ASSESSMENT OF PERFORMANCE OF ROAD MAINTENANCE LOCAL CONTRACTORS IN UGANDA: A CASE OF UGANDA NATIONAL ROADS AUTHORITY LIRA STATION

BY

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A RESEARCH DISSERTATION SUBMITTED TO KYAMBOGO UNIVERSITY GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF SCIENCE DEGREE IN CONSTRUCTION TECHNOLOGY AND MANAGEMENT OF KYAMBOGO UNIVERSITY

AUGUST, 2021

APPROVAL

The undersigned professionals certify that they have read and hereby recommend for submission to Kyambogo University a dissertation titled **"Assessment of performance of road maintenance local contractors in Uganda: A case of Uganda National Roads Authority Lira Station",** in fulfillment of the requirements for the award of a Master of Science degree in Construction Technology and Management of Kyambogo University.

Signature ……. **Date ……**

Dr. Muhwezi Lawrence (Supervisor)

Signature ……. **Date ……**

Eng. Mubiru Joel (Supervisor)

DECLARATION

I, Namara Babra Beamanya, Registration number 17/U/14649/GMET/PE hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree of the university or other institute of higher learning, except where due acknowledgement has been made in the text and reference list.

Signature: ……. **Date:**……

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I wish to thank the Almighty God for keeping me alive and in good health up to this time. It is by his grace that I have been able to complete this study.

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To my parents and family, without you I would never have been where I am. You set the firm foundation on which I stand now.

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May the almighty God reward all those whose blessed hands have made this research a success.

DEDICATION

This dissertation is specifically dedicated to the following, my dear Husband Mr. Aweko Reginald Moses and our beloved children. Blessing, Given, Able.

The message is when you want to move fast move alone but when you want to move far move with friends thanks.

May God Bless You

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LIST OF ACRONYMS

ACODE	Advocate Coalition for Development and Environment
ANOVA	Analysis of Variance
BOO	Build Operate Own
BOT	Build Operate and Transfer
CE	Contractor's experience
CVI	Content Validity Index
DBB	Design, Bid and Build
GOG	Governments of Ghana
KYU	Kyambogo University
LCP	Local Contractor Performance
OPM	Office of the Prime Minister
PF	Project financing process
MoFPED	Ministry of Finance, Planning and Economic Development
MoWT	Ministry of Works and Transport
OAG	Office of the Auditor General
PMS	Project manager's skills and knowledge
PS	Procurement System and processes
RAFU	Road Agency Formation Unit
r	Pearson's Correlation Coefficient
R^2	Coefficient of Determination
SPSS	Statistical Package for Social Scientist
TQM	Total Quality Management
UGX	Ugandan shillings
UNABCEC	Uganda National Association of Building and Civil Engineering Contractors

UNRA	Uganda National Roads Authority
UNRWA	United Nations Relief and Works Agency
URF	Uganda Road Fund

ABSTRACT

Road maintenance is essential in order to preserve the road in its originally constructed condition, protect adjacent resources and ensure user safety in Uganda. However, there has been inadequate improvement in the road sector evidenced by some of the roads being poorly maintained in terms of surface quality, markings and signs, and the government is still losing billions of shillings in shoddy works and services being delivered by road maintenance local contractors, thereby increasing maintenance backlog. The study assessed the performance of road maintenance local contractors in Uganda using a case study of Uganda National Roads Authority Lira Station. From targeted population of 103 respondents, a sample size of 87 respondents was selected using random and purposive sampling techniques. Data were collected using questionnaires and statically analyzed. Relative importance index (RII) was used to determine critical factors affecting the performance of road maintenance local contractors. Through literature review and document analysis, critical factors affecting the performance of road maintenance contractors were identified. These factors were ranked using RII for developing a framework to enhance performance of road maintenance local contractors. The study results indicated that respondents regarded contractor's managerial skills (RII= 0.1088), followed by contractor's financial capacity (RII= 0.893), contractor's experience (RII= 0.855), cost factors (RII= 0.854), technology (RII= 0.846), procurement process on contractors selection (RII= 0.845), time factors (RII= 0.839), health & safety standards (RII= 0.838), and design changes (RII= 0.828) as the critical factors affecting performance of road maintenance local contractors. A framework was developed to indicate that the planning phase of road maintenance projects depends on; contractor's managerial skills, and contractor's level of experience. Implementation phase of road maintenance projects by local contractors was found to depend on; level of contractor's financial capacity, cost factors, procurement process on contractors selection, level of health & safety standards, time factors, and design changes. The study concluded that contractor's managerial skills was the most impactful factor on performance of road maintenance local contractors in Uganda. The study recommended that more focus should be put on contracts managerial skills since it had the greatest impact on Local Contractor's performance.

Keywords: Critical factors, Performance, Local contractors, Road maintenance.

CHAPTER ONE:

INTROCUCTION

1.1 Background to the Study

This chapter presents the background to the study, statement of the problem, objectives of the study, research questions, justification, significance, scope, and conceptual framework. The background to the study is presented under four perspectives notably the historical, theoretical, conceptual and contextual.

Road maintenance is essential in order to preserve the road in its originally constructed condition, protect adjacent resources and ensure user safety. Maintenance projects and their success are closely related to performance of contractors. In assessing a contractor's performance, an agency must look at the performance in the context of the project as a whole, including the respective roles and obligations of the principal and contractor under the contract. Evaluation against performance criteria must be undertaken after taking into account matters beyond the contractor's control.

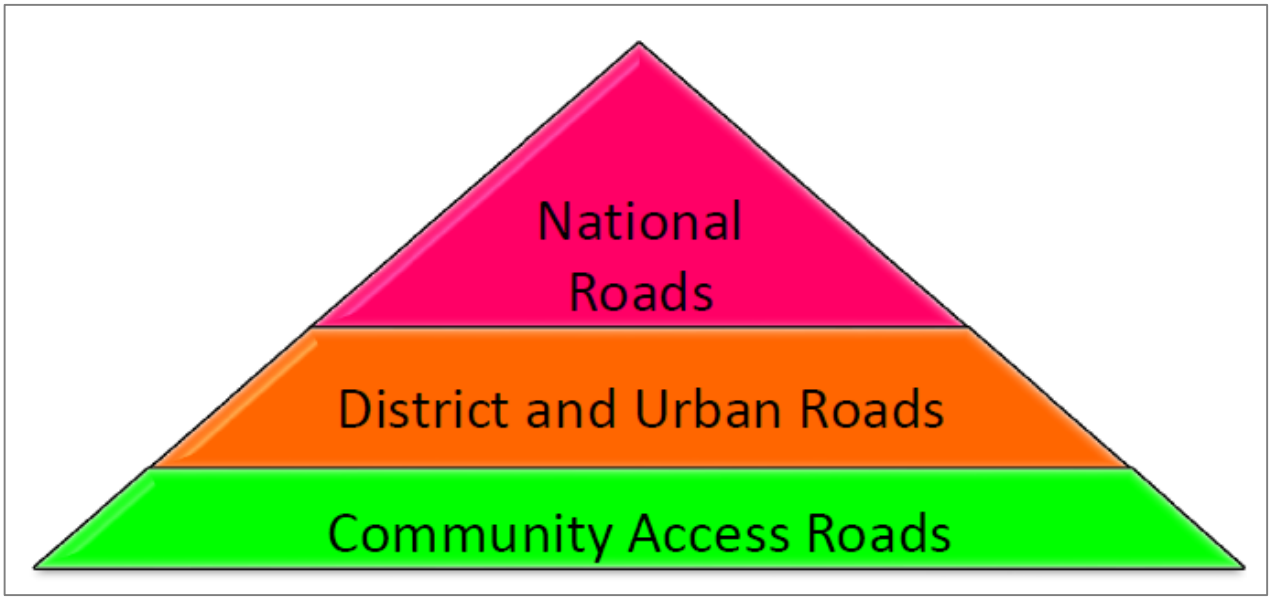
In developing countries, problems associated with performance are high and even compounded due to inadequate resources and organizations to address them. Although the construction industry in Nigeria is vibrant and the largest in Africa, there is poor performance of large and medium local contractors (Masrom & Garba , 2019).

The Government of Uganda instituted reforms in the road sector in 1996, due to the importance attached to road infrastructure. These reforms culminated into the creation of Road Agency Formation Unit (RAFU) in 1998, and eventual establishment through the Act of Parliament, Uganda National Roads Authority (UNRA). UNRA replaced the RAFU as an autonomous body

mandated to develop and maintain the National Road network. UNRA became operational on 1st of July 2008 and as part of the key functions it was mandated to select contractors for road works, monitor road construction and ensure effective performance of road projects (UNRA, 2008)

1.1.1 CATEGORIZATION OF ROADS IN UGANDA

Roads in Uganda are categorized in a hierarchical order with national roads at the top followed by District and Urban roads and, Community Access roads at the bottom (Advocates Coalition for Development and Environment (ACODE), 2013). The Uganda National Roads Authority (UNRA) is responsible for development and maintenance of the national roads while the Higher Local Governments (districts and municipalities) - are responsible for District and Urban roads.



Source: UNRA, (2020)

Figure 1.1: Categorization of roads in Uganda

National road is a road forming part of a network of major intercity roads. The agency is responsible for the national road network. An Urban Road is a road located within the boundaries

of a built-up area. Urban roads are typically characterized by the presence of street lighting and in most but not all cases the presence of kerb and channel adjacent to the road edge.

A road within the boundaries of a built-up area, which is an area with entries and exits specially sign-posted as such. And Community access road means a road, path or track linking. Communities and villages to other classified roads und, provides access to administrative, social and economic. Services;

A report from the Office of the Auditor General (OAG) 2015 indicates that the Uganda Road Fund (URF) invested a total of UGX 914 billion in road maintenance activities during the three years (2011/2012, 2012/2013 and 2013/2014), with a total of 45,108km of roads maintained.

Despite the increasing investment, there are reports and persistent public outcry about poor works being executed (OAG, 2015). Government of Uganda in the Financial Year 2015/2016 released about UGX 3 trillion to Uganda National Roads Authority (UNRA) for road projects (Kasaija, 2015). Despite the high investments, the general state and quality of the roads across the country still requires a lot of improvement (OAG, 2015). The public alleges that Uganda National Roads Authority (UNRA) has projects cost overruns, contract variations, delays, failure to compensate persons affected by projects, high levels of corruption, incompetence of contractors; and generally poor contractor monitoring (Byaruhanga and Basheka, 2017).

In Lira district, the public have decried the state of Lira-Kamdini highway due to the dilapidated road with potholes (Ebong, 2019). Residents of Lira district have protested the bad state of roads in the district. The state of the roads has worsened following the ongoing rainy season that has rendered several roads impassable where motorists are forced to spend several hours maneuvering through potholes and slippery roads (Oketch, 2018). The bad state of roads has hindered social and economic activities. For instance, pupils reach school when they are soaked and wet, patients are dying before reaching health centers, fresh foodstuff are rotting because

farmers cannot access markets (Oketch, 2018). This study aimed at assessing local contractor's performance in Uganda's construction industry using a case of road maintenance contractors under Uganda National Roads Authority lira station.

The study used the Agency Theory by Jensen and Meckling (19126) which holds that the construction company is the service provider which is the agent and the government in this case is the principal. The agent who is the local construction company has more information about the road maintenance projects than the principal which is government and this creates an information asymmetry which affects the ability of the government to monitor whether their interests are being protected by the agents and as a result this yields the undesirable performance by the local contractors (Jensen & Meckling, 19126).

The independent variables which are the critical factors include; contractor's experience in construction, project financing processes, procurement system and processes, project manager's skills and knowledge while as the dependent variable is contractor's performance.

The study was conducted at UNRA Lira station because residents of Lira district had protested the bad state of roads in the district many times and yet UNRA is mandated to manage the provision and maintenance of the national roads network in a more efficient and effective manner, to render advisory services to government on roads related matters and manages ferries linking the national roads network (UNRA, 2008). So the researcher found the station worth conducting the study.

In 2012, UNRA Lira station embarked on the rehabilitation of several roads such as the Lira-Apac highway at the tune of 5.8 billion shillings and a private company had been contracted to undertake the road rehabilitation for two years (Odong, 2012). In 2019, UNRA Lira station also embarked on the rehabilitation of the 90 km road stretch from Lira town to Abim district at the

cost of 3.8 billion shillings and the entire rehabilitation works being undertaken by Universal Engineering Company, according to the Ministry of finance, planning and economic development (MoFPED) report 2019.

1.2 Statement of the Problem

In spite of the reforms and increased funding allocated to Works and Transport Sector from Uganda shillings 4.8 trillion in 2018/19 to 6. 4 trillion in 2019/20 accounting for 16.2% of the national budget (Segawa, 2019) and an increase in the budget for Uganda Road Fund from 36 billion shillings to 507.4 billion shillings by parliament in the 2019/20 financial year (FY) (The independent, 2019), there has been inadequate improvement in the road sector. According to the ministry of works and transport (MoWT) sector performance report for the FY 2017/18, the total funds availed for road maintenance and rehabilitation have marginally grown in nominal terms from UGX 393 billion in FY 2010/11 to UGX 542.5 billion in FY 2018/19 (MoWT,2018) and the budget for maintenance of public roads has also increased from UGX 417.8 billion in the FY 2017/18 to UGX 448.108 billion in the FY 2019/20 (URF, 2019). Similarly, financing by the government and by donors were close to 17% of the budget for the financial year 2017/18 was allocated to the Works and Transport Sector, and yet most roads are poorly maintained in terms of surface quality, markings and signs, and road maintenance backlog challenges still exist (UN, 2018). Reports on local contractor's performance of the road sector continue to indicate that the government is still losing billions of shillings in shoddy works and services (IG,2012).

There are cases of incomplete or collapsing road infrastructure projects soon after commissioning of these roads and over 50 road projects in Uganda were either delayed or poorly constructed (URF, 2015). Many awarded road projects have delayed at implementation, and those launched have faced cost overruns and complaints of poor quality of works. The success attained by UNRA notwithstanding, the goal to optimize the quality, timeliness, cost effectiveness in road

maintenance so as to guarantee safe and efficient movement of people and goods is still difficult to achieve (MoWT, 2011). Poor Supervision and management of contracts, the awarding of contracts to incompetent Contractors unable to complete work in time, and unexplained delays in processing contractors' payments are still rampant and continue to affect road project costs and schedules and this delays the road maintenance process (Byaruhanga and Basheka, 2017). Poorly maintained roads may lead to a failure in achieving the Uganda Vision 2040 which emphasizes the urgent need for an integrated transport infrastructure network to be put in place to encourage the country's economic growth. It limits efficient transport infrastructure and services to ease domestic and international trade. It's upon this background that this study aimed at assessing the performance of road maintenance local contractors in Uganda. Lira district was chosen because of the bad state of roads in the district for example the Lira – Kamdini highway, Lira – Pader road among others where the residents of lira had protested the bad state of the roads in the district many times and also being my home District where am married.

1.3 Objectives of the Study

1.3.1 Main Objective

The main objective of the study was to assess the performance of road maintenance local contractors in Uganda's construction industry considering a case of road maintenance contractors under UNRA Lira station.

1.3.2 Specific Objectives

i. To establish the critical factors affecting local contractor's performance in road maintenance projects in Uganda;
ii. To determine the impact of the identified critical factors on local contractor's performance in road maintenance projects in Uganda;
iii. To develop a framework for improvement of performance of the local contractors in road maintenance projects in Uganda.

1.4 Research Questions

The research was guided by the following research questions;

i. What are the critical factors affecting Local Contractor's performance in road maintenance projects in Uganda?

ii. What is the impact of the identified critical factors on the Local Contractor's Performance in road maintenance projects in Uganda?

iii. What can be done to improve the performance of the local contractors in road maintenance projects in Uganda?

1.5 Justification

Preliminary studies indicate that over 50 road projects in Uganda were either poorly maintained or constructed and this has led to loss of billions of money (OAG, 2010. Other reports also indicated that local contractors were not adequately implementing environmental, health and safety provisions as stated in the signed contracts and this was evidenced during the visit of some quarries and borrow pits. Furthermore, during inspection of some of the roads, it was observed that scaping and grassing were not done according to the expectations in the contract (Auditor General Report, 2015).

1.6 Significance

The findings of the study can be used by relevant bodies such as UNRA, Uganda National Association of Building and Civil Engineering Contractors (UNABCEC) in enhancing the performance of the local contracting firms through recommending solutions to critical factors deterring local contractor's performance.

The study determined the critical factors affecting local contractor's performance on roads maintenance projects success in UNRA Lira station so as to identify the areas where urgent action need to be taken to safeguard the interest of the sector.

The study findings shall contribute to the available body of knowledge the critical factors that influence local contractor's performance on roads maintenance projects which may be used as a literature review point by other researchers. In addition, this study will also suggest further areas for research to guide future researchers in conducting a similar study.

The findings of this study shall also act as a reference point for policy makers in setting guidelines and standards for selecting and awarding contracts to local contractors who have the necessary requirements basing on the critical factors that affect the performance of local on roads maintenance projects.

1.7 Scope of the Study

1.7.1 Geographical scope

The study was carried out within Uganda National Roads Authority (UNRA) Lira network station and focused mainly on road maintenance projects under the UNRA administration. Uganda National Roads Authority (UNRA) Lira network station was chosen due to constant public outcry of poorly maintained roads carried out by local contractors who are sub contracted by Uganda National Roads Authority (UNRA) Lira network station.

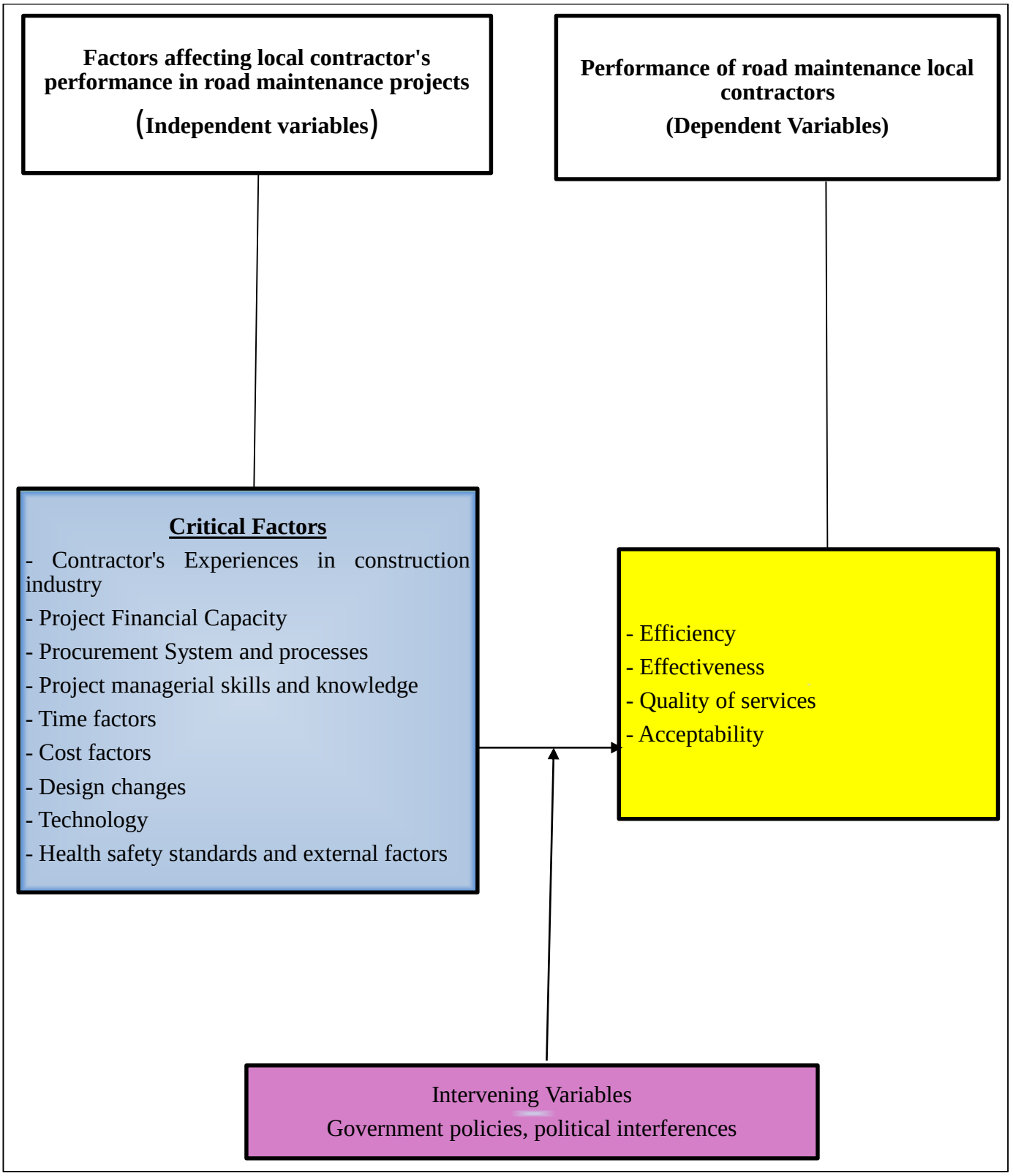
1.7.2 Content Scope

The study was limited to establishing critical factors affecting road maintenance local contractor's performance, determining the impact of the identified critical factors on road maintenance local contractor's performance and formulating a framework for improvement of performance of the road maintenance local contractors.

1.7.3 Time scope

The study was conducted starting from September 2020 to October 2021.

1.8 Conceptual framework



Source: (*Namara, 2021)*

Figure 1.2: Conceptual framework of the study

1.9 Chapter Summary

This chapter presented the background to the study, it also presented the statement of the problem, the main objective and specific objectives of the study, research questions, justification, and significance, scope of the study and the conceptual framework of the study. The next chapter presents literature related to each specific objective of the study. It highlights what other scholars have written in relation to each specific objective.

CHAPTER TWO:

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the theory underpinning this study on the assessment of performance of road maintenance local contractor's and the related literature pertaining each independent variable and the dependent variable. The first section presents the theoretical review, followed by a review of related literature on critical factors and local contractor's performance.

2.2 Theoretical review

The agency theory holds that the construction company is the service provider which is the agent and the government in this case is the principal (Jensen & Meckling, 1976). Agency model is considered as one of the oldest theory in the literature of the management and economics (Daily, Dalton, & Rajagopalan, 2003; Wasserman, 2006). Agency theory discusses the problems that surface in the firms due to the separation of owners and managers and emphasizes on the reduction of this problem. This theory helps in implementing the various governance mechanisms to control the agents' action in the jointly held corporations.

Grossman and Hart (1983) made an interesting tale on the divergence of risk preference between the principal and agents. They explained that the consumption of the principal gets affected by the agent's output. The agent's level of effort affects the firms' output, where the principals desire for the higher level of effort from agents. Hence, the principal should trade- off the agent's behavior with a proper payment structure for which they used an algorithmic model to figure out an optimal incentive structure. The incentive structure is affected by the agents' attitude towards the risk and information quality possessed by the principals and no incentive problem arise if the agent is risk neutral.

This theory was essential to the study since the assessment of Critical factors affecting local contractor's performance is the mechanism employed to ensure that no agency problems exist within the local contractor's firm. The assessment of the critical factors further helps to reduce information asymmetry within the dealings between the Local Contractors and government.

Road maintenance aims at keeping the road conditions close to its original (design) standard as long as possible without major investments. The classification of roads enables the agency that is responsible for the development and maintenance of the roads to plan and programme road maintenance and upgrading works.

The level of maintenance is directed by the road functional class, together with other indicators such as existing and predicted traffic on the road. Uganda Road Fund (URF) was established by act of parliament in 2008 for the purpose of financing routine and periodic maintenance of public roads and to facilitate the delivery of road maintenance services.

2.3 Critical factors affecting the performance of road maintenance local contractors

Despite the large variability in the project success factors, efforts had been made to develop predictive models (Shahrzad & Hamidreza , 2011), (Gwaya, Sylvester , & Githae , 2014), that if only critical factors are considered there could be a specific model that can be used to predict if the road maintenance projects were successful. Application of such models, however, has not been widely accepted as the so-called critical success factors do keep on changing for different road maintenance projects.

Results of the study conducted by Ezekiel Fukwo Wafula for the Factors influencing road projects performance in Kenya: a case of road contractors in Machakos County showed that capital availability, managerial skills, organizational culture and technical skills influenced

performance of road projects. technical skills, organizational culture and funds availability had the greatest influence on road projects performance (Ezekiel , 2017) .

The study conducted by Worku Asratie, Michael Wudet and Gurmel Ghataora in 2021 for the risks affecting the performance of Ethiopian domestic road construction contractors showed that shortage of cash, inadequate planning, lack of access to foreign currency, delay in possession of site, frequent breakdown of equipment, delay in delivery of material and equipment, financial failure, inflation, delay in payments and poor commitment and coordination within the contractors' team are the ten most significant risk events affecting the performance of Ethiopian domestic road construction contractors (Worku, Michael, & Gurmel , 2021).

Therefore, in view of the above, this study was put forward to have an opportunity of determining critical factors affecting performance of road maintenance local contractors in projects being executed in Uganda, specifically under UNRA Lira station. This study focused mainly on contractor's experience, project financial capacity, procurement system and process, project manager's skills and knowledge, time factors, cost factors, design changes, technology, health safety standards and external factors as the critical success factors. This study was only limited to the aforementioned factors due to the commonest of these factors in literature reviewed.

2.3.1 Contractor's Experiences in road maintenance projects

Contractor's experiences in construction industry; knowledge or skill in the construction industry, which the contractor has gained because of working in the industry for a long time (Colins English Dictionary, 2019). Contractor's performance; this can be defined by the level and quality of projects delivered to clients. It has been a common practice, however, to select the least cost bidder among competing contractors to perform the job (Lee, Syuhaida , & Mohammad , 2014).

A study conducted revealed that local contractor's experience in construction industry was the second highly ranked critical factor that hindered local contractor performance. Furthermore, most of the respondents in the same study agreed that contractor's experience plays a very important role in achieving local contractor performance of the projects. The authors concluded that lack of experienced contractors in the construction industry is one of the challenges put forward by most construction industry policies in developing economies (Gawhula & Wittonde 2016).

Available literature contends that proper project planning, availability of materials, equipment and adequate labor are key critical success factors for the successful implementation of building construction projects. A number of studies have been carried out in those key critical dimensions in order to assess their relative contributions to schedule delays in the construction industry (Muhwezi, Acai and Otim, 2014). Shortage of materials in the market as a factor causing delay, poor quality of materials, escalation of material prices and late delivery of materials as factors causing delay (Muhwezi, Acai and Otim, 2014).

A Study carried out to determine the factors affecting the Performance of Contractors in Construction Project in Bagdad, Iraq also showed that contractor experience and design team experience are among the factors affecting the Performance of Contractors in Construction Projects. Available literature contends that proper project planning, availability of materials, equipment and adequate labor are key critical success factors for the successful implementation of building construction projects. A number of studies have been carried out in those key critical dimensions in order to assess their relative contributions to schedule delays in the construction industry.

A Study carried out by Yerevan Ali to determine the factors affecting the Performance of Contractors in Construction Project in Bagdad, Iraq also showed that contractor experience and design team experience are among the factors affecting the Performance of Contractors in Construction Projects (Yerevan , 2018).

A study conducted by Matu Johnson Mwangi for the factors influencing performance of contractors in the road construction sector: case of selected contractors in Kenya revealed that working capital, skilled manpower, organization structure and client support have influence on performance of contractors in the road sector and It was noted that working capital and organization structure have the highest influence followed by skilled manpower and client support in that order of significance (MATU , 2016) .

The Ugandan construction industry policy also supports the fact that local contractor's experience in construction industry is highly ranked with regards to local contractor performance and as well emphasizes on the need of having experienced contractors in construction industry (UNRA, 2015). Uganda policy directs the government to develop capabilities of local contractors through training, allocating more work opportunities and resources in terms of finance.

A study illustrated that elements of quality project output include, workmanship, teamwork, cost control, timely project completion, proper resource management, availability of experienced and skilled personnel, competitive tendering and continuous improvement. All these elements can be managed and properly controlled by experienced local contractors. The success of construction projects depends on the experience of the contractors and capability of the contractor's project manager (Matiko 2015).

A study carried out in Nigeria to establish the direct risk factors and cost performance of road projects in developing countries: Contractors' perspective showed that a significant positive relationship exists between the aggregate project risk, i.e. project risk index of cost (PRIC) and cost performance of the projects (Chukwuemeka & Chinemdi, 2020).

2.3.2 Project financing processes

Project financing processes; process of financing a specific economic unit that the sponsors create, in which creditors share much of the venture's business risk and funding is obtained strictly for the project itself (João, 2017).

A study carried out to determine the influence of contractor's financial capacity on performance of road Construction in Kakamega County in Kenya showed that delay in progress payment by client and financial difficulties by contractors as among the most important causes of delay in Iranian construction projects and also indicated that financial ability/financial arrangement and late payment of bills were amongst the major relevant factors in construction projects in Pakistan. Hence the study recommended that to ensure that project financing does not affect successful completion and performance of road construction project, enough finances should be set aside for the project before it commences and highly qualified and experienced road contractors with a relevant experience and technical skills should be hired to implement road projects (Timothy & Yona , 2018)

A study carried out by Gawhula and Wittonde (2016) to determine factors that affect performance of construction and maintenance projects showed that project financing process was the highly ranked quality performance factor among respondents. Chan (2011) also indicated that lack of sustained financing processes leads to project unit cost variations, time variation, project net present values variability, changes in project functionality and stakeholders' dissatisfaction. Definitely this is failure to achieve the quality initially planned.

In addition, a study conducted by Nor and Syuhaida (2017) showed that financial difficulties were one of the main causes of delayed construction and maintenance projects. The findings of Nor and Syuhaida (2017) conformed to the findings of Othman and Ismail (2014) who observed that contractors with financial difficulties was experiencing delays in delivering maintenance and construction projects. Lack of project financing arrangement could lead to compromise on quality, project delays and legal disputes due to delays of payments to the contractor, cost overruns to mention but a few Frimpong (2003), Aibimi (2006) and Ramanathan et al. (2012).

Available literature contends that proper project planning, availability of materials, equipment and adequate labor are key critical success factors for the successful implementation of building construction projects. A number of studies have been carried out in those key critical dimensions in order to assess their relative contributions to schedule delays in the construction industry. Shortage of materials in the market as a factor causing delay, poor quality of materials, escalation of material prices and late delivery of materials as factors causing delay (Muhwezi, Joseph, & Otim, 2014).

2.3.3 Procurement System and processes

Procurement system and processes; Procurement may be defined as the acquisition of goods, works and services. This embraces not only purchasing, that is, buying of goods, but it also includes hiring of contractors or consultants to carry out services (World Bank, 2004).

Procurement system offers a lot of influence on successful project outcomes. The procurement category can be traditional that involve Design, Bid and Build (DBB) while the non-traditional ones are the Build Operate Own (BOO) and Build Operate and Transfer (BOT). The DBB is the common method of procurement in use for most construction projects. The DBB has the advantages of being easy to use, least cost, provides fair amount of competition, provides adequate time to review design, has higher degree of quality certainty and promotes

transparency. The procurement system as a critical project quality performance factor was ranked third in the study of (Noor et.al, 2013). Similarly, a study carried out by (Gawhula and Wittonde 2016) also revealed that for quality performance of projects, there is a need of having a well-recognized procurement system. Furthermore, the authors recommended that policy makers, financiers, planners and designers should be aware of the procurement system to be used in acquiring an entity that was responsible for execution of the project well from instigation of the project.

2.3.4 Project managerial skills and knowledge

Project manager's skills and knowledge; discipline of initiating, planning, executing, monitoring and controlling, and closing the work of a team to achieve specific goals and meet specific success criteria (Achara, 2016).

A study conducted by (Gawhula & Wittonde 2016) revealed that the local contractor's quality performance factor, project manager's knowledge and skills were among the 20 quality performance factors. Gawhula & Wittonde referred to project manager as the head of the project supervision team. Furthermore, the respondents of the study considered that such a person should have adequate knowledge, skills and experience in the project. A project manager manages project data and people. As a leader, he or she must be able to establish direction for the future, communicate the project data and forge an aligned team work spirit.

2.3.5 External Factors

A study carried out to determine the factors affecting the delay of the road maintenance project in the application of the long segment method in central Sulawesi showed that external factors are among the factors affecting the delay of the road maintenance projects in the central Sulawesi Indonesia (Eko, Donny , & Tutang, 2019).

A study carried out revealed that roads allocated to politically connected contractors are significantly more likely never to be constructed (Lehne, Shapiro and Eynde 2014). The census data collected after road construction at a village-level indicated that a number of roads listed as having been completed for which payments were made, do not appear to exist. In addition, regression discontinuity estimates at the road level showed that political interference raises the cost of road construction and increases the likelihood that roads go missing (Lehne et al., 2014).

Similarly, a study conducted by Edward, Joseph and Bernard in 2014 determined factors affecting Ghanaian contractors in which it was revealed that contracts awarded based on political considerations had the greatest effects on the performance of Ghanaian contractors (Edward, Jeseph, & Bernard, 2014).

In addition, (Abidali and Ali 2018) conducted a study to determine the factors affecting performance of contractors in Bagdad, Iraq. The results from the findings indicated that external factors such as economic climate was ranked first since economic climate affect strongly on the cost and delivery of the project and in return impact negatively on contractor's performance and the contractors ranked this factor as the most important factor. Physical Condition was also ranked second and this finding is in agreement with the research results submitted by Hedidor (2015) who found that the physical conditions influenced contractor performance and construction quality.Results of the study carried out by Eko Prasety, Donny M. Mangitung and Tutang Muhtar in 2019 to determine the factors affecting the delay of the road maintenance project in the application of the long segment method in central Sulawesi showed that external factors are among the factors affecting the delay of the road maintenance projects in the central Sulawesi Indonesia (Eko, Donny , & Tutang, 2019).

2.3.6 Design changes

A study carried out by (Smallwood and Venter 2001) to analyze performance of contractors in New Zealand revealed that design changes such as late information about the changes, poor specifications and design errors negatively affect the performance of contractors. Furthermore, poor specifications, late information and design errors achieved rankings of sixth, seventh and eighth respectively among the indicators of design changes use in the study.

The impact of design on contractor performance is universally acknowledged. Designer's design, detail, specify materials and processes, conduct quality and progress inspections and contribute to the health and safety process. Effective management of the design process is crucial for the success of projects. This includes, among others, the development of an accurate design brief to confirm client requirements and the integration of the work of designers, and variations, which result in out of sequence operations (Latham, 1994).

2.3.7 Time factors

A study carried out in Nigeria to find out if any significant difference existed between the time and cost performance of contractors. It was discovered that sub-contractors time performance is sometimes at the expense of work quality as a result of the speedy execution of work at hand in order to pave way for another engagement. It is, therefore, suggested that project monitoring and supervision should be given a priority attention if the labour-only subcontracting procurement method is to achieve its expected success (Fagbenle and Amusan 2005).

A study carried out in Bagdad to determine the factors affecting performance of contractors indicated that time factors such as average delay in regular payments was ranked first. This finding is in agreement with a study carried out by Akomah and Jackson (2016) which also identified average delay in regular payments as the most critical time performance factor. The study also revealed that Site preparation was ranked second by contractors and the authors concluded that this factor directly affects contractor's performance during project.

A Study carried out in Thailand indicated that Time, Cost, Quality, Safety & Health, Internal Stakeholder, External Stakeholder, Client Satisfaction, Financial Performance, Environment, and Information, Technology & Innovation are the ten key performance factors affecting construction performance. (Soewin & Chinda, 2018).

2.3.8 Health and safety standards

Olanipekun et.al., (2017) carried out a study in Nigeria to determine the factors affecting contractor's performance in construction project delivery where questionnaires were distributed to contractors, clients, architects and quantity surveyors. The study revealed that health and safety standards affect project delivery and it was ranked fourth basing on a mean score (4.33) by the respondents in the study.

Similarly, Attabara-yartey (2012) carried out a study at ABASA General Enterprise Limited-Kumasi to assess the impact of occupational health and safety needs on the lives of construction workers. The findings of this study indicated that first-aid equipment, safe drinking water, sanitary facilities, provision of personal protection equipment (PPE) and training of workers on safety procedures, were the measures needed for addressing the occupational health and safety issues confronting workers on construction sites. The author also urged that absence of health and safety gadgets and welfare facilities cause a lot of injuries on site and ultimately affecting the performance of contractors (Attabra-Yartey, 2012).

2.3.9 Technology

As technology adoption continues to ramp up in the construction industry, one area getting a lot of attention is improving safety. Technology solutions are making it easier to properly train and monitor workers to prevent accidents and reduce the rate of serious injuries and worker deaths (Jones, 2018).

Similarly, a study carried out by Ofori-Kuragu, Baiden and Badu (2014) to determine factors affecting Ghanaian contractors revealed that low technology affects the performance of Ghanaian contractors. The study also recommended that the capacities of Ghanaian contractors be developed through the use of new technologies (Ofori-Kuragu, Baiden and Badu, 2014). A Study carried out to determine the factors affecting construction performance in Thailand indicated that Time, Cost, Quality, Safety & Health, Internal Stakeholder, External Stakeholder, Client Satisfaction, Financial Performance, Environment, and Information, Technology & Innovation are the ten key performance factors affecting construction performance. (Soewin & Chinda, 2018).

Stephen, Candace and Song-Hon Lee (2001) analyzed the impact of Information Technology (IT) on construction projects in the United States in which the results of the study establish that projects benefit from IT use. This study results also indicated that both owners and contractors can expect overall project cost savings of approximately 2.1 and 1.8 percent, respectively. For owners, there was evidence of construction cost savings of nearly 4 percent by increasing the use of IT, as well. For both, there was evidence of construction schedule compression (Stephen et.al., 2001).

2.3.10 Cost factors

A study conducted by Olaniran (2015) revealed that choosing contractors solely on the basis of the quoted price may cause poor performance in the construction project. Analysis of close data obtained from the survey of construction experts showed the nature of project performance problems associated with the Cost-Based Contractor Selection (CBCS) to be project time delays and non-compliance with construction standards. The major reason they occurred was found to be the reduced profit margin for contractors (Olaniran, 2015).

Similarly, a study conducted by Abidali and Ali (2018) which determined the factors affecting performance of contractors in Bagdad indicated that cost factors such as excessive variation orders were ranked first implying that this factor affects contractor's performance directly during the execution stage of project. Accurate and reliable budget estimate was ranked second indicating that it is significant for contractors since it affects construction performance in terms of cost and time. Shortage of materials in the market as a factor causing delay, poor quality of materials, escalation of material prices and late delivery of materials as factors causing delay (Muhwezi, Acai and Otim, 2014).

2.4 Frameworks for improvement of performance of road maintenance local contractors

The adoption of construction frameworks in the construction industry has invariably been driven by service improvement agendas. Objectives include increasing client choice and achieving better quality output with more assurance in respect of cost and time. They are also used to secure better value for money, increase purchasing power and reduce transaction costs, overheads and waste. Many authorities have recognized that frameworks make it possible to add value in a number of other important ways through increased local employment, material sourcing, sustainability and reducing whole life costs. Skills Gap Identification and Training is important and considered in addressing local contractor's performance as a need to identify relevant gaps in their skills and then find their solution to overcome them. Each featured authority has to develop its own approach to train and identify skills gap (Local Government Task Force, 2007).

2.5 Performance improvement frameworks/ models

Lean construction model: Lean construction is a way to design production systems to minimize waste of materials, time, and effort in order to generate the maximum possible amount of value (Koskela, Huovila & Leinonen, 2002). Essential features of lean construction include a clear set of objectives for the delivery process, aimed at maximizing performance for the customer at the project level, concurrent design, construction, and the application of project control throughout the life cycle of the project from design to delivery. Lean construction projects are easier to

manage, safer, completed sooner, and cost less and are of better quality (Aziz and Hafez, 2013, Remon & Sherif, 2013).

Lean construction model is based on the principles of lean production which are;

i. Specify Value: Specify value from customer's own definition and needs and identify the value of activities, which generate value to the end product;

ii. Identify the Value Stream: Identify the value stream by elimination of everything, which does not generate value to the end product. This means, stop the production when something is going wrong and change it immediately. Processes which have to be avoided are miss production, overproduction (repeat production of the same type of product, etc.), storage of materials and unnecessary processes, transport of materials, movement of labor workforces and products, and finally production of products which does not live up to the wished standard of the customer as well as all kind of unnecessary waiting time;

iii. Flow: Ensure that there is a continuous flow in the process and value chain by focusing on the entire supply chain. Focus has to be on the process and not at the end product.

iv. Pull: Use pull in the production and construction process instead of push. This means produces exactly what the customer wants at the time the customer needs it and always prepared for changes made by customer.

v. Perfection: Aims at the perfect solution and continuous improvements (Thomas, Horman, Minchin & Chen, 2003).

Six sigma framework: Six Sigma continuous improvement methodology which is known as DMAIC (define, measure, analyze, improve, control) aims to enhance the efficiency of the existing processes and increase customer satisfaction through designed products and services. DMAIC framework is a integration of several techniques such as QFD (quality function deployment), SPC (statistical quality control), DOE (design of experiments), and FMEA (failure mode and effects analysis) in a logical direction. Six Sigma principles as an effective framework

in construction industry, stress on reducing variation and eliminating the root causes of defects. Six Sigma metrics and tools are able to measure the defects rate, analyze the performance and improve the quality level in construction projects (Tehrani, 2010).

Al-Otaibi, Osmani and Price (2013) proposesed a framework for improving the project performance of Standard Design Model (SDMs) in the Saudi construction industry. Eight case studies related to a typical standard design project were performed that included interviews with 24 key stakeholders who were involved in the planning and implementation of SDM projects within the Saudi Ministry of Interior (SMoI). The study identified 14 critical success factors (CSFs) that have a direct impact on the SDM project performance. These were classified into three main CSF-related clusters: adaptability to the context; contract management; and construction management.

The framework developed by Al-Otaibi et.al., (2013) presents a holistic roadmap of the components that influence the SDM project performance improvement process. The framework, is comprised of four phases in a chronological sequence, where each phase describes one component, i.e., the design modification phase (adaptability of SDMs to the context), the pre-construction phase (management of contracts), the construction phase (construction management) and the post-project audit (Lesson Learnt, database). The four phases were identified and classified based on the processes used by the SMoI to implement SDM projects and the phase encompasses input factors, which are in the form of CSFs.

Abonga (2019) in his study developed a model for cost performance improvement of road maintenance projects in Northern Uganda. The study was conducted in four UNRA stations in Northern Uganda, namely Arua, Gulu, Kitgum and Moyo Stations. Both qualitative and quantitative data were collected using survey questionnaires and documentary reviews from a sample size of 100 elements. A cost performance improvement model was developed using a

multivariate regression analysis of budgeted cost elements, the model proposed to address inaccurate costing of the budget elements through addressing problems related to Clients' Project management & contract administration, labor management, financial management, contractor's site management and design & documentation factors.

2.6 Chapter Summary

From the literature reviewed, the major critical factors affecting local contractor's performance are contractor's experience, project financing processes, procurement systems and process, project manager's skills and knowledge, Time factors, Cost factors, Design changes, Technology, Health safety standards and external factors. As noted by other scholars, tools or frameworks that can be used to improve the performance of local contractors include framework agreement, performance contracting, the Baldrige award, infrastructure procurement route map, skills gap identification and training, and collaborative basis to construction team relationship. From the literature, most of the critical factors identified to be affecting the performance of local contractors and models proposed to improve performance of road maintenance local contractors were not based on the context of Ugandan road maintenance local contractors. The study looked at very many models/ frameworks from other scholars and most of the scholars were looking at a few variables whereby they were not putting all the factors in consideration as compared to what this study has done.

In all the identified literature documents, a model by Abonga, A. A. (2019) was found to have been developed for Uganda but the identified model was developed with different objective of improving cost performance in road maintenance projects while considering only the cost related factors which is contrary to the objective of the developed model in this study which was to assess the performance of road maintenance local contractors in Uganda, other models include that developed by Gwaya et.al., (2014) which was aimed at project monitoring in Kenya and the project success model developed by Shahrzad and Hamidreza ,(2011). A Success Measurement

Model for Construction Projects in Singapore and therefore application of such models has not been widely accepted as the so called critical success factors do keep on changing for different road maintenance projects.

The study also indicated that there is need to develop a framework to improve the performance of road maintenance local contractors in Uganda and the proposed framework focuses on how local contractors and other stakeholders should adopt the framework in order to achieve an improved outcome. Thus, the study sought to assess the performance of road maintenance local contractors in Uganda's construction industry.

CHAPTER THREE:

METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was used in the study. It includes the study design, population of study, sample size and selection, sampling technique and procedure, data collection methods and instruments, validity and reliability of the study instruments, measurement of variables and data analysis techniques.

3.2 Research Design

A cross sectional study design was used to enable the researcher to collect data at a point in time (Sekaran, 2003). This helped the researcher to describe in details the factors affecting the performance of road maintenance local contractors under UNRA Lira station which made it easy to save time but also enabled the end user to digest the content.

The in-depth study of any problem with limited time frame is actually perceived as a holistic way of obtaining insights (Amin, 2005). The researcher triangulated quantitative and qualitative methods; the quantitative approach was used to quantify the findings using measure of central tendency while the qualitative approach was used to gain explanations for the poor performance of road maintenance local contractors. Qualitative data is actually good in getting facts and therefore was used to strengthen the Figures and quantitative data was presented and analyzed using charts, Figures, tables and frequencies.

3.3 Population of study

The study was carried out on the performance of road maintenance local contractors under UNRA Lira Station. Considering a target sample of 160, this was distributed in form of 10 Local contractors, 60 Employees in construction companies, 10 UNRA Employees, 10 Local Leaders and 2 Uganda Road Fund Officials, 50 Road users, 3 Road sector experts, 5 UNABCEC, 10 Consultants. The population was considered due to the following reasons

The station had 10 contractors (companies) with running contracts by the time the study was conducted and all the contractors were considered in the study, picking 6 employees from each construction company, 10 employees from the station, 10 local leaders ie the LCs, 2 road fun officials, 50 road users ie (20 bus drivers,10 taxi drivers, 10 motor cyclist and 10 pedestrians) who were on the road during the study, 3 road experts, 10 consultants and 5 UNABCEC officials.

The population was considered due to the following reasons

i) The station had 10 contractors (Construction companies) with running contracts by the time the study was conducted and all the contractors were considered in the study, picking 6 employees from each construction company, 10 employees from the station, 10 local leaders ie the LCs, 2 road fun officials, 50 road users ie (20 bus drivers,10 taxi drivers, 10 motor cyclist and 10 pedestrians) who were on the road during the study, 3 road experts, 10 consultants and 5 UNABCEC.

ii) This population was considered simply because they would provide quality responses to support this research due to the financial constraint since the researcher was moving from Kampala to Lira during the study.

3.4 Sample size and selection

For a finite population size, Yamane (1967) provides a formula for calculating the sample size. The sample size was determined using the Yamane (1967) formula for sample size determination. Yamane formula is

$$n = \frac{N}{(1+Ne^2)} \quad \text{.....(Equation 3.1)}$$

Where N is the population size, *n* is the sample size, and *e* is the degree of precision (Yamane, 1967).

Table 3.1: Sampling size and selection mechanism

Category of the Population	Target Population	Sample size guided by Yamane (1967)	Sampling Technique
Local contractors	10	10	Census sampling technique
Employees in construction companies	60	52	Random sampling technique
UNRA Employees	10	10	Census sampling technique
Local Leaders	10	10	Purposive sampling
Uganda Road Fund Officials	2	2	Purposive sampling
Road users	50	44	Census sampling technique
Road sector experts	3	3	Census sampling technique
UNABCEC	5	5	Purposive sampling
Consultants	10	10	Purposive sampling
Total	160	146	

For a researcher to generalize his/her sample size must be large enough to have a low likely error in probability sampling method (Saunders et.al., (2003).

For employees N=10

$$n = \frac{N}{(1 + Ne^2)} = n = \frac{60}{(1 + (60 * 0.05 * 0.05))} = n = \frac{60}{(1 + 0.145)} = \ n = 52$$

For local contractors N=10

$$n = \frac{N}{(1 + Ne^2)} \quad n = \frac{10}{\left(1 + (10 * 0.05 * 0.05)\right)} = \ n = \frac{10}{(1 + 0.05)} = \ 10$$

Similarly, other sample sizes were attained for this study

3.5 Composition of population and their selection criteria

- ✓ **Local contractors**

The selection of a contractor for any project is one of the most critical undertakings performed by contracting authorities. The effectiveness of selection is directly related to project success and the past achievements. UNRA Lira station, had ten road maintenance local contractors and they were all considered in the study.

- ✓ **Employees in construction companies**

Fifty-two employees from these ten local contractors were considered in the study and they were able to provide insights about the factors affecting the performance of road maintenance local contractors.

- ✓ **UNRA employees**

Ten employees were considered from UNRA Lira station basing on their level of knowledge and their work position within the station as these employees were directly involved in awarding of road maintenance contracts and assessing the performance of the local contractors.

- ✓ **Local leaders**

Ten local leaders were considered basing on the level of their engagement in the process of awarding contracts to road maintenance local contractors and also basing on the level of engagement in the monitoring and evaluation process of the performance of road maintenance local contractors.

- ✓ **Uganda road fund official**

Two road funds official were considered basing on the level of knowledge and level of engagement with the road maintenance local contractors.

- ✓ **Road users**

These were bus drivers who were frequenting the road as the maintenance works goes on and fifty road users were considered in the study basing on the level of road usage. ie (20 bus drivers,10

taxi drivers, 10 motor cyclist and 10 pedestrians) who were on the road during the study, 3 road experts, 10 consultants and 5 UNABCEC.

- ✓ **Road sector experts**

Three road sector experts were considered basing on the level of their knowledge about the factors affecting the performance of road maintenance local contractors.

- ✓ **UNABCEC**

Five UNABCEC officials were considered to give their views on the factors affecting the performance of road maintenance local contractors.

- ✓ **Consultants**

Ten consultants were considered in the study basing on the level of their supervisory works with regards to supervising road maintenance local contractors in Lira.

3.6 Sampling techniques and procedures

The researcher used three sampling methods which included the simple random sampling technique, census sampling technique and the purposive sampling technique. Census sampling was used to select participants from the population category of UNRA employees, local contractors, road users and road sector experts. Simple random sampling was used to select participants from the population category of employees in construction companies.

The study used the lottery approach in employees within the road maintenance local construction companies where all names were written in different tags, mixed thoroughly and a tag picked one at a time until the required number of respondents was accessed. Whereas, purposive sampling was used to select key informants who were knowledgeable and experienced about factors affecting the performance of road maintenance local contractors.

3.7 Type of data

The study used both primary and secondary data. Primary data was data which was collected for the first time by the researcher. The researcher used questionnaires and interview guide to collect primary data. Secondary data refers to data that was in existence already and accessed by the researcher. The study used secondary data from journal articles, Uganda Road fund reports, Budget monitoring reports from Ministry of Finance Planning and Economic Development, reports from the Office of the Auditor General among others as its sources for literature review, background to study and others.

3.8 Data collection methods

3.8.1 Questionnaire method

The researcher used structured questionnaires in the study which contained closed-ended questions to enable the collection of quantitative data. Questionnaires had self-administered questions simply because all respondents could read and write except for the road users which were directly administered by the researcher.

3.8.2 Interview method

The interview method was used to collect qualitative data from the UNRA employees, local leaders and Uganda Road Fund officials.

3.8.3 Document reviews

Primary data was reinforced with secondary data. Critical documents were reviewed to cross check and collaborate information generated from primary data collection technique. The documents reviewed included road sector performance reports, Lira district performance reports, and journal articles relating to factors affecting local contractor's performance among others. Documentary review was mainly carried out to identify the critical factors affecting the performance of road maintenance local contractors.

3.9 Data collection instruments

3.9.1 Self-Administered questionnaire

A self-administered close-ended questionnaire on critical factors affecting performance of road maintenance local contractors under UNRA Lira Station was administered to respondents; it possessed logically ordered questions to which the subjects responded in writing. The questionnaire had three sections namely; section A which captured background information of the respondents, section B which captured critical factors affecting the performance of road maintenance local contractors and lastly section C which captured the impact of the selected critical factors on local contractor's performance.

3.9.2 Interview Guide

A key informant interview guide was used to guide the researcher in which type of questions to pose to the respondents, to collect rich qualitative data and in this case the respondent was given an opportunity to respond verbally while the researcher recorded the responses. The guide had open-ended questions (Appendix II).

3.9.3 Document review checklist

Secondary information was obtained using document reviews and since a lot of documents were reviewed, a checklist was developed to summarize information reviewed. The checklist had a list and type of documents reviewed, source and summary information generated from it. The review checklist was guided by the research objectives of the study.

3.10 Validity and Reliability of the study instruments

3.10.1 Validity of the study instruments

According to Mugenda and Mugenda (1999), 1% to 10% of the sample size of the study is suitable enough for pre testing an instrument. To ensure validity, the questionnaire was administered to seven (7) selected respondents representing 8% of the total sample size to score the relevance of each statement and question in providing answers to the study. The selected

respondents included five (5) Engineers, one (1) Assistant Architect and one (1) Contractor from the sample size. These were purposively selected because they were believed to be knowledgeable about the topic under investigation. After scoring the relevancy of the items in the research instrument, a content validity index (C.V.I) was computed using equation

3.2 as;

$$\text{CVI} = \frac{\text{Number of items declared valid}}{\text{Total number of items}} \quad \text{(Equation 3.2)}$$

$$Content\ Validity\ Index = \frac{161}{164}$$

$$= 0.982$$

A CVI of 0.7 and above is considered acceptable as suggested by Amin (2005). The validity of the instruments was tested using the Content Validity Index (CVI) using expert judgment, in this case, the CVI was 0.982, which implied that the constructs of the questionnaire measured what it was supposed to measure.

3.10.2 Reliability of the study instruments

To ensure reliability, a pre-test was done on 7 respondents representing (7/87) *(100) which equals to 8% of the total number of respondents as suggested by (Mugenda and Mugenda 1999). Data was coded and entered into a computer software. According to Webb, Shavelson and Haertel (2006), coefficient alpha (also known as "Cronbach's alpha") is the most widely used reliability coefficient. It estimates test-score reliability from a single test administration using information from the relationship among test items. In this study, Cronbach's alpha coefficient was used to determine the reliability of the data collection instruments. Cronbach's Alpha Reliability Coefficients were generated using the statistical package for social scientists (SPSS) a computer program to estimate the reliability of the questionnaire. The Cronbach's alpha reliability coefficients above 0.6 are acceptable (Richard J & Cronbach, 2004) On the

contrary, Santos (1999) argued that there is no commonly agreed cut-off for the Cronbach Alpha Coefficient and that even lower values are sometimes taken as acceptable and used in literature.

The response results were confirmed to be reliable as reflected in Table 3.2. Sekaran (2003) asserts that Cronbach Alpha Coefficient that ranges between 0.6 – 0.8 is more acceptable. From Table 3.2, the average of the average Cronbach Alpha Coefficient is 0.1212 implying that the findings of the pilot study reflected that the study instruments were reliable and therefore capable of generating reliable findings. Table 3.2 presents the pre-test results of this study.

Table 3.2: The reliability test results of the study

Narrative Summary	Indicators	Cronbach Alpha coefficient	Number of items
Factors	Contractors Experience	0.691	10
	Contractors Financial Capacity	0.724	9
	Effect of procurement process on contractor's selection	0.603	9
	Contractors managerial skills	0.880	9
	Cost factors	0.683	9
	Time factors	0.922	9
	Design changes	0.743	7
	Technology	0.912	5
	External factors	0.558	5
	Health and safety standards	0.652	8
Average of Success factors		**0.737**	**8**
Impact of the selected critical success factors	Contractors Experience	0.772	10
	Contractors Financial Capacity	0.613	9
	Effect of procurement process on contractor's selection	0.777	9
	Contractors managerial skills	0.533	9
	Cost factors	0.831	9
	Time factors	0.765	9
	Design changes	0.544	7
	Technology	0.772	5
	External factors	0.789	5
	Health and safety standards	0.876	8
Average of Impact of the selected critical success factors		**0.727**	**8**
Average of the average		**0.732**	**8**

Source: Primary Data (2021)

3.11 Data collection procedure

An introductory letter was obtained from the Department of Civil and Building Engineering of Kyambogo University to permit the researcher to collect data. The researcher accessed UNRA Kampala office using the introductory letter in order to ask for permission to go to UNRA Lira Station. The researcher accessed the list of road maintenance local contractors registered under UNRA Lira station and contacted the different local contractors to distribute the questionnaires to their employees and the questionnaires were later picked by the researcher. Interviews were also scheduled with the different key informants so as to collect qualitative data. The researcher used the introductory letter from the Department of Civil and Building Engineering during the data collection process.

3.12 Data Analysis

3.12.1 Quantitative data analysis

The analysis was aided by the use of Statistic Package for Social Science (SPSS) where the scores assigned to each factor by the respondents were entered and consequently the responses from the questionnaires were subjected to statistical analysis for further insight. The contribution of each of the factors to the performance of road maintenance local contractors was examined and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of Relative Importance Index (RII) which was computed using

equation (3.3) and the results of the analysis are presented in the next chapter. According to Johnson and LeBreton (2004), RII aids in finding the contribution a particular variable makes to the prediction of a criterion variable both by itself and in combination with other predictor variables.

$$RII = \frac{\sum W}{A \times N} (0 \leq RII \leq 1) \quad \text{..... (Equation 3.3)}$$

Where:

W = is the weight given to each factor by the respondents which ranges from 1 - 5, (where

"1" is "No Impact" and "5" is "Major Impact");

A = highest weight in this study (5 = Major Impact); and

N = total number of respondents.

The Mean of RII for each selected critical factor was computed to give a benchmark value for significance where by the RII less than the mean, reveals that the factor has less impact and the RII above the mean reveals that the factor has a high impact or significance. The RII formula was adopted from a study by (Scott & James, 2009).

Quantitative data was presented in form of descriptive statistics which include RII, standard deviation, ***p*** value, Fisher's statistic among others for each variable that was used in the study. Data were analyzed using Pearson correlation and regression analysis. Pearson's coefficient ***r*** and significance ***p*** were tested at 95% confidence limits to test if there is any significant relationship between the independent and dependent variables.

The regression analysis as earlier stated was used to test the extent to which the independent variables predict the variance in the dependent variable (performance of contractors) mainly using Analysis of variance (ANOVA) statistic of adjusted R^2 values, beta, t-values.

The t test score was calculated using the equation 3.4 as indicated below

$$t = \frac{(\sum D)/N}{\sqrt{\frac{\sum D^2 - \left(\frac{(\sum D)^2}{N}\right)}{(N-1)(N)}}} \qquad \text{.....Equation 3.4}$$

Where; ΣD: Sum of the differences, ΣD^2: Sum of the squared differences and $(\Sigma D)^2$: Sum of the differences (from Step 2), squared.

Similarly, the F statistics was calculated using the formula below;

F statistic = variance of the group means / mean of the within group variances

Regression equation was calculated using the formula below;

$y = \mathbf{m}+\mathbf{x_1}\mathbf{mx_2} +\mathbf{mx_3}... \mathbf{mx_n}+ b$

Y – Dependent variable

X_1, X_2, X_3 – Independent (explanatory) variables

a – Intercept

b, c, d – Slopes

ϵ – Residual (error)

M_1, M_2, M_3

Where; Y= the dependent variable of the regression, M= slope of the regression, **X_1**=first independent variable of the regression, the **X_2**=second independent variable of the regression, the **X_3**=third independent variable of the regression, xn is the nth independent variable of the regression and b= constant.

3.12.2 Qualitative data analysis

Qualitative data analysis was done in narrative form on the different interview questions, the researcher organized statements and responses from different respondents to generate useful conclusions and interpretations on the research objectives but reports in a narrative form.

3.13 Measurement of variables

The variables were measured by their exact meaning operational definitions of concepts. They were operationalized into observable and measurable elements to enable the development of an index of the concept using a five-point Likert scale ranging from 5=Major Impact,4=Moderate Impact, 3= Marginal Impact, 2=Negligible Impact, and 1 = No Impact to measure both the independent and dependent variables in the study.

3.14 Achievement of objectives

3.14.1 Objective 1: To establish the critical factors affecting local contractor's performance in road maintenance projects in Uganda

The study reviewed several journal articles like (Bitamba & An, 2020: Enshassi, Mohamed & Abushaban, 2009) and reports (Onnan, 2018: Mwangi, 2016: Muhwezi, Abonga & Sengonzi, 2020: Otim & Alinatwe, 2013) , (Chukwuemeka & Chinemdi, 2020), (Edward, Jeseph, &

Bernard, 2014), (Eko, Donny , & Tutang, 2019), (Gwaya, Sylvester , & Githae , 2014), (Lee, Syuhaida , & Mohammad , 2014), (MATU , 2016), (Masrom & Garba , 2019), (Muhwezi, Joseph, & Otim, 2014), (Timothy & Yona , 2018), (Yerevan , 2018) among others that have been published in the areas of factors affecting the performance of road maintenance local contractors so as to identify the major critical factors that affect the performance of road maintenance local contractors. It was upon the documents reviewed that the study identified the critical factors. Several statements were developed to portray the identified factors upon which respondents had to state their opinions basing on a five point Likert scale (5=Major Impact, 4=Moderate Impact, 3= Marginal Impact, 2=Negligible Impact, and 1 = No Impact) on whether the identified factors were critical in affecting the performance of road maintenance local contractors or not. The scores for major and moderate Impact were grouped to represent respondents who agreed with statements that the different factors are critical in affecting the performance of road maintenance local contractors whereas the scores of marginal and no Impact were also grouped to represent respondents who disagreed with the statements that the different factors are not critical in affecting the performance of road maintenance local contractors, while the scores. For respondents who were neutral to the statements that the different factors were considered as those who were not sure whether those factors are critical or not.

3.14.2 Objective 2: To determine the impact of the identified critical factors on local contractor's performance in road maintenance projects in Uganda

The study used the RII to rank the identified and selected critical factors basing on the perception of the respondents about the level of impact of these critical factors where the respondents were subjected to a set of statements and the respondents had to state their opinions regarding the statements guided by a five-point Likert scale (1= No impact,2= Negligible impact, 3= Marginal impact, 4= Moderate impact and 5= Major impact).

3.14.3. Objective 3: To develop a framework for improvement of performance of the local contractors in road maintenance projects in Uganda

The framework was developed basing on the relative importance index of each of the critical factors. The constructs with RII above the average RII were considered to have an impact on the performance of road maintenance local contractors and were therefore used as inputs in the development of the framework to improve performance road maintenance local contractors.

3.15 Ethical considerations

Respondent's names were withheld to ensure anonymity and confidentiality in terms of any future prospects and in-order to avoid bias. The researcher avoided plagiarism by acknowledging the different authors of any material or literature reviewed during the research process. Voluntary participation, the researcher didn't use force on the respondents and reasons for interviewing them was given. Guarantee privacy, most important is that the researcher guaranteed the privacy of all the respondents throughout and after the study.

3.16 Chapter Summary

This chapter presented the methodology which was used in the study. It included the research design used in the study, population of the study, sample size and selection, sampling techniques and procedures, data collection methods and data collection instruments, validity and reliability of the study instruments, data collection process, data analysis, measurement of variables and the ethical considerations of the study and the next chapter presents the findings, analysis and discussions with regards to each specific objective of the study.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents the analysis and discussions of the study findings arising from the field information collected from respondents on the assessment of performance of road maintenance local contractors in Uganda considering a case of Uganda National Road Authority (UNRA) Lira Station. The information obtained from the road users showed that the roads are not satisfactorily maintained as they are characterized by many defects that hinder the road user movements. However, the first section of this chapter presents the response rate, followed by presentation and analysis of the study findings in relation to the specific objectives of the study.

4.2 Response rate

A total of 146 questionnaires were distributed but only 135 questionnaires were completed and returned as reflected in Figure 4.1

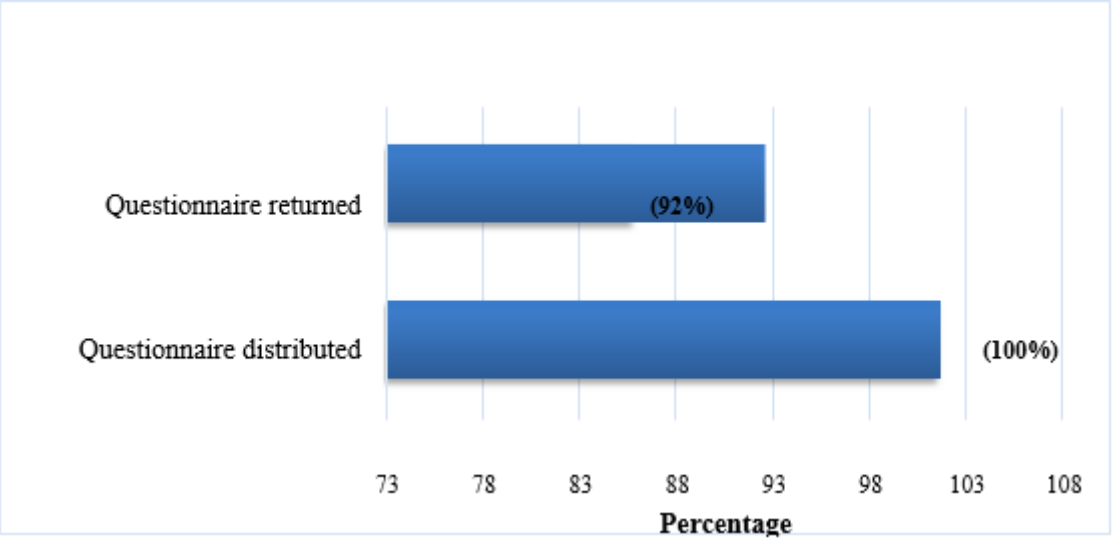


Figure 4. 1: Response rate

Source: *Primary Data, (2021)*

The results in Figure.4.1 show a resultant response rate of 92%. The proportionately high response rates of 92% suggested more accurate survey results. Amin (2005) recommends that

for results to be considered representative and generalizable to the population, the response rate of a study should be 75% and above.

Thus, this study meets the recommendation by Amin (2005) implying that the study results are representative and can be generalized for the population.

4.3 Demographic Characteristics

4.3.1 Gender of respondents

This section presents results about gender of the respondents disaggregated by gender into male and female as shown in Table 4.1.

Table 4.1: Gender of the Respondents

Description	Sex	Frequency	Percentage
Sex of the respondent	Male	108	80%
	Female	27	20%

Source: *Primary Data, (2021)*

According to the results in Table 4.1, some of the respondents were male, they were sixty-four in number representing 80% of the total number of respondents while the female respondents were seventeen respondents representing 20% of the total number of respondents. The results in Table 4.1imply that the responses were not biased with regards to the respondent's sex since both male and female respondents were well represented.

4.3.2 Age group of the respondents

This section presents results about the ages of the respondents. Respondents' ages were categorized into groups in Table 4.2.

Table 4.2: Age Group of the Respondents

Description	Age category	Frequency	Percentage
Age Category of the respondents	19-30	79	59%
	31-45	35	26%
	46 and above	21	15%
Total		135	100%

Source: *Primary Data, (2021)*

According to the results in Table 4.2, forty-eight respondents representing 59% of the total number of respondents who were the some were aged from 19 to 30, followed by seventeen respondents representing 26% of total respondents were aged from 31 to 45 and then sixteen respondents representing 15% of the total number of respondents were aged 46 and above. The results in Table 4.2 imply that the responses were not biased with regards to the respondent's age since the different age groups were well represented.

4.3.3 Level of education of respondents

This section presents results with regards to level of education of the respondents as shown in table 4.3.

Table 4.3: Education Level of Respondents

Description	Education level	Frequency	Percentage
Highest education level of the respondent	Ordinary Diploma	75	56%
	Degree	10	7%
	Post Graduate Diploma	5	4%
	Others	45	33%
Total		135	100%

Source: *Primary Data, (2021)*

From Table 4.3, some of the respondents had attained an ordinary diploma representing 56% of the total number of respondents, five respondents had attained a degree representing 7%

while four respondents representing 4% of the total number of respondents had attained post graduate diploma and those that had attained other qualifications were four representing 33% of the total number of respondents. The results in Table 4.3 indicate that the responses were not biased with regards to the respondent's highest level of education since every level was well represented and had the capacity to read and effectively respond to the data collection instrument.

4.3.4 Profession of respondents

This section displays results about the profession of respondents as shown in Table 4.4.

Table 4.4: Profession of the Respondents

Description	Profession	Frequency	Percentage
Profession of the respondents	Contractors	9	7%
	Architects	5	4%
	Engineers	67	50%
	Road users	39	28%
	Business	15	11%
Total		135	100%

Source: *Primary Data, (2021)*

The results in Table 4.4 indicate that sixty-seven respondents representing 50% of the total number of respondents who were the some were engineers, nine respondents representing 7% were contractors, thirty-nine respondents representing 28% of the total number of the respondents were road users while as five respondents representing 4% were architect and only 15 respondents representing 11% were having other qualifications. The results in Table 4.4 imply that the responses were collected from well informed people about the phenomenon under the study reliable as most of the profession were well represented and therefore the collected data were to produce reliable and dependable findings.

4.3.5 Position of respondents

This section displays results with regards to the position of respondents in their companies as shown in Table 4.5.

Table 4.5: Position of respondents in organization

Description	Position	Frequency	Percentage
Respondents position in his/her organization	Project engineers	20	15%
	Administration and Finance	14	10%
	Foremen	9	6%
	Assistant engineers	26	20%
	Contractors	8	6%
	Directors	18	13%
	Others	40	30%
Total		135	100%

Source: *Primary Data, (2021)*

Basing on the results in Table 4.5, twenty six respondents representing 20% held the position of assistant engineers, eighteen respondents representing 13% held the position of directors, twenty respondents representing 15% held the position of project engineers in their organizations while as nine respondents representing 6% held positions of foremen within their organizations, fourteen respondents representing 10% of the total number of respondents held positions of Administration and Finance, eight respondents representing 6% held position of contractors and forty respondents representing 30% held a position of others in their organizations. The results in Table 4.5 imply that the respondents were in suitable positions in the organization to provide relevant information about the factors affecting performance of road maintenance local contractors and thus the study results are credible and reliable.

4.3.6 Experience of the construction company

The study sought to understand the experience of the respondents in the construction industry.

This section presents the results about the level of experience of the construction companies with regards to road maintenance.

Table 4.6: Experience of the construction company

Description	Years of experience	Frequency	Percentage
Years of experience of the construction company or firm	5-10 years	39	29%
	11-14 years	68	50%
	15 - 20 years	28	21%
Total		135	100%

Source: *Primary Data, (2021)*

Construction companies with 11-14 years of experience had sixty-eight respondents representing 50% of the total number of respondents which was the some with while as construction companies with 15-20 years of experience had twenty-eight respondents representing 21% and those construction companies with 5-10 years of experience had only thirty-nine respondents representing 29%. The results in Table 4.6 imply that all of the construction companies have been in the industry for over 5 years and are in position to generate reliable responses with regards to performance of road maintenance local contractors.

4.3.7 Department of deployment of respondents

This section presents results about the different departments the respondents are deployed in as shown in Table 4.7.

Table 4.7: Respondents department of deployment

Description	Department	Frequency	Percentage
Respondents' department of deployment	Projects	9	7%
	Road maintenance	42	31%
	Site supervision	5	4%
	Management	30	22%
	Finance and administration	8	6%
	Others	41	30%
Total		135	100%

Source: *Primary Data, (2021)*

The preliminary analysis indicates that forty two respondents representing 31% were under road maintenance, thirty respondents representing 22% were under management, nine respondents representing 7% of the total number of respondents were under projects, eight respondents representing 6% were under finance and administration whereas five respondents representing 4% of the total number of respondents were under site supervision and only forty one respondents representing 30% were under others. The results in Table 4.7 imply that the responses collected were reliable and informative of the study findings since most of the respondents were well informed about the phenomenon in the study.

4.3.8 Work details of local construction companies

This section presents the work details of the local construction companies in terms of whether the companies do maintenance projects, experience of the company in road maintenance, whether the company hire or bring in people from outside to do the works, whether the companies complete work in time, whether there are errors to be corrected during finishing and the amount rework carried out during finishing.

Table 4.8: Work details of local construction companies

Description	Indicators	Frequency	Percentage
Does your company also do maintenance projects?	Yes	135	100%
If your company also does maintenance projects, how long have you been participating in road maintenance projects?	Below 5 years	5	3%
	5 -9 years	62	46%
	10-14 years	52	39%
	15-19 years	8	5%
	20 years and above	8	5%
Does your company hire or bring in people from outside to do the works?	Yes	34	25%
	No	101	75%
Have you been completing your works on time?	Yes	125	93%
	No	10	7%
Are there any errors to be corrected during final finishing?	Yes	10	7%
	No	4	3%
	Sometimes	78	58%
	Not always	43	32%
If yes, to what extent, using a scale of 0-20% select the amount of rework carried out during finishing	0-5%	115	85%
	6-10%	15	11%
	11-15%	5	4%

Source: *Primary Data, (2021)*

According to Table 4.8, eighty-one respondents representing 100% of the total number of employees in the different construction companies agreed that their companies deal in road maintenance projects. The results in Table 4.8 imply that the responses were not biased at all with regards to the respondent's maintenance projects since all respondents agreed.

Results in Table 4.8 indicate that some of the companies do not hire or bring people from outside to do their work evidenced by some respondents disagreeing with the statement whether their company hires or brings in people from outside to do the works with ninety-three respondents representing 93% of the total number of respondents and twenty respondents representing 15% agreeing with the statement that their companies hire or bring in people from outside to do the works. The results in Table 4.8 imply that the responses were not biased with regard to the respondents hiring of other people to do the work in the company since twenty-two respondents

representing 16% disagreed with the statement implying that some of the construction companies have experienced and technical stuff who can handle road maintenance projects.

According to Table 4.8, results indicate that some of the respondents agreed with the statement that they have been completing their works on time and this was evidenced by one hundred and twenty-five respondents representing 93% and only ten respondents disagreed with the statement that they have been completing their works on time.

Furthermore, the results in Table 4.8 indicate that ten respondents representing 7% of the total number of respondents agreed with the statement that there are errors to be corrected during final finishing while as only four respondents representing 3% of the total number of respondents disagreed with the statement that there are no errors to be corrected during final finishing and one hundred and twenty-one respondents representing 90% being the some were not sure about the statement. The results implied that some of the respondents were not sure if there were errors to be corrected during final finishing.

4.4 Critical factors affecting performance of road maintenance local contractors in Uganda

Through documentary review, the researcher identified several factors affecting performance of road maintenance local contractors but mainly focused on contractor's experience, contractor's financial capacity, effect of procurement process on contractor's selection, contractor's managerial skills, cost factors, time factors, design changes, technology, external factors, and health and safety standards. Some of the documents reviewed include (Muhwezi, Abonga & Sengonzi, 2020: Bitamba & An, 2020: Enshassi, Mohamed & Abushaban, 2009) and reports (Onnan, 2018: Mwangi, 2016: Otim & Alinatwe, 2013)

The analysis of critical factors in this section is arranged with regards to the study instrument specifically data collected on the second objective. The RII was computed using Equation (3.3) as stated earlier in Chapter Three (Section 3.10).

4.4.1 Contractor's experience

Table 4.9 shows the RII for each of the indicators used to measure contractor's experience. These indicators include; adherence to specifications of maintenance works, adequate supervision of workers, adequate planning and scheduling of works, adequate monitoring of works, good workmanship, adequate experience and competence, through supervision of subcontractors and effective contractors and worker's relationship.

Table 4.9: Contractor's experience

No.	Details	Number of respondents	Percentage	RII	Rank
1	Adequate supervision of workers	121	90%	0.928	1
2	Adherence to specifications of maintenance works	121	90%	0.918	2
3	Good workmanship	121	90%	0.874	3
4	Good contraction techniques	121	90%	0.87	4
5	Effective contractors and workers relationship	120	89%	0.862	5
6	Adequate planning and scheduling of works	115	85%	0.852	6
7	Contractor's reputation	121	90%	0.842	7
8	Adequate experience and competence	128	95%	0.812	8
9	Adequate monitoring of works	113	84%	0.802	9
10	Through supervision of subcontractors	115	85%	0.792	10
Average of the RII				0.855	

Source: *Primary Data, (2021)*

The RII <0.855 (less than 0.855) was considered that the factor has less impact and that above >0.855 (greater than 0.855) was considered that the factor has a high impact.

The findings of the study indicate that 90% of the respondents believed that adequate supervision of workers (RII of 0.928) affects the performance of contractors and was rank first among the factors considered.

According to Table 4.9, seventy-three respondents believed that adherence to specifications of maintenance works (RII = 0.918) affects the performance of the contractors and was ranked second among the factors considered. The results from Table 4.9 indicate that 90% respondents believed that good workmanship (RII= 0.874) affects the performance of the contractor indicates that the contractor and was rank third among the factors considered.According to Table 4.9, seventy-seven respondents believed that adequate experience and competence has impact on contractor's experience (RII=0.812) affects the performance of contractors and was ranked eighth among the factors considered. It means, without enough experience and competence the contractor cannot achieve an improved performance.

The findings from Table 4.9 indicated that one hundred and thirteen respondents believed that adequate monitoring of works depends on the contractor's experience which in turn affects the performance of road maintenance local contractors and was ranked ninth. Therefore, the contractor should have adequate knowledge of monitoring the works to achieve an improved outcome.

Generally, the overall mean of RII was 0.855 implying that respondents agreed with most of the statements that represented contractor's experience, therefore Contractor's experience is one of the critical factors affecting local contractor's performance in Uganda's construction industry.

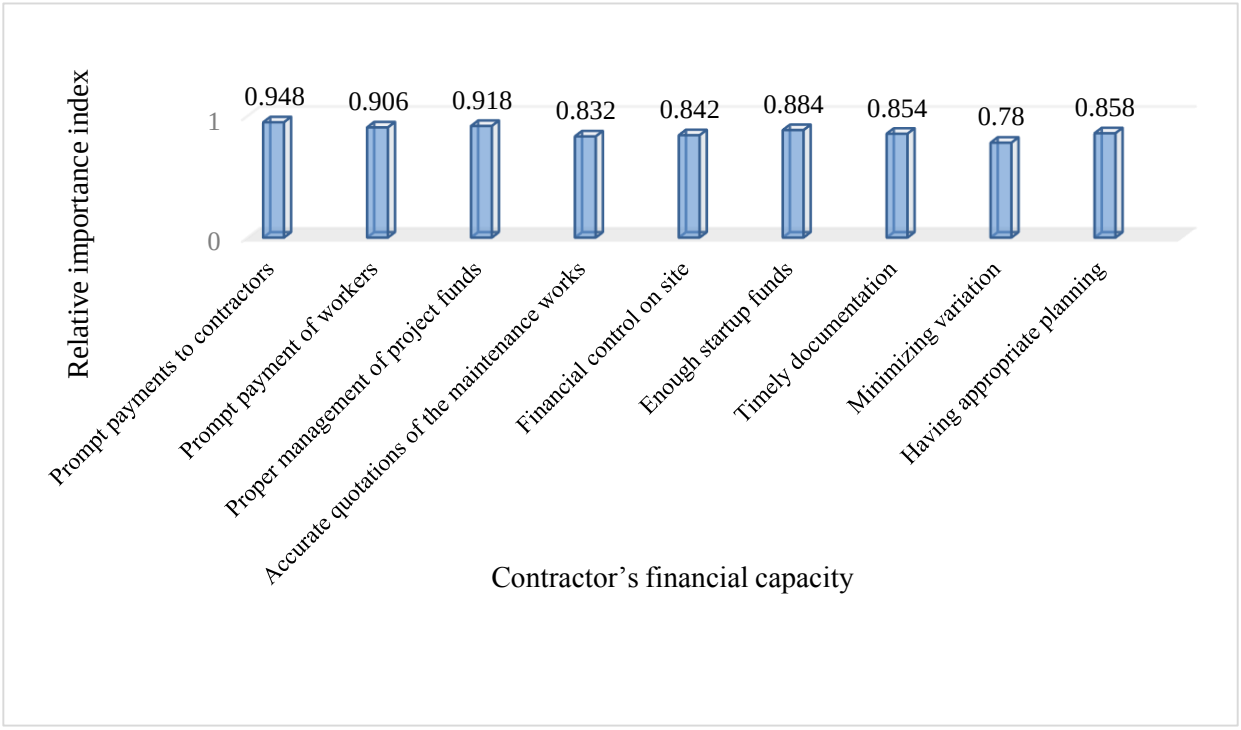
Results indicate that most of the respondents were in agreement with the contractor's experience being a critical factor since five indicators had RII values above the average value (0.855) and

this is consistent with the findings of Atout (2008) who also asserted that the success of construction projects depend on the experience of the contractor and capability of the contractor's project manager. Also a study conducted by Gawhula & Wittonde (2016) revealed that local contractor's experience in construction industry was the second highly ranked critical factor that hindered local contractor performance.

The Ugandan construction industry policy also supports the fact that local contractor's experience in construction industry is highly ranked with regards to local contractor performance and as well emphasizes on the need of having experienced contractors in construction industry (UNRA, 2015). Therefore, the success of maintenance or construction projects depends on the experience of the contractors and capability of the contractor's project manager. Thus, the finding of the study is in agreement the finding of (UNRA, 2015).

4.4.2 Contractor's financial capacity

Figure 4.2 shows the average RII for each of the indicators used to measure contractors' financial capacity.



Source: *Primary Data, (2021)*

Figure 4.2: Contractor's financial Capacity

The factor with RII value < 0.893 was considered that the factor has less impact and that above >0.893 was considered that the factor has very high impact.

The findings in Figure 4.2 indicate that Prompt payments to contractors with the RII of 0.948 above all the other indicators and greater than the average RII (0.893) has the greatest impact on the contractor's financial capacity which in turn affects contractor's performance and this implies that if the contractors are paid on time there would be no delay, hence achieving an improved outcome. According to the findings in Figure 4.2, proper management of project funds with the RII of 0.918 above the average RII has high impact on contractor's financial capacity which in turn affects the performance contractors. Project funds should be managed well to get a better outcome.

In the analysis of contractor's financial capacity, the RII of 0.906 implied that prompt payment of workers takes the third position on the impact of contractor's financial capacity which in turn affects the performance of local contractors since the RII of 0.906 is greater than 0.893. It also implies that, when the workers are paid on time, the contractor achieves a n improved performance. According to Figure 4.2, indicate that having appropriate planning the RII of 0.858 has moderate impact on the contractor's financial capacity and thus implying that financial capacity in terms of appropriate planning affects the performance of local contractors. For the contractor to achieve an improved performance, there is need for an appropriate planning in the company to get a better outcome.

Generally, the overall mean value of RII was 0.893 which implied that some of the respondents agreed with most of the statements that represented contractor's financial capacity, therefore contractor's financial capacity is one of the critical factors affecting performance of road maintenance local contractor's in Uganda.

The findings of this study are in agreement with the findings of Nor and Syuhaida (2017) who indicated that financial difficulties were one of the main causes of delayed construction and

maintenance projects. Lack of project financing arrangement could lead to compromise on quality, project delays and legal disputes due to delays of payments to the contractor, cost overruns (Frimpong, 2003; Aibimi; 2006; Ramanathan et al., 2012).

4.4.3 Procurement process on contractors selection

Figure 4.3 presents the relative importance index of the indicators the represented procurement process on contractors' selection. The indicators include time of biding, company's strength in the industry, confidence in workforce, appropriate method of selecting contractors, transparency in procurement, filling and filing required bidding documents, no bribery and corrupt practices, no influence peddling and effective procurement process.

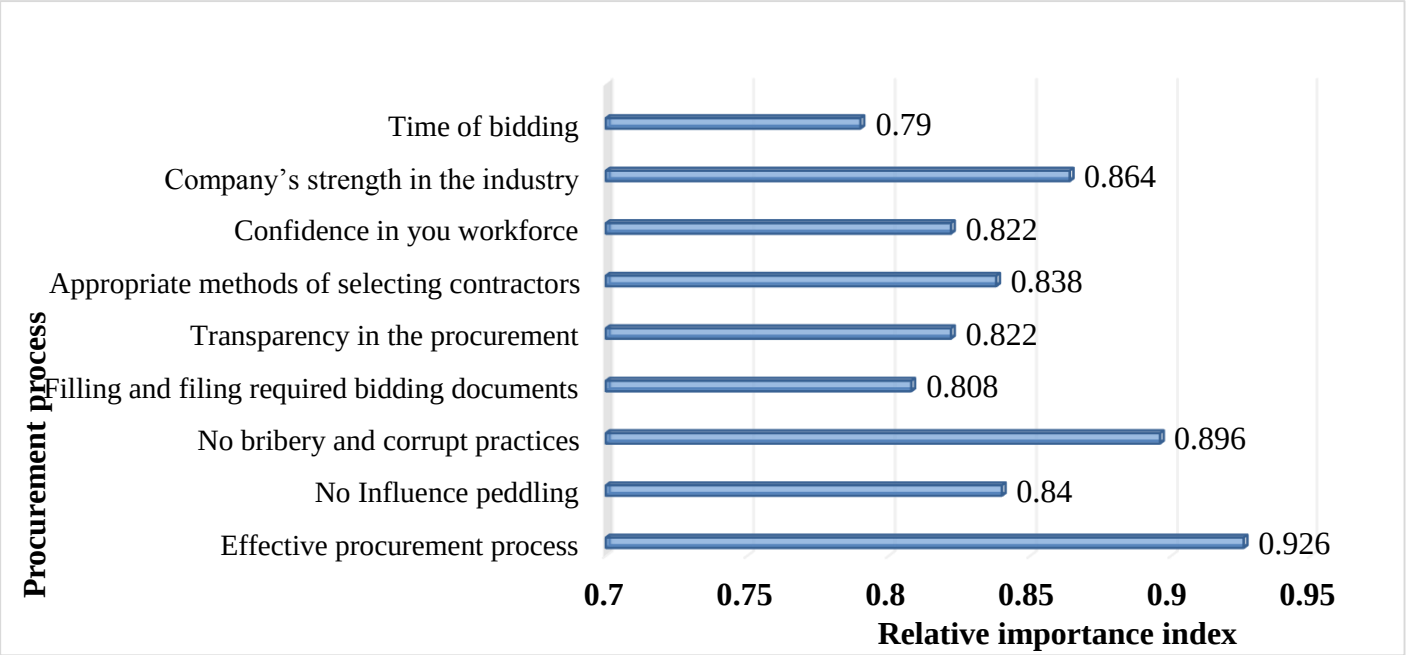


Figure 4. 3: Procurement process on contractors' selection

Source: *Primary Data, (2021)*

The RII < 0.845 (less than 0.845) was considered that the factor has less impact and that above>0.845 (greater than 0.845) was considered that the factor is very impactful. According to the findings in Figure 4.3, showed that effective procurement process has the greatest impact on procurement process on contractors selection (RII=0.926) was greater than average RII which affects the performance contractors. So, the contractor should have an effective procurement

process in order to achieve an improved performance in the construction industry. The findings in Figure 4.3, indicate no bribery and corrupt practices with the RII of 0.896 greater than the average RII has high impact on procurement process on contractors selection which affects the performance of contractors.

Basing on the results in the Figure 4.3, indicate that filling and filing required bidding documents with RII of 0.808 has moderate impact on procurement process on contractors selection which affects the performance of road maintenance local contractors and if filling and filing of the bidding document is not done properly, it affects the performance of the local contractors. Basing on the results in the Figure 4.3, showed that transparency in the procurement falls under procurement process on contractors selection with moderate impact on the performance of the contractors and this can only be achieving if the contractor trusts the workers. According to the results in the Figure 4.3, the RII of 0.838 implied that appropriate methods of selecting contractors has moderate impact on procurement process on contractors.

Generally, the overall Mean of RII was 0.845 implying that some of the respondents agreed with most of the statements that represented procurement process on contractor's selection, therefore procurement process on contractors selection one of the critical factors affecting local contractor's performance in road maintenance projects in Uganda. Procurement system offers a lot of influence on successful project outcomes. The procurement category can be traditional that involve Design, Bid and Build (DBB) while the non-traditional ones are the Build Operate Own (BOO) and Build Operate and Transfer (BOT). The DBB is the common method of procurement in use for most construction projects (Noor et.al., 2013).

The procurement system as a critical project quality performance factor was ranked third in the study of Noor et al., (2013). Similarly, a study carried out by Gawhula and Wittonde (2016) also revealed that for quality performance of projects, there is a need of having a well- recognized procurement system. Furthermore, the authors recommended that policy makers, financiers,

planners and designers should be aware of the procurement system to be used in acquiring an entity that was responsible for execution of the project well from instigation of the project and this is solely in agreement with the findings of the study.

4.4.4 Contractor's Managerial Skills

Table 4.10 presents the relative importance index for the indicators that represented contract managerial skills. The indicators include quick decision making, technical skills, human skills, good communication and control, proper material checking and testing before use, proper individual task allocation, adequate emphasis on quality work and use of skilled operators.

Table 4.10: Contractor's Managerial Skills

No.	Details	Number of respondents	Percentage	RII	Rank
1	Quick decision making	120	90%	0.924	1
2	Adequate emphasis on quality work	121	90%	0.908	2
3	Use of skilled operators	121	90%	0.906	3
4	Technical skills	120	90%	0.904	4
5	Proper material checking and testing before use	121	90%	0.888	5
6	Good communication and control	115	95%	0.884	6
7	Problem solving skills	120	90%	0.88	7
8	Human skills	113	84%	0.86	8
9	Proper individual task allocation	121	90%	0.846	9
Average of the RII				0.888	

Source: *Primary Data, (2021)*

Findings in Table 4.10 indicate that Quick decision making has the greatest impact on the Contractor's managerial skills since the RII of 0.924 was greater than 0.888. which affects the performance of the contractors especially when the contractor takes time in deciding on what to do for the work to go on faster.

From Table 4.10, showed that Technical skills has high impact on Contractor's managerial skills since the RII of 0.904 is greater than 0.888. This implies that contract managerial skills inform of technical skills highly affects the performance of local contractors. It also means that a contractor should have knowledge on technical skills in order to achieve an improved performance.

The results in Table 4.10 indicate that problem solving has moderate impact on Contractor's managerial skills with RII of 0.88. This implies that for the contractor to have an improved performance, he/she should have a problem-solving skill in order to manage the workers.

According to Table 4.10, indicate that adequate emphasis on quality work has high impact which affects the performance of contractors. This implies that means to achieve an improved performance, a contractor must know how to deal with the workers in order to do well. In the analysis of the contractor's managerial skills, RII of 0.906 indicate that Good communication and control depends on the Contractor's managerial skills and this implies that a good manager must be an example to the people that he/she is managing in order to achieve an improved performance.

Generally, the overall Mean of RII was 0.888 implying that some of the respondents agreed with most of the statements that represented Contractor's Managerial Skills, so Contractor's managerial skills is one of the critical factors affecting performance of road maintenance local contractors in Uganda

4.4.5 Cost Factors

Table 4.11 indicates the relative importance index for each of the indicators that represented cost factors as a critical factor affecting the performance of road maintenance local contractors. The indicators include increase in material cost, wrong method of estimation, inadequate labor, high cost of machinery, waste rate of materials, regular project update, cost of variations, project overtime cost and cost of reworks.

Table 4.11: Cost Factors

No.	Details	Number of respondents	Percentage	RII	Rank
1	Increase in material cost	127	94%	0.966	1
2	Wrong method of estimation	121	90%	0.916	2
3	Cost of reworks	113	84%	0.896	3
4	Project overtime cost	107	79%	0.866	4
5	High cost of machinery	120	89%	0.862	5
6	Waste rate of materials	108	80%	0.818	6
7	Inadequate labor	100	74%	0.818	7
8	Regular project budget update	108	80%	0.776	8
9	Cost of variation orders	121	90%	0.772	9
Average of the RII					0.854

Source: *Primary Data, (2020)*

The RII < 0.854 (less than 0.854) was considered that the factor has less impact and that above >0.854 (greater than 0.854) was considered that the factor has very high impact.

In the analysis, increase in material cost with the RII of 0.966 above all the other indicators and greater than the average RII (0.893) has the greatest impact on impact on cost factors which affects contractor's performance. In Table 4.11 the RII of 0.916 indicate that Wrong method of estimation has very high impact on cost factors since the RII of 0.916 is greater than the average RII and was ranked second among the factors considered.

According to the results in Table 4.11, 74% of the respondents believed that Inadequate labor has impact on cost factors. This finding implies that if the contractor has inadequate labor, chances are high that the performance of local contractors would be affected in terms of cost. According to Table 4.11 one hundred and twenty respondents agreed that High cost of machinery has very high impact on cost factors which in turn affects the performance of the local contractors in terms of looking for money to buy a better machine as time goes on. Similarly, from Table 4.11, one hundred and eight respondents believed that waste rate of materials contributes to cost factors and this implies that when the rate of materials waste is high, it affects the contractor's performance in terms of cost.

A study conducted by Olaniran (2015) revealed that choosing contractors solely on the basis of the quoted price may cause poor performance in the construction project. The major reason they occurred was found to be the reduced profit margin for contractors (Olaniran, 2015).

Similarly, a study conducted by Abidali and Ali (2018) which determined the factors affecting performance of contractors in Bagdad indicated that cost factors such as excessive variation orders were ranked first implying that this factor affects contractor's performance directly during the execution stage of project which is also in line with the findings of the study.

4.4.6 Time Factors

Table 4.12 shows the relative importance index for each indicator of time factors used in the study. The indicators include delay due to material shortage, delay in payment, time taken to rectify defects, site preparation time, time to implement variation, timely availability of materials, planned time for project construction, percentage of orders delivered late and average delay in payment from owner to contractors.

Table 4.12: Time Factors

No.	Details	Number of respondents	Percentage	RII	Rank
1	Delay in payment	120	89%	0.936	1
2	Delay due to material shortage	121	90%	0.919	2
3	Timely availability of materials	115	85%	0.85	3
4	Time taken to rectify defects	108	80%	0.842	4
5	Percentage of orders delivered late	113	84%	0.84	5
6	Average delay in payment from owner to contractor	97	72%	0.808	6
7	Time to implement variation	100	74%	0.802	7
8	Site preparation time	112	83%	0.782	8
9	Planned time for project construction	108	80%	0.77	9
Average of the RII				0.838	

Source: *Primary Data, (2021)*

The RII < 0.838 (less than 0.838) was considered that the factor has less impact and that above >0.838 (greater than 0.838) meant that the factor has very high impact.

The RII of 0.936 in Table 4.12 indicate that delay in payment has the greatest impact on time factors since the RII of 0.936 is greater than 0.838 which affects the performance of the contractors. The delay in payment to contractors causes a delay in service delivery that later affects the contract time.

In the analysis of time factors, the RII of 0.919 implied that delay due to material shortage has very high impact on time factors since the RII of 0.919 is greater than 0.838. The material shortage may force contractors to source for materials in long distances that increases on the time taken to deliver materials on site.

The findings from the Table 4.12 indicate that the RII of 0.802 implied that 74% of the respondents accepted that time variation in implementation has less impact on cost factors which in turn affects the performance of local contractors.

Generally, the overall Mean of RII was 0.838 and most of the indicators had RII value greater than the average and this implied that a big percentage of the respondents agreed with most of the statements that represented time factors, therefore time factors is one of the critical factors affecting performance of road maintenance local contractors in Uganda.

A study carried out by Abidali and Ali (2018) to determine the factors affecting performance of contractors in Bagdad indicated that time factors such as average delay in regular payments was ranked first. This finding is in agreement with a study carried out by Akomah and Jackson (2016) which also identified average delay in regular payments as the most critical time performance factor. It is estimated that Uganda loses $ 1 billion per year on road construction projects that break up due to poor maintenance (CoST, 2018). (Akomah and Jackson, 2016) also discussed this factor in their study and ranked it first implying that site preparation is important to a contractor's performance and hence the above studies were in agreement with the findings of the study.

4.4.7 Design changes

These are changes that are brought about by modification and improving the road designs. The statements that portray design changes were ranked basing on the RII value of each statement as shown in Table 4.13.

Table 4.13: Design Changes

No.	Details	Number of respondents	Percentage	RII	Rank
1	Consultant submits construction drawing late.	113	84%	0.892	1
2	Insufficient instruction and information in the contract specification, drawing and	115	85%	0.856	2
3	Mistakes and discrepancies in design documents	113	84%	0.842	3
4	High cost of machinery	120	89%	0.819	4
5	Lack of coordination between designers & contractor	107	79%	0.812	5
6	Contractor takes control of design compared to consultant	90	67%	0.796	6
7	Owner less involved in controlling design	107	79%	0.776	7
Average of the RII					0.828

Source: *Primary Data, (2021)*

The RII < 0.828 (less than 0.828) was considered that the factor has less impact and that above >0.828 (greater than 0.828) was considered that the factor has very high impact.

In the Table 4.13, the RII of 0.892 which was equivalent to 84% of the respondents accepted that consultants submitting construction drawings late has very high impact on design changes which affects the performance of the contractors since the RII of 0.892 is greater than 0.828. The study established that the RII of 0.856 that was equivalent to 85% of the respondents accepted that if there is insufficient instruction and information in the contract specification, drawing and design it contributes to design changes since the RII of 0.856 is greater than 0.828.

The finding in Table 4.13 indicate that sixty-nine respondents believed that design changes in terms of insufficient instruction and information in the contract specification, drawing and design

effects the performance of the contractors and it was ranked second among the factors considered.

According to Table 4.13, 68% of the respondents agreed that contractor taking control of design compared to consultant with RII= 0.796 has impact on design changes. This meant that design changes in terms of a contractor taking control of design compared to a consultant greatly affects the performance of local contractors. The results in Table 4.13, indicate that the RII of 0.776 that is less than the average RII meant that some of the respondents agreed that when the owner is less involved in controlling design, there is less impact on design changes. This implies that design changes where the owner is less involved has less impact on the performance of local contractors.

Generally, the overall Mean of RII was 0.828 and from Table 4.13 the RII for some indicators were above the average and this represents a percentage of the respondents who agreed with most of the statements that represented design changes, therefore design changes is one of the critical factors affecting performance of road maintenance local contractors in Uganda. The impact of design on contractor's performance is universally acknowledged and effective management of the design process is crucial for the success of projects.

A study carried out by Smallwood and Venter (2001) to analyze performance of contractors in New Zealand revealed that design changes such as late information about the changes, poor specifications and design errors negatively affect the performance of contractors. Furthermore, poor specifications, late information and design errors achieved rankings of sixth, seventh and eighth respectively among the indicators of design changes used in the study and the findings of the researcher was in agreement with the findings in the previous research conducted by Smallwood and Venter (2001).

4.4.8 Technology factors

These are factors that are brought about by the level of technology used by the local contractors in executing their work. Technology factors were ranked basing on the RII of each statement that reflected technology factors as in Table 4.14

Table 4.14 Technology factors

No.	Details	Number of respondent	Percentage	RII	Rank
1	Low technology available to construction firms	113	84%	0.888	1
2	Adapting new technology	126	94%	0.886	2
3	Training the workers to cope up with the new technology	107	79%	0.852	3
4	Improved the design and construction process	120	89%	0.822	4
5	Hiring people from outside to operate the machines	90	67%	0.782	5
Average of the RII				0.846	

Source *primary data (2021)*

Since the RII of 0.886 is greater than 0.846 which in turn impacts on the performance of road The RII < 0.846 (less than 0.846) was considered that the factor has less impact and that above 0.846 (greater than 0.846) was considered that the factor has very high impact (Critical).

In the analysis of technology, 84% of the respondents accepted that Low technology available to construction firms depends on the available technology since the RII is greater than 0.846. This implies that low technology availability among construction firms highly impacts on the performance of the local contractors and to improve on the performance of the local contractors, there should be advanced technology in the industry.

According to Table 4.14, 79% of the respondents agreed that training of the workers to cope up with the new technology depends on the available technology since the RII of 0.852 is greater than 0.846. This finding implies that training of workers on how to use the available technology within the construction firms has high impact on the performance of local contractors since it will need more time for the performance to be improved.

According to Table 4.14, 79% of the respondents mentioned that hiring people from outside to operate the machines has impact on the available technology. This implies that hiring people from outside to operate the available technology in terms of machines has impact on the performance of local contractors and to get the improved performance, there will be need to hire people. The results in Table 4.14 indicated that 94% of the respondents believed that adapting new technology has high impact on the available technology since it takes time for the new methods to be adapted in order to have an improved performance of the local contractors. The results in Table 4.14indicate that the RII of 0.822 implied the respondents believed that improved design and construction process has less impact on the available technology which in turn affects the performance of local contractors.

Generally, the overall Mean of RII was 0.846 implying that the respondents agreed with most of the statements that represented technology, therefore technology is one of the critical factors affecting the performance of road maintenance local contractors in Uganda. As technology adoption continues to ramp up in the construction industry, one area getting a lot of attention is improving safety. Technology solutions are making it easier to properly train and monitor workers to prevent accidents and reduce the rate of serious injuries and worker deaths (Jones, 2018).

Stephen, Candace and Song-Hon Lee (2001) analyzed the impact of Information Technology (IT) on construction projects in the United States in which the results of the study established that projects benefit from IT use. Similarly, a study carried out by Ofori-Kuragu, Baiden and Badu (2014) to determine factors affecting Ghanaian contractors revealed that (Eko, Donny , & Tutang, 2019) low technology affects the performance of Ghanaian contractors. The study also recommended that the capacities of Ghanaian contractors be developed through the use of new technologies. Therefore, the findings of the study are in agreement with the findings of the following (Jones, 2018), Ofori-Kuragu, Baiden and Badu (2014) and Stephen, Candace and Song-Hon Lee (2001).

4.4.9 External Factors

These are factors that are beyond the local contractor's control. The external factors were ranked basing on the RII value of each statement as shown in Table 4.15

Table 4.15: External Factors

No.	Details	Number of respondents	Percentage	RII	Rank
1	Weather conditions	126	94%	0.956	1
2	Government policy (political influence from higher authority)	120	89%	0. 859	2
3	Level of technological advancement	90	67%	0.796	3
4	Economic influence (economic climate)	113	84%	0.768	4
5	Physical conditions	105	78%	0.756	5
Average of the RII				0.827	

Source *primary data (2021)*

The RII < 0.827 (less than 0.827) was considered that the factor has less impact and that above >0.827 (greater than 0.827) was considered that the factor has very high impact (Critical).

The findings of the study indicate that 94% of the respondents believed that weather conditions with (RII=0.956) affects the performance of contractors and was rank first in the study among the factors considered. According to Table 4.15, one hundred and twenty respondents believed that Government policy (political influence from higher authority) affects the performance of the contractors and was rank second among the factors considered. The findings in Table 4.15, the RII of 0.796 indicate that fifty-four respondents believed that Level of technological advancement has impact on External Factors which affects the performance of local contractors.

The results from Table 4.15, indicate that 84% respondents believed that Economic influence (economic climate) has high impact that affects the performance of the contractors and was rank fourth in the study. The results of the study from Table 4.15 indicate that sixty-three respondents with RII=0.756 believed that Physical conditions have less impact on External Factors which in turn affects the performance of local contractors and was ranked fifth among the factors considered as well as the last factor.

Generally, the overall Mean of RII was 0.827 implying that some of the respondents agreed with most of the statements that represented External Factors. Therefore, External Factors is one of the critical factors affecting performance of road maintenance local contractors in Uganda.

The study findings were in agreement with the findings oof the following studies below, a story carried out by Lehne, Shapiro and Eynde (2014) revealed that roads allocated to

politically connected contractors are significantly more likely never to be constructed. Similarly, a study conducted by Ofori-Kuragu, Baiden and Badu (2014) determined factors affecting Ghanaian contractors in which it was revealed that contracts awarded based on political considerations had the greatest effects on the performance of Ghanaian contractors.

In addition, Abidali and Ali (2018) conducted a study to determine the factors affecting performance of contractors in Bagdad, Iraq. The results from the findings indicated that external factors such as economic climate was ranked first since economic climate affect strongly on the cost and delivery of the project and in return impact negatively on contractor's performance and the contractors ranked this factor as the most important factor.

4.4.10 Health and Safety standards

The statements that depicted health and safety standards were ranked basing on the RII value of each statement as indicated in Table 4.16.

Table 4.16: Health and Safety Standards

No.	Details	Number of respondent	Percentage	RII	Rank
1	Protecting the workers from any kind of danger/ accident during operation time	121	90%	0.906	1
2	Sensitizing workers on how to use safety gears	113	84%	0.876	2
3	Having safety gears for the workers	121	90%	0.870	3
4	Application of health and safety factors in organization	128	95%	0.846	4
5	Easiness to reach site	112	83%	0.834	5
6	Make sure safety gears are readily available	107	79%	0.829	6
7	Reportable accident rates in projects	97	72%	0.778	7
8	Project success	92	68%	0.766	8
Average of the RII				0.838	

Source: *Primary Data, (2021)*

The RII < 0.838 was considered that the factor has less impact and that above >0.838 was considered that the factor has very high impact (Critical).

In the analysis of Health and Safety standards, the RII of 0.906 indicates that 90% of the respondents believed that protecting the workers from any kind of danger/ accident during operation time has the greatest impact on health and safety standards which affects the performance of the contractors and it was ranked first among the factors considered.

The RII of 0.876 implied that 84% of the respondents agreed that sensitizing workers on how to use safety gears has high impact on health and safety standards. This affects the performance of the contractors if the workers are sensitized properly about the use of the safety gears. And was ranked second among the factors considered.

In addition, seventy-three of the respondents believed that availing the safety gears at the workplace has impact on health and safety standards which affects the performance of local contractors if not provided. Therefore, the employer should provide for appropriate personal protective equipment to the workers to improve on the contractor's performance. According to the results in Table 4.16, the RII of 0.870 implied that 90% of the respondents believed that having safety gears for the workers has high impact on health and safety standards that affects the performance of the contractors.

According to the results in Table 4.16, seventy-seven of the respondents agreed that application of health and safety factors in organization has high significance on of health and safety standards and the organization should have a targets such as reduction of accidents or achieve zero accidents, reduce the sickness absences and reduce the insurance claims for the contractor to achieve the improved performance. The findings from Table 4.16, one hundred and twelve of the respondents stated that easiness to reach site has impact on health and safety standard which

means when the workers are able to recognize the value the management has for their well-being, it helps build trust. The findings in Table 4.16, indicated that 73% of the respondents believed that reportable accident rates in projects falls under health and safety standards and it can cause bad publicity to the profession. Which in long run affects the performance of the contractor.

Generally, the overall Mean of RII was 0.838 implying that some of the respondents agreed with most of the statements that represented health and safety standards, therefore health and safety standards is one of the critical factors affecting performance of road maintenance local contractors in Uganda.

The findings of the study are in agreement with study of Olanipekun et., al. (2017) who carried out a study in Nigeria to determine the factors affecting contractor's performance in construction project delivery where questionnaires were distributed to contractors, clients, architects and quantity surveyors. The study revealed that health and safety standards affects project delivery and it was ranked fourth basing on a mean score (4.33) by the respondents in the study. And a study by Attabra-Yartey, (2012) who also urged that absence of health and safety gadgets and welfare facilities cause a lot of injuries on site and ultimately affecting the performance of contractors.

4.4.11 The ordinal arrangement of the mean of RII

The vertical axis of Figure 4.4 displays critical factors affecting performance of road maintenance local contractors and the horizontal axis displays the Relative Importance Index. This study established that Contractor's experience, Contractor's financial capacity, Procurement process on contractors selection, Cost Factors, Time factors, Design changes,

Technology, External Factors and Health and safety standard are some of the factors affecting performance of road maintenance local contractors in Uganda

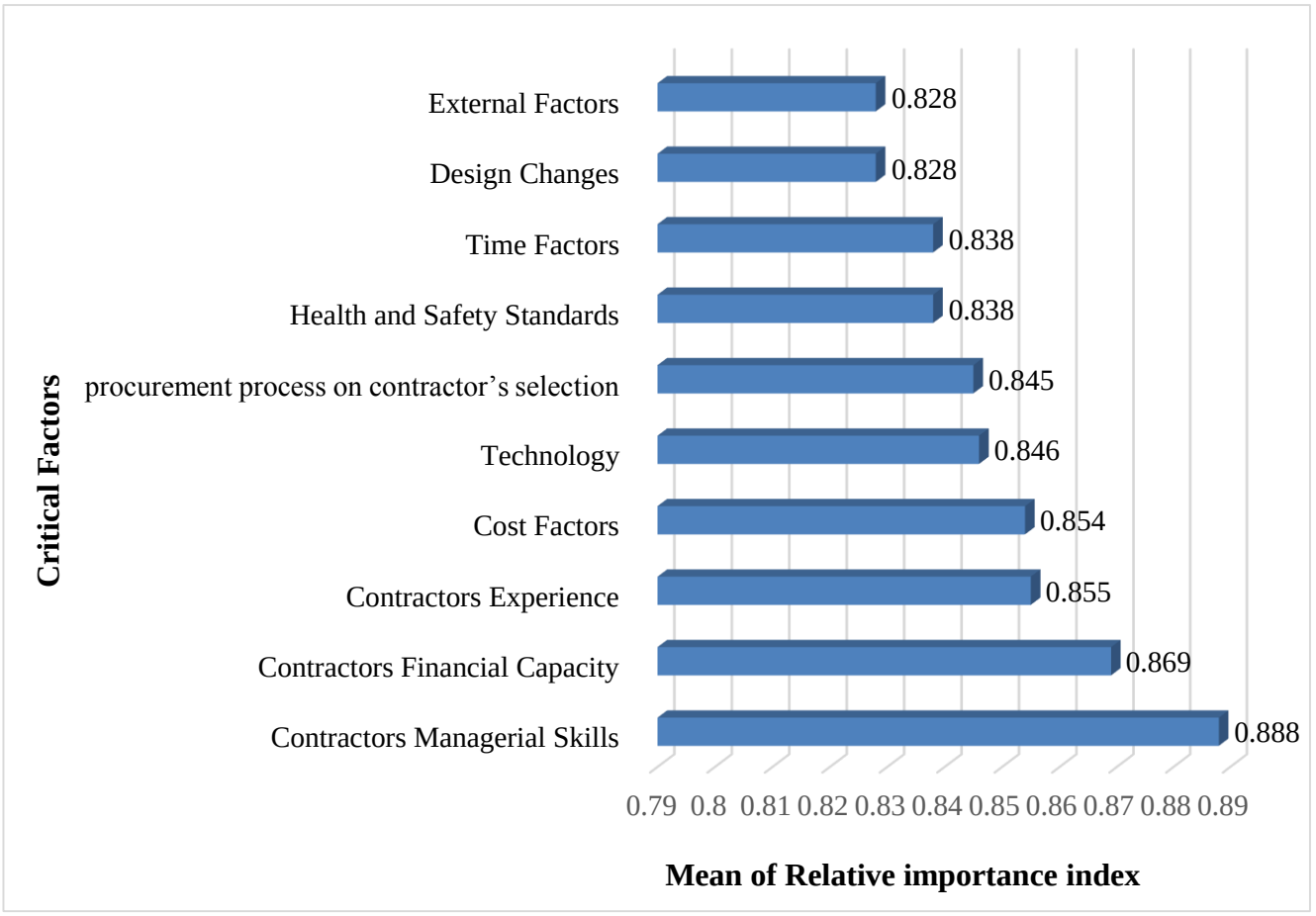


Figure 4.4: Ordinal Arrangement of the Mean of the RII

4.5 Impact of the selected critical factors on performance of road maintenance Local Contractors

In the analysis of the impact of the selected critical factors on performance of road maintenance Local Contractors in Uganda, the variable on contract managerial skills had the highest mean of RII or average of RII of 0.888 meaning that some of respondents regarded it as the most critical factor. However, the same variable had the lowest value of the standard deviation which was 0.236 close to 0 reflecting a small amount of variation in the group that was being studied and implying that respondents had similar opinions with regards to the statements about contract managerial skills.

The ratio of the estimates of variability was 451.121 under the column indicated (F (1, 8)) =451.121 or F-Statistic. The probability of obtaining the F-ratio of 451.121 is 0.000 (***p***-value) which is very small as compared to the level of significance of 0.05, implying that the variable Contract Managerial skills has significant impact on the performance of road maintenance local contractors.

4.5.1 Descriptive statistics of the identified critical factors

Table 4.17 shows how the identified critical factors behaved after analyzing the collected data and the table was arranged starting with most impactful factor to the least impactful factor using the mean of RII. Example Contract Managerial skills had the highest mean of RII, lowest standard deviation and highest F-statistics with the lowest ***p***-value implying that it was the most impactful critical factor on performance of road maintenance Local Contractors in Uganda.

Table 4.17: Illustration of the descriptive statistics of the identified critical factors

No.	Details	Mean of RII	S.D (Standard Deviation)	p-value	F-Statistic	Ranking
1	Contractor's Managerial Skills	0.888	0.236	0.000	451.121	1st
2	Contractor's Financial Capacity	0.869	0.278	0.001	380.443	2nd
3	Contractor's Experience	0.855	0.244	0.000	350.121	3rd
4	Cost Factors	0.854	0.345	0.004	311.562	4th
5	Technology	0.846	0.396	0.009	210.898	5th
6	Procurement process on contractors selection	0.845	0.523	0.021	203.710	6th
7	Time Factors	0.839	0.591	0.031	140.208	7th
8	Health and Safety Standards	0.838	0.557	0.025	180.101	8th
9	Design Changes	0.828	0.731	0.043	120.897	9th

Where RII is the Relative Importance Index

Source: *Primary Data, (2021)*

According to Table 4.17, the respondents believed that the most critical factor affecting the performance of road maintenance local contractors under UNRA Lira Station was Contractor's Managerial Skills and was ranked first followed by Contractor's Financial Capacity ranked second, Contractor's Experience was ranked to be third, Cost Factors was ranked fourth, Technology was ranked fifth, procurement process on contractors selection was ranked sixth, Time Factors was ranked seventh, Health and Safety Standards was ranked eighth, Design Changes was ranked ninth, and lastly External Factors was ranked the tenth.

However, according to some of the reviewed literature, the following were some of the findings; the Ugandan construction industry policy supports the fact that local contractor's experience in construction industry is highly ranked with regards to local contractor's performance and as well emphasizes on the need of having experienced contractors in construction industry (UNRA, 2015).

A study conducted by Gawhula & Wittonde (2016) revealed that local contractor's experience in construction industry was the second highly ranked critical factor that hindered local contractor's performance. In addition, most of the respondents in the study agreed that contractor's experience plays a very important role in achieving local contractor's performance of the projects.

A study conducted by Nor and Syuhaida (2017) also showed that financial difficulties was one of the main causes of delayed construction and maintenance projects. The findings also conformed to the findings of Othman and Ismail (2014) who observed that contractors with financial difficulties were experiencing delays in delivering maintenance and construction projects. A study conducted by Abidali and Ali (2018) to determine the factors affecting performance of contractors indicated that time factors such as average delay in regular payments was ranked first.

According to the results in Table 4.17, the variables Contractor's financial Capacity, Contractor's experience, Cost Factors, Technology, Procurement process on contractors selection, Time Factors Health and Safety Standards, and Design Changes had their mean of RII or average of RII subsequently arranged in descending order from 0.888, 0.869, 0.855, 0.854, 0.846, 0.845, 0.839, 0.838, 0.828 and 0.827 meaning that some of respondents regarded these variables as critical factors but preference was given in order of the individual mean of RII.

However, their standard deviations were arranged in a reverse relationship with variables with the high mean having low values of the standard deviation and those with low mean of RII taking on high standard deviations. Variables with low values of the standard deviation reflected a small amount of variation in the group that were being studied and implied that the respondents had similar opinions with regards to the statements about contractor's financial capacity, contractor's experience, cost factors, technology, procurement process on contractors selection, health and safety standards, time factors and design changes.

The formula used for getting the fishers statistic is F (1, N-1) Where 1 is constant and N is number of variables under each parameter. The ratios of the estimates of variability were F (1, 8) = 380.443, F (1, 9) = 350.121, F (1, 8) = 311.562, F (1, 4) = 210.898, F (1, 8) = 203.710, F (1, 7) = 180.101, F (1, 8) = 140.208 and F (1, 6) = 120.8120 under the column labeled F-Statistic. The probabilities of obtaining all the F-ratios are small as compared to the level of significance of 0.05, this implies that the variables are significant at 95% level of significance.

This study established that the variable External Factors and design changes had the lowest mean of RII or average of RII of 0.828 meaning that a moderate number of respondents regarded the variables as critical factors, however external factors had the highest value of the standard deviation which was 0.922 which was higher than all previous standard deviations reflecting a

small amount of variation in the group that is being studied and implying that the values in a statistical data set were moderately close to the mean of the data set. The ratio of the estimates of variability was 96.152 under the column labeled F (1, 3) = 96.152 or F-Statistic which was significantly high but less than all the previous F-Statistics. The probability of obtaining the F-ratio of 96.152 is 0.052 (P-value) which is higher than the level of significance of 0.05, implying that the Probability value (P-value) of 0.052 > 0.05. This implies the variable External Factors is not significant at 95% level of significance. External Factors had the smallest value of the mean of RII, highest standard deviation and lowest F-statistics with the highest p-value greater than 0.05 implying that it was the least impactful critical factor on performance of road maintenance Local Contractors in Uganda.

4.6 Framework development process

The study developed a framework for improvement of performance of road maintenance local contractors which considered two stages namely; planning stage and implementation stage. The critical factors under planning stage are Contractor's managerial skills and contractor's experience and those under implementation stage were Contractor's financial Capacity, Cost Factors, technology, the local procurement process, Health and Safety Standards, time factors, and design changes. The planning phase of the local construction project was considered to be affected by the Constructors Managerial Skills and the contractor's level of experience. In the framework developed, the study indicated that implementation of maintenance projects in Uganda are affected by Contractor's financial Capacity, the Cost Factors that may affect the project, the level of technology that the local contractor deploys, the local contractor's level of procurement process on contractors selection, the existing level of Health and Safety Standards, the time factors in place and the design changes.

It was further suggested that to ensure effectiveness at the planning phase of the local construction projects, stakeholders should focus more on Constructors Managerial Skills and the contractor's level of experience. In addition, the study suggests that to enhance the implementation of projects, stakeholders should put more emphasis on the Contractor's financial Capacity, the Cost Factors that may affect the project, the level of technology that the local contractor deploys, the local contractor's level Procurement process on contractors selection, the existing level of Health and Safety Standards, the time factors in place, the design changes which will subsequently facilitate the achievement of improved performance of road maintenance local contractors in Uganda.

Under performance of the local contractors, the framework indicates if the system is efficient or not, if the system is efficient then the contractor gets the improved outcomes of the deliverables in the construction industry but if the system is not efficient then the contractor goes back to identify the area of inefficiency for further improvement

4.7 A framework for improvement of performance of road maintenance local contractors in Uganda

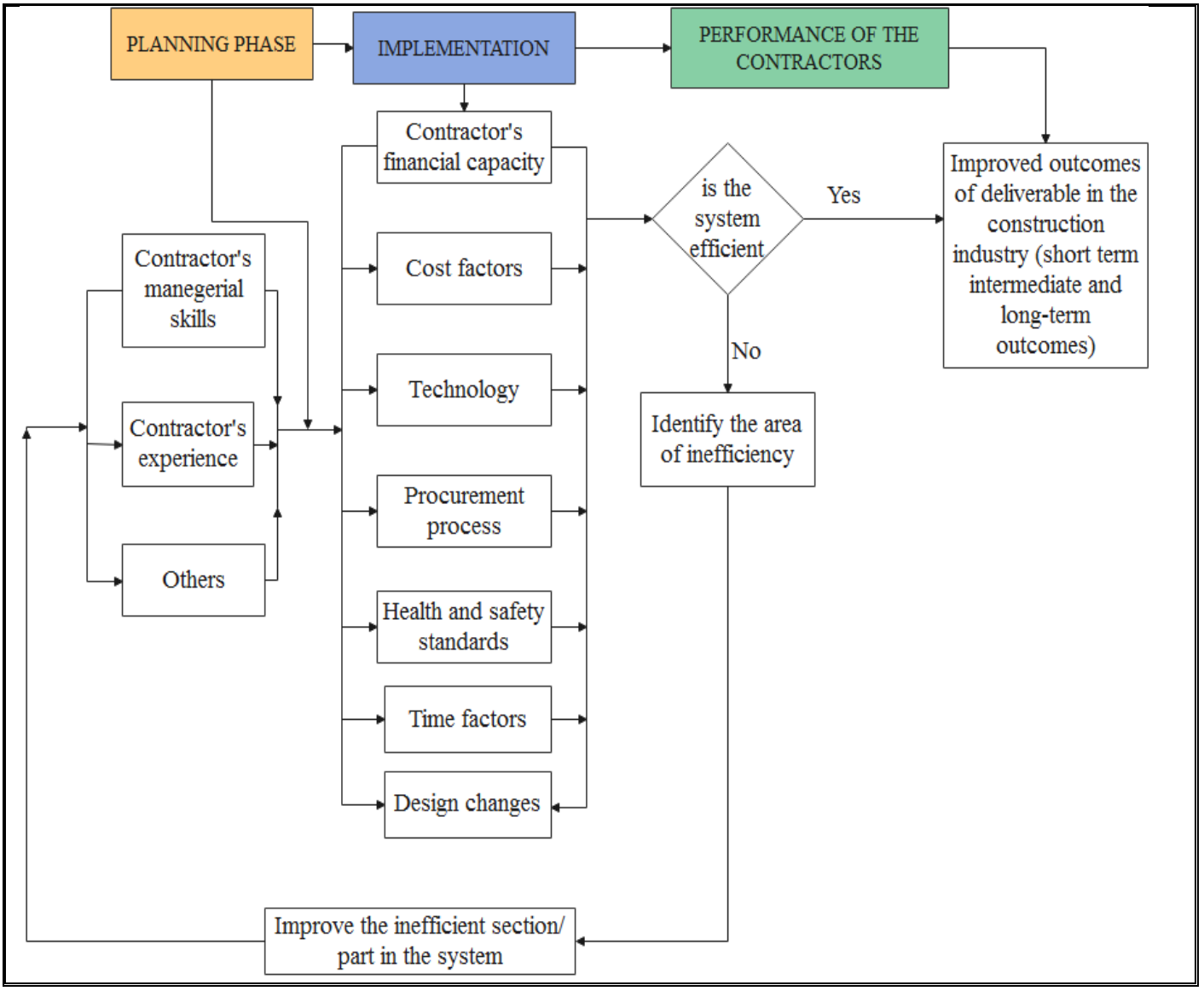


Figure 4.5: A framework for improvement of performance of the local contractors

Source: *Developed by the researcher, (2021)*

The illustration in Figure 4.5 presents a framework for improvement of performance of road maintenance local contractors in Uganda. This study established that performance of the local contractors is a function of the implementation phase of a local construction project and the planning phase of the local construction projects.

The framework suggests that the planning and project design phase of the local construction project is usually affected by the Contractor's Managerial Skills and the contractor's level of experience, implying that local contractors with excellent managerial skills and high levels of experience in Uganda's construction industry are highly likely to register improvement of performance as compared to contractors with low levels of managerial skills and little or totally no experience in Uganda's construction industry.

Equation 4.1: Planning phase, Contractor's Managerial Skills and Contractor's Experience

$$\boldsymbol{PP = fn(CMS, CE)} \quad \text{(4.1)}$$

Where

$\boldsymbol{PP}$ Refers to the project planning phase of the local construction projects

$\boldsymbol{CMS}$ Refers to the Contractor's Managerial Skills

$\boldsymbol{CE}$ Refers to the Contractor's Experience

Implying that Planning of projects in the Ugandan Construction industry is a function of Contactor's Managerial Skills and the contractor's level of experience. This study as well established that implementation of projects in Uganda's construction industry by local contractors depends on the level of Contractor's Financial Capacity, the Cost Factors.

However, the study also asserted that implementation of Ugandan road maintenance construction projects is significantly affected by External Factors such as Political interference, Legal factors, Gender Issues, Economic factors such as Interest Rates, Exchange Rates, Government policies, Payment schedule, Acceptability of the project by the community and as well as Inflation to mention but a few.

Equation 4.2: Project Implementation phase and other factors

$$\boldsymbol{I = fn(CFC, CF, T, PP, HSS, TF, DC, EF)} \quad \text{(4.2)}$$

Where

$\boldsymbol{I}$ Refers to the Implementation phase of projects in Uganda's construction industry

$\boldsymbol{CFC}$ Refers to the Contractor's Financial Capacity

$\boldsymbol{CF}$ Refers to the Cost Factors

$\boldsymbol{T}$ Refers to the level of technology

$\boldsymbol{PP}$ Refers to procurement process on contractors selection

$\boldsymbol{HSS}$Refers to the existing level of Health and Safety Standards

$\boldsymbol{TF}$ Refers to the time factors

$\boldsymbol{DC}$ Refers to the design changes

$\boldsymbol{EF}$ Refers to the External factors

Implying that implementation of projects in Uganda's construction industry by local contractors is a function of the Contractor's Financial Capacity, Cost Factors, contractor's level of technology, procurement process on contractors selection, the existing level of Health and Safety Standards, the time factors, design changes and as well as External Factors.

Ultimately the performance of the local contractors in Uganda's construction industry was established to depend on the project planning phase and the construction project implementation phase, the researcher established that proper planning of construction projects will influence the implementation of the projects which will ultimately affect the performance of the local contractors leading to improved Outcomes of deliverables in the construction industry (Short-term, Intermediate and Long-term outcomes)

Therefore,

Equation 4.3: Performance of Local contractors as a function of other factors

$$\boldsymbol{PLC = fn(PP, PI)} \quad \text{(4.3)}$$

Where

PLC Refers to Performance of Local contractors

PP Refers to Project Planning phase

PI Refers to Project Implementation phase

This study therefore established the framework in Figure 4.9 that can be used for the improvement of performance of road maintenance local contractors in Uganda basing on the model equations (4.1), equation (4.2) and equation (4.3).

4.8 Multivariate Regression Analysis

The model was developed for validation purpose and in the model, performance of road maintenance local contractors in Uganda was considered as the dependent variable while all the other factors are regarded as the independent variables.

Table 4. 18: Illustration of the coefficients of the variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (p)
	B	Std. Error	Beta		
(Constant)	.454	.2126		1.643	.005
Contractor's Experience (CE)	.357	.153	.348	2.334	.000
Contractor's Financial Capacity (CFC)	.118	.132	.301	.890	.001
Procurement Process on Contractors Selection (PP)	.337	.090	.303	3.756	.021
Contractor's Managerial Skills (CMS)	.384	.088	.347	4.353	.000
Cost Factors (CF)	.163	.120	.228	1.351	.004
Time Factors (TF)	.131	.120	.111	1.088	.031
Design Changes (DC)	.022	.070	.028	.321	.043
Technology (T)	.471	.131	.222	3.599	.009
Health and Safety Standards (HSS)	.194	.131	.205	1.480	.025

a. Dependent Variable: Performance of road maintenance projects

Source: *Primary Data, (2021)*

The p-values of the independent variables (Contractor's Experience, Contractor's Financial Capacity, Procurement Process on Contractors Selection, Contractor's Managerial Skills, Cost Factors, Time Factors, Design Changes, Technology and Health and Safety Standards) are all less than 0.05 (p-values<0.05) at a 95% level of significance, implying these are the critical factors with significant impact on the performance of local contractors.

Therefore, the researcher concluded that there is a significant positive relationship between these independent variables (Contractor's Experience, Contractor's Financial Capacity, Procurement Process on Contractors Selection, Contractor's Managerial Skills, Cost Factors, Time Factors, Design Changes, Technology and Health and Safety Standards) and performance of road maintenance local contractors in Uganda. However, the p-value of the variable External Factors was greater than 0.05 (p-value>0.05, 0.052>0.05) at a 95% level of significance, implying that external factors have no significant impact on the performance of local contractors.

The standardized beta (B_i) coefficients are all positive, which reflects a direct relationship between the independent variables and performance of road maintenance local contractors in Uganda. This implies that a unit improvement in any of the independent variables leads to a higher likelihood of better performance of road maintenance local contractors in Uganda and where low values of model coefficients there is usually a low likelihood or poor performance of road maintenance local contractors in Uganda.

Equation 4.4: Model of performance of road maintenance local contractors and the independent variables

$$\boldsymbol{PLC = 0.454 + 0.348CE + 0.301CFC + 0.303PP + 0.347CMS + 0.228CF + 0.111TF + 0.028DC + 0.222\,T + 0.205HSS} \quad \text{(4.4)}$$

Furthermore, the positive B_0 **coefficient (Constant)** implies that a unit increase in each of the

independent variables will lead to a directly proportional increase in Performance of road maintenance local contractors by 0.454 units and a unit decrease in the level of the independent variables will lead to a 0.454 decrease in Performance of road maintenance local contractors.

4.9 Model Summary

The model summary in table 4.19 reflects the results of a multivariate regression between dependent variable and the independent variables.

Table 4. 19: Illustration of the coefficient of determination (R^2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.958[a]	.917	.907	.19217

a. Predictors: (Constant), Health and Safety Standards, Design Changes, Technology, Procurement Process on Contractors Selection, Cost Factors, Contractor's Managerial Skills, Time Factors, Contractor's Financial Capacity, Contractor's Experience.

The model summary in Table 4.19 reflects the results of a multivariate regression between performance of road maintenance local contractors (dependent variable) and Health and Safety Standards, Design Changes, Technology, Procurement Process on Contractors Selection, Cost Factors, Contractor's managerial skills, Time Factors, Contractor's Financial Capacity, Contractor's Experience (Independent variables). The resultant R^2 which is 0.917 implies that the independent variables Health and Safety Standards, Design Changes, Technology, Procurement Process on Contractors Selection, Cost Factors, Contractor's managerial skills, Time Factors, Contractor's financial Capacity and Contractor's Experience accounts for 91.7% (0.917*100) of the variations in performance of road maintenance local contractors in Uganda

and the remaining only 8.3% is explained by other factors other than the factors considered in this model. The Adjusted R Squared of 0.907 (90.7%) implies that the independent variables (Health and Safety Standards, Design Changes, Technology, Procurement Process on Contractors Selection, Cost Factors, Contractor's Managerial Skills, Time Factors, Contractor's Financial Capacity and Contractor's Experience) account for 90.7% of the variance in performance of road maintenance local contractors in Uganda.

4.10 Chapter Summary

This chapter presented the findings, analysis and discussions with regards to each specific objective of the study and the next chapter presents the Summary of the findings, Conclusions of the Findings and the Recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

The study assessed the performance of road maintenance local contractors in Uganda considering a case of Uganda National Road Authority (UNRA) Lira Station, this chapter specifically presents the summary of the findings, the conclusion of the study, recommendations of the study and the areas for further research.

5.2 Summary of findings

This section presents the inferences that were made by the researcher, specifically through summarizing the entire findings of the study. Its presented objective by objective guided by the flow of variables in the conceptual framework.

In the analysis of contractor's experience, the overall mean of RII was 0.855 implying that respondents agreed with most of the statements that represented contractor's experience. While analyzing contractor's financial capacity, it was established that the overall mean of RII was 0.8115 implying that the respondents agreed with most of the statements that represented contractor's financial capacity.

Regarding procurement processes on contractor's selection, the overall mean of RII was 0.845 meaning that most of the respondents agreed with the statements that represented procurement process on contractor's selection. The respondents agreed with most of the statements that represented Contractor's Managerial Skills. For Cost Factors the mean of RII was 0.854 implying that the respondents were in agreement with most of the statements that represented Cost Factors.

In evaluating the Time Factors the average mean of RII was 0.838 implying that the respondents agreed with most of the statements that represented time factors. While assessing design changes, the average mean of RII was 0.828 implying that the respondents agreed with most of the statements that represented design changes since the mean of RII was 0.828. The study also found Technology with an overall mean of RII of 0.846 implying that the respondents agreed with most of the statements that represented technology. Most respondents agreed with most of the statements that represented health and safety standards since the mean of RII was 0.839.

This study established that performance of road maintenance local contractors is a function of the implementation phase of a local construction project and the planning phase of the local construction projects. This study as well established that implementation of projects in Uganda's construction industry by local contractors depends on the level Contractor's Financial Capacity, the Cost Factors that may affect the project, the level of technology that the local contractor deploys, the local contractor's level of procurement process on contractors selection, the existing level of Health and Safety Standards, the time factors in place and as well as the design changes.

5.3 Conclusions of the Findings

The study concluded that Contractors Managerial skills was the most impactful factor on performance of road maintenance Local Contractor's in Uganda. The study also concluded that the developed framework for improvement of performance of road maintenance local contractor's considered the planning phase of the local construction project to be affected by the Contractors Managerial Skills and the contractor's level of experience and that the implementation phase of projects in Uganda are affected by all the other factors.

5.4 Recommendations

The study recommends that Uganda National Road Authority (UNRA) specifically Lira Station, local contractors and other stakeholders that more focus should be put on Contracts Managerial skills since it had the greatest impact on Local Contractor's performance, followed by Contractor's financial Capacity, Contractor's experience, Cost Factors, Technology, procurement process on contractors selection, Health and Safety Standards, Time Factors, Design Changes and External Factors respectively with little emphasis on external factors as compared to the preceding factors.

The study also recommended that Uganda National Road Authority (UNRA) specifically Lira Station, local contractors and other stakeholders ought to regard road maintenance local construction projects in two main phases that include planning phase and implementation phase of the projects.

It was further suggested that to ensure effectiveness at the planning phase of the local construction projects, stakeholders should focus more on Constructors Managerial Skills and the contractor's level of experience. In addition the study recommended that to enhance the implementation of projects, stakeholders should put more emphasis on the Contractor's financial Capacity, the Cost Factors that may affect the project, the level of technology that the local contractor deploys, the local contractor's level, Procurement process on contractors selection, the existing level of Health and Safety Standards, the time factors in place, the design changes and as well as external factors which will subsequently facilitate the achievement of improved performance of road maintenance local contractors in Uganda.

5.5 Areas for Further Studies

The study recommends that further research should be conducted in the area of Contracting local contracts and its effects on the performance of road maintenance local contractors in Uganda considering a case of Uganda National Road Authority (UNRA) Lira Station.

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APPENDICES

Appendix I: Questionnaire

KYAMBOGO UNIVERSITY

"Assessment of Performance of Road Maintenance Local Contractors in Uganda; A Case of Uganda National Road Authority (UNRA) Lira Station"

Questionnaire Form

Dear Sir/Madam,

I am Namara Babra Beamanya a student of Kyambogo University undertaking a study titled "Assessment of Performance of Road Maintenance Local Contractors in Uganda" considering a case of Uganda National Roads Authority (UNRA) Lira Station. The study is in partial fulfilment of the requirements for the award of a Master's of Science Degree in Construction Technology and Management of Kyambogo University.

You have been purposively selected as a resourceful person to participate in this study and hereby request you kindly to respond to the questions below. The information you will provide shall be treated with uttermost confidentiality and shall only be used for academic purpose.

Thanks in advance for your participation

SECTION A: Background Information **Tick appropriately**

1. **Name (optional)…….**

2. **Sex:** ☐ **Male** ☐ **Female**

3. **Age category**

☐ 18 and below ☐ 19-30 ☐ 31-45 ☐ 46-55 ☐ 56-70 ☐ 70 and above.

4. Level of education

☐ Primary ☐ Secondary ☐ Diploma ☐ Degree ☐ Others please

specify……

5. Profession …….

6. Name of the company/ Organization

……
…

7. Your position in the organization……

8. How long has this construction company or firm been in existence?

☐ Below5 yrs. ☐ 5-10 yrs. ☐ 15-20 yrs. ☐ 20 yrs. and above

9. In which department do you work?.....

10. Does your company also do maintenance projects?

☐ Yes ☐ No

11. If yes, how long have you been participating in road maintenance projects?

☐ Below5 yrs. ☐ 5-10 yrs. ☐ 10-15 yrs ☐ 20 yrs and above

12. **Does your company hire or bring in people from outside to do the works?**

☐ Yes ☐ No

13. Have you been completing your works on time?

☐ Yes ☐ No

14. Are there any errors to be corrected during final finishing?

Yes ☐ No ☐ Sometimes ☐ Not always ☐

SECTION B:

16. Tick the factors that you consider critical in affecting the performance of road maintenance local contractors

Where 5 = strongly agree, 4= Agree, 3= Neutral, 2= Disagree and 1= strongly disagree

	Success factors	**5**	**4**	**3**	**2**	**1**
A	**Contractor's experience**					
	Adherence to specifications of maintenance works					
	Adequate supervision of workers					
	Adequate planning and scheduling of works					
	Adequate monitoring of works					
	Good workmanship					
	Adequate experience and competence					
	Through supervision of subcontractors					
	Good contraction techniques					
	Contractors reputation					
	Effective contractors and workers relationship					
B	**Contractor's financial capacity**					
	Prompt payments to contractors					
	Prompt payment of workers					
	Proper management of project funds					
	Accurate quotations of the maintenance works					
	Financial control on site					
	Enough startup funds					
	Timely documentation					
	Minimizing variation					
	Having appropriate planning					
C	**Effect of procurement process on contractors selection**					
	Effective procurement process					
	No Influence peddling					
	No bribery and corrupt practices					
	Filling and filing required bidding documents					
	Transparency in the procurement					
	Appropriate methods of selecting contractors					
	Confidence in your workforce					
	Company's strength in the industry					
	Time of bidding					

D	**Contractor's managerial skills**					
	Quick decision making					
	Technical skills					
	Problem solving skills					
	Human skills					
	Good communication and control					
	Proper material checking and testing before use					
	Proper individual task allocation					
	Adequate emphasis on quality work					
	Use of skilled operators					
E	**Cost factors**					
	Increase in material cost					
	Wrong method of estimation					
	Inadequate labor					
	High cost of machinery					
	Waste rate of materials					
	Regular project budget update					
	Cost of variation orders					
	Project overtime cost					
	Cost of reworks					
F	**Time factors**					
	Delay due to material shortage					
	Delay in payment					
	Time taken to rectify defects					
	Site preparation time					
	Time to implement variation					
	Timely availability of materials					
	Planned time for project construction					
	Percentage of orders delivered late					
	Average delay in payment from owner to contractor					
G	**Design changes**					
	Consultant submits construction drawing late.					
	Contractor takes control of design compared to consultant					
	Owner less involve in controlling design					
	Insufficient instruction and information in the contract specification, drawing and design					
	Mistakes and discrepancies in design documents					
	High cost of machinery					
	Lack of coordination between designers &contractor					
H	**Technology**					
	Low technology available to construction firms					
	Training the workers to cope up with the new technology					

	Hiring people from outside to operate the machines					
	Adapting new technology					
	Improved the design and construction process					
I	**External factors**					
	Weather conditions					
	Government policy (political influence from higher authority)					
	Level of technological advancement					
	Economic influence (economic climate)					
	Physical conditions					
J	**Health and safety standards**					
	Protecting the workers from any kind of danger/ accident during operation time					
	Sensitizing workers on how to use safety gears					
	Make sure safety gears are readily available					
	Having safety gears for the workers					
	Application of health and safety factors in organization					
	Easiness to reach site					
	Reportable accident rates in projects					
	Assurance rate of project					

17. Please tick the reason why you choose the above critical success factors.

They are extremely important ☐ They are important ☐

They are very important ☐ They are important ☐

Somewhat important ☐

18.How did you get to know about the type (s) of critical success factors above?

A. Own experience ☐

B. Through a consultant ☐

C. Through reading project ☐

documents. D. Through ☐

orientation

E. Through observation ☐

F. By trial and errors ☐

SECTION C:

19. Tick the impact of the selected Critical Factors on local contractors' performance, as below Where 5 = Very high impact 4 = High impact 3 = Moderate impact

2 = Low Impact 1 = No impact

	Impact of the selected critical factors on the following	**5**	**4**	**3**	**2**	**1**
A	**Contractor's experience**					
	In adherence to specifications of maintenance works					
	Inadequate supervision of workers					
	Inadequate planning and scheduling of works					
	Inadequate monitoring of works					
	Poor workmanship					
	Inadequate experience and competence					
	Improper supervision of subcontractors					
	Lack of good contraction techniques					
	Bad reputation					
	Ineffective working relationship between the contractors and workers					
B	**Contractor's financial capacity**					
	Delayed payments to contractors					
	Delayed payment of workers					
	Mismanagement of project funds					
	Inaccurate quotations of the maintenance works					
	Bad financial control on site					
	Bad experience from previous works					
	Delayed documentation					
	Minimizing variations					
	Inappropriate planning					
C	**Procurement process on contractors selection**					
	Ineffective procurement process					
	Influence peddling					
	Bribery and corrupt practices					
	Filling and filing required bidding documents					
	No transparency in the procurement					
	Inappropriate methods of selecting contractors					
	Lack of confidence in your workforce					
	Company's weakness in the industry					
	Time of bidding					

D	**Contractor's managerial skills**					
	Slow in decision making					
	Lack of technical skills					
	Poor problem-solving skills					
	Human skills					
	Good communication and control					
	Improper checking and testing of material before use					
	Delay in task allocation					
	Does not emphasis on quality work					
	Use of unskilled operators					
E	**Cost factors**					
	Increase in material cost					
	Wrong method of estimation					
	Inadequate labor					
	High cost of machinery					
	Waste rate of materials					
	Regular project budget update					
	Cost of variation orders					
	Project overtime cost					
	Cost of reworks					
F	**Time factors**					
	Delay due to material shortage					
	Delay in payment					
	Time taken to rectify defects					
	Site preparation time					
	Time to implement variation					
	Timely availability of materials					
	Planned time for project construction					
	Percentage of orders delivered late					
	Average delay in payment from owner to contractor					
G	**Design changes**					
	Consultant submits construction drawing late.					
	Contractor takes control of design compared to consultant					
	Owner less involve in controlling design					
	Insufficient instruction and information in the contract specification, drawing and design					
	Mistakes and discrepancies in design documents					
	High cost of machinery					
	Lack of coordination between designers &contractor					
H	**Technology**					
	Low technology available to construction firms					

	Hiring people from outside to operate the machines					
	Adapting new technology					
	Improving the design and construction process					
I	**External factors**					
	Weather conditions					
	Government policy (political influence from higher authority)					
	Level of technological advancement					
	Economic influence (economic climate)					
	Physical conditions					
J	**Health and safety standards**					
	Protecting the workers from any kind of danger/ accident during operation time					
	Sensitizing workers on how to use safety gears					
	Make sure safety gears are readily available					
	Having safety gears for the workers					
	Application of health and safety factors in organization					
	Easiness to reach site					
	Reportable accident rates in projects					
	Assurance rate of project					

In your opinion, mention other factors that you would consider critical in affecting local contractor's performance

	Other Factors	**Their Impacts**
a		
b		
c		
d		
e		
F		
g		
h		

Appendix II: Interview guide

INTERVIEW GUIDE

Dear Sir/Madam,

I am Namara Babra Beamanya a student of Kyambogo University undertaking a study titled "Assessment of Performance of Road Maintenance Local Contractors in Uganda" considering a case of Uganda National Roads Authority (UNRA) Lira Station. The study is in partial fulfilment of the requirements for the award of a Master's of Science Degree in Construction Technology and Management of Kyambogo University.

You have been purposively selected as a resourceful person to participate in this study and hereby request you kindly to respond to the questions below. The information you will provide shall be treated with uttermost confidentiality and shall only be used for academic purpose.

Questions

1) In your opinion, what are the factors affecting local contractor's performance in road maintenance projects in Uganda? (*Probe for critical factors among those mentioned*)
2) How impactful are the critical factors on the local contractor's performance in road maintenance projects in Uganda?
3) In your view, what do you suggest that can be done to improve the performance of local contractor's performance in road maintenance projects in Uganda

THANK YOU

Appendix III: Letter by UNRA KAMPALA

Uganda National Roads Authority
Plot 3 -5, New Port Bell Road, Nakawa
UAP Business Park
P.O. Box 28487
Kampala Uganda
In any correspondence on this subject
Please quote No UNRA/19/HRM/03

11th July 2019

Ms. Namara Babra Beamanya
C/O Kyambogo University
P.O. Box 1,
Tel. 0782251666/0758251666
KAMPALA

RE: REQUEST TO CONDUCT RESEARCH ON PERFORMANCE OF ROAD MAINTENANCE LOCAL CONTRACTORS.

Reference is made to the recommendation letter from Kyambogo University requesting Uganda National Roads Authority (UNRA) to allow you to conduct your research in this Authority.

We are glad to inform you that Management has no objection to conducting your research in UNRA – Directorate of Road Maintenance in liaison with the Lira Station Manager.

Accordingly, we shall provide the necessary information for your research subject to confidentiality requirements with the other third parties. In addition you will be required to share your Research findings after completion of your study. Please note that, all information obtained from the Directorate will strictly be for academic purposes and you will be held liable for its improper use.

We wish you all the best in your assignment.

Jennifer B. Kaggwa
Director Human Resource

Copy to: Lira Station Manager

JK/mn/iw/hr

Appendix IV: Copy of request letter received by UNRA KAMPALA

KYAMBOGO UNIVERSITY
Department of Civil and Building Engineering
P. O. BOX 1, KYAMBOGO – KAMPALA, UGANDA
TEL: +256-41-4287340, FAX: +256-41-4289056/4222643

8th May 2019

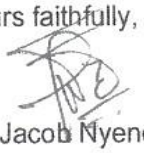
TO WHOM IT MAY CONCERN

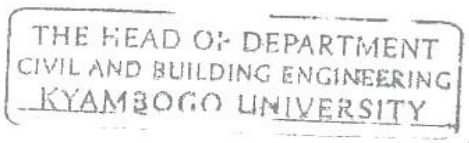
RE: INTRODUCTION LETTER FOR NAMARA BABRA BEAMANYA REG: NO 17/U/14649/GMET/PE

This is to introduce the above-named final year student who is undertaking a Master of Science in Construction Technology and Management at the Faculty of Engineering, Department of Civil and Building Engineering, Kyambogo University. Babra is undertaking a research study entitled: **ASSESSMENT OF PERFORMANCE OF ROAD MAINTENANCE LOCAL CONTRACTORS IN UGANDA - A CASE OF UNRA - LIRA STATION".** This is one of the requirements for graduation at Kyambogo University to conduct research and submit a dissertation/thesis by graduate students before awarding them a degree.

The purpose of this communication is to humbly request your office and the relevant staff to assist her access the necessary information and guidance to help her successfully conduct her research at your organisation. The information will only be used for academic purposes and shall be kept confidential. We thank you in advance for your cooperation and we hope the findings of this research will also benefit the organisation.

Yours faithfully,





Dr. Jacob Nyende
Head of Department

Appendix V: Introduction letter offered by Kyambogo University

KYAMBOGO UNIVERSITY
Department of Civil and Building Engineering
P. O. BOX 1, KYAMBOGO – KAMPALA, UGANDA
TEL: +256-41-4287340, FAX: +256-41-4289056/4222643

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The purpose of this communication is to humbly request your office and the relevant staff to assist her access the necessary information and guidance to help her successfully conduct her research at your organisation. The information will only be used for academic purposes and shall be kept confidential. We thank you in advance for your cooperation and we hope the findings of this research will also benefit the organisation.

Yours faithfully,

THE HEAD OF DEPARTMENT
CIVIL AND BUILDING ENGINEERING
KYAMBOGO UNIVERSITY

Dr. Jacob Nyende
Head of Department

Appendix VI: Samples of supportive letters for data collection by UNRA LIRA

UGANDA NATIONAL ROADS AUTHORITY
Plot 34 – 37 Church road
P.O Box 24, Lira
Tel: 0434120341
In any correspondence on this subject No

11/7/2019

The Managing Director
Tegeka Enterprises Ltd

07798 26278
Senyondo Stephen

Attn: Mr. Tegras I Byeitima

Re: Introduction Letter for Mrs. Namara Babra Beamanya

The above named person was introduced to UNRA-Lira by Kyambogo University as a student of master of science in construction Technology and Management (letter attached). She is carrying out a research study with the title '**Assessment of the performance of Road Maintenance Local Contractors in Uganda-A case of UNRA-Lira Station'**

I am forwarding to your office to assist her with the necessary data she may require in her questionnaires.

Yours Faithfully

.....

Ogam Harriet Francy

Station Manager-Lira

UGANDA NATIONAL ROADS AUTHORITY
Plot 34 – 37 Church road
P.O Box 24, Lira
Tel: 0434120341
In any correspondence on this subject No

11/7/2019

The Managing Director
JB united Civil Engineering and Building Contractors Ltd –

Attn: Mr. Johnson Ocol (0776561305) -JIMMY.

Re: Introduction Letter for Mrs. Namara Babra Beamanya

The above named person was introduced to UNRA-Lira by Kyambogo University as a student of master of science in construction Technology and Management (letter attached). She is carrying out a research study with the title '**Assessment of the performance of Road Maintenance Local Contractors in Uganda-A case of UNRA-Lira Station**'

I am forwarding to your office to assist her with the necessary data she may require in her questionnaires.

Yours Faithfully

.....

Ogam Harriet Francy

Station Manager-Lira

UGANDA NATIONAL ROADS AUTHORITY
Plot 34 – 37 Church road
P.O Box 24, Lira
Tel: 0434120341
In any correspondence on this subject No

11/7/2019

The Managing Director
Upland Enterprise Ltd

Attn: Mr. Beja Charles – 0775020369 (Epila Geoffrey)

Re: Introduction Letter for Mrs. Namara Babra Beamanya

The above named person was introduced to UNRA-Lira by Kyambogo University as a student of master of science in construction Technology and Management (letter attached). She is carrying out a research study with the title '**Assessment of the performance of Road Maintenance Local Contractors in Uganda-A case of UNRA-Lira Station**'

I am forwarding to your office to assist her with the necessary data she may require in her questionnaires.

Yours Faithfully

.....

Ogam Harriet Francy

Station Manager-Lira

Appendix VII: List of Local Contractors under UNRA-Lira Station

No.	Name of Local Contractors
1	JB United Civil Engineering And Building Contractors
2	Tegeka Enterprises Ltd
3	Upland Enterprises Ltd
4	Ticlokere
5	Rukooge Gen. Enterprises Ltd
6	Dotts Services Ltd
7	Olet Elyak Ltd
8	Global Network
9	Cannan Sites
10	Heaat
11	JS Engineering Works Ltd
12	C&B Engineering Works Ltd
13	Allied Tech Services Ltd
14	Noas Enterprises Ltd

Appendix VIII: Map of Lira District