09	0.11	0.92	-0.18	0.20
Lack of equipment		-0.25	0.08	-3.13	0.00	-0.41	-0.09
Insecurity		-0.04	0.09	-0.43	0.67	-0.21	0.13
Inadequate funding		0.04	0.08	0.57	0.57	-0.11	0.19
Poor accountability		0.05	0.06	0.89	0.38	-0.07	0.18
Project Location		-0.29	0.10	-2.78	0.01	-0.50	-0.08
Low mechanical imprest		-0.03	0.10	-0.27	0.79	-0.22	0.17
Poor reporting		0.03	0.10	0.35	0.73	-0.16	0.23
Low Remuneration		-0.10	0.10	-0.98	0.33	-0.30	0.10
Inadequate training		-0.08	0.15	-0.50	0.62	-0.38	0.22
Constant		4.61	0.50	9.27	0.00	3.63	5.60

The coefficient for inexperienced personnel (0.038) suggests that, while leaving other variables constant, a unit increase in the inexperienced staff manning the road project will typically result in an increase of 0.038 in the force account mechanism's implementation. Additionally, since the T value (0.40) absolute is 2, it is suggested

that the implementation of the force account mechanism is only marginally impacted by the inexperienced personnel at the road project.

A unit increase in the lack of manpower at the road construction project will, on average, result in a 0.240 decrease in the force account mechanism's implementation, according to the coefficient for inadequate manpower (-0.240). Since the T value (2.04) absolute is greater than 2, this suggests that inadequate manpower has a significant impact on the force account mechanism's implementation in road construction projects.

Similarly, the coefficient for equipment deficiency at the road construction project (-0.248) suggests that, on average, a unit increase in equipment deficiency will result in 0.248 decreases in the implementation of the force account mechanism. Since the absolute T value (3.13) is >2 , this suggests that equipment deficiency significantly affects the implementation of the force account mechanism in road construction projects.

4.8 Comparative Analysis of Unit Cost for FAM and Contracting

The comparative analysis of the Unit cost for both force account and contracting over the different financial years is presented graphically in Figure 4.3.

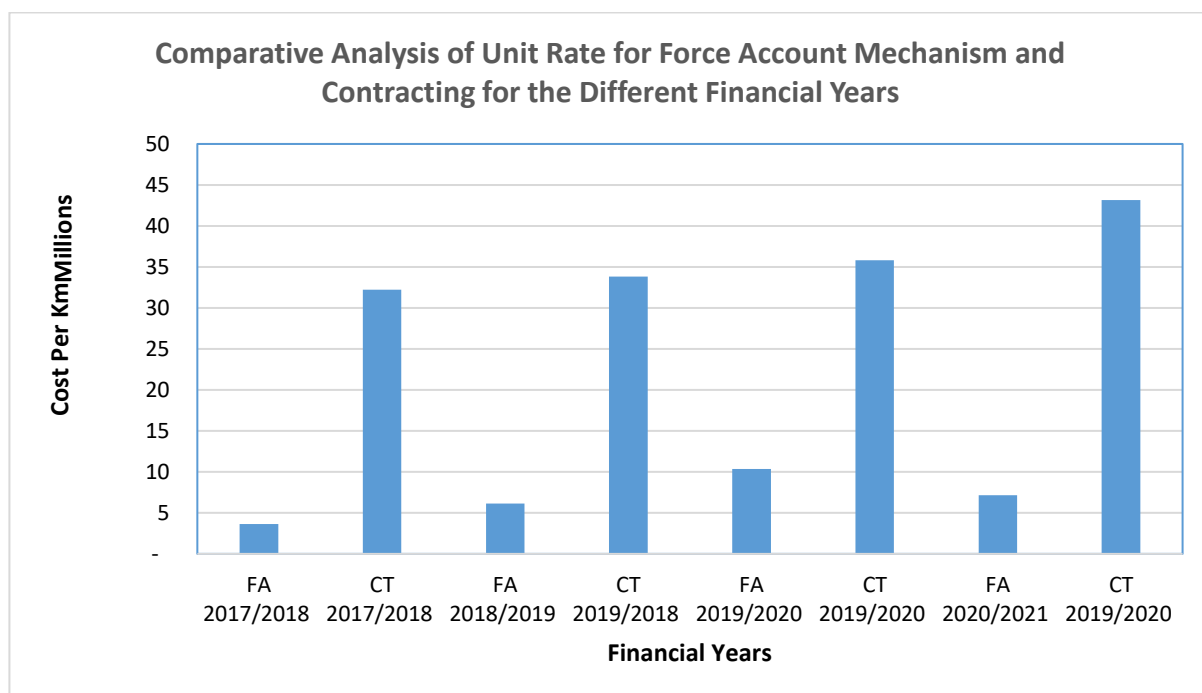


Figure 4.2: Showing the behavior of force account mechanism and contracting over the year.

Table 4.7: Summary of the findings

Financial year	Unit cost Under Contracting/UGX	Unit Cost Under Force Account /UGX
2017/18	32,207,651	3,645,146
2018/19	33,814,097	6,132,409
2019/20	35,813,922	10,374,161
2020/21	43,151,004	7,171,986
Average Unit Cost	36,246,669	6,830,926

Figure 4.6 presents the mode of behavior of the costs incurred under force account mechanism and contracting. Findings on the bar graph revealed that in the financial year 2017/2018 under contracting, the unit cost was Uganda Shillings 32,207,651 and Uganda Shillings 3,645,146 under FAM.

Table 4.8: The table below is tabulation of the force account mechanism implementation and contracting for the different financial years starting from 2020/2021 and 2017/2018

AGENCY	FA 2020/2021	FA 2019/ 2020	FA 2018/ 2019	FA 2017/ 2018	Avera ge Unit cost FA	CT 2020/2 021	CT 2019/ 2020	CT 2019/ 2018	CT 2017/2 018	Avera ge Unit cost CT
Kyankwanzi DLG	10,609,322	3,340, 409	6,619, 933	2,872,5 28	5,860,5 48	44,966, 988	43,066, 919	36,890, 300	35,348, 922	40,068, 282
Kiboga DLG	4,899,448	6,856, 906	4,498, 316	2,585,5 17	4,710,0 47	44,035, 484	34,035, 484	32,000, 234	30,980, 000	35,262, 801
Mityana DLG	7,568,825	4,909, 695	11,29 1,327	6,487,2 82	7,564,2 82	40,921, 750	30,921, 750	29,567, 934	28,046, 755	32,364, 547
Luwero DLG	2,370,821		10,39 9,125	5,225,4 87	5,998,4 78	61,192, 258	38,151, 304	36,890, 500	34,676, 000	42,727, 516
Buikwe DLG	8,797,594	7,890, 548	9,423, 000	5,897,0 00	8,002,0 36	30,365, 600	30,275, 882	29,789, 000	28,000, 490	29,607, 743
Jinja DLG	3,113,861	6,000, 000	4,967, 532	5,215,7 54	4,824,2 87	34,009, 890	33,333, 372	33,678, 456	32,566, 324	33,397, 011
Nakaseke DLG	2,405,863	2,198, 254	2,451, 888	1,950,9 42	2,251,7 37	40,094, 667	41,096, 410	38,900, 567	35,670, 452	38,940, 524
Entebbe MC	25,216,400	56,197 ,605	3,709, 968	688,57 9	21,453, 138	40,042, 667	29,789, 083	27,467, 980	25,890, 000	30,797, 433
Wakiso DLG	2,576,966	2,031, 475	2,949, 089	2,155,5 30	2,428,2 65	61,814, 962	37,399, 459	36,456, 000	35,000, 567	42,667, 747
Mukono DLG	4,160,759	3,942, 560	5,013, 914	3,372,8 41	4,122,5 19	34,065, 778	40,069, 555	36,500, 000	35,897, 000	36,633, 083
Mean Values	7,171,986	10,374 ,161	6,132, 409	3,645,1 46	6,830,9 26	43,151, 004	35,813, 922	33,814, 097	32,207, 651	36,246, 669

Figure 4.7 showing the Unit Cost for force account and contracting for the different projects in the different districts

The findings also revealed that in the next financial year 2018/2019 the unit cost was Uganda Shillings 33,814,097 under contracting where as in the same financial year under FAM it was 6,132,409. Not deviating from the same results, findings show that in the financial year 2019/2020 under contracting the cost was Uganda shillings 35,813,922 while under FAM it was 10,374, 161 and lastly, in the financial year 2020/2021 the cost was Uganda shillings 43,151,004 under contracting and Uganda shillings 7,171,986.02 under FAM.

Generally, the results above indicate that the unit cost for contracting is higher than the unit cost for FAM in all the districts and for all the years of analysis. The average unit cost under contracting was UGX. 36,246,669 and UGX.6,830,926 under the force account mechanism.

For the individual districts analysis, Entebbe municipality had the highest unit rate under force account mechanism. This is attributed to scarcity of gravel and long-haul distance during acquisition of murram. Nakaseke district local government had the lowest rate of UGX.2,251,737 due to nature of the works being executed within the district. It was observed that the scope of works involved bush clearing and reshaping of the road works to restore them to present condition

The unit cost for contracting keeps on increasing in all the years analyzed unlike FAM where the unit cost increases from 2017/18- 2019/2020 and then reduces in 2020/21. This was due to acquisition of equipment by the district local governments.

The unit costs for contracting are five times compared to FAM due to the forces of demand for fuel and equipment hire rates that change with the market demand. The

findings are supported by (Oluka,2019) who revealed that contractors always bid for road works at high costs due to inadequate manpower and lack of equipment. These findings are also in line with (Mulla &Waghmare ,2015) who added that under contracting, road construction works unit costs tend to be higher than in force account mechanism, a justification of the adoption of the force account mechanism. The implication here is that the road unit cost under contracting were much higher because of a number of various factors associated with contractors which are minimal with force account mechanism.

4.9 FAM strategies improvement analysis in road projects in Uganda

According to the methodology, the relative importance index RII of the various strategies and their average as a baseline point were computed to determine the most significant strategies to improvement of force account mechanism.

Table 4.9: FAM strategies improvement analysis in road projects in Uganda

S/N	Strategies	RII	Rank
1	Increase funding and timely release of funds	0.927	1 st
2	Establishment of supervision committee	0.918	2 nd
3	Provision of quality equipment	0.917	3 rd
4	Provision of training workshops and capacity building programmes	0.908	4 th
5	Stakeholders' involvement in planning and supervision	0.902	5 th
6	Adherence to PPDA laws and use of right procurement channels	0.831	6 th
7	Creation of more regional mechanical centers	0.815	7 th
8	Increased supervision by Roads committee members	0.764	8 th
9	Recruiting of more staff	0.465	9 th
	Average Relative importance index	0.827	

The analysis of the strategies revealed that majority of the respondents agreed to Increasing funding and timely release of funds by the central government with the highest RII value of 0.927, research in Nigeria by (Okuwoga,2014) who identified that the increasing funding boosts timely completion of road projects. It was followed by Establishment of supervision committee with RII value of 0.918, Provision of quality equipment with RII value of 0.917. These findings are comparable with the (BMAU, 2019) report, which asserts that timely equipment availability is a critical factor in enabling district local governments to complete projects in accordance with the planned timeline provided by the purchasing organization, despite the experience of

inadequate equipment, such as water bowzers and graders, that are still in use. Provision of training workshops and capacity building programmes with RII value of 0.908, Stakeholders' involvement in planning and supervision with RII value 0.902, Adherence to PPDA laws and use of right procurement channels with RII value of 0.831, were the factors above the average RII value of 0.827. This is in line with (Shengeza,2018), who hypothesized that the prompt acquisition of materials for enabling construction is a crucial component as, under FAM, the procuring body is in charge of acquiring materials for the process' facilitation. Contractor time is spent without producing any value because of a delay in the availability of the materials.

Creation of more regional mechanical centers had RII value of 0.815. These results are consistent with the budget monitoring report from 2015, which highlighted that it is simple to borrow money from the regional headquarters to build roads using the force account mechanism if some local governments lack the necessary equipment to perform maintenance work. Equipment is constantly accessible and borrowing is always inexpensive. The result in this case is that a significant portion of the respondents agreed with the claims regarding the techniques.

Increased supervision by Roads committee members had RII value of 0.764; Recruiting of more staff with RII value of 0.465 were the factors below the average RII value of 0.827.

These findings are supplemented by interviews results with the respondents in which one respondent revealed that;

“..... Districts having a significant road network should receive special attention from the government. Mukono District's 1,200 km

of roads receive only Shs600 million (year), despite the standards calling for 27 million for each kilometer of graveled roads....”
(Mukono Municipality District Chairperson). On the 25th April 2021

This is approved by the respondent that;

; “..... over time the Government embarked on a policy of attracting and retaining qualified staff in several departments and offices, which further evidenced commitment of government to retain skilled people in road construction units at local governments as this will improve performance of road construction under force account mechanism....”.

(Chief Administrative Officer) On the 25th April 2021

Another respondent had this to say about the matter;

“.....The government generally gives 100% release of all the budget for the financial year for the road maintenance activities and as result the Chief Administrative Officer and District Engineer are made to sign performance agreements with Uganda Road Fund to ensure achievement of the targets. They are obliged to either perform or get sacked. Also because of this, timely and adequate maintenance requirements have been achieved which would have delayed using the contracting mechanism,” (Member district roads committee) On the 25th April 2021

4.10 Closing the gaps in the implementation of the force account mechanism

4.10.1 Training of Staff

Professionals with the right training and credentials are a crucial tool for implementing the force account method successfully. According to the study, staff training through short courses is the only option to close the ability gaps. The training possibilities are offered to improve the relevant intervention groups' abilities to implement and maintain high standards. For the upkeep of the labor base, this could take the form of quality refresher training that is organized inside the district or outside the district at Mbale Mt Elgon Labor Based Training Centre (MELTEC). This might assist in preserving quality throughout the entire road construction process.

4.10.2 Creation of Capacity Building Programmes at the District

There is need to ensure capacity building at the district level, this is where the road gangs are trained on how to handle road construction works under force account mechanism. This is due to the fact that a skilled and qualified expert is a crucial tool for the efficient use of force. Construction projects, especially those funded through force accounts, are likely to be poorly executed by entities with weak capacity building programs.

The development of district capacity building programs is another task assigned to the Ministry of Works and Transport. As a result, the purchasing organization will be able to lower the quality risks associated with machine operation, such as faults and poor road work quality, as well as achieve the best value for money through more effective use of the resources at hand and on-time project completion. Construction projects,

especially those funded through force accounts, are likely to be poorly executed by entities with weak capacity building programs.

4.10.3 Adherence to Procurement Regulations

The procuring entities at the local government authorities must adhere to the laws and regulations governing the execution of FAM in order for force account to be implemented effectively. This will make it possible for local governments to both achieve their project goals and get the best value for their money. The district engineer and the CAO should strictly adhere to the laws. To abide with the law, procurement should be approved, monitoring to be tightened and records to be kept.

4.10.4 Procurement of more Equipment

The government of Uganda should procure new and modern long-lasting equipment to be distributed to local governments, these will supplement on the worn-out machines and improve on the equipment availability in local governments.

4.11 Summary of Findings

4.11.1 Influence for effective implementation of Force Account Mechanism

The Government has over the years since 2012, put in place frameworks to effectively implement force account mechanism. The acquisition of new equipment, recruitment of competent personnel and (PPDA Act, 2012) are among the many that are guiding the activities of the Force account mechanism. The study too established that as much as all funds for District Road works are through URF, it was noted that the Budget allocations received by local governments are too meagre to effectively ensure a country wide road network in good and working condition. The districts frequently find themselves in a tight spot as they try to maintain the roads that are significantly

impacted by seasonal weather variations. It was also highlighted that regional workshops established in the various parts of the nation to serve as repair facilities for varied road equipment. This initiative is part of the Government's effort to ensure the effective application and use of the FAM.

During the field study, these workshops were verified by the researcher and thus have played a crucial role over the years, especially the initial time when the FAM had been put to use by the Government. Furthermore, the Government has also constituted competent human resource in the local governments in Uganda that has made the implementation of the FAM more effective, this was contrary in the earlier years, when district lacked or did not have technical persons to work on the roads.

4.11.2 Barriers to implementation of the Force Account Mechanism

The study found that inadequate funding, lack of equipment, poor accountability, project location, lack of stakeholder involvement, remuneration of the road gangs, unreliable source of materials for road construction and use of unqualified and inexperienced staff were the significant obstacles to effective implementation. Despite the Government's commitment to supply new road equipment to the districts in 2012 and 2017; majority of the district sampled had only the newly acquired district equipment. The researcher was inquisitive as why this was happening and one of the District Leaders highlighted that equipment has to be used for works all year round given the nature of the terrain of the roads and the repetitive works, has caused the equipment to wear and tear quickly and hence frequent break down.

Regarding funding, the analysis discovered that there was no provision made in the funds supplied to the districts for equipment repair and acquisition. The districts are

therefore required to raise their own revenue that they can budget towards these expenses. Many Districts have got very poor or meagre local revenues bases and as thus they will budget for these expenses from the locally generated funds.

The shortage of the regional workshops, spare parts to be used to fix breakages in these machines was lacking, something that has paralyzed works on these roads. When the equipment was handed over in 2017, the government promised that the supplier will take care of repairs and maintenance for the three-year period (i.e., 2017–2020). However, it was established that this is not taking place. When questioned, the majority of the district leaders suggested that the researcher seek explanation from the Ministry of Works and Transport.

Lastly during the interviews with the District Leadership, they pointed out the issue of road gangs who are the casual laborers that help in the various field works. The MOWT set a monthly fee of UGX 100, 000 per worker; this has over time led to a high labor turn over because the workers abandon the work sites and go elsewhere that pays more, more so on a weekly basis.

In many of these Districts, they are continuously recruiting new road gangs, to feel the gaps; and one of the district engineers said, “this is an ongoing exercise that has no end, MOWT should increase the fees to 250,000” in order to retain the road gangs and head men.

Political interference from the Politicians has also posed a great threat to the implementation of the FAM. Given Uganda’s political climate, the Political leaders usually give preference to road projects that are within their constituencies in order to

gain political mileage. This was one of the toxic concerns during the era of contracting, however since most of the leaders in the districts are Politicians; interference still persists and it has become a barrier in the FAM. One case was in 2015, when the residents in Busabala attacked the District Chairman about the state of their road, which they claimed had been neglected and yet the Leadership had worked on other community roads elsewhere.

4.11.3 Analysis of Unit cost for FAM and Contracting in the implementation of road Project

Using the bar graph to display the direction and behavior of the costs incurred in road construction, the study of the costs incurred under force account mechanisms and contracting was provided. Findings on force account revealed that in the initial stages, unit cost were initially high and gradually reducing at a steady rate compared to the chart for contracting where the unit costs were on the increasing trend in the subsequent financial years basing on the trend line. The observation here is that; the costs incurred in road construction under contracting are relatively higher than under contracting.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the conclusions of the findings of the research study and also highlights on a number of recommendations resulting from the study.

5.1 Conclusions

This study was about comparative analysis of force account mechanism and contracting on the implementation of road projects in Uganda with a case study of Central Uganda.

The conclusions were built on the objectives defined in the preceding chapter, as described below;

5.1.1 Influences for effective implementation of force account mechanism

According to the findings of the influence factors for force account mechanism, the study revealed, the road unit cost per kilometer, followed by the personal skills of the employees, road equipment availability were the most significant factors. In contrast, the human resource availability, Duration of the road project, availability of road construction materials and Uganda road fund were the less significant factors to the implementation of the force account mechanism. This implies that for effective implementation of road construction project, the road unit cost, personal skills of employees, and road equipment availability needs factors should be given more attention before other factors influencing implementation of force account mechanism as revealed in Table 4.3.

5.1.2 Barriers to effective implementation of road projects in Uganda

The FAM now faces numerous obstacles that prevent it from having much of an impact in the districts with inadequate road implementation, as evaluated by the MOWT. According to the study findings inadequate funding from the central government was the outstanding barrier, lack of equipment, accountability for funds, stakeholder involvement, project location, poor remuneration of the road gangs, unreliable source of materials as well as use of unqualified and inexperienced staff as the most significant barriers to implementation of force account mechanism. In addition to the above, poor contract management, poor schedule management, inadequate manpower, lengthy procurement as well as disputes amongst parties involved in project implementation were the less significant barriers. This implies that for effective implementation of road construction project under force account mechanism, adequate funding, availability of equipment, workshop trainings and accountability should be given more attention before other barriers of force account mechanism as revealed in table 4.5.

5.1.3 Analysis of Unit cost for FAM and Contracting in the implementation of road Projects

According to the bar chart for force account reveal that the unit cost under contracting was generally higher than that of force account mechanism in all the districts and for all the years under analysis. This implies that Force account modality is the most cost-effective method for implementation of road projects in Uganda.

5.2 Recommendations

Road maintenance funds should be increased per Km to the terrain in the different LGs, current allocation for urban LGs be tripled to cater for the high cost of road maintenance in urban setup and there is need to double the current allocation for Community access roads to reduce congestion on the roads. This, the roads condition would be improved leading to easy and better access to markets, enhanced local economic development and local revenue among the communities and improved service provision to the citizens and better conditions of living. The study further recommends that engagement with MoFPED and other stakeholders in effort to operationalize the URF Act, 2018 and advocate for increased funding for road maintenance.

A change in policy is required to allow LGs to construct roads using the Road Fund. However, it was highlighted that the Road Fund Act of 2018 specifies that the Uganda Road Fund is intended to finance ordinary and periodic maintenance of public roads. The Ministry created a project for Community Roads Improvement to promote accessibility in rural areas after realizing that community access roads make up the majority of the country's road network. However, there was a lot of demand in LGs for the opening of community access roads.

There is need to increase funds for routine mechanical maintenance, since the study findings revealed that 15% is released to the local governments and covers 20km for routine mechanized maintenance. This implies that an increment to 30% would cover 40km of the road works. This would lead to improved mechanical condition of the district road equipment, reduce their mechanical breakdown, improve road conditions

and improve access to markets, improve local revenue collections by LGs and general service provision to the citizens.

LGs should adhere to the guidelines and not use mechanical imprest to hire machinery and also the MOWT regional offices should endeavor to provide timely responses to LGs' imprest requisitions so that work of districts does not stall. There is need for the MoWT to engage MoFPED and other potential development partners for possible funding for the creation of more zonal centers as this will reduce on area coverage per regional Office to ease their access by LGs.

There is need to increase the conditional grant allocated for operational expenses. This would lead to an improved work environment for LG staff to serve the communities due to improved monitoring and functional road committees.

The study recommends proposed for URF to advocate for enhancement of the salaries of machine operators. This would ease the recruitment, motivation and retention of the machine operators such that they end up stealing the spare parts.

5.3 Areas for further research

Due to the dearth of research on the use of force account projects in Uganda, it would be best for future researchers to focus on a study of the barriers to force account project effectiveness as well as a cost-benefit analysis of force account and contracting.

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Appendix I: QUESTIONNAIRE

My name of Gamubaka Fred Cedric, a master's student at Kyambogo University. Comparative Analysis for Force Accounting Mechanism and Contracting is the subject of my research. This is done in order to fulfill a portion of the criteria for the Master of Science in Construction Technology and Management degree. The provided information will be handled with the utmost discretion. You can choose to participate in this study voluntarily at any moment, and you are allowed to object to certain questions being asked of you. If necessary, the data asked below will be used for academic and feedback purposes.

Please mark the option that best fits your response, and where relevant, provide feedback.

SECTION A: (Bio Data)

With the use of the following questions, this section aims to learn more about the respondents' demographic attributes.

1. Age of the respondent

30 - 35 ☐ 36 - 40 ☐ 41- 50 ☐ 51- 60 ☐

Above 61 ☐

2. Gender of the respondent

Male ☐

Female ☐

3. Respondent's level of education

Degree ☐

Others ☐

Diploma ☐

Master's Degree ☐

4. Respondents department

Contract Committee ☐ Finance and Admin ☐

LC V ☐ Works department ☐ PDU ☐ Councilor ☐

5. Time spent at the district

5 years and less ☐ 6 – 10 year ☐ 11 - 15 ye ☐ 16 years and ☐

above

Section B (Influence of Effective Implementation of Force Account Mechanism)

6) This section aims to provide an answer to the query regarding the Influence of Effective Force Account Mechanism Implementation. Please rate the following assertions regarding the Force Account Mechanism's influences on a scale of 1 to 5.

The key is provided below to help you decide how much you agree or disagree with each statement. Please check all of the applicable boxes in the spaces provided.

Very high significance =5, High significance =4 Medium significance =3 Low significance =2, Very low significance =1

Statements	5	4	3	2	1
The road unit cost					
Duration of the road project					
Availability of the human resource					
Personal Skills of employees					
Road construction materials					
Uganda Road Fund					
The road equipment					

Any other comment on the influence of effective implementation of FAM

Section C (Barriers to efficient Implementation of Road Projects)

7) This section aims to provide an answer to the query regarding obstacles to the effective implementation of road projects in Uganda. Please rate the following statements concerning the difficulties in effectively implementing road improvements in Uganda on a scale of 1 to 5. The key is provided below to help you decide how much you agree or disagree with each statement. Please tick appropriately all that apply in spaces provided.

Very high significance =5, High significance =4 Medium significance =3 Low significance =2, Very low significance =1

Statements	5	4	3	2	1
Under force account					
Local governments receive inadequate funds					
Lack of Equipment					
Accountability for funds					
Stakeholder Involvement					
Project location e.g remoteness from busy centers					
Within FAM remuneration of the road gangs is still low					
Unreliable sources of materials on the local market					
Use of unqualified and inexperienced personnel					
Poor contract management					
Poor schedule management					
In adequate man power e.g in terms of numbers					

Lengthy procurement					
Disputes amongst parties involved in project implementation					
Political interference					

Any other comment on the barriers to efficient implementation of road projects under contracting in Uganda

Section D (Strategies to improve Road Projects in Uganda)

8) This part seeks to answer the question about Strategies to improve road projects in Uganda. On a scale of 1-5, respond to the following statements about Strategies to improve road projects in Uganda. The key to guide your responses as to your level of agreement or disagreement is given below. Please tick appropriately all that apply in spaces provided.

Very high significance =5, High significance =4 Medium significance =3 Low significance =2, Very low significance =1

Statements	5	4	3	2	1
Increase funding and timely release of funds					
Establishment of supervision committee					
Provision of quality equipment					
Provision of training workshops and capacity building programmes					
Stakeholders' involvement in planning and supervision					
Adherence to PPDA laws and use of right procurement channels					

Creation of more regional mechanical centers					
Increased supervision by Roads committee members					
Recruiting of more staff					

Any other comment on the strategies to improvement of force account mechanism

END

Appendix II: Kreijcie and Morgan Table of sample size determination

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note.— N is population size. S is sample size.

APPENDIX III: VALIDITY TEST RESULTS FOR THE QUESTIONNAIRE

Validity Results for the Influence and effectiveness of project implementation

Judges	Relevant	Irrelevant
Judge 1	17	2
Judge 2	18	1
Judge 3	15	4
Judge 4	14	5

19

Validity Results for the barriers to efficient implementation of road projects

Judges	Relevant	Irrelevant
Judge 1	12	2
Judge 2	10	4
Judge 3	13	1
Judge 4	9	5

14

Validity Results for the strategies

Judges	Relevant	Irrelevant
Judge 1	19	4
Judge 2	21	2
Judge 3	22	1
Judge 4	17	6

APPENDIX IV: RELIABILITY RESULTS FOR THE QUESTIONNAIRE

Reliability Statistics for the influence factors to effective implementation of the force account

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.7011	0.7657	19

Reliability Statistics for barriers to implementation of force account mechanism

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.7518	0.8126	14

Reliability Statistics for the strategies to barriers

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.7512	0.8012	23

Items	Content Validity Index
Influence factors on the performance	
Barriers faced in road projects	0.7857
Average Content Validity Index	0.8239

Appendix V: Ill-Equipped at a Regional Mechanical Workshop



Some of the dilapidated equipment at a Regional Mechanical Workshop.

