AN ASSESSMENT OF ALTERNATIVE CONTRACT AWARD METHODS AND CONTRACTOR PERFORMANCE IN LOCAL GOVERNMENTS IN UGANDA:

A CASE STUDY OF OYAM DISTRICT

BY

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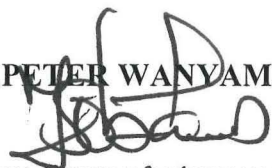
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APPROVAL

We the undersigned, certify that we have read and hereby recommend for acceptance by Kyambogo University a research dissertation titled "An assessment of alternative contract award methods and contractor performance in Local Governments in Uganda: A case study of Oyam District" in fulfillment of the requirements of the award of a degree of Master of Science in Construction Technology and Management of Kyambogo University

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DECLARATION

I, Achanit Stella Eve, do hereby declare that to the best of my knowledge, the work contained in this dissertation is entirely my own and has never been submitted by anyone to any institution/University before for any award.

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DEDICATION

I dedicate this book to my family for their patience during my studies; my classmates, lecturers, family members and friends.

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LIST OF ABBREVIATIONS

ANOVA   Analysis of variance

AoV   Awarding on Value

CVI   Content validity index

EU   European Union

FBS   Fixed Budget Selection

LCS   Least Cost Selection

MEAT   Most Economically Advantageous Tender

PPDA   Public Procurement and Disposal of Assets

QBS   Quality Based Selection

QCBS   Quality and Cost Based Selection

RII   Relative Importance Index

TCS   Technical Compliance Selection

WFS   Weighted Factor Score

SPSS   Statistical Package for Social Sciences

ABSTRACT

There are several alternative contract award methods stipulated in the PPDA Act, regulations and Local government guidelines to guide the identification of contracts for Government projects in Uganda. The alternative contract award methods include: Quality and Cost Based Selection, Quality Based Selection, Fixed Budget Selection, Least Cost Selection and Technical Compliance Selection and contractor performance is specified by cost and time variation. This study assessed alternative contract award methods and contractor performance in Oyam District Local Government in Uganda. The study employed a triangulation approach whereby both qualitative and quantitative techniques were used to collect the data relating to the factors for the choice and commonly used contract award methods and contractor performance. The Statistical Package for Social Sciences (SPSS) software was used to analyze data contract award methods and contractor performance and Relative Importance Index (RII) was used to rank the methods and their impact on contractor performance. Regression analysis was used to show the effect of contract award methods on contractor performance. The study findings revealed that Least Cost Selection (LCS) with RII of 0.845 was the most frequently used contract award method. It also revealed that technical factors with RII of 0.892 were the most important in determination of the choice for method of contract awarding in Oyam District Local Government. The study recommended that Quality Based Selection and Technical Compliance Selection should be prioritized in contract award process in order to foster effective contractor performance (timely completion and adequate cost) in Oyam District Local Government.

Key words: Contract award, Alternative Methods, Contract, Performance

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

1.1.1 Contract Award Methods

The awarding phase is the last phase in the tendering process. During this phase all bidders already have complied with the minimum requirements set during the prior phases. The goal of the award phase is to determine the best bidder. This can be done based on Lowest Price or one of the Most Economically Advantageous Tender (MEAT) methods that also include other criteria instead of solely based on price. Awarding is preceded by a selection process, which rejects all contractors beyond defined price or capacity thresholds. The large number of available contractors is reduced to a short list. And in public purchasing, National or International Competitive Bidding is the common selection method (World Bank, 2013) where a request for quotation is asked for from those contractors who are considered for an order to place a detailed bid. In order to receive appropriate bids, the award procedure is published with it. It's therefore on the basis of these bids that awarding is implemented to choose a winner (Schoenherr & Mabert, 2008).

For a long time, contractors' bids have mostly been assessed on basis of the price, whereby the contractor offering the lowest price is chosen. One major reason is that this is the most objective method and leaves very little room for fraudulent behavior. However, a significant drawback is that it does not result in best bids, rather,

contractors knowing that price is the only criterion possibly reduce their performance efforts to the minimum threshold and emphasize on submitting a low-priced bid, (Bergman & Lundberg, 2013). Most public procurement guidelines also allow for awarding which takes both costs and benefits into account. The EU Procurement Directives established a method known as the Most Economically Advantageous Tender (MEAT), in which performance-related criteria are observed as well (European Parliament & Council of the European Union, 2014). In addition, the World Bank enables awarding based on estimated total costs of ownership. "Subject to paragraph 2.57, the bid with the lowest evaluated cost, but not necessarily the lowest submitted price, shall be selected for award" (World Bank, 2013). The alternative contract award methods to lowest price can also be considered. These result in more sophisticated bids, but must be investigated with regard to price, quality and completion time.

The District Local Governments of Uganda have the following contract award methods clearly stipulated in the PPDA Act (2003): Quality and Cost Based Selection, (QCBS); Quality Based Selection, (QBS); Fixed Budget Selection, (FBS); Least Cost Selection, (LCS) and Technical Compliance Selection, (TCS). Oyam District Local Government is one of these Districts that use the methods mentioned and as a result there was need to get the Most Economically Advantageous Tender (MEAT). This would guide the study to identify the best contract award method/s to be used in Oyam District Local Government.

1.1.2 Contractor Performance

Contractor performance can be defined by the level and quality of contracts delivered to clients (Love & Li, 2000). It has been a common practice, however, to select the least cost bidder among competing contractors to perform the job. Predicting the performance of construction firms in such a situation is indispensable in order to ensure quality and guarantee international standards. Inefficient management of construction contracts can result in low performance and productivity. Therefore, it is important for contractors to be familiar with the method leading to evaluate the performance of the construction contract (Love & Li, 2000). Poor performance such as low quality, time delays and cost overrun are not uncommon in construction contract (Lo et al., 2006). Frimpong et al., (2003) suggested that time delays and cost overruns arise primarily as a result of payment difficulties, poor contractor management, material procurement problems, poor technical ability, and escalation of material prices. On the other hand, some researchers have analyzed the major causes of quality defects, one of which Atkinson (1999) identified as human effort and another of which Love & Li (2000) described as poor workmanship. These studies also contributed to the identification of quality, time and cost as the three most important indicators to measure construction contractor performance. Conversely this may not ensure quality which is an indispensable measure in contract delivery. Predicting the performance of the contractor is highly important for both the contractor and the owner/client.

Quality performance is defined as the totality of features required by a product or services to satisfy a given need, or fitness for purpose (Parfitt & Sanvido 1993). In

other words, the emphasis of quality in construction industry is on the ability to conform to established requirements. Requirements are the established characteristics of a product, process or service as specified in the contractual agreement and a characteristic is any specification or property that defines the nature of those products, processes or services, which are determined initially by the client. In order to achieve a completed contract that meets the owner's/client's quality expectations, all parties to a contract must acquire an understanding of those expectations, incorporate them into the contract price and other contract documents to the extent possible, and commit in good faith to carry them out (Ganaway, 2006).

Time performance is very important for construction contracts to be completed on time, as the clients, users, stakeholders and the general public usually looks at contract success from the macro view where their first criterion for contract success appeared to be the completion time (Lim & Mohamed 1999). Salter & Torbett (2003) mentioned that time variance is one of the techniques for assessing contractor performance in construction contract. The element of time could indicate to contract managers that the contract was not running as smoothly as scheduled. Furthermore, ensuring timely delivery of contracts is one of the important needs of clients of the construction industry. Construction time can be regarded as the elapsed period from the commencement of site works to the completion and handover of a facility to the client. The construction time of a facility is usually specified before the commencement of construction. Construction time can also be deduced from the client's brief or derived by the construction planner from available project information.

Cost performance is defined as the degree to which the general conditions promote the completion of a contract within the estimated budget (Bubshait & Almohawis, 1994). Salter & Torbett (2003) indicated that cost variance was the most common technique used to measure design performance. It is not only confined to the tender/contract sum, but the overall cost that a contract incurs from inception to completion, which includes any costs arising from variations, modification during construction period and the cost arising from the legal claims, such as litigation and arbitration. It can be measured in terms of unit cost, percentage of net variation over final cost (Chan & Tam, 2000). Cost variance is a very important factor in measuring contract performance because it indicates how much the contract is over or under budget. Georgy et al., (2005) suggested the element of cost to measure the performance of engineering contracts. Hence, in this article, cost variance is calculated by the variance between the actual cost and the original cost of a contract. Clients' satisfaction is regarded as a function of comparison between an individual's perception of an outcome and its expectation for that outcome.

1.2   Problem Statement

Selection of a proper construction contractor increases chances of successful completion of a construction project/contract. It also fulfills the client's goals and keeps the schedule of the cost, time and quality. Least cost selection is one of contract award methods used by District Local Governments in Uganda which aims at obtaining goods and services at the lowest price, by stimulating competition and preventing favoritism. However, least cost selection method does not guarantee the

cost, time and quality since not every project is done in the same environment as has been noted in some executed projects in Oyam District Local Government in the period of 2015-2019. The unrealistic low bids lead to risk of poor performance and bare minimum acceptable quality. It was therefore necessary to carry out an assessment of alternative contract award methods and contractor performance that would result in getting the Most Economical Advantageous Tender (MEAT) in Oyam District Local Government.

1.3 Objectives of the study

1.3.1   Main Objective

The main objective of the study was to assess the alternative contract award methods and contractor performance in Oyam District Local Government.

1.3.2   Specific Objectives

The study was guided by the following four specific objectives:

   i.   To establish the most commonly used contract award methods in selecting contractors in construction contracts in Oyam District Local Government;

   ii.   To determine the factors that influence the choice of contract award methods used in Oyam District Local Government;

   iii.   To determine the impact of the choice of contract award method on contractor performance in Oyam District Local Government;

iv. To develop a tool to enhance the use of the alternative contract award methods for better contractor performance in Oyam District Local Government.

1.4 Research questions

i. What is the most commonly used contract award methods in selecting contractors in construction contract in Oyam District Local Governments?

ii. What are the factors that influence the choice of the contract award methods used in Oyam District Local Government?

iii. What is the impact of choice of contract award method on contractor performance in Oyam District Local Government?

iv. What can be done to enhance the use of alternative contract award methods for better contractor performance in Oyam District Local Government?

1.5 Significance of the Study

The study shall contribute to the quest for knowledge on the alternative contract award methods to least cost/or bidder on public construction contracts performance and will provide possible solutions to the problem statement. It is envisaged that this study shall create new knowledge and awareness in the area of alternative contract award methods and contractor performance to the researcher, various stakeholders and more especially the public sector. The academia, research institutions, public and private sectors will benefit from the findings and make decisions from an informed point of view. The research report shall be used by future researchers who wish to explore more on the research problem or other similar topics in contract award

methods and contractor performance. The Local governments, Oyam in particular, might start using the MEAT methods that may bring about better contractor performance in terms of successful completion time, cost, quality and safety in the construction projects. This is through ensuring proper selection of contract award method and improved contractor performance to the satisfaction of stakeholders/clients which can meet the aims and objectives of the SDGs six and nine which call for ensuring availability and sustainable management of water and sanitation for all, ensuring and Building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation respectively.

1.6   Justification of the Study

According to Mugenda & Mugenda, (1999), justification refers to the reasons for conducting a study and the importance of carrying it out. Although other researchers have studied about alternative contract award methods and contractor performance of projects in other parts of the world, there is little/scanty information about the study in Uganda. It was therefore, anticipated that this study would provide literature that might enhance further research on the alternative contract award methods on performance of projects and also provide a tool through which future funded projects shall be planned for and how they could improve on their procurement or contract award methods to perform better.

If the study had not been conducted, the most economical advantageous tender (MEAT) in Oyam District Local Government in Uganda probably would not have

been known according to this study. The district would remain using the traditional lowest/least cost selection method which has drawbacks of poor performance such as low quality, time delays and cost overruns which are common in construction contract (Lo et. al., 2006).

1.7 Conceptual Framework

The conceptual framework laid out the relationship between the independent and dependent variables. Independent variables were contract award/selection methods in PPDA Act (2003), Quality and Cost Based Selection, (QCBS); Quality Based Selection, (QBS); Fixed Budget Selection, (FBS); Least Cost Selection, (LCS) and Technical Compliance Selection, (TCS) and factors that determine the contract award criteria Dependent variable was the contractor performance (Cost, quality and project successful completion time. A figurative representation of the relationship between the stated variables herein was presented in Figure 1.1.

Independent Variables   **Dependent Variables**

Contract award/selection Methods
- Quality and Cost Based selection (QCBS)
- Quality Based Selection (QBS)
- Fixed Budget Selection (FBS)
- Least Cost Selection (LCS)
- Technical Compliance Selection (TCS)

Factors that determine choice of award criteria

- Technical, management and Prior-experience factors
- Past-performance factor
- Price factor

Contractor Performance
- Quality
- Successful Completion time
- Cost

Intermediate Variables
- Corruption
- Political interference

Figure 1.1: Conceptual framework of the study

There were also other factors (intermediate variables) that might affect the contractor performance like corruption and political interference which were not studied here in this research, but might need to be studied in the future.

1.8 The Scope of Study

The study scope comprises of content, time and geographical scope**s.**

1.8.1   Content Scope

The study focused on an assessment of the alternative contract award methods and contractor performance in construction contracts in Oyam District Local Government which involved; establishing the most commonly used contract award method, determining factors that influence the choice of contract award methods, determining the impact of the choice of contract award method on contractor performance and developing a tool to enhance the use of contract award methods for better contractor performance in Oyam District Local Government. The contracts looked at were buildings and roads service works of contract value of fifty million shillings (50,000,000=) and more from 2015 to 2019, and most of which were funded by the Government of Uganda.

1.8.2   Time Scope

The period of study was between December 2019 and August 2021.

1.8.3   Geographical Scope

The project area was in Oyam District Local Government in Northern Uganda.

1.9 Chapter Summary

In this chapter, alternative contract award methods have been introduced to have an effect on contractor performance in construction contracts in Oyam District Local Government. These affected the quality, time and cost of projects/contracts differently in Oyam District. The chapter has also presented the problem statement, objectives and research questions, significance, justification, scope and conceptual framework of the study. The next chapter provides a review of the literature in relation to contract award methods and contractor performance of construction contracts.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The latest developments and desires in different aspects of human life have resulted into various construction projects, including transportation infrastructure, commercial buildings, industrial facilities, domestic housing, etc. Construction projects are developed through various stages, including: *feasibility study* where specific user needs are identified, *planning stage* where required inputs for the project are identified, *design stage* where the technical specifications of the project are developed, *approval stage* where the technical specifications are verified and approved, *contract award stage* where a contractor to execute the project is procured, and *project execution and management stage* where the construction work is implemented. During the contract award stage, the professionals in construction industry use various methods to identify contractors to award contracts.

The contracts are awarded through bidding and contract awarding processes which involve development of pre-determined selection criteria and the objective of the prequalification and bid evaluation processes and acceptable bidders are invited to bid for the contracts. In Uganda, the major client of construction industry is the Government of Uganda (GOU); therefore, the processes of award of contracts for construction projects undertaken for the Government of Uganda are regulated by the Public Procurement and Disposal Act (PPDA). (Hatush, 1998).

2.2 Most Economically Advantageous Tender (MEAT)

Different from LP, MEAT methods include other criteria than only price in the award phase of the tender process. Sebastian et. al., (2013) described this as: 'Enabling the contracting authority to take account of criteria that reflect qualitative, technical and sustainable aspects of the tender submission as well as price when reaching an award decision'. This combination of price and quality in methods was used more frequently than lowest price in the EU. Lambropoulos (2007) especially recognized the need for this in public work programs due to strict completion dates. The aim of MEAT is the focus for value-price optimization; this includes both price minimization and value maximization (Sebastian, 2013). Jansen et. al., (2007) distinguished the most important criteria that can be included in the award phase, this list consisted of: price, product quality, process quality, delivery time, knowledge and competencies, lifecycle costs, functionality, risk management, past experience, sustainability, societal benefits, empathy and amount of involvement. Even though many methods have been created to come to the value-price optimization, Sebastian (2013) still recognized that the main barriers for implementing MEAT was the lack of information on how to formulate suitable MEAT award mechanisms. I will further elaborate on two of the possible methods, namely WFS and AoV.

The most common procurement method was the lowest-bidder/system in which contracts were awarded to a responsive contractor who offered the least price/cost. In last twenty to thirty years, the prequalification criteria and bidding processes had not seen much advancement and were still in their old form. The client was provided by prequalification, with a list of contractors that were invited to tender on a regular

basis. There were unambiguous benefits and distinct pitfalls to the lowest-bidder/least cost bid awarding system. It compelled the contractors to lower their costs, usually through innovation and modernization, to ensure they won bids and maintained their profit margins. In addition, the process was beneficial specifically to the public sector because of the transparency and simplicity, an important criterion of public policy (Photois, 1993). However, allowing projects to be awarded based on the least price/cost had inherent flaws. Delays in meeting the contract duration, increment of the final project cost due to high variations, tendency to compromise quality, and adversarial relationship among contracting parties was the major pitfalls associated with responsive low bid award procedure (Thomas, 2009). Moreover, the low-bid/Least cost award system encouraged unqualified bidders in the competition and in contrary it discouraged qualified contractors to participate. In a survey conducted in the Oromiya regional state, Developing Country Studies www.iiste.orgnon-existence of real competition during contractors selection; excessive time overruns; compromising quality; and escalation of the final project cost from the estimated cost were the major problems associated with the existing approach of delivering projects. Among many causes of disagreements in the construction project, the project delivery system selected is one of the significant elements (Abera, 2005).

According to Hardy (1978), the criteria used for bid evaluation should reflect the clients' objectives. These are that bids are fully responsive to the contract and bidders are sufficiently well qualified to undertake the contract. The criteria for selecting the successful bidder are then that bid which maximizes the return on the

clients' investment. Thus he has proposed that bidders should submit a schedule of the payments they expect to fall due to them during the contract.

In the award phase of the tendering process, different award methods could be used. This could either be based on Lowest Price (LP) or one of the Most Economically Advantageous Tender (MEAT) methods. MEAT methods include, among many more, Weighted Factor Score (WFS) and Awarding on Value (AoV). AoV had been developed in the Netherlands to help avoid corruptive practices that had occurred in the past and stimulate innovation (Jansen et. al., 2007). The three methods were compared in an empirical study using a questionnaire that was distributed among purchasing professionals across the world. The attitudes towards the three methods were tested based on familiarity, whether they have been used before, likability and considered applicable. While the MEAT methods were better liked compared to LP, the latter was still being used more.

2.3 Global Contract Awarding Methods

On a global level, the contract award methods commonly used to identify the Most Economically Advantageous Tender (MEAT), include: Lowest Price, Weighted Factor Score, and Awarding on Value.

A common alternative is the Weighted Factor Score method whereby, different criteria in addition to the price are decided on initially and weighted according to their importance. Further, a scoring scale (such as 1 to 10 or 1 to 100) must be set. All bids are then scored along each criterion and finally recalculated with the given

percentage weightings. The supplier/contractor with the highest score wins (Telgen & Schotanus, 2010). Another option is rather new to purchasing literature and practice. It was firstly published by the Dutch infrastructure organization CROW under the name "gunnen op waarde", which translates into Awarding on Value (AoV). This award method transfers all criteria other than price into monetary terms. It enables the purchaser to subtract the expected performance values from the actual price. And here, the supplier/contractor with the lowest remaining money value will be awarded (Jansen et. al., 2007).

Many countries, especially developing ones, prefer to simply award a contract to the bidder with the lowest price (LP) which generally is an objective criteria on which decisions can be based on to avoid the possibility of corruption. However, proposals providing enhanced characteristics at a slightly higher price are not taken into consideration when using the awarding on lowest price method. Potentially important evaluation factors such as technical merits, quality, experience, extent and length of guarantees, maintenance costs, after sale service and lifecycle costs, are being disregarded (Lorentziadis, 2010). Consequently, competitive bidding might prevent fraud to a large extent; however it is likely to neglect quality and not providing the best value for money. It has been suggested that purchasing management practices in developing economies are behind those in developed economies, amplifying the need to catch up (Msimangria, 2003). As a result, other practices need to be made known in order to promote a development towards a more economically advantageous perspective to find the best possible compromise between available resources and the quality of the required work or service. Many different methods of contract award

fall under multi-criteria and MEAT perspective (Sciancalepore et al., 2011). However, the application of that kind of award mechanism is not widespread, because it is perceived as more complicated than the traditional lowest price award mechanism, which could lead to resistance (Dreschler, 2009).

2.3.1 Lowest Price

Lowest price is also known as competitive bidding. This aims at obtaining goods and services at the lowest price, by stimulating competition and by preventing favoritism (Business Dictionary, 2014). The contract would be awarded to the bid with the lowest price. Public procurement was strictly regulated and therefore procurement contracts were in most cases awarded to the bid with the lowest price (Bergman & Lundberg, 2013). Wong et. al., (2010) argued that assigning contracts based on tender price was a way of public clients to defend themselves from public criticism and accountability. However, the method also caused additional problems. Lowest price did not guarantee the cost, time and quality since not every project was done in the same environment (Palaneeswaran & Kamaraswamy, 2001). The unrealistic low bids lead to risk of poor performance and bare minimum acceptable quality (Lambropoulos, 2007; Bergman & Lundberg, 2013). The low prices consequently lead to the use of low quality materials or the chance of leaving other firms and contractors in the risk of possible bankruptcy (Gunduz & Karacan, 2017). This again might lead to management and supervision problems on behalf of the client and claims or disputes on behalf of the contractor which both cause delays (Lambropoulos, 2007). Abnormally low tenders could have been caused due to the need of a bidder to stay in business, miscalculation of bid price, inaccuracy of

conceptual cost and requirement of work experience document (Gunduz & Karacan, 2017), this was done either accidentally or deliberately (Grogan, 1992).

2.3.2   Weighted Factor Score (WFS)

WFS is the most used awarding method (Mateus et. al., 2010; Sciancalepore & Telgen, 2011). The first step was to determine all relevant criteria, after which the weights were assigned to each criterion according to importance. Consequently, all contractors were awarded scores on all criteria. These scores were multiplied (weighted) with the respective weights of the criteria. The total score for each contractor defined as the WFS is given in equation 2.1. The contractor with the highest total score was awarded the contract.

$$WFS = \sum_{e}^{E} WeCe \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \quad (Equation\ 2.1)$$

2.3.3 Awarding on Value (AoV)

The goal of AoV was to create a more innovative industry (Jansen et. al., 2007). The relationship between price and quality can be improved by including more criteria than only objective measurable criteria such as price, similar to what is done in other MEAT methods. However, AoV also included the measurability of the total value (Jansen et. al., 2007). Sebastian et. al., (2013) also described this method as the price correction system: "When the 'price correction system' was used, the added value of each contractors bid above the minimum tender requirements was determined. The offered price will then be adjusted depending on its added value (i.e. corrected price

= offered price- added value for the project). The bid with the lowest corrected price becomes the winner." When using AoV first the technical quality criteria should be decided and made known to all parties involved. After this the value of the minimum required quality (Qmin) and maximum possible quality (Qmax) should be defined. The technical quality score (Qi) can be determined, with which the technical quality (qi) can be calculated according to the following formula:

$$q_i = \frac{Q_i - Q_{min}}{Q_{max} - Q_{min}} \quad \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (Equation\ 2.2)$$

Consider how much you are willing to pay in order to move from the minimum required quality to the maximum possible quality, hence for the added value. This parameter is set at the Delta Value (V) and represents the highest added value considered possible for the tenders. When determining the technical values, the technical quality (qi) is translated into monetary terms by multiplying it with the Delta Value (V). Then sum up the technical values of all criteria: $\sum_j V_j q_{ij}$

The price correction is done by subtracting the technical values from the commercial bid price. It is not before this point that the bid price is taken into consideration and made known to the evaluators.

$$CP_i = P_i - \sum_j V_j q_{ij} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \text{(Equation 2.3)}$$

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Eventually the lowest corrected price wins. Due to the translation into monetary terms instead of abstract points the output is easy to understand for both the suppliers and the buyers and their stakeholders or oversight bodies (Sciancalepore & Telgen, 2012) Jansen et. al., (2007) distinguished some possible difficulties when implementing AoV, such as legal restrictions, lack of education, bad loser behavior, additional costs, resistance to change and the possibility to choose from too many tools. Determination of the Delta Value is another problem defined by (Sciancalepore & Telgen, 2011).

2.4 Contract Award Methods used in Uganda

The contract award methods stipulated in the Public Procurement and Disposal of Assets (PPDA) Act (2003) and the PPDA Local government guidelines (2006) include: Quality and Cost Based Selection; (QCBS), Quality Based Selection; (QBS), Fixed Budget Selection, (FBS); Least Cost Selection, (LCS); Technical Compliance Selection, (TCS).

2.4.1   Quality and Cost Based Selection

This is the evaluation methodology that takes into account both the quality and the cost of bids in a process under which technical bids are evaluated without access to financial bids (Wills and David, 2009).

2.4.2   Quality Based Selection

Thai (2004) cites that Quality Based Selection is the evaluation methodology that uses quality as the primary factor in a process under which a technical bid is evaluated without access to a financial bid and a financial comparison is undertaken only for the best technical bid.

2.4.3   Fixed Budget Selection

This is the evaluation methodology that recommends the bidder with the best technical bid, which is within the budget (Gransberg & Senadheera, 1999).

2.4.4   Least Cost Selection

This is the evaluation methodology that recommends the lowest priced bid, which meets all the requirements of the procuring and disposing entity, both commercial and technical (Spagnolo & Bianchi, 2006).

2.4.5   Technical Compliance Selection

Decarolis (2014) constitutes that technical Compliance Selection is the evaluation methodology that recommends the lowest priced bid, which is substantially responsive to the commercial and technical requirements of the procuring and disposing entity.

2.5   Contractor Performance

Performance is described as the degree of achievement of certain effort or undertaking. It is related to the prescribed goals or objectives which formed the

project parameters (Chitkara, 2005). From the project management perspective; it is all about meeting or exceeding stakeholders' needs and expectations from a project. It invariably involved placing consideration on three major project elements, which included time, cost and quality (PMI, 2004). Tukel and Rom (2001) also concluded that satisfaction of key project/contract stakeholders was the overriding measure of successful project/contractor performance. Bryde (2005), states that the satisfaction of multiple stakeholders and the quality of product as well as the process of achieving the objectives amounts to project/contractor performance.

In the construction industry, the measurement of client's satisfaction is often associated with performance and quality assessment in the context of products or services received by the client (Soetanto & Proverbs 2004). Usually the client's requirements are to get construction needs translated into a design that specifies characteristics, performance criteria and conformance to specifications, besides to get the facilities built within cost and time. Client's satisfaction has remained an elusive and challenging issue for some considerable time. Dissatisfaction is widely experienced by clients of the construction sector and may be caused by many aspects but is largely attributable to overrunning contract costs, delayed completion, inferior quality and incompetent service providers including contractors and consultants (Chan et al., 2001). Terziovski & Power (2007) suggested that it is five times more expensive to develop a new construction client than to maintain an existing one and companies could increase their profits by almost 100 per cent by retaining just 5 per cent more of their clients. Client's satisfaction is therefore a fundamental issue for

construction participants who must constantly seek to improve their performance if they are to survive in the global marketplace.

The contractors' satisfaction with the employer and consultants was tested with regard to overall performance, the quality of the tender documents and specifications, efficiency, openness and transparency of the contract procurement and the management of variation orders and claims. (Leung et al, 2004). The best overall employer categories were public corporations and public private partnerships with an average satisfaction level of 83% followed by provincial departments with 82%. The worst overall performance was achieved by the private sector and district councils, with a satisfaction level of 79%, bearing in mind that a score of 80% means satisfied, then the lowest score achieved is of no concern (Yang & Wang 2003). The average overall performance of the agents, in the eyes of the contractors, was slightly lower than the performance of the employers. The contractors were satisfied with the quality of the documentation and specifications, but the private sector and national departments received a slightly lower score of 78%, and district councils the lowest score of 77%. The contractors were satisfied with the procurement of the tenders. The contractors' satisfaction levels were definitely lower for the management of variation orders (VO's) and claims. The national departments received the lowest scores of 73% for VO's and 71% for claims (Holt et al., 1994).

Success of construction contracts depends mainly on success of performance. Dissanayaka and Kumaraswamy (1999) remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the

inappropriateness of the chosen procurement system. Reichelt and Lyneis (1999) remarked three important structures underlying the dynamic of a project/contract performance which are: the work accomplishment structure, feedback effects on productivity and work quality and effects from upstream phases to downstream phases. Thomas (2002) identified the main performance criteria of construction contracts as financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting. Chan & Kumaraswamy (2002) stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization. Cheung et al., (2004) identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication. It is obtained by Navon (2005) that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed. Pheng & Chuan (2006) obtained that human factors played an important role in determining the performance of a project/contract.

Ugwu & Haupt (2007) remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc. Ling et al., (2007) obtained that the most important of practices relating

to scope management are controlling the quality of the contract document, quality of response to perceived variations and extent of changes to the contract.

Consequently, project construction must be managed in an effective manner. The demands from clients, competition, and regulatory agencies have been growing rapidly (Andi & Minato 2003). These challenges present a paradox: few of these demands directly contribute to the physical construction of the contract. However, a failure to properly manage them can lead to problems for the entire project/contract and construction team. The selection of a proper construction contractor increases chances of successful completion of a construction project/contract. It can also fulfill the client's goals, and keep the schedule of the cost, time and quality. So it is extremely critical to select an appropriate contractor in the process of construction management (Terziovski et al., 2003).

The selection of construction contractors are very often conducted during tendering. Tendering indeed gives a client a choice in awarding contract to a company which proposes the lowest/least price and short construction cycles, but usually they do not allow for precisely evaluating a bidder. At the same time there are more and more procedures in which the decisive criterion of choosing a bid is the price. In recent years, most clients made use of such a method, (Willis & Willis 1996). On the other hand, the research results showed that the cheapest bidders always have problems with completing the project. Accepting the lowest/least price is the basic cause of the contract completion problems (time and cost overruns) because very often lowering the price means lowering the quality. The above conditions make it especially

important to properly evaluate the alternative contract award methods and contractor's performance capabilities.

The issue of shortening construction time, reducing cost and improving production performance has engaged both practitioners and researchers for a long time. The studies include motivation and productivity investigation as well as the analysis of planning and scheduling technique. Project time delay means a time overrun either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project (Hamzah et al., 2011).

2.6   Factors that Determine Choice of Award Criteria

Every procurement activity must be evaluated based on evaluation factors and sub-factors established before the release of the request for proposals. The government tailors those factors and sub-factors to represent areas of importance for source selection and provide a basis for meaningful comparison among competing proposals. Agencies have broad discretion in establishing evaluation factors and sub-factors and determining the relative importance of those factors.

2.6.1 Technical, Management and other Evaluation Factors

Non cost evaluation factors must be established to assess the quality of proposed solutions, services or products (Gransberg & Senadheera, (1999). These factors included technical approach, management capability, personnel qualifications, prior experience or small-business participation, among others.

2.6.2   Past-Performance Evaluation Factor

Past performance was a mandatory evaluation factor, and agencies must include it in every procurement process that exceeds the value of the simplified acquisition threshold, unless the contracting officer specifically excludes it (Lema and Samson, 2002). The agency describes its approach to evaluating past performance and usually requires bidders to provide past-performance contract summaries for relevant contracts of similar size, scope and complexity. Past-performance selection criteria can be defined broadly or narrowly. For example, past-performance contract references might be restricted to contracts performed or completed in the past three years. Narrow definitions can eliminate some excellent contracts from being presented as past-performance examples.

2.6.3   Price as an Evaluation Factor

Price is a mandatory evaluation factor for contracts, including best-value procurements. However, its relative importance can vary. For example, when mission success is important to the agency, the relative importance of price in the evaluation criteria can be lowered in comparison with other evaluation factors (Hatush & Skitmore, 1998).

2.7 Challenges faced in Contract Award

Procurement corruption is one of the most common and lucrative "white-collar crimes" in government machineries across the world. According to Auriol (2006), an ongoing Research of the World Bank estimates the total amount of bribery for public

procurement to be 200 billion US Dollar each year, which translates to 3.5% of the world's procurement spending. One of the most quoted definitions of corrupt behavior emphasizes "the abuse of public power or position for personal benefit" (Amanda, 1998).

This is common in Local governments of Uganda which has hampered with some projects (Basheka, 2004). And as it is a rule of thumb that there should never be political involvement in procurement (the contract award).Some contracts end up being subjected to review if some contractor/s is or are not satisfied with the award procedure/process used (Apiyo & Mburu, 2014).When contracts are awarded to public officers this becomes conflict of interest and becomes hard to enforce (Cao & Huang, 2018).

Even within a transparent public procurement context, the restricted interface of public and private sectors creates incentives for corruption (Coppier&Piga, 2007). Efforts to curb corruption through increased levels of transparency often confront high implementation costs. If transparency is costly, organizations tend to stop short implementing the level of transparency in procurement that would dissolve corruption.

Thai, (2004) depicted the contract awarding dilemma as a particular case of 'asymmetric information' surrounding national affairs and their conduct, making favoritism difficult to detect as it is universally conjectured that it ensues from 'human nature' that it is beneficial for anyone to favor their closest neighbors.

Another related reason is that governments, even though collectively the source of the idealist prescription, have been simply reluctant to implement it on practical grounds and because they are biased towards short-term values.

The inability to produce evidence about process or outcome, the lack of attention given to monitoring and incapacity to evaluate, and the powerlessness at implementing compliance with promised actions appear to be in stark conflict with the conviction that those supporting preferential treatment in local procurement exhibit towards its feasibility, creating doubts about the intentions of localities and regions (Grandia& Meehan, 2017).

Apiyo & Mburu, (2014) attested that it is likely that the vagueness of public procurement objectives, vagueness regarding the definition of 'local', the ambiguity usually found surrounding public procurement decisions processes at the local scale, the lack of evidence about effectiveness and the limited capability of local authorities to even foresee the data requirements needed to convincingly determine the value of such policies (considering the full array of complex economic impacts beyond their simplistic formulation of recirculation impacts) and ultimately their inability to enact compliance are all inter-related symptoms.

Grandia & Meehan (2017) cited that contract awarding that lacks strategic maturity in general, is likely to be implemented by inexperienced staff and backed by inadequate institutions in smaller regions, and as a field, faces critical issues that could undermine its further development. This is notably the case when considering

the investments and competencies required to demonstrate and evaluate its impact and even simply to define "success" in local contexts, an aspect that has barely been tackled by research and by practice.

The tender advertisement period has to take into account the need for approval (usually at the advertisement and award stages) from the lender or donor (Cao & Huang, 2018). The advertisement should take 6-8 weeks to allow fair competition. Give sufficient time for display of at least 10 calendar days between the decision being notified to all tenderers and final contract conclusion.

2.8 Chapter Summary

The chapter has identified the alternative contract award methods that contribute to contractor contract performance (quality, cost completion time). As reflected in the above literature, contract award methods contract performance are closely related in various aspects, although the literature is not exhaustive in regard to how different methods of contract awarding relate with contract performance. More so, the context and findings cited in the literature differ in many aspects, depending on geography economy and sector studied. To that extent, it left a gap to be explored on these concepts in the Ugandan perspective, and reflecting entirely on the construction projects in Local Governments. Hence, this study focused on assessing the alternative contract award methods and contractor performance in local governments in Uganda. The next chapter provides the methodology used for the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter provides a brief description of the process of research for the study. The chapter contains research design, research approach, study population, sample size, selection and sampling techniques, data collection methods and instruments, pre-testing techniques, types of data required, procedure of data collection, data analysis, pilot survey, validity and reliability and measurement of variables.

3.2 Research Design

This study used a cross- sectional descriptive design to have complete enumeration and gather data from sample population as stated by Amin (2005). The study enabled collection of data on multiple variables within a reasonable period of time. It allowed the researcher to easily collect data that could be used as a basis for further research. The study carried out an assessment of alternative contract award methods and contractor performance in Local Governments in Uganda and particularly in Oyam District to narrow down a broad field of research into an easily researchable topic.

The study also applied quantitative and qualitative approaches. Amin (2005:58) states that quantitative approaches are plans for carrying out research oriented towards quantification and are applied in order to describe current conditions or to investigate relationships, including cause and effect relationships (Ezeani, 2005). Quantitative approach was adopted in sampling, data collection, data quality control

(Reliability and Validity) and in data analysis. The rationale for the approach is that the analyzed quantitative data provides insights of addressing the research problem and qualitative data refines and explains the quantitative statistical results by purposively selected participants' opinions and attitudes in-depth (Creswell & Clark, 2007). This helped the researcher gain in-breadth and in-depth of understanding and corroboration, while offsetting the weaknesses inherent to using each approach by itself. The study used mainly the questionnaires to give the researcher what different respondents perceive about the alternative contract award methods and contractor performance.

3.3 Research Approach

The study used a triangulation approach involving both qualitative and quantitative approaches. Quantitative methods were used to establish the most commonly used contract award methods and contractor performance in terms of cost and time. The quantitative approach provided a detailed numerical analysis of the relationship between the contract award methods and contractor performance. Quantitative information on awarded contracts was obtained from contract award documents. Qualitative methods were used to establish the in-depth understanding of the relationship between the contract award method and contractor performance. The qualitative methods used included interviews and questionnaires.

3.4 Data Collection Methods and Instruments

Data for the research was collected using the three following methods; a self-administered survey (SAS) questionnaire, face-face interviewing and document review methods. Basically, three research instruments were used in conducting the study. The instruments were questionnaires, interview guides and documents. The questionnaire was the main instrument and the interview guide helped to gain an in depth understanding of the subject. The interface with the respondents provided a platform for probing deeper into the subject matter while documents were intended to obtain a framework for interpretation of the findings in order to arrive at realistic conclusions.

3.4.1   A Self- Administered Survey (SAS) Questionnaire

The self-administered questionnaires completed by the relevant officers in the contract award process in Oyam district provided primary data that enabled establishment of the relationship between contract award methods and contractor performance. According to Gay (1996), questionnaires are instruments which attempt to obtain comparable data from all members partaking in the sample given that the same questions have to be answered by all participants. The main reason for using this tool was that it helped to cover a large number of respondents in a reasonable time, generated reliable data (since respondents answer the questions themselves) and minimized bias from the researcher. The responses were rated on a four and five point Likert scales. A four point likert scale was used because it gives specific responses and leaves the respondent with no safe "neutral" opinion. A five point likert scales was used because it takes reasonable time and effort to complete.

Respondents have choices without becoming overwhelmed. The structured questionnaires consisting of closed-ended questions where the respondents were required to choose from a distinct set of responses were used. The questionnaire was structured in 3 sections: The first section of the questionnaire covered the demographic characteristics of respondents. The second section covered the first objective of the study which was to establish the most commonly used contract award method in selecting contractors in construction contracts. The remaining sections covered questions on the three other objectives which were; to determine the factors that influence the choice of contract award methods used, to determine the impact of the choice of contract award method on contractor performance and to develop a tool to enhance the use of the alternative contract award methods for better contractor performance in Oyam District Local Government.

3.4.2   Face to Face Interviews

Interviewing of professionals was used to obtain in-depth understanding of the contractor performance. Gay (1976) defines an interview as an oral, in-person administration of a questionnaire to each member of a sample. If conducted well, an interview can provide in-depth data not possible with a questionnaire (Karoro, 2001). Interviews were opted for because they have a high response rate and first hand data from the persons of interest.

3.4.3   Document Review

The contract award documents were reviewed to establish the aspects of contract award and contractor performance such as contract award method, contract cost, cost

variations, completion times, and time variations. Secondary data about contracts awards made in Oyam District was obtained through review of contract award documents which included: project evaluation reports, project work progress reports, reports on payments made for completed contracts, project assessment reports, reports from Dorks and Technical Services Department.

3.5 Pre-Testing of the Questionnaire

Before distributing the questionnaires to the actual participants, they must be pretested in a form of a pre-test (Salant and Dillman, 1994).This pilot represents a small sample of people characteristic of those in the survey (Leung, 2001). This gave feedback whether the questionnaire was well structured or not. Ten (10) questionnaires were used for pre- test. This pre-test run was necessary as it helped to sharpen and refined the data collecting instruments. Corrections and necessary modifications were accordingly made in the relevant areas. Improved questionnaires were then administered to the sampled subjects of the study.

3.6 Study Population and Sampling

The study population included officers who were involved in the contract award process in order to obtain useful information. Therefore, the study population comprised of staff of Procurement and Disposal Unit (PDU) department, Works and Technical Services department, Finance department, Community department, Environmental sector, Administration, and contract committee, evaluation teams, contractors, site workers and some members of user committee of Oyam District Local Government. The study used purposive sampling.

Purposive sampling was used to identify the respondents and a representative sample size of respondents selected was determined by using the criteria presented by Krejcie and Morgan, (1970) which provides sample size when population is known. In Table 3.1, Administrators in this case represented finance department (Chief finance, District accountant and line accounts assistant), PDU Unit, Community department (District community development officer and community development officer), Environment Sector (District Environment Officer), Contract committee members and evaluation teams (Technical personnel from other different departments, for example Education, Town councils and sub-counties). Works and Technical Services department comprised of Engineering officers and Project managers, and others represented user committees.

Table 3.1: Determination of a population and sample size

Category	Population	Sample Size	Criteria for Selection
Project managers	03	03	
Contractors	20	10	Purposive sampling
Engineering officers	22	20	Purposive sampling
Administrators	40	35	Purposive sampling
Others	05	05	
Total	**90**	**73**	

3.7 Data Quality Testing

Data collection instruments must possess certain qualities and standards to make them and the data collected acceptable, appropriate and authorized. To determine validity and reliability, Katebire (2007) notes that whenever a test or any other

measuring device was used as part of the data collection process, the validity of the test or device and reliability of the data was in portrait.

3.7.1 Content Validity

Validity is the degree to which a test measures what it was supposed to measure and consequently permits appropriate interpretation of scores Nitko (1996). In this study, the tools were pre-tested by administering them to at least 10 persons in Oyam District. Results of the pre-test were used to compute the Content Validity Index (CVI).

$$CVI = \left(\frac{(Relevant\ items)}{Total\ items}\right) x100 \dots \dots \quad (Equation\ 3.1).$$

A content validity index (CVI) score of 0.87 was obtained which was above 0.7. This implied that the items in the questionnaire were valid as recommended by Amin (2005). In addition, face validity was obtained by consulting supervisor on the questionnaire items, removing those suggested to be deleted and adding in other relevant ones. The tools were tested for their validity by content validity index (CVI) and reliability of these values is as shown in Tables 3.2. Results in Table 3.2 show that CVI of 0.87(87%) was obtained for all the questionnaire constructs. This implied that the tools were considered valid for use in this study and the researcher went ahead to use the questionnaire

Table 3.2: Content Validity Index

Category	Relevant items	Total items	CVI Values
Method of contract awarding	4	5	0.80
Factors for the choice of contact award methods	6	7	0. 86
Impact of the choice of contracting award method on contractor performance	4	5	0.80
Contract performance indicators	7	7	1. 00
Average CVI			**0.87**

3.7.2 Reliability Tests

This is the degree to which a test consistently measures whatever it is to measure. In the study, reliability of the instruments was determined using test – retest method. As Greene (2001) recommends, pre-testing of the instrument was necessary to provide useful feedback regarding the clarity of the questions and overall presentation of the instruments. Reliability means the consistence of the tools to prove similar or related answers over repeated circumstances of administering (Kombo & Tromp, 2010). To ascertain reliability, the tools were subjected to SPSS version 23, and their Cronbach alpha values were obtained. As recommended by Cronbach (1946), any tool with alpha values of 0.7 and above is said to be reliable for a study. All the statements in the questionnaire were subjected to the Cronbach alpha test and the results are presented in Table 3.3.

Table 3.3: Cronbach's Alpha Values for Reliability

Constructs	Cronbach's Alpha
Method of contract awarding	0.943
Factors for the choice of contract award methods	0.965
Impact of the choice of contracting award method on contractor performance	0.941
Contract performance indicators	0.987
Average Cronbach Alpha Values	**0.959**

Results in Table 3.3 show that the data were reliable and this was based on the average alpha value (0.959) which was above 0.7 as recommended by Cronbach (1946).

3.8 Data Analysis

Quantitative data collected were sorted, classified and coded, then tabulated for ease of analysis. The statistical package for social sciences (SPSS) computer software was used to aid the analysis as it is more user friendly and most appropriate for analysis of management related attitudinal responses. Relative Importance Index (RII) as computed in equation 3.2 was used to rank the impact of contract award methods on contractor performance with respect to aspects of time, quality and cost and factors that influence the choice of contract award methods. Regression analysis was also used in analysis to determine the level of the effect of contract award methods on contractor performance.

$$\text{RII} = \sum_{i=1}^{n} \frac{W}{A \times N} \ (0 \le \text{RII} \le 1) \ \dots\dots\dots\dots\dots\dots\dots\dots \ (\text{Equation 3.2})$$

Where: w – is the weight given to each factor by the respondents and ranges from 1 to 5, (where "1" is "strongly disagree" and "5" is "strongly agree").

A – Is the highest weight (i.e. 5 in this case) and;

N – Is the total number of respondents

Multiple linear regression was considered to validate results of the three specific objectives obtained above to develop a tool to enhance contractor performance. Multiple linear regression equation is:

$$Y = C + \beta_1 X_I + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \square \ \dots\dots\dots\dots\dots \ (\text{Equation 3.3})$$

Where: Y- is the dependent variable (contractor performance),

C -is the constant,

β_1, β_2 and β_3, are co-efficient of the independent variables

X_1, X_2, X_3, X_4 and X_5 are independent variables (Quality and Cost Based Selection, Quality Based Selection, Fixed Budget Selection, Least Cost Selection and Technical Compliance Selection)

$\square$ - error

With qualitative data analysis, all interview results were transcribed and translated into English (where applicable). The codes mainly included descriptions and labels of specific concepts as the transcripts were read. Related codes were then grouped

into different categories, and the categories subsequently grouped into specific themes.

The themes were inductively and deductively developed, involving predetermined themes included in the interview guides and explicitly covered during data collection and review, as well as those that emerged during data review. The merged themes were then shared for analysis and a consensus was reached about the various themes and how they fit.

3.9   Determination of the Most Commonly Used Contract Award Method

In order to determine which contract award method is commonly used in Oyam District Local Government, documents were reviewed and respondents were consulted to give their views. Contracts and frequencies were used in analyzing which contract award method was commonly used in Oyam District Local Government. This was done by requesting the respondents to choose from among the following methods: Quality and Cost Based Selection, (QCBS); Quality Based Selection, (QBS); Fixed Budget Selection, (FBS); Least Cost Selection, (LCS) and Technical Compliance Selection, (TCS).

Options from closed ended questionnaires were categorized, pre-coded and then data were entered into the analysis software (SPSS) after which analysis of results was obtained in form of relative importance index. Post-coding was used for open questions and the data were presented in tables. Based on values of RII obtained, the methods used were ranked to determine the most commonly used method of contract

awarding in Oyam District Local Government. The findings are presented in Chapter Four sub- section 4.4.3.

3.10 Determination of the factors that influenced choice of Contract Award Methods

Respondents were requested to give opinions on factors listed in the questionnaire for the choice of contract award methods used in Oyam District. Options from closed ended questionnaires were categorized, pre-coded and data relating to factors that influence choice of contract award methods obtained. The data were entered into the software (SPSS) for analysis. The results were obtained in form of relative importance index. Post-coding was used for open questions and the data was presented in tables. Based on the values of RII obtained, the factors that influence the choice of contract award methods in Oyam District Local Government were ranked. The findings are presented in Chapter Four, sub-section 4.3.

3.11 Determination of the impact of choice of Contract Award Method on Contractor Performance

Data for this objective were collected by use of the questionnaires and entered into SPSS ver. 23 for analysis. Pearson Product Moment correlation coefficient was utilized to establish the relationship between the study variables. RII was computed and the methods were ranked to determine the impact of the choice of contract award method on contractor performance in Oyam District. Average RII was computed and those factors ranked above the average RII were considered to have significant

impact and were used as inputs in the regression process to develop the tool in 3.12. The findings are presented in Chapter Four, sub- section 4.4.

3.12 Development of the tool to enhance the use of alternative contract award methods for better contractor performance

Relative Importance Index (RII) was computed and multiple regression analysis to validate results was obtained. Highly ranked variables were used in validation (regression analysis) and the results in 3.11 using RII used to develop a tool. Based on the findings of objectives 1, 2 and 3, the study presented suggestions and recommendations for how to enhance the use of alternative contract award methods for better contract performance. The findings are presented in Chapter Four, section 4.5.

3.13 Research ethical considerations

The researcher upheld the principle of informed content, in addition, it was acknowledged that there was need to obtain valid and reliable data and this obliged the researcher to seek and access information with the knowledge of the relevant authorities. In planning the study, the researcher took responsibility to make careful evaluation of its ethical acceptability. The researcher was under obligation to seek ethical advice, observe stringent safeguards and to protect the rights of human participles.

3 .14 Respondents Background Information

3.14.1 Response rate

Out of the 73 questionnaires administered to respondents, 63 were returned giving a response rate of 86%. The researcher also had interviewed 10 participants to get in-depth data which were compared with data collected by questionnaires. Table 3.4 results indicate that the response rate was excellent as recommended by Amin (2005) who noted that when response rate is above 50%, it is good but if it is above 80%, it is excellent. This indicates a very good representation of stakeholders in Oyam District Local Government and therefore provided reliable information required for the study.

Table 3.4: Response rate

Category	Respondents	Response rate
Questionnaires returned	63	86%
Questionnaires not returned	10	14%
Total	**73**	**100%**

3.14.2 Education Qualifications of respondents

The study sought to find out the qualifications held by the selected respondents and the distribution obtained is presented in Table 3.5. The results in Table 3.5 reveal that a higher proportion of the respondents, 26(41.3%) had attained diploma as their highest education level. These were followed by 18(28.6%) those who had attained first degree and who constituted the second highest proportion. Those who had post

graduate diploma were 12(19.0%) and masters 7(11.1%) of the respondents. Results indicate that all respondents had attained education to some level implying that the construction of projects required knowledgeable personnel of different specialties. Furthermore, educated respondents were able to provide relevant and fact based information related to relationship between alternative contract award methods and contractor performance.

Table 3.5: Education Qualifications of respondents

Education levels	Frequency (F)	Percent (%)
Diploma	26	41.3
1st degree	18	28.6
Post graduate diploma	12	19.0
Masters	07	11.1
Total	**63**	**100.0**

3.14.3 Working Experience

Working experience was considered to be an important attribute to the study and the results obtained are as in Table 3.6. Results in Table 3.6 indicate the distribution of respondents according to the time they had spent working with the local government. Results show that the majority 29(46.0%) of the respondents had worked from 6-10 years, 21(33.3%) had worked with the local government for 11-15 years, 11(17.5%) had worked for 1-5 years whereas the minority 2(3.2%) of the respondents had spent 16 and above years working with the local government. This showed that most respondents had enough experience with construction in local government and thus were believed to provide reliable and dependable data to generate reliable findings.

Table 3.6: Working Experience

Age (Years)	Frequency (N)	Percentage (%)
1-5	11	17.5
6-10	29	46.0
11-15	21	33.3
16 & above	02	3.2
Total	**63**	**100.0**

3.14.4 Category of Respondents

The study considered the category of respondents to be important to the study. The distribution of respondents among different categories is presented in Table 3.7. Results from Table 3.7 indicate that 32(50.8%) of the respondents were administrators.

Table 3.7: Category of Respondents

Position	Frequency (N)	Percent (%)
Project managers	03	4.8
Contractors	05	7.9
Engineering officers	20	31.7
Administrators	32	50.8
Others	03	4.8
Total	**63**	**100.0**

The Engineering officers followed with 20(31.7%), contractors with 5(7.9%) and finally project managers and others (representatives of user committees) with (4.8%). This depicts that respondents served under different positions that were useful in providing fact based results based on their experience with contracts in construction.

3.14 Chapter Summary

This chapter focused on the research design strategies, specified population of the study. Purposive was suggested as the appropriate sampling procedures. Data collection methods included questionnaires, interview guide and documents whose reliability and validity were measured. The next chapter consists of data presentation, analysis and discussion of results.

Determination of the most commonly used contract award method was weighed on a 4-point Likert scale of Very frequent (V F) = 4, Frequent (F) = 3, Fairly Frequent (FF) =2, Not Frequent (N.F) =1. They were scored as 4, 3, 2 and 1 respectively for further analysis. Determination of the Impact of Choice of Contract Award Method on Contractor Performance was weighed on a scale of 5 = Very high impact, 4 = High impact, 3= low impact, 2= Very low impact, 1 = no impact and determination of factors that influence the choice of contract award methods items were weighed on a 5- point Likert scale where 5 = Very significant, 4 = Significant, 3 = Average   2 = Insignificant   1= Very Insignificant.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents the findings that were obtained regarding alternative contract award methods and contractor performance in Local Governments in Uganda using Oyam District Local Government as the case study. The presentation focused on the study objectives as presented in the next subsequent sections.

4.2 Most commonly used Contract Award Methods

4.2.1 Perceptions of Different Respondents on the Most Commonly Used Contract Award Method

The study focused on the perceptions of different categories of respondents on the most commonly used contract award method in Oyam District Local Government. The findings are presented using frequencies and percentages in Table 4.1. The respondents were labeled as follows: Project managers (**PM**), Contractors (**C**), Engineering officers (**EO**), Administrators (**A**), Others (**O**).

Table 4.1 consists of frequencies and percentages to determine different perceptions of different categories of respondents on contract award methods. For least cost selection, the table 4.1 showed that contractors, Engineering officers and administrators had a perception that, least cost was very frequently used and others considered it was fairly frequent while Project managers said least cost method was not frequently used.

Table 4.1: Perceptions of different respondents on the most commonly used Contract Award Method

	PM		C		EO		A		O	
Quality and Cost Based Selection	F	%	F	%	F	%	F	%	F	%
Very Frequent	0	0.0	2	10.5	7	36.8	7	36.8	3	15.8
Frequent	0	0.0	0	0.0	7	36.8	8	42.1	0	0.0
Fairly Frequent	0	0.0	0	0.0	0	0.0	15	78.9	0	0.0
Not Frequent	3	21.4	3	21.4	6	42.9	2	14.3	0	0.0
Fixed Budget Selection										
Very Frequent	0	0.0	0	0.0	7	53.8	3	23.1	3	23.1
Frequent	0	0.0	5	29.4	2	11.8	10	58.8	0	0.0
Fairly Frequent	0	0.0	0	0.0	9	39.1	14	60.9	0	0.0
Not Frequent	3	30.0	0	0.0	2	20.0	5	50.0	0	0.0
Quality Based selection										
Very Frequent	0	0.0	0	0.0	2	33.3	4	66.7	0	0.0
Frequent	0	0.0	2	56.0	6	24.0	14	8.0	3	12.0
Fairly Frequent	0	0.0	3	70.6	2	11.8	12	17.6	0	0.0
Not Frequent	3	20.0	0	13.3	10	66.7	2	0.0	0	20.0
Technical Compliance Selection										
Very Frequent	3	0.0	2	56.5	5	21.7	13	8.7	0	13.0
Frequent	0	0	3	55.6	9	33.3	15	11.1	0	0.0
Fairly Frequent	0	27.3	0	36.4	4	36.4	4	0.0	3	0.0
Not Frequent	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0
Least Cost Selection										
Very Frequent	0	0.0	5	13.5	8	21.6	24	64.9	0	0.0
Frequent	0	0.0	0	0.0	7	53.8	6	46.2	0	0.0
Fairly Frequent	0	0.0	0	0.0	5	50.0	2	20.0	3	30.0
Not Frequent	3	100.0	0	0.0	0	0.0	0	0.0	0	0.0

This showed that respondents had varying perceptions on different contract award methods. However, according to Table 4.1, least cost selection had the highest

number of 37 (58.73%) of respondents who considered it being most commonly used. Least cost was followed by Technical Compliance with 27(42.86%) and the rest followed as ranked in Table 4.2.

4.2.2 Ranking of contract award methods

The first objective of the study focused on determining the most commonly used contract award methods in selecting contractors in construction projects in Oyam District Local Government. The findings are presented using relative importance index analysis in Table 4.2. An average of relative importance index (RII) values was computed and the obtained result was 0.7. This means any relative index value below the average was considered to have an importance level "Low" while RII above the average was given an importance level "High".

In regards to results in Table 4.2, it was identified that "Least Cost Selection" was the most frequently applied contract award method in Oyam District Local Government as revealed by a relative importance index of 0.845, and this had a corresponding overall ranking as the first which implied that there was a high preference of this method. This implies that local governments prefer cheaper contractors since in Least Cost Selection method, a contract is awarded to the firm with the lowest financial bid.

Table 4.2: The most commonly used Contract Award Methods in Oyam District Local Government

Items	Relative importance Index	Overall Ranking	Importance Level
Least Cost Selection (LCS)	0.845	1	High
Technical Compliance Selection (TCS)	0.782	2	High
Quality and Cost Based selection (QCBS)	0.655	3	Low
Fixed Budget Selection (FBS)	0.631	4	Low
Quality Based Selection (QBS)	0.587	5	Low
Average RII	**0.7**		

This was supported by interview findings where one of the respondents mentioned that;

"Least Cost selection is often used in Oyam District Local Government as a contract award method"

From the study findings, "Technical Compliance Selection" as a contract award method, was considered the 2nd frequent used method. This is indicated by the relative importance of 0.782. This implies that in Oyam District Local Government, the lowest priced bid which is eligible, compliant and substantially responsive and Technical compliance selection which is based on technical knowledge are preferred to cost and quality based selection, quality based selection and fixed budget selection.

The findings in Table 4.2 are in line with Jansen *et al.,* (2007) who noted that at the award phase of the tendering process; different award methods can be used. This can either be based on Lowest Price (LP) or one of the Most Economically Advantageous Tender (MEAT) methods. MEAT methods include, among many more, Weighted Factor Score (WFS) and Awarding on Value (AoV). AoV has been developed in the Netherlands to help avoid corruptive practices that have occurred in the past and stimulate innovation. Even though many methods have been created to come to the value-price optimization, Sebastian (2013) still recognized that the main barriers for implementing MEAT was the lack of information on how to formulate suitable MEAT award mechanisms.

From Table 4.2, it was found out and deduced that "Quality and Cost Based selection" was ranked 3rd among the frequently used contract award methods in Oyam District Local Government with relative importance index (RII) of 0.655. Based on these results, the research established that Oyam District Local Government rarely selected contractors based on Quality and Cost Based selection. This implies that a contract is granted to that company whose bid has received the highest combined score in the result of evaluation of its technical and financial capability. This was in line with interview findings where one of the respondents pointed out that;

"To award a contract, management always considers the technical ability and the financial capability of the construction firm. This is because these two factors determine whether the firm will excellently execute the contract."

As reflected in Table 4.2, a relative importance index of 0.631 was established regarding the view that Fixed Budget Selection was not frequently used contract award method in Oyam District Local Government. This aspect attracted the importance level of "low" and this implied that Fixed Budget Selection has a low probability of being used in awarding contracts. The research expounded that the bidder with the best technical bid which is within the procuring and disposing entity's budget is recommended for award in this method. This was in agreement with interview findings where one of the respondents mentioned that;

"As the local government authority, we always have a specific budget within which a contract should be executed. Therefore, a construction firm whose budget is within our expectations, it is likely to be selected."

Results in Table 4.2 show that Quality Based Selection was the least frequently used contract award method in local governments. This is indicated by a relative importance index of 0.587 and was ranked in the 5th position. This aspect attracted an importance level of "Low" which justified its significance in awarding contracts by local governments. This shows that while awarding contracts to construction companies, Oyam District Local Governments put less emphasis on skills, experience and other essential attributes of these companies. The above findings were also supplemented by interview findings where one of the respondents stated that;

"Open domestic bidding should be for the contract above 50m and selective bidding when it is below 50m"

55

In Table 4.2, the study revealed that the various alternative contract award methods that affect contractor performance have been caused by various factors which are measured by dimensions of time, cost and quality. The methods revealed by the study include, Quality and Cost Based Selection, Quality Based Selection, Fixed Budget Selection, Least Cost Selection and Technical Compliance Selection.

4.3 Factors that influence the Choice of Contract award Methods

Under this section, the researcher explored the respondents' views in relation to the factors for the choice of contract award methods. The findings are presented in Table 4.3 by the values of the relative importance index. An average relative importance index value was computed and the obtained result was 0.783. Any relative importance index value below the average was considered to have an importance level "Low" and therefore had insignificant influence while relative importance index above the average was given an importance level "High" and considered to have significant influence on the choice of contract award methods.

Respondents were asked about technical factors in relation to the factors for the choice of a contract award method and in response a relative importance index value of 0.892 was attained indicating a "high" importance level. This implied that technical factors had a high significant influence on the method to be used whereby which may bring about high contract performance. This also conforms how important technical factors are as most of respondents agreed to the technical people in the field.

Table 4.3: Factors for the Choice of Contract Methods

Factors	Relative Importance Index	Overall Ranking	Importance Level
Technical factors	0.892	1	High
Past performance of the contract award method	0.873	2	High
Mangement and proir experience of using the method	0.829	3	High
Scope of work needed	0.778	4	Low
Price/cost of use of the method	0.775	5	Low
Scheduled milestone dates	0.730	6	Low
Risk expectations of the method	0.603	7	Low
Average	**0.783**		

Further findings clarified that awarding of construction contracts is highly influenced by the technical capability of the bidders. This was supported by interview findings where one of the respondents mentioned factors such as:

"Technical capability and past performance in the same kind of work related to construction activities are necessary in contract award"

From Table 4.3, it was mentioned by the respondents that "past performance of the contract award method" was highly significant factors in relation to making a choice of the contract award method to be used. This was indicated by a relative index value of 0.873 which was considered a "High" importance level and was 2nd position. This

implied that Oyam District Local Governments should endeavor to adopt a certain method depending on how it performed in the past. It is also in line with procurements that offer a significant opportunity for subcontracting; past-performance evaluation must include an assessment of how well the bidder met applicable small-business goals in previous contracts that required subcontracting plans (Chitkara, 2005). This was supported by interview findings where one of the respondents mentioned;

"Past performance records, capital and human resource personnel and work schedules are required"

Results in Table 4.3 show that majority of the respondents agreed and supported the assertion that the choice of a contract award method" is determined by "management and prior experience of using the method as indicated by a relative importance index of 0.829**.** This was considered "high" importance level an indication that all parties involved in the construction projects should endeavor not to deviate from this factor while considering adoption and application of contract award methods.

Results further show that a relative importance index (RII= 0.778) was obtained for scope of work. This attracted a "low" importance level, an implication that scope of work needed had an average influence on choice of the method to be used. The researcher established that the needs of the construction project are directly related to the capacity of the bidder. Hence, a low capacity in terms of technicality, finance, skills cannot be awarded a contract which needs higher technicality, a lot of finance

and high skills. This was supported by interview findings where one of the respondents mentioned that;

"Selecting a firm to award a contract is entirely based on the scope of the work. For example, which technicalities are needed, the size of the company, how much money is needed to complete the construction activities"

Results indicate clearly that a relative importance index (RII= 0.775) was obtained regarding the view that cost of use the method determines the choice of the contract award method. This implied that majority of the respondents were not very certain about the fact that a contract is awarded depending on the cost of the method. This assertion was consistently supported as realistic, since it had a "low" importance level. This finding significantly shows that as parties get involved in the bidding process, they should not only look at the cost of the construction award method but rather focus on different factors like technical compliance and quality.

Results in Table 4.3 show that minority of the respondents supported the assertion that the choice of a contract award method is determined by "scheduled milestone dates" as indicated by a relative importance index of 0.730 and "low" importance level. This depicts that Oyam District Local Government should not emphasize on the scheduled milestone dates as the basis to award a contract to a bidder.

Respondents were asked about risk expectations of the method regarding the factors for the choice of a contract award method and in response a relative importance

index value of 0.603 and an importance level "low" were attained. This implied that risk expectations of the method had a low impact on the method to be used. Here some respondents were not sure of whether they knew about the risk expectations or not.

Study findings reveal that different factors have been used to choose a contract award method. Factors identified in the study include technical factors, management and prior experience of using the method, past performance of the contract award method, price/cost of use of the method, Scope of work needed and risk expectations of the method, scheduled milestone dates.

From the study findings, it was revealed that technical factors were considered to be the most influencial in determination of the choice for method of contract awarding in Oyam District Local Government with relative importance index (RII=0.892). This was followed by the past performance of the contract award method ranking 2nd with (RII=0.873) and the factor of mangement and proir experience of using the method followed with (RII=0.829) as the 3rd most important factor in choosing contract awarding in Oyam District Local Governments in Uganda. The above findings relate to the findings of Gransberg & Senadheera, (2009) who earlier noted that non cost evaluation factors must be established to assess the quality of proposed solutions, services or products. The author mentioned that these factors can include technical approach, management capability, personnel qualifications, prior experience or small-business participation, among others.

Scope of work needed (RII=0.778), Price/cost of use of the method (RII=0.775), scheduled milestone dates (RII= 0.730) and lastly risk expectations of the method (RII=0.603) were ranked in their order of presentation above as factors that Oyam District Local Government considered of low importance in choosing a contract award method.

4.4 Impact of the Choice of Contract Award Method on Contractor Performance

4.4.1 Time and Cost Variations in Projects

The findings in Table 4.4 indicate some contracts which were awarded on the basis of least cost selection but ended up costing more than the initial/original contract sum and taking more time than was specified in the contract. In reference to Table 4.4, it clearly showed that all the contracts had a variation in cost and completion time. This, however, revealed that least cost/price selection does not guarantee the cost, time and quality since not every project is done in the same environment which is in agreement with Palaneeswaran & Kamaraswamy, (2001). The unrealistic low bids lead to risk of poor performance and bare minimum acceptable quality (Lambropoulos, 2007; Bergman & Lundberg, 2013). The low prices consequently lead to the use of low quality materials or the chance of leaving other firms and contractors in the risk of possible bankruptcy (Gunduz & Karacan, 2017).

Figure 4.1 shows cost variations which were obtained from the difference between the original contract sums and final contract sums. The blue graph shows the initial/original contract sums and red one represents the final contract sums. The

differences between the two graphs at different respective points are cost variations. Figure 4.2 shows the percentage cost variations in the projects. The graph represents the percentage cost variations of contracts. Contract 1 had the highest percentage cost variation compared to contracts 2, 3 and 4.

Figure 4.3 shows the time delay in completion of contracts. Renovation of community based services office block at the District headquarters took un reasonably more time (686 days/ more than 1.5 years). According to table 4.5, this contract was the smallest contract but attracted more time and cost overruns irrespective of circumstances under which these overruns occurred. Contracts 2 and 4 took almost the same days more (33 and 32) respectively and contract 3 had 55 days more. Contract was the biggest contract that might have been handled by a bigger company.

Table: 4.4 Projects awarded on the basis of least cost

S/N	Contract		Contractor	Proc.Ref. No.	Project Cost				Project Time		
	Contract Name	Contract Label			Original Contract Sum (UGX)	Final Contract Sum (UGX)	Approved Variation	Percentage Cost Variation	Original Completion Date	Actual Completion Date	Delay in Completion of Project (Days)
1	Renovation of community based services office block at the District head quarters	Office Block Renovation	Roman Jak& C o. Ltd.	Oyam572/Wrks/DDEG/2017-2018/Lot 00015	50,000,000	62,500,000	12,500,000	25	14/2/2018	31/10/2019	686
2	Construction of facility at Abok Seed S.S	Seed School Facility	Ambrose Construction Co. Ltd	Oyam572/CC/ 2017-2018/04	629,868,850	683,746,765	53,877,915	9	28/05/2018	30/06/2018	33
3	Rehabilitation of Bunaseke-Bigiboni road (2.2km), BUyobo-Longotani-Sonoli (4 km), Nangooli-Butandiga road(2.6km)&Nakayindira road (2.0 km) in Sironko District; Total length =10.8 km MoWt/Wrks/IP/18-19/016	Road Rehabilitation	Uganda Martyrs Housing and Construction Co. Ltd	MoWt/Wks/IP/ 18-19/00019	994,272,720	1,140,388,958	146,116,238	15	25/01/2020	10/03/2020	55
4	Construction of Radiology Unit	Radiology Unit	Rovacco (U) Ltd	Oyam572/Wr ks/DDEG/201 7-2018/Lot 00010	200,086,500	218,094,285	18,007,785	9	30/06/2019	31/07/2019	32

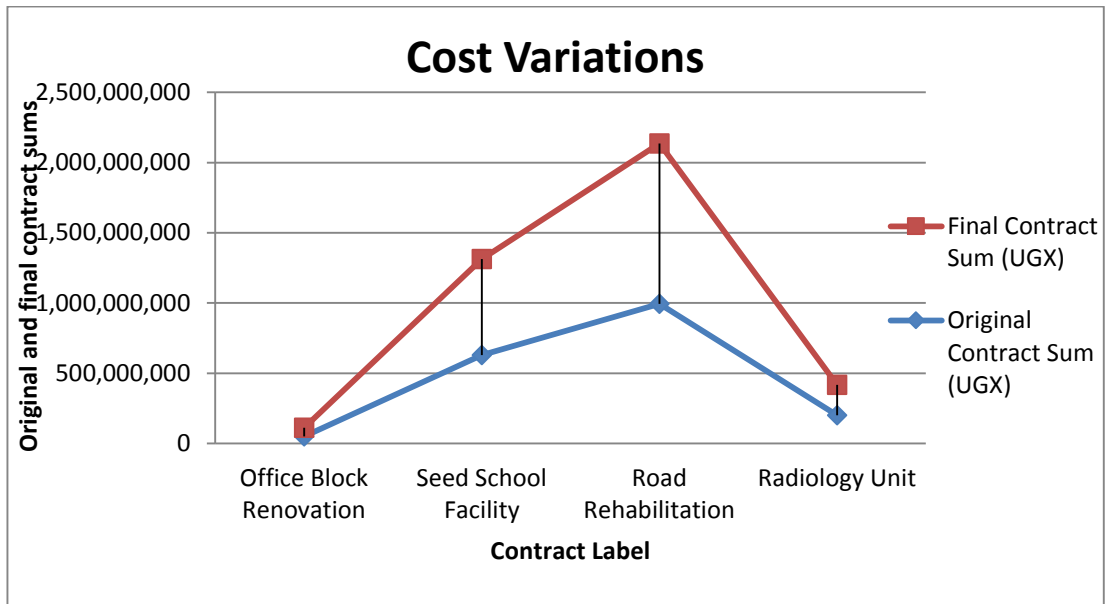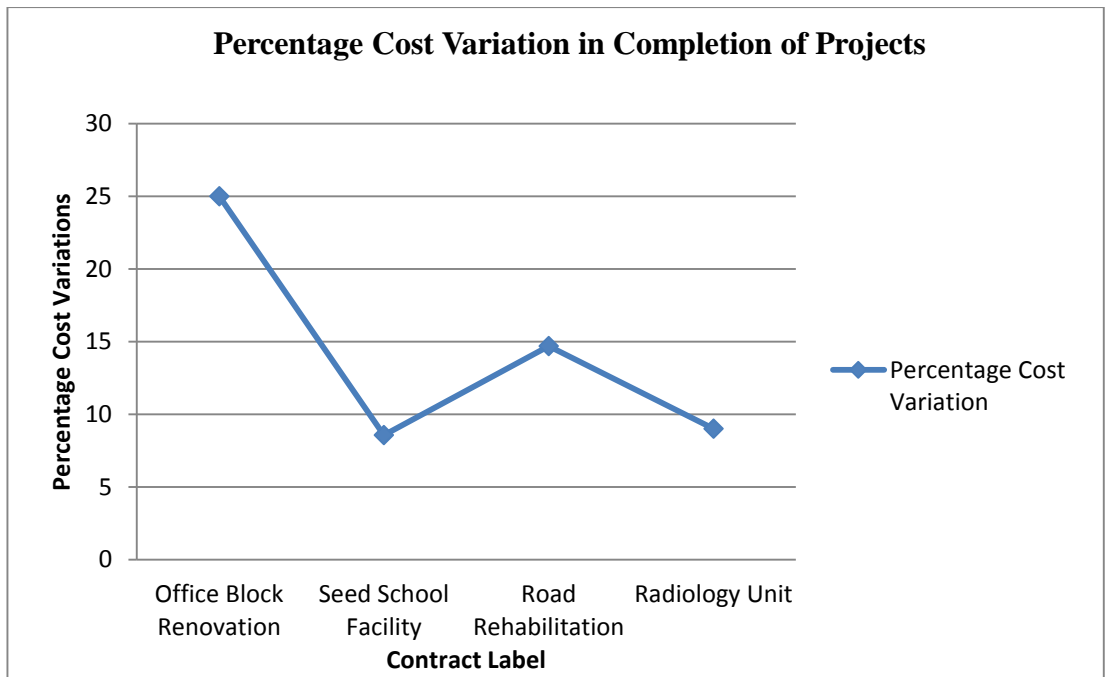**Figure 4.1 Cost Variations**

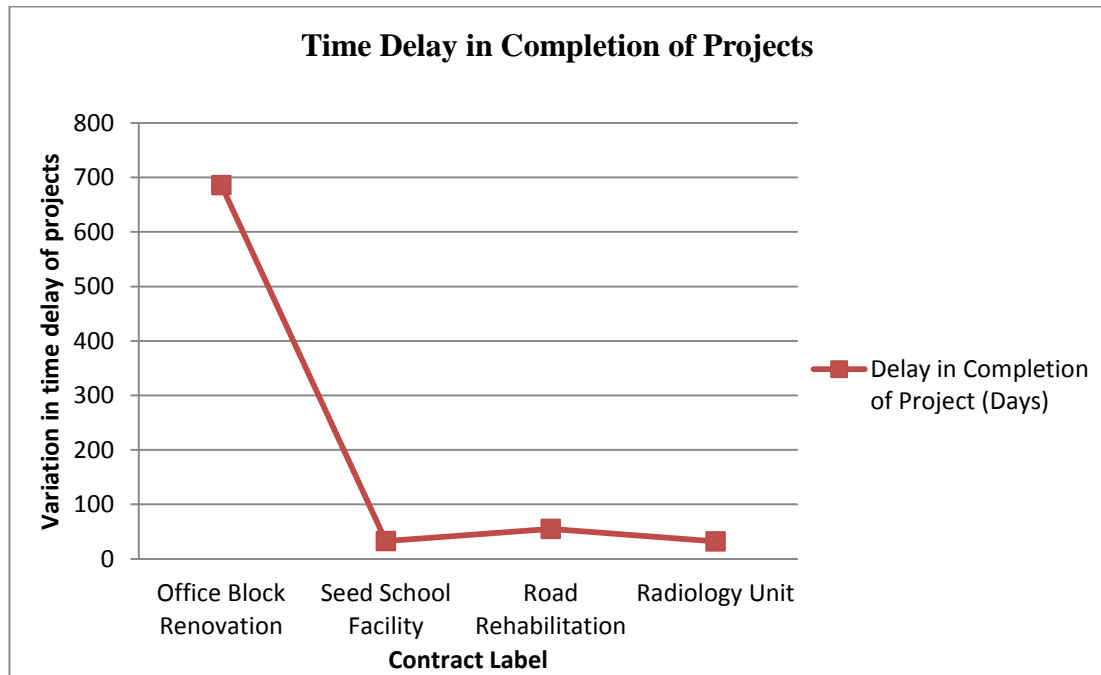**Figure 4.2 Percentage Cost Variation in Completion of Projects**

Figure 4.3 Variation in time delay of projects

4.4.2 Impact of the choice of contract award method on time performance

Time performance is very important for construction contracts to be completed on time, as the clients, users, stakeholders and the general public usually look at contract success from the macro view where their first criterion for contract success appeared to be the completion time (Lim & Mohamed 2000). The study findings using RII are presented in Table 4.5.

Findings in Table 4.5 show that on average majority of the respondents stated that the Technical Compliance Selection had the highest impact on time frame of a contract (RII = 0.654) and this attracted an importance level "High". The results also clarified that a bigger proportion of respondents were certain that the use of Technical Compliance Selection had a higher impact on time factor. In relation to

this assertion, Technical Compliance Selection ranked 1st implying it was supported by the majority of the respondents.

Table 4.5: Impact of the Choice of Contracting Award Method on Time Performance

Items	Relative Importance Index	Overall Ranking	Importance Level
Technical Complaince Selection (TCS)	0.654	1	High
Least Cost Selection (LCS)	0.635	2	High
Quality and Cost Based selection (QCBS	0.575	3	Low
QuQuality Based Selection (QBS)	0.562	4	Low
Fixed Budget Selection (FBS)	0.524	5	Low
Average	**0.590**		

Results in Table 4.5 show also that, Least Cost Selection attained the 2nd position in affecting the project time frame and this was indicated by a relative importance index value of 0.635. This method had an importance level of "high" an implication that the duration in which a construction project should be completed is highly affected by Least Cost Selection. This again might lead to management and supervision problems on behalf of the client and claims or disputes on behalf of the contractor which both cause delays (Lambropoulos, 2007).

In regard to the study findings, the use of Quality and Cost Based selection in awarding contracts was observed to have an average impact on the time frame of the project. This was indicated by a relative importance Index of 0.575 which was considered to be a "Low" point of the importance level. The method was 3rd which depicted that an average support of the majority of the respondents. This implied that Quality and Cost Based selection does not imply any change in the time allocated by the Oyam District Local Governments to a certain construction project.

In addition to the above, results in Table 4.5 show that Quality Based Selection attained low impact the project time frame and this is indicated by a relative index value of 0.562. This method had an importance level of "Low" an implication that the duration in which a construction project should be finished is not highly affected if Oyam District Local Government uses Quality Based Selection. The finding were in support with Thai (2004) who cites that Quality Based Selection uses quality as the primary factor in a process under which a technical bid is evaluated without access to a financial bid and a financial comparison is undertaken only for the best technical bid.

From Table 4.5, it was found out and deduced that Fixed Budget Selection had a low impact on duration of a construction contract/project. This is indicated by a relative importance index value of 0.524 in comparison to other effects. Further findings established from interviews also confirmed the view that Fixed Budget Selection does not have a high/has least impact on the time frame for executing the contract/project.

The finding was in line with Izam, Y.D. (2014) who noted that these are the most important parameters, which are critical to building project performance. According to the Construction Industry Institute, the main difference with respect to fixed-price contract is the risk factor. This is because risk has a significant impact on construction project performance. How risks are shared between the parties is to a large extent governed by the procurement option and the content of the related contract document and forms.

4.4.3 Impact of the choice contract award method on the cost performance

Cost performance is defined as the degree to which the general conditions promote the completion of a contract within the estimated budget (Bubshait & Almohawis, 1994). Findings in Table 4.7 show that the majority of the respondents stated that the Least Cost Selection had the highest impact on cost of a construction project (RII = 0.648) indicating a "high" importance level. The results also indicated that a bigger proportion of respondents were certain that the use of Least Cost Selection had a higher impact on cost as a variable in a contract. Salter & Torbett (2003) indicated that cost variance was the most common technique used to measure design performance. This finding is in an agreement with Lambropoulos, (2007) and Bergman & Lundberg, (2013) who state that the unrealistic low bids lead to risk of poor performance and bare minimum acceptable quality. In relation to this assertion, Least Cost Selection ranked 1st and this was supported by the majority of the respondents.

Table 4.6: Impact of the Choice of Contract Award Method on Cost Performance

Item	Relative Importance Index	Overall Ranking	Importance Level
Least Cost Selection (LCS)	0.648	1	High
Technical Compliance Selection (TCS)	0.619	2	High
Quality and Cost Based selection (QCBS)	0.590	3	High
Quality Based Selection (QBS)	0.540	4	Low
Fixed Budget Selection (FBS)	0.537	5	Low
Average	**0.587**		

Results in Table 4.6 showed that Technical Compliance Selection attained the 2nd ranking in regard with methods which affect the cost of construction and this is indicated by a relative index value of 0.619. This method had an importance level of "High" an implication that the costs associated with executing the contract awarded are to a larger extent affected by Technical Compliance Selection. The above findings are in line with Hatush & Skitmore (1998) who expounded that price is a mandatory evaluation factor for contracts, including best-value procurements.

In regard to the study findings, the use of Quality and Cost Based selection in awarding contracts was observed to have an average impact on the cost of construction. This was indicated by a relative importance index of 0.590 which indicated a "high" importance level. The method was ranked 3rd which depicted that Quality and Cost Based selection stood a high probability of causing changes in the cost of the entire contract.

In addition to the above, results in Table 4.6 further showed that, to a smaller extent Quality Based Selection affected the cost of executing a construction project and this was indicated by a relative index value of 0.540**.** This method attracted an importance level of "Low" an implication that the cost associated with the contracts awarded by the Oyam District Local Government are not highly affected/has low impact if Quality Based Selection is applied. This was in line with interview findings where one of the respondents pointed out that;

"Construction projects have standard quality specifications. This means the quality should not affect the cost of the project since the requirements are fixed."

From Table 4.6, it was also found out and deduced that Fixed Budget Selection had the lowest impact on cost of a construction contract/project if used. This is indicated by a relative index value of 0.537 and 5th in comparison to other contract award method. These results implied that choosing bidders with the best technical bid which is within the procuring and disposing entity's budget has no impact on the cost of a contract.

4.4.4 Impact on the choice of contract award method on quality performance

Quality performance is defined as the totality of features required by a product or services to satisfy a given need, or fitness for purpose (Parfitt & Sanvido 1993).The findings are presented in Table 4.7.

Table 4.7: Level of Impact of the Choice of Contract Award Method on Quality Performance

	Relative Importance Index	Overall Ranking	Importance Level
Technical Compliance Selection (TCS)	0.683	1	High
Quality and Cost Based selection (QCBS)	0.663	2	High
Quality Based Selection (QBS)	0.622	3	Low
Least Cost Selection (LCS)	0.613	4	Low
Fixed Budget Selection (FBS)	0.568	5	Low
Average	**0.630**		

Findings in Table 4.7 show that the majority of the respondents stated that the Technical Compliance Selection had the highest impact on quality as a measure of contract performance (RII = 0.683). (Soetanto & Proverbs 2004) also state that in construction industry, the measurement of client's satisfaction is often associated with performance and quality assessment in the context of products or services received by the client. The importance level "High" clarified that a bigger proportion of respondents were certain that the use of Technical Compliance Selection had a higher impact on quality. In relation to this assertion, Technical Compliance Selection ranked first. This was also in line with interview findings where one of the respondents pointed out that;

"The technical capability of a construction firm is a number one factor of how good or bad the project might perform"

Results in Table 4.8 also show that Quality and Cost Based selection attained the 2nd ranking in relation to its impact on the quality as a measurement of contract performance. And this is indicated by a relative index value of 0.663. This method had an importance level of "high" an implication that the quality specifications in a contract are to a larger extent affected by Quality and Cost Based selection.

In regard to the study findings, the use of Quality Based Selection in awarding contracts was observed to have an average impact on the quality as a measure of contract performance. This is indicated by a relative importance Index of 0.622 which indicated a "Low" importance level. The method was ranked 3rd which depicted Quality Based Selection is directly related to quality assurance during construction. This was supported one respondent who stated;

"Quality is the most important factor considered while executing a project. Therefore, considering the quality specifications by the company proves whether they will meet the expected standards by Oyam District Local Government."

In addition to the above, results in Table 4.7 show that, to a smaller extent Least Cost Selection affected the quality in construction and this is indicated by a relative index value of 0.613.The method was ranked 4th and attracted an importance level of "Low" an implication that the quality is not highly affected if Least Cost Selection is used after careful consideration of technical factors in awarding contracts.

From Table 4.7, it was found out and deduced that Fixed Budget Selection had the low impact on quality of a construction project/contract. This is indicated by a relative index value of 0.568 and ranking last (5th). This assertion attracted an importance level of "Low" and based on this the researcher established that in a situation where Oyam District Local Government chooses bidder with the best technical bid that is within the procuring and disposing entity's budget, there will be less effect on the quality. These results are in line with Bryde (2005), who states that the satisfaction of multiple stakeholders and the quality of the product as well as the process of achieving the objectives amounts to project/contractor performance.

4.5 Regression Analysis

In order to establish an effective alternative contract award method, a regression analysis was conducted. A regression analysis was done between Quality and Cost Based selection, Quality Based Selection, Fixed Budget Selection, Least Cost Selection, Technical Compliance Selection and Contractor Performance. The details are presented in Table 4.8.

Table 4.8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.510[a]	.260	.196	.60806

a.   Predictors: (Constant), Technical Compliance Selection (TCS), Quality

Based Selection (QBS), Least Cost Selection (LCS), Fixed Budget Selection (FBS),

Quality and Cost Based selection (QCBS).

The coefficient of determination (R squared) is equal to 0.260. This implies that

26.0% variation in contractor performance is brought by the changes in these

variables; Quality Based Selection (QBS), Least Cost Selection (LCS), Fixed Budget

Selection (FBS), Quality and Cost Based selection (QCBS) and Technical

compliance selection (TCS). This means that all alternative contract award methods

have a positive effect on contract performance. The other 74.0% variation is

explained by other methods and factors which are not looked at in this study.

Table 4.9 Analysis of Variation (ANOVA[a])

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.421	5	1.484	4.014	.003[b]
	Residual	21.075	57	.370		
	Total	**28.497**	**62**			

a. Dependent Variable: Contractor Performance

b. Predictors: (Constant), Technical Compliance Selection (TCS), Quality

Based Selection (QBS), Least Cost Selection (LCS), Fixed Budget Selection (FBS),

Quality and Cost Based selection (QCBS).

The ANOVA findings indicate that there is a correlation between the combined Predictor variables (Technical Compliance Selection (TCS), Quality Based Selection (QBS), Least Cost Selection (LCS), Fixed Budget Selection (FBS), Quality and Cost Based selection (QCBS)) and dependent variable (Contractor performance) since P-value of 0.003 is less than 0.05.The purpose of the analysis of the variance is to test differences in means (for groups or variables) for statistical significance. The accomplishment is through analyzing the variance, which is by partitioning the total variance into the component that is due to true random error and the components that are due to differences between means. The ANOVA results indicate that the independent variables combined together are significant (F=4.014, p=0.003). From Table 4:9 illustrations, the p values of Quality Based Selection(p=.008), and Technical Compliance Selection (p=0.049),are <0.05 hence there is evidence to accept that the methods of alternative contract awarding of Quality Based Selection and Technical Compliance Selection have an effect on contractor performance. This is evidenced by the β coefficients, Quality Based Selection (0.242) and Technical Compliance Selection (0.179).This implies that units increase in any of the variables (Quality Based Selection and Technical Compliance Selection) other factors constant increase the level of contractor performance.

a. Dependent Variable: Contractor Performance
The established multiple linear regression equation becomes:

$Y = 2.133 + 0.156QCBS + 0.242QBS - 0.123FBS + 0.0561LCS +$

$0.179TCS$……………………………………………………………… (Equation 4.1)

Table 4.10: Coefficients for the regression equation

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.133	.512		4.167	.000
Quality and Cost Based selection	.156	.080	.262	1.955	.055
Quality Based Selection	.242	.088	.341	2.759	.008
Fixed Budget Selection	-.123	.087	-.180	-1.416	.162
Least Cost Selection	.056	.091	.071	.613	.543
Technical Compliance Selection	.179	.096	.214	1.856	.049

Where;

Y is dependent variables: contract award methods and factors for the choice of the method

QCBS - Quality and Cost Based Selection

QBS -   Quality Based Selection

FBS   -   Fixed Budget Selection

LCS   -   Least Cost Selection

TCS   -   Technical Compliance Selection

Constant = 2.133, this shows that if Quality Based Selection, Technical Compliance Selection, were rated as zero; contract performance rating would be;

2.133 + S0.156QCBS - 0.123FBS+ 0.0561LCS

A regression was done to ascertain the effect of Quality Based Selection on contract performance taking into consideration the unstandardized beta coefficient obtained is 0.242. This means that one unit change in Quality Based Selection results in 0.242 units increase in contractor performance. The unstandardized beta coefficient shows that Quality Based Selection has a positive contribution towards contractor performance. In the regression results, this means that Quality Based Selection contributes to contract performance by 0.242. Therefore, these results accept the conclusion that;

"There is a statistically significant effect of Quality Based Selection alternative method of contract awarding on contractor performance.

$\beta 2= 0.179$ shows that one unit change in Technical Compliance Selection, results in 0.179 units increase in contract performance. The unstandardized beta coefficient indicates that Technical Compliance Selection method of contract awarding has a positive contribution towards contract performance. In the regression results, this means that Technical Compliance Selection method of contract awarding contributes to the contract performance by 0.179. This reveals that,

"There is a statistically significant effect of Technical Compliance Selection method of contract awarding on contractor performance"

The p values of Quality and Cost Based selection (p=055), Fixed Budget Selection (p =.162), and Least Cost Selection (p=.543) are >0.05 hence there is evidence to accept

that the methods of contract awarding methods of Quality and Cost Based selection, Fixed Budget Selection and Least Cost Selection do not significantly contribute to contractor performance.

Findings revealed that quality based selection and technical compliance selection are most effective methods of contract award method for better contractor performance. Evidence was ascertained by the effect of quality based selection on contractor performance taking into consideration the unstandardized beta coefficient obtained at 0.242 that implied that unit change in Quality Based selection results in 0.242 units increase in contractor performance which provided a statistically significant effect of Quality Based Selection as an alternative method of contract awarding on contractor performance. The above findings are in agreement with Thai (2004) who constituted that that Quality Based Selection is the evaluation methodology that uses quality as the primary factor in a process under which a technical bid is evaluated without access to a financial bid and a financial comparison is undertaken only for the best technical bid.

It was also revealed that Technical Compliance Selection was another important method to use in order to attain effective contractor performance. Findings on the effect of technical compliance selection reveals a $\beta 2= 0.179$ which shows that one unit change in Technical Compliance Selection, results in 0.179 units increase in contractor performance and represented a statistically significant effect of Technical Compliance Selection method of contract awarding on contractor performance. These findings are also in line with Decapolis (2014) who mentioned that technical

Compliance Selection is the evaluation methodology that recommends the lowest priced bid, which is substantially responsive to the commercial and technical requirements of the procuring and disposing entity. On the other hand, the other methods of contract awarding did not show a significant contribution to contractor performance, as presented by the p values which were greater than 0.05. Therefore quality and cost based selection (p=055), fixed budget selection (p =.162), and least cost selection (p=.543) showed that they do not significantly contribute to contractor performance.

It is therefore recommended that two methods; Quality Based Selection and Technical Compliance Selection be considered as priority in contract award process in order to foster effective contractor performance in Oyam District Local Government since they greatly contribute to the contractor performance compared to quality and cost based selection, fixed budget selection and least cost selection which scored insignificant contribution to contactor performance as revealed by the study findings.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study concluded that Least Cost selection was the most frequently used contract award method in Oyam District Local Government. It also concluded that Technical factors were considered to be the most important in determination of the choice for method to be used followed by past performance of contract award method and, Mangement and proir experience of using the method respectively in Oyam District Local Government. And finally it concluded that, Quality Based Selection and Technical Compliance greatly contribute to the contractor performance compared to quality and cost based selection, fixed budget selection and least cost selection.

5.2 Recommendations of the Study

Basing on the findings and conclusions, the following recommendations were made:

i. The Technical factors should be considered the most important in determination of the choice for method followed by past performance of contract award method, and Mangement and proir experience of using the method respectively which attained importance level of "High" as compared to other factors discussed in this study; Scope of work needed, Price/cost of use of the method, Schedule milestone dates and Risk expectations of the method which attained importance level of "low" in Oyam District Local Government.

ii.   It is also recommended that two methods; Quality Based Selection and Technical Compliance Selection be considered as priority in contract award process in order to foster effective contractor performance in Oyam District Local Government since they greatly contribute to the contractor performance compared to quality and cost based selection, fixed budget selection and least cost selection which scored insignificant contribution to contactor performance as revealed by the study findings.

5.3 Areas for further Research

The following areas are identified for further research:

i.   Effect of contract management practices on quality of construction contracts in Local Governments in Uganda.

ii.   Control of the contract's implementation and operational risks, leading to improved contract outcomes.

REFERENCES

Abera, (2005) *Alternative Dispute Resolution Methods in Construction Industry*: An Assessment of Ethiopian Situation.

Amin, M.E. (2005). Social Science research: Conception, Methodology and analysis. Kampala, Uganda. Makerere University Printery.

Andi and T. Minato, (2003) *"Design Documents Quality in the Japanese Construction Industry:* Factors Influencing and Impacts on Construction Process," International Journal of Project Management, 21(7), 537-546.

Apiyo, R. O., & Mburu, D. K. (2014). *Factors affecting procurement planning in county governments in Kenya, case study of Nairobi City County.* International Journal of Economics, Commerce and Management, 2(11), 1-34.

Atkinson, R. (1999) "*Project management:* cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria", 17(6), 337-342.

Basheka, B. C. (2009). *Procurement planning and local governance in Uganda:* A factor analysis approach. International Journal of Procurement Management, 2(2), 191-209.

Bordoli, D. W. and Baldwin, A.N (1998). *A methodology for assessing construction project delays.* Construction Management and Economics, 16(3), 327–337.

Bryde, D. J., & Robinson, L. (2005). *Client versus contractor perspectives on project success criteria*. International Journal of Project Management, 23(8), 622-629.

Bubshait, A. A. and Almohawis, S. A. (1994) *Evaluating the general conditions of a construction contract*. International Journal of Project Management 12 (3): 133–135.

Cao, F. G., & Huang, J. Y. (2018). *Research on the Remedy System in China's Government Procurement Contract Awarding Phase*. Journal of Investment and Management, 7(2), 59-69.

Chan, A. P. C. (2001) *Time-cost relationship of public sector projects in Malaysia*. International Journal of Project Management 19(4), 223–229.

Chan, A. P. C. and Tam, C.M. (2000) *Factors affecting the quality of building projects in Hong Kong*. International Journal of Quality & Reliability Management 17 (4/5): 423–441.

Cheung, C, H, Henry and K, W, Cheung, (2004) *"PPMS a Web based construction project Performance Monitoring System,"* Automation in Construction, 13(3), 361 − 376.

Chitkara, K. K. (2005), Project Management - Planning, Scheduling and Controlling − Tata McGraw Hill, New Delhi. Project Management Institute.

Creswell, J. W., & Plano Clark, V. L. (2007). Designing and Conducting Mixed Methods Research. London: Sage Publications Ltd.

Decarolis, Francesco, (2014) "Awarding Price, Contract Performance, and Bids Screening: Evidence from Procurement Auctions." *American Economic Journal: Applied Economics*, 6 (1): 108-32.

Dissanayaka, S. M. and Kumaraswamy, M. M. (1999). *Comparing contributors to time & cost performance in building projects*. Building and Environment, 34(1), 31-42.

Ezeani, E. (2005). Social science, research, conceptual, methodology and analysis, Kampala Makerere University Printers.

Frimpong, J, Oluwoye, L, Crawford, (2003) "*Causes of delay and cost overrun in construction of groundwater projects in development countries*; Ghana as a case study," International Journal of Project Management, 21(5), 321-326.

Ganaway, N. B. (2006) Construction Business Management: A Guide to Contracting for Business Success. London: Butterworth-Heinemann.

Georgy, M. E., Chang, L. M. and Zhang, L. (2005) *Prediction of engineering performance*: A Neurofuzzy approach. Journal of Construction Engineering and Management 131 (5), 548–557.

Gransberg, D. D., and S. P. Senadheera, (1999) "Design-Build Contract Award Methods for Transportation Projects," *Journal of Transportation Engineering,* ASCE, 125 (6), 565-567.

Hamzah, M. A. Khoiry, I. Arshad, N.M. Tawil and A.I. Che Ani, (2011)., *Cause of construction delay – Theoretical framework*, Procedia Engineering, 20(4), 490-495.

Hardy, S. C., (1978), Bid evaluation study for the World Bank, The University of Manchester Institute of Science and Technology, Manchester, UK.

Hatush, Z. and Skitmore, M. (1998), Contractor selection using multi-criteria utility theory: an additive model building Environment.

Holt, J. G., Krieg, N. R., Sneath, P. H. A., Stanley, J. T. and William, S. T. (1994) Bergey's Manual of Determinative Bacteriology. Williams and Wilikins, Baltimore, 786-788.

Izam, Y. D. (2014)., Construction Estimating and Procurement Issues: A monograph of the Department of Building, University of Jos, Nigeria

Jansen, E., J. Overpeck, K.R. Briffa, J.-C. Duplessy, F. Joos, V. Masson-Delmotte, D. Olago, B. Otto-Bliesner, W.R. Peltier, S. Rahmstorf, R. Ramesh, D. Raynaud, D. Rind, O. Solomina, R. Villalba, and D. Zhang, (2007). Cambridge University Press, pp. 433-497.

Krejcie, R. V. and Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement,* 30(1), 607-610.

Kumaraswamy, M. M.; Chan, D. W. M., (1998) *Contributors to construction delays.* Construction Management and Economics, 16 (1), 17–29.

Lambropoulos S. (2007) *"The Use of Time and Cost Utility for Construction Contract Award under European Union Legislation,"* Building and Environment, 42 (1), 452-463.

Lema, N. M. and Samson, M. (2002), Development of construction contractors performance measurement framework, 1st International conference of creating a sustainable construction, UK.

Lim and M. Z. Mohamed, (1999) *"Criteria of Project Success and Exploratory Re-Examination,"* International Journal of Project Management, 17(4), 243- 248.

Ling F. Y. Y., Low S. P., Wang S. Q. and Lim H. H., (2009) "Key Project Management Practices Affecting Singaporean Farms' Project Performance in China," International Journal of Project Management, 27(1), 59-71.

Lo, I, W, H, Fung, K, C, F, Tung, (2006) "*Construction delays in Hong Kong civil engineering projects*." Journal of Construction Engineering and Management, 132(6), 636-649.

Mugenda, O. M & Mugenda, A. G (2003). Research Methods; Nairobi ACTS PRESS.

Murat Gunduz& H. VolkanKaracan (2017) Assessment of abnormally low tenders: a multinomial logistic regression approach, Technological and Economic Development of Economy, 23:6, 848-859.

Navon, (2005) "Automated project performance control of construction projects," Automation in Construction, Vol. 14, PP. 467 – 476.

Parfitt, M. K and Sanvido, V. E (1993) *Checklist of Critical Success Factors for Building Projects*. "Journal of Management in Engineering", ASCE, 9(3), 243-249.

Pheng, L. S.,Chuan, Q. T. (2006). *Environmental factors and work performance of project managers in the construction industry*. International Journal of Project Management 24(1), 24-37.

Photois, G. I. (1993). Average-Bid Method-Competitive Bidding Strategy: Journal of Construction Engineering and Management Vol. 119, No. 1, Public Procurement Act, 2003(Act663)

PMI (2004) A Guide to The Project Management Body of Knowledge (PMBOK Guide) Third Edition. Pennsylvania: Project Management Institute, INC. pp.5, 8, 377.

PPDA Act & Regulations as Amended 2014, Uganda Media Centre.

Reichelt, K., & Lyneis, J. (1999). *The dynamics of project performance benchmarking the drivers of cost and schedule overrun.* European Management Journal, 17(2), 135–150.

Salter, A. and Torbett, R. (2003) *Innovation and performance in engineering design*. Journal of Construction Management and Economics 21(6), 573–580.

Sciancalepore, F., & Telgen, J. (2012). Supplier selection by Awarding on Value. Working Paper. University of Twente.

Sciancalepore, F., Falagario, M., Costantino, N., &Pietroforte, R. (2011). "*Multiple-Criteria Bid Evaluation of Public Projects.*" Paper Presented at Conference Management and Innovation for a Sustainable Built Environment, Amsterdam, and the Netherlands.

Soetanto, R. and Proverbs, D. G. (2004). *Intelligent models for predicting levels of client satisfaction*. Journal of Construction Research 5 (2): 233–255.

Spagnolo G. and Albano, G. L., M. Bianchi, (2006). *Bid average methods in procurement*. Rivista di PoliticaEconomica 96 (1), 41-62.

Terziovski, M. and Power, D. (2007) *Increasing ISO 9000 certification benefits*: A continuous improvement approach. International Journal of Quality & Reliability Management 24 (2): 141–163.

Terziovski, M., Power, D. and Sohal, A. S. (2003) *The longitudinal effects of the ISO 9000 certification process on business performance*. European Journal of Operational Research 146 (3): 580–595.

Thai, Et. (2004), *Public Procurement as a lever of government reform*: International research evidence in: Proceedings of worldwide symposium, San Diego, California, 6-8 April.

Thomas Bedford,(2009).*Analysis of the Low-Bid Awards System in Public Sector Construction Procurement*, Graduate Department of Civil Engineering University of Toronto.

Tukel, O. I., Rom, W. O. (2001). *An empirical investigation of project evaluation criteria*. International Journal of Operations & Production Management, 21(3), 400–416.

Ugwu, O. O & Haupt, TC 2007, *'Key performance indicators and assessment methods for infrastructure sustainability-a South African construction industry perspective'*, Building and Environment, 42(2), 665-680.

Willis, T. H. and Willis, W. D. (1996) *A quality performance management system for industrial construction engineering projects.* International Journal of Quality & Reliability Management 13 (9), 38–48.

Wills Yuko Oso., David Onen., (2009).Writing Research proposal and Report: A Hand book of beginning researchers .Jomo Kenyatta Foundation, Sitima Printers & Stationers Ltd, Nairobi – Kenya.

Yang, S. Y., Wang, C. Z. (2011). Traditional culture and local social work construction: Analysis of localization of social work under the perspective of modernization. Journal of South-Central University for Nationalities (Humanities and Social Sciences), 6, 74–77. CNKI Knowledge Resources (in Chinese).

Appendix I: Projects awarded on the basis of least cost

S/N	Contract	Contractor	Proc.Ref. No.	Original contract sum(UGX)	Approved variation	Current contract sum(UGX)	Original completion date	Actual completion date
1	Renovation of community based services office block at the District head quarters	Roman Jak& C o. Ltd.	Oyam572/Wrks/DDEG/2017-2018/Lot 00015	50,000,000	12,500,000	62,500,000	14/2/2018	31/10/2019
2	Construction of facility at Abok Seed S.S	Ambrose Construction Co. Ltd	Oyam572/CC/2017-2018/04	629,868,850	53,877,915	683,746,765	28/05/2018	30/06/2018
3	Rehabilitation of Bunaseke-Bigiboni road (2.2km), BUyobo-Longotani-Sonoli (4 km), Nangooli-Butandiga road(2.6km)&Nakayindira road (2.0 km) in Sironko District; Total length =10.8 km MoWt/Wrks/IP/18-19/016	Uganda Martyrs Housing and Construction Co. Ltd	MoWt/Wks/IP/18-19/00019	994,272,720	146,116,238	1,140,388,958	25/01/2020	10/03/2020
4	Construction of Radiology Unit	Rovacco (U) Ltd	Oyam572/Wrks/DDEG/2017-2018/Lot 00010	200,086,500	18,007,785	218,094,285	30/06/2019	31/07/2019

Appendix II: Sample Determination Table

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

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

Source: Krejcie & Morgan, 1970