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ASSESSMENT OF QUALITY MANAGEMENT PRACTICES OF BUILDING CONSTRUCTION FIRMS IN UGANDA: A CASE OF KAMWENGE DISTRICT

BY

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Certification

This is to certify that we have read and hereby recommend for acceptance by Kyambogo University a research dissertation titled: "**Assessment of quality management practices of building construction firms in Uganda": A case of Kamwenge District Local Government**" in fulfilment of requirement for the award of a Master of Science in Construction Technology and Management degree of Kyambogo University.

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Declaration

I, **Baguma Andrew,** hereby declare that this dissertation is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree of the university or other institute of higher learning, except where due acknowledgement has been made in the text and reference lists.

Signature:..... Date.....16/05/2024.....

BAGUMA ANDREW

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Dedication

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Table of Contents

Certification ..... **i**

Declaration ..... **ii**

Acknowledgements ..... **iii**

Dedication ..... **iv**

Table of Contents ..... **v**

List of Tables ..... **x**

List of Figures ..... **xi**

List of Acronyms ..... **xii**

Abstract ..... **xiii**

CHAPTER ONE **1**

INTRODUCTION **1**

1.1 Background of the study 1

1.2 Theoretical background 3

1.3 Conceptual background 4

1.4 Statement of the problem 5

1.5 Objectives of the study 6

1.5.1 Main objective 6

1.5.2 Specific Objectives 6

1.6 Research Questions 7

1.7 Justification of study 7

1.8 Significance of study 8

1.9 Scope of the study 8
1.9.1 Content scope 8
1.9.2 Geographic Scope 9
1.9.3 Time Scope 11
1.9.4 Financial scope 11
1.10 Conceptual Frame work 11
1.11 Chapter summary 13
CHAPTER TWO 14
LITERATURE REVIEW 14
2.1 Introduction 14
2.2 Theoretical Review 14
2.3 Quality management systems in construction projects 15
2.3.1 Quality Management Systems in projects as per ISO 9000 16
2.3.2 Quality Management Systems in projects as per ISO 9001, 2015 18
2.3.3 Quality Management System in Project as per ISO 10006:2017 21
2.4 Quality Planning and quality of construction projects 22
2.5 Quality assurance and quality of construction projects 24
2.6 Quality Control and quality of construction projects 26
2.7 Purpose of Quality Management in the Construction Industry 28
2.8 Factors affecting project time delay and cost overruns 29
2.9 Critical success factors for quality management 30
2.10 Stakeholder framework and building construction 34

2.11 Knowledge Gap 35

CHAPTER THREE 36

METHODOLOGY 36

3.1 Introduction 36

3.2 Research Design 36

3.3 Study target Population 37

3.4 Sample Size and selection 37

3.5 Sampling Technique and procedure 38

3.5.1 Simple random sampling 38

3.5.2 Purposive sampling 38

3.6 Sources of Data 38

3.6.1 Desk Survey 39

3.6.1.1 Internal Secondary Sources 39

3.6.1.2 External Secondary Sources 39

3.6.2 Field Survey: Primary Data Source 39

3.6.3 Descriptive survey 40

3.7 Data collection instruments 40

3.8 Pre-testing 41

3.8.1 Validity 41

3.8.2 Reliability 42

3.9 Data analysis 42

3.10 Achievement of specific objectives 43

3.11 Measurement of tool 44

3.12 Ethical Considerations 45

CHAPTER FOUR 46

PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS 46

4.1 Introduction 46

4.2 Demographic characteristics of respondents 46

4.2.1 Age of the respondents 46

4.2.2 Level of education 47

4.2.3 Profession of respondents 48

4.2.4 Position of respondents 49

4.2.5 Sex of respondents 49

4.3 Quality management practices of construction of buildings 50

4.3.1 Quality planning practice 50

4.3.2 Quality control practice 52

4.3.3 Quality assurance practice 53

4.4 Extent to which quality management is practiced 55

4.5 Challenges of implementation of quality management 57

4.5.2 Quality control challenges 60

4.5.3 Quality assurance challenge 61

4.6 A framework that can be adopted by the district in quality management 62

4.7 Operation of the developed framework 65

4.7.1 Initiation Phase 65

4.7.2 Planning Phase 65

4.7.3 Implementation stage 66

4.7.4 Closing Phase 67

4.7.5 Role of each stakeholder 67

4.8 Closing the gaps in the quality management process 68

CHAPTER FIVE 70

CONCLUSIONS AND RECOMMENDATIONS 70

5.1 Introduction 70

5.2 Conclusions 70

5.3 Recommendations 71

5.4 Limitations to the Study 72

5.5 Areas for further Research 73

References 74

APPENDICES 87

APPENDIX I: QUESTIONNAIRE FOR CONSTRUCTION FIRMS 87

List of Tables

Table 3. 1: Research population by category and sample size 37

Table 3. 2: Validity Analysis 41

Table 3. 3: Reliability analyses 42

Table 4. 1: Description of respondents by level of education 47

Table 4. 2: Quality planning 51

Table 4. 3: Quality control 52

Table 4. 4: Quality assurance 54

Table 4. 5: Extent to which quality management is practiced 56

Table 4. 6: Quality Planning Challenges 58

Table 4. 7: Quality control challenges 60

Table 4. 8: Quality assurance challenges 61

List of Figures

Figure 1. 1: Map of Kamwenge district 10

Figure 1. 2: A conceptual framework of the study 12

Figure 4. 1: Description of Respondents by Age group 46

Figure 4. 2: Description of Respondents by position 48

Figure 4. 3: Description of position of respondent 49

Figure 4. 4: Sex of respondents 50

Figure 4.5: Developed framework for improving quality management of buildings projects. 64

List of Acronyms

ANOVA	Analysis of Variance
ASQC	American Society for Quality
CAO	Chief Administrative Officer
CIDBM	Construction Industry Development Board of Malaysia
CIOB	Chartered Institute of Building
CQM	Construction Quality Management
CVI	Content Validity of Index
EFQM	European Foundation for Quality Management
GDP	Gross Domestic Product
ISO	International Organization for Standardization
PMBOK	Project Management Body of Knowledge
QA	Quality Assurance
QMS	Quality Management System
QS	Quantity Survey
RII	Relative Importance index
SPSS	Statistical Package for Social Sciences
TQM	Total Quality Management
UBOS	Uganda Bureau of statistics

Abstract

Generally, local firms always strive to gain competitive edge in building projects based on Total Quality Management initiatives that are customer centered in nature. The study focused on assessment of quality management practices in building construction firms in Uganda particularly Kamwenge District. The quality of buildings has continued to deteriorate evidenced by the fact that a number of buildings are collapsing in the country. Simple random sampling and purposive sampling were used to select respondents and 54 questionnaires were administered to building construction firms and district local government targeting mostly contractor's staff and local government officials. Data were analysed using relative importance index to determine the significant factors affecting quality of building projects in the study area. The study revealed that there was significant relationship between quality management practices and quality of buildings projects in Kamwenge District. The biggest challenge in implementation of quality management practices was lack of a quality assurance team to lead the process in construction firms. The framework developed to address a coordination gap between stakeholders. The study concluded that third party certification and testing materials before actual implementation are critical factors affecting quality of construction projects. It was recommended that every construction firm should test materials before actual implementation of building project and recruit skilled workers to construct quality projects.

Key words: Quality management, Quality planning, quality control and quality assurance

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The concept of quality management is to ensure efforts to achieve the required level of quality for a product which is well planned and organized. From the perspective of a construction company, quality management in construction projects should mean maintaining the quality of construction works at the required standard so as to obtain customers' satisfaction that would bring long term competitiveness and business survival for the companies (Tan & Abdul-Rahman, 2005). Construction industry has been widely criticized for delivery of its low-quality construction projects (Hoonakker et al., 2010). Ashokkumar (2014) pointed out that the construction firms need to adopt quality management in order to solve quality problems and meet the demands of the clients.

Hashmi (2010) defines total quality management as a management viewpoint that encompasses all functions of an entity like human resources, operations and marketing in order to focus on meeting customer needs and firm's objectives. Quality management is used as construction industry that is all encompassing and embedded in the phenomenon itself and are concepts such as quality control, quality planning, quality assurance and quality improvement (Olatunji *et. al.*, 2012).

Globally, Wasiu *et. al.*, (2012) postulated that building construction sector is considered to be a basic sector on which the development of a country depends. Bell and Omachonu (2011) revealed that quality of global firms in building projects is

driven by practices adopted. Olepein (2015) also added that Total Quality Management culture has contributed to increased productivity of firms around the world. Global, international, regional and local firms always strive to gain competitive edge in building projects based on TQM initiatives that are customer centric in nature.

In Africa, Melcom Shopping Mall collapsed on Achimota road in Ghana, this was attributed to lack of supervision and poor concrete mix in construction process (Myjoyonline, 2012). Myjoyonline (2012) still narrated that six-storey Melcom building collapsed because of inferior quality of materials used in construction process.Fernandez (2014) pointed out that the collapse of buildings in Africa have been attributed to weak foundations, substandard constructional materials, poor material mixing by construction workers, excessive load on strength of buildings, and poor testing of building strength.

In East Africa, Muhumuza (2013) remarked that collapsed buildings are a growing problem where many buildings in the region's major cities are under construction or renovation. Fernandez (2014) pointed out that Kenya has probably suffered the most building collapses in the last decade. In one of those instances, Wachira (2015) remarked that although the developer was served with a stoppage order due to violation of construction regulation and huge cracks that had developed in the said building, work continued and hence the collapse. Kuta and Nyaanga (2014) revealed that most collapsed buildings were constructed with low-quality building materials and incompetent craftsmen and that there was a lack of political will to enforce existing building codes.

In Uganda, Alinaitwe (2008) postulated that building construction employs 1.3% of the total registered employees. According to Uganda's Ministry of Finance (2005), the construction industry was contributing 12% of the GDP by 2005. Despite this contribution, there has been reported a case of irregularity in the quality of buildings whereby a storeyed building collapsed in the city suburb of Kansanga, and the causes were poor materials and inexperienced engineers (New vision, 2014). In Kamwenge District, children were ordered to vacate a 3-classroom block due to severe cracks in the walls and the floor (Auditor general report, 2016). This, therefore, prompted the Government to shift the contracts to design-build with the notion that the contractor will do more testing to improve on the quality of designs and save construction costs (Mutikanga, 2017).

1.2 Theoretical background

The study was guided by "*stakeholder theory*" which was propounded by Freeman (1984). According to Freeman (1984), a stakeholder is "any group or individual who can affect or is affected by the achievement of the organization's objectives". Richard Edward Freeman advanced the theory in 1984 contained in his book of strategic management as a theory of structural management and business ethics.

The theory states that the organization itself should be thought of as a grouping of stakeholders and the purpose of the project should be to manage their interests, needs and viewpoints. This grouping of stakeholder calls for improving quality in construction industry hence pooling all interests and opinions in ascertaining quality in buildings. The theory defines stakeholders as those groups, individuals or

organizations who can affect and be affected by the actions associated to value creation and trade (Freeman et. al., 2010). This theory assumes that if a unit of analysis is adopted in the relationships between a business and the groups or individuals who can affect or be affected by a project for instance buildings in Kamwenge district is affecting the natives because of the life span and defects occurring such as peelings and cracks.

In this study, the theory is relevant since it advocates for quality management of buildings of all stakeholders. The theory further asserts that stakeholders who have more attributes (that is power, legitimacy and urgency) and higher levels of the attributes would be more salient than those with fewer and lower levels of these attributes (White, 2009). In the same context, stakeholders who have the power and influence have higher chances and capacity to use government systems in improving the quality management of construction buildings.

The stakeholders can take part of the information sharing role to report any defects so that immediate action can be taken by government agencies to halt any forms of breakdown which if not undertaken stake of buildings in Kamwenge district may be alarming hence increasing the risks of breakdowns.

1.3 Conceptual background

According to Hashmi (2010), Quality management is a management viewpoint that encompasses all functions of an entity like human resources, operations and marketing in order to focus on meeting customer needs and firms to realise organizational

objectives. Quality management is used as the construction industry that is all encompassing and embedded in the phenomenon itself and are concepts such as quality control, quality planning, quality assurance and quality improvement (Olatunji et. al., 2012).

1.4 Statement of the problem

Building construction firms in Uganda implement ISO 9001 Quality Management System and obtain consequent approvals, rewards and certificates. The standard is based on a number of quality management principles including a strong customer focus, the motivation and suggestion of top management, the process approach and continual improvement and using US ISO 9001:2015 helps to ensure that customers get consistent, good quality products and services, which in turn brings many business benefits. The design and implementation of building construction's quality management system is influenced by varying prices of inputs for instance, there was highest 25.8 percent increase in average prices of inputs in the overall construction sector registered in 2011, followed by an increase of 11.4 percent in 2009 and the lowest increases in average prices for the whole sector was 2.2 percent which was registered in 2013 (UBOS, 2014).

Despite the standard set by 1SO 9001, the quality of buildings has continued to deteriorate evidenced by the fact that buildings are collapsing in the country and are not using the standards as set by ISO 9001 for example New vision (2016) reported that a six-storey building at Makerere Hill collapsed in Kampala estimated at 9 billion and over five people were reported dead. Also storeyed building collapsed in the city

suburb of Kansanga estimated at 15 billion and twelve people were reported dead, and many others survived with severe injuries, the causes were due to poor quality materials, inexperienced engineers and failure to adhere to agreed standards as per contract documents. Kamwenge District is not exception, children were ordered to vacate a 3-classroom block recently constructed due to severe cracks in the walls and the floor (Auditor general report, 2016). Also, in Kamwenge a hotel which was under construction on the shores of lake George collapsed due to settlement mainly because the ISO standards were not followed.

The said reports clearly demonstrate that the quality of building projects by many building firms is only on paper work and it is against this background that this study sought to assess the quality management practices of building construction firms in Uganda particularly Kamwenge District in order to prevent loss of lives and money.

1.5 Objectives of the study

1.5.1 Main objective

The main objective of the study was to assess the quality management practices of building construction firms in Uganda.

1.5.2 Specific Objectives

i. To determine the current quality management practices in building construction firms in Uganda.
ii. To determine the extent to which quality management is practiced in building construction firms in Uganda.

iii. To establish the challenges in implementation of quality management practices in building construction firms in Uganda.

iv. To develop a framework for effective quality management practices in building construction firms in Uganda.

1.6 Research Questions

i. What are the current quality management practices in building construction firms in Uganda?

ii. What is the extent to which quality management is being practiced in building construction firms in Uganda?

iii. What are the challenges in implementation of quality management practices in building construction firms in Uganda?

iv. What can be done to implement effective quality management practices in building construction firms in Uganda?

1.7 Justification of study

The study was to assess the quality plan, quality control and quality assurance of buildings that collapse year and after year because of poor designs, use of poor materials and inexperienced engineers. A framework was developed to address these challenges and if the study was not done, more lives would be claimed out of collapsing buildings, thus causing financial losses to government, individual developers as well as hindering the economic growth of the country.

1.8 Significance of study

This study was of value to building contractors who wish to know the impact of an effective quality management practice with particular focus on quality planning, quality control, quality assurance and developed framework that would have an effect on their deliveries.

It also revealed how quality management was used in Ugandan construction industry and identifying loop holes that hamper economic development. The study was a requirement by the researcher for award of a Degree of Master of Science in construction technology and management of Kyambogo University. The study added knowledge to the academicians who used the study for academic purposes.

The study led to economic development of the country since engineers, architecture and contactors used the findings to understand the dynamics in quality management and improve on the quality of building projects.

1.9 Scope of the study

1.9.1 Content scope

The study focused on quality management practices as the independent variables and quality of building projects as the dependent variable. The independent variables is limited to three dimensions which include; quality planning, quality control and quality assurance while the dependent variable was also limited to performance indicators that include time lines and cost.

1.9.2 Geographic Scope

The study was carried out within Kamwenge district. The choice of the location was based on two main factors: **i**) the current rural construction projects that have either been completed or are under construction that have a complete team of various stakeholders that are responsible for quality management that was useful to the study and **ii**) most of construction projects were being financed by world vision, save the children, world bank, UNCHR and School facilities grant coupled with the high level of investments in them; the developers were under pressure to complete on time and within budget so as to put them to use immediately.

Kamwenge district lies in western Uganda. It is bordered by Kasese district in the west, Kabarole in the northwest and extreme north, Kyenjojo and Kyegegwa in north and north east, Kiruhura in the east, Ibanda in the east and south east and Rubirizi in south west. It is located approximately 305 Km from Kampala by road.

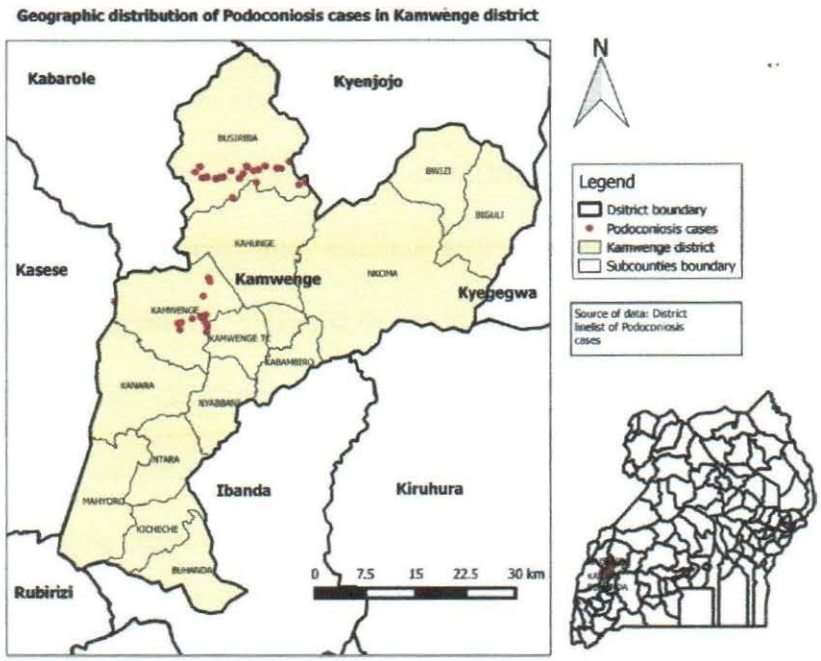

Figure 1. 1: Map of Kamwenge district

1.9.3 Time Scope

To effectively capture data relating to quality management practices, the study took one year from August 2018 to August 2019. This is the period that data was collected, analysed, interpreted and findings presented and submitted to Kyambogo University Graduate School for further examination.

1.9.4 Financial scope

This study costed 8,550,000 Uganda shillings in purchasing stationary, transport, purchasing online journals, data collection and printing.

1.10 Conceptual Frame work

A conceptual framework was developed to postulate the linkage between the independent variables and the dependent variable. The independent variables were quality management practices that have three dimensions which include; quality management practices and challenges in implementation of quality practices management practices while the dependent variable which is quality of buildings has dimensions like timeliness and cost. The conceptual framework also shows the moderating variables which may directly and or indirectly have an influence on quality of building by construction projects by construction firms in Kamwenge district.

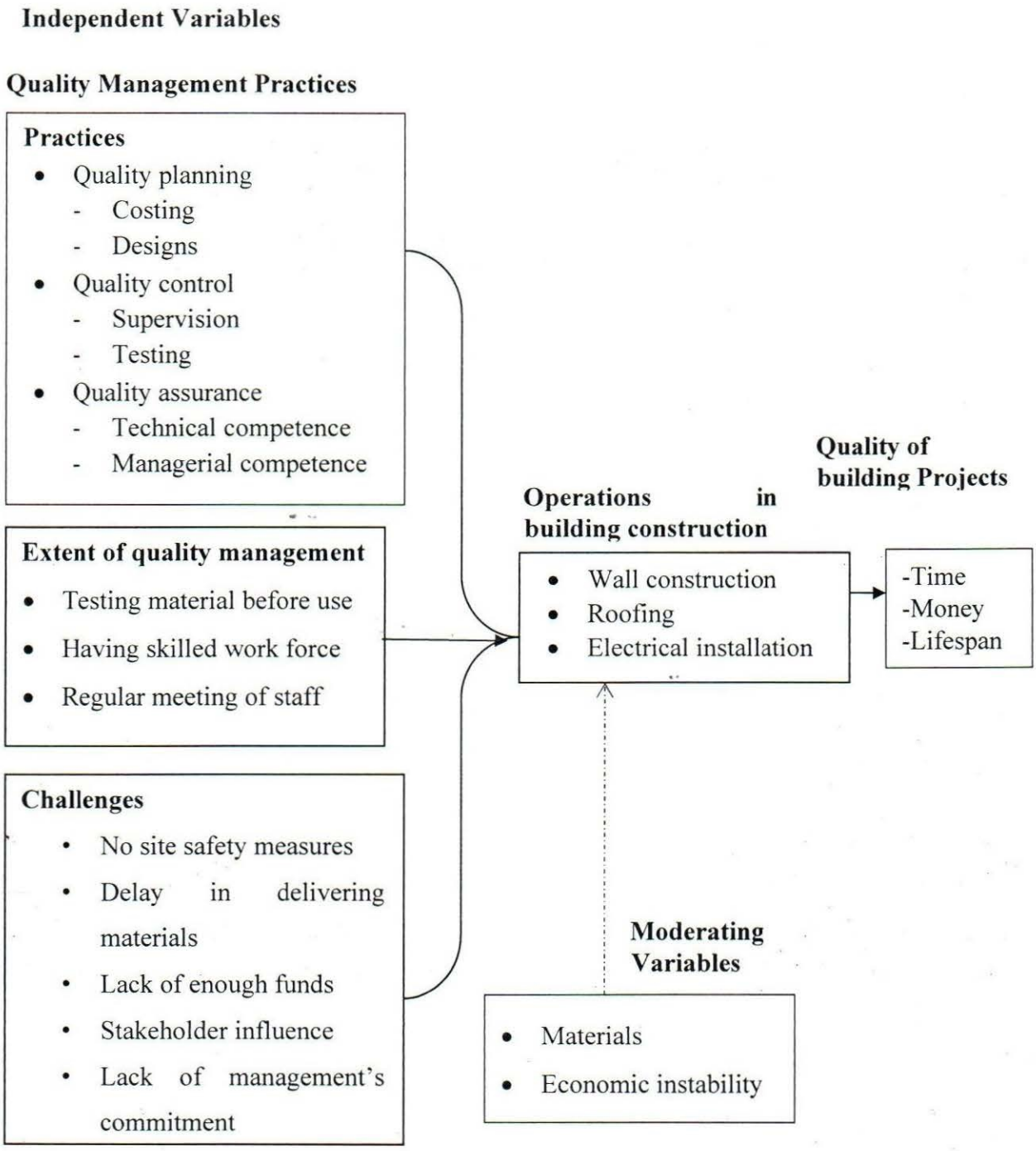

Figure 1. 2: A conceptual framework of the study

1.11 Chapter summary

The chapter constituted of background of the study that describes the quality management practise from global to local perspective, the problem statement that identifies the gap in the study, the specific objectives that guided the study, justification of the study describes the need and urgency of the study in Kamwenge district, conceptual framework that shows the interaction of stakeholder involvement quality management practices and status of building constructions, the study will take a duration of 1 year and a framework will be developed to improve the quality management practices of building construction firms. The sub-sequent chapters are; Literature review methodology, presentation and discussion of findings then conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter deals with appreciating of documented data out of the libraries from written text, construction Acts, regulations and guidelines, related literature from researchers, scholars, theories, workshop handouts, journals, newsletters, Centre resource book bank and internet web sites. It was presented under the following subheadings which are relevant to achievement of specific objectives of the study as below:

- Current quality management practices in building construction firms.
- Extent to which quality management is practiced in building construction firms.
- Challenges in implementation of quality management practices in building construction firms.
- A framework for effective quality management practices in building construction firms.

2.2 Theoretical Review

The theory of stakeholders was developed by Freeman (1994). According to McCloskey (1998), the "maximizing shareholder value" view is put forward as a "scientific" theory that is modelled and verified appropriately by ideologists called "economists." On the other hand, Phillips (2003) argued that stakeholder ship involved a theory of organizational management and ethics which was distinct because it addressed morals and values as explicit central features of organizational management.

He also pointed out that: Management of stakeholders involved attention to more than simply maximizing shareholder wealth. Attention to the interests and well-being of those who can assist or hinder the achievements of organization's objectives is the central admonition of the theory. In this way, stakeholder theory is similar in large degree with alternative models of strategic management such as resource dependence theory.

The stakeholder theory has drawn considerable attention and support since its early formulation. Stakeholder theory incorporates the executive power model, which claimed that the purpose of a corporation is the maximization of corporate wealth. However, this intensified the stakeholders acting in their own self-interest, as they support policies that led to the protection of their positions and powers in the company (Kay & Silberston, 1995). Indeed, the executive power model claimed that the purpose of corporation is the maximization of stakeholders' wealth as a whole. However, this involved the absence of stakeholder involvement in the running of the company, giving directors the opportunities to push policies that do not take the needs of the company's stakeholders into consideration (Freeman, 1984).

2.3 Quality management systems in construction projects

If properly implemented, formal quality management systems provide a vehicle for achieving quality. Quality system is "the organizational structure, responsibilities, procedures, processes, and resources for implementing quality management" (Battikha, 2002).On the hand, quality management systems refer to the set of quality activities involved in producing a product, process, or service, and encompasses

prevention and appraisal (Burati et al., 1992). It is "a management discipline concerned with preventing problems from occurring by creating the attitudes and controls that make prevention possible" (Battikha, 2002). Quality activities include the determination of the quality policy, objectives, and responsibilities and implementing them through quality planning, quality control, quality assurance, and quality improvement, within the quality system (Battikha, 2002).

American Society for Quality (2004) stressed that quality management system is a management technique used to communicate to employees what is required to produce the desired quality of products and services and to influence employee actions to complete tasks according to the quality specifications.

Yasamis *et al.*, (2002) quality management system as a set of co-ordinated activities to direct and control an organisation in order to continually improve the effectiveness and efficiency of its performance. These activities interact and are affected by being in the system, so the isolation and study of each one in detail will not necessarily lead to an understanding of the system as a whole. The main thrust of a QMS is in defining the processes, which will result in the production of quality products and services, rather than in detecting defective products or services after they have been produced.

2.3.1 Quality Management Systems in projects as per ISO 9000

The ISO 9000 series of standards consists of ISO 9000, which describes fundamentals of a quality management system and specifies terminologies thereof. ISO 9001 specifies the requirements of a quality management system. ISO 9004, which provides

guidelines that consider the effectiveness and efficiency of the quality management system and finally ISO 19011 that provides guidance on auditing quality and environmental management systems (KBOS, 2006).

ISO 9000 is a set of quality system standards that prescribes good quality practices, without mandating how a company should achieve those practices. ISO 9000 series of standards have become widely accepted for companies aiming to achieve cost effective and quality assurance methods (Nurre, Gunaman & De-almeida, 2000).

ISO 9000 is focused on quality control systems in general addressing the sequence from process to product design and also after sale service. The series also alludes to the notion that specific minimum characteristics of a quality control system can be standardized. The standards do not automatically guarantee good quality of products but of a constant quality. The standards are aimed at quality consistency (Singels, Ruel & Water, 2001).

A company operating within the requirements of the ISO 9000 standards should achieve customer satisfaction as the interactions with customers are improved and reductions in customer complaints are achieved. The standards are supposed to have a positive influence on employees which may lead to an increase in motivation albeit the fact that the standards increase the documentation workload and standardization of procedures which may impede the creative thinking of employees (Singels, Ruel & Water, 2001).

When employees work according to the procedures that are described in the ISO 9000 series, they are able to identify sources of problems in the production process. This enhances the purpose of the ISO 9000 series procedures which are meant to guarantee that the products or services an organization offers are in accordance with customer specifications. With better operational performance, the products or services the organization offers should become more attractive to customers and the firm should have better business performance. Sales and profitability should increase (Singels, Ruel & Water, 2001).

2.3.2 Quality Management Systems in projects as per ISO 9001, 2015

According to (ISO 9001, 2015) the implementation of a QMS implies planning, defining, verifying, and updating processes and procedures. This is defined in the (ISO 9001, 2015) norm as the "plan-do-check-act cycle." It encourages a change of attitude from a reactive to a proactive attitude. Planning and prevention gain ground to replace the daily solving of unexpected urgent problems. Griffith and Watson (2004) pointed out that there are different QMS that construction companies use including investors in People (IIP), ISO 9000, EFQM, custom designed systems and or third-party certifications.

According ISO 9001, 2015) the implementation of a QMS implies planning, defining, verifying, and updating processes and procedures Quality management system is defined as "all activities of the overall management function that determine the quality policy, objectives and responsibilities, and implement them by means such as quality

planning, quality control, quality assurance and quality improvement within the quality system".

To ensure the continuous improvement of QMS, it is essential that the top management give their full support and commitment especially to the development and implementation of construction project/s. This indicates that quality should be managed in ways that are clearly identified, well documented and efficiently planned, implemented and controlled.

A project quality plan is prepared to establish project level quality procedures bringing together the project information and the companies' policies, procedures and inspection routines' (Watson & Howarth, 2012). This concept is practically and theoretically related to all the appropriate parts of the participants in the project activities to quality systems together around the needs of the project activities.

ISO 9001:2015 is the standard that provides a set of standardized requirements for a quality management system, regardless of what the user organization does, its size, or whether it is in the private, or public sector. It is the only standard in the family against which organizations can be certified, although certification is not a compulsory requirement of the standard. Without satisfied customers, an organization is in threat. To keep customers satisfied, the organization needs to meet their requirements. The ISO 9001:2015 standard provides a tried and tested framework for taking a systematic approach to managing the organization's processes so that they consistently turn out with product that satisfies customers' expectations.

The international standard for quality management (ISO 9001, 2015) adopts seven principles that can be used by top management to guide their organizations towards improved performance such as: customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making and relationship management. Since any construction firm and its suppliers are mutually supporting, therefore a mutually beneficial relationship between them increases the ability of both to add value and these seven principles form the basis for the quality management system standard (ISO 9001, 2015).

According to Crawford (2002) the overall aim of quality management is to satisfy the customer, conform to requirements, ensure fitness for purpose, and ensure the product for use. Project model looks at quality management as set of activities or tasks that are required to ensure the project satisfies all the needs for which it was undertaken in the state of work and includes a focus on quality management from the perspective of product, processes, and the people needed to make quality an effective and efficient aspect of successful project completion.

ISO 9001:2008 is based on eight quality management principles namely: customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision making; and mutually beneficial supplier relationships.

Internal integration of a standard, such as ISO 9001, means designing and developing new systems to conform to the standard based on an analysis of a company's existing

internal processes. It requires integrating the standard with practices already in place. When a new practice such as ISO 9000 is introduced, the organization must find a fit between the ISO 9000 rules and its old ways of operating (Hongyi, 2000).

Bell and Omachonu (2011) observed that, a standard such as ISO 9001 must be customized to the company's needs, an activity best led by employees trained and nurtured in the company, as opposed to one led by outside consultants. Implementation is not enough, however, for a quality system such as ISO 9000 to have a long-term effect on an organizations performance.

2.3.3 Quality Management System in Project as per ISO 10006:2017

ISO 10006 (2017) gives guidelines for the application of quality management in projects. It is applicable to organizations working on projects of varying complexity, small or large, of short or long duration, being an individual project to being part of a programme or portfolio of projects, in different environments, and irrespective of the kind of product/service or process involved, with the intention of satisfying project interested parties by introducing quality management in projects. This can dictate some tailoring of the guidance to suit a particular project. ISO 10006 (2017) is not a guide to project management itself. Guidance on quality in project management processes is presented in it. Guidance on project management and related processes is covered in ISO 21500.

ISO 10006 (2017) addresses the concepts of both "quality management in projects" and quality management systems in projects". These are distinguished by being

addressed separately by the following topics and clauses:-Quality management in projects includes: quality management systems in projects (Clause 4); management responsibility in projects (Clause 5); resource management in projects (Clause 6); product/service realization in projects(Clause 7); and measurement, analysis and improvement in projects (Clause 8); However, Quality management systems in projects includes: project characteristics (4.1); quality management principles in projects (4.2); project quality management processes (4.3) and a quality plan for the project (4.4).

2.4 Quality Planning and quality of construction projects

Harris and Mc Caffer, (2001) defined quality planning as a set of activities whose purpose is to define quality system policies, objectives, and requirements, and to explain how these policies will be applied, how these objectives will be achieved, and how these requirements will be met. Subsequent to this definition, Construx, (2003) stressed that quality plan is different from a test plan.

Project Management Book of Knowledge (2009) also addressed quality planning from a different position to enhance the thoughts earlier expressed. It said that quality planning has a process input generated by predecessor processes referred to as the Project Scope Statement and Project Management Plan. These processes are introduced by external units like Enterprise Environmental Factors and Organizational Process Assets.

Planning is the process of setting goals, designing strategies, outlining tasks and schedules to accomplish the goals (Cooke & Williams, 2005). According to Forum (June, 2003) that was held in Vancouver Canada, quality planning can be assessed through several stages in building construction sector and these include:

i) **Design stage:** This contains a lot of steps: programming and feasibility, schematic design, design development, and contract documents. It is the responsibility of the design team to ensure that the design meets all building codes and regulations. It is during the design stage that the bidding process takes place.

ii) **Pre-construction stage**: It begins when the owner gives a notice to proceed to the contractor that they have chosen through the bidding process. A notice to proceed is when the owner gives permission to the contractor to begin their work on the project. The first step is to assign the project team which includes the project manager, contract administrator, superintendent, and field engineer.

iii) **The procurement stage**: Is when labour, materials and equipment needed to complete the project are purchased. This can be done by the general contractor if the company does all their own construction work. If the contractor does not do their own work, they obtain it through subcontractors. Subcontractors are contractors who specialize in one particular aspect of the construction work such as concrete, welding, glass, or carpentry. Subcontractors are hired the same way a general contractor would be, which is through the bidding process. Purchase orders are also part of the procurement stage.

iv) **The construction stage**: This begins with a pre-construction meeting brought together by the superintendent. The pre-construction meeting is meant to make decisions dealing with work hours, material storage, quality control, and site access. The next step is to move everything onto the construction site and set it all up. At this stage, construction monitoring and supervision is of great importance to ensure that a project is completed on time and on budget, while meeting all relevant regulations and quality standards. Construx (2003) stressed that quality plan is different from a test plan. Quality plan defines the quality goals, it is realistic about where defects come from, It selects appropriate detection and prevention methods, and has means not to "go dark".

According to Nyomek (2010), the guidelines to ensure the quality in planning are; Establish and define the purpose of the quality system, Ensure that all relevant parties involved including consultants, subcontractors and suppliers are included in the task of quality planning for the project, in the plan, minimize the effort required to amend copies of documents, Set up a quality system development team so that the team can produce an effective plan and ensure that throughout the quality planning task constantly focused on the customer requirements.

2.5 Quality assurance and quality of construction projects

Harris and McCaffer (2001) defined quality assurance as a set of activities with the purpose to demonstrate that an entity meets all quality requirements. Quality assurance activities are carried out in order to inspire the confidence of both customers and managers, confidence that all quality requirements are being met.

Harris and McCaffer (2001) continued that quality assurance emphasizes defect prevention, unlike quality control that focuses on defect detection once the item is produced or constructed.

In recent years, increasing concern has been expressed at the standards of performance and quality achieved in building works. The need for structured and formal systems of construction management to address the aspect of performance, workmanship and quality has arisen as a direct result of deficiencies and problems in design, construction, materials and components. Many of the problems experienced in building appear as a range of inadequacies from minor technical and aesthetic aspects to major building defects. Irrespective of their degree of severity, such problems are known to cost the industry so much annually, yet, many difficulties might be alleviated through greater care and attention to standards of performance and quality at the briefing, design and construction stages of the building process (Griffith, 1990). If buildings are to be trouble-free, more attention needs to be given to applying quality assurance principles to design and site-work, including project selection and specification, and to supervision of the handling and protection on site (Atkinson, 2005).

The purpose of quality assurance is to demonstrate whether an entity meets all quality requirements. Quality Assurance activities are carried out in order to inspire the confidence of both customers and managers, confidence that all quality requirements are being met. Khan et al., (2008) noted that quality requirements should be clear and verifiable so that all parties in the project can understand them for conformance. Harris

and McCaffer, (2001) continued that QA emphasizes defect prevention, unlike quality control that focuses on defect detection once the item is produced or constructed. Khan et al., (2008) further established that quality assurance concentrates on the production or construction management methods and procedural approaches to ensure that quality is built into the production system.

2.6 Quality Control and quality of construction projects

ISO 9001 (2008) explains 'quality control' as a process through which a business seeks to ensure that product quality is maintained or improved and manufacturing errors are reduced or eliminated. Quality control requires the business to create an environment in which both management and employees strive for perfection. This is done by training personnel, creating benchmarks for product quality, and testing products to check for statistically significant variations. A major aspect of quality control is the establishment of well-defined controls. These controls help standardize both production and reactions to quality issues. Limiting room for error by specifying which production activities are to be completed by which personnel, reduces the chance that employees will be involved in tasks for which they do not have adequate training.

Hernad and Gaya (2013) stated that, quality control is the process of evaluating whether construction projects adhere to specific standards. The main objective of quality control is safety. Additionally, quality control is also meant to ensure that buildings are reliable and sustainable. Harris and McCaffer (2001) defined quality control as a set of activities or techniques whose purpose is to ensure that all quality

requirements are being met. In order to achieve this purpose, processes are monitored and performance problem are solved.

In other words, according to Scatterfield (2005), quality control is critically important to a successful construction project and should be adhered to throughout a project from inception and design to construction and installation. Inspection during construction will prevent costly repairs after the project is completed. The inspector, engineer, contractor, funding agency, permit agency, and system personnel must work together to inspect, document, and correct deficiencies.

According to Linderman et. al., (2004) postulated that quality control of construction production factors was divided as; The contents of human control includes the overall quality of organization and individual's knowledge, ability, physical condition, psychological state, quality consciousness, behavior, concept of organizational discipline, and professional ethics. Materials (including raw materials, finished products, semi-finished products, components and parts) are material conditions of construction, and material quality is one of necessary conditions to ensure construction quality.

According to Chitkara (2005), the relationship between time and cost in determining quality control is a very important aspect on site as any variation in time has automatic implication on cost. It is important to report and record all the works involving materials, plant and labour on sites. This enables the contractor be able to know the

costs and expenses of the resources used on site and compare with the initial cost budget.

Quality control according to Sirbadhoo et. al., (2010) is concerned with monitoring results to determine if they comply with relevant quality standard and identifying ways to eliminate causes of unsatisfactory performance. It focuses on measuring correction and should be performed throughout the project lifecycle. Agbenyega (2014) stated that quality control verifies that a project is built to plan and the allowable tolerance by the industry standard and engineering practices are met or bettered and that the finished project met with the quality standards. Quality Management Systems (2013) stated that, quality control is the process of evaluating whether construction projects adhere to specific standards.

2.7 Purpose of Quality Management in the Construction Industry

The U.S. Army Corps of Engineers (2004) states that card quality management is the performance of tasks, which ensure that construction of projects, is performed according to plans and specifications, on time, within a defined budget, and a safe work environment. For a construction project, quality begins with requirements carefully developed, reviewed for adherence to existing guidance and ultimately reflected in criteria and design documents which accurately address these needs. Therefore, the designer establishes the quality standards and the contractor in building to the quality standards in the plans and specifications, controls the quality of the work. The purpose of card quality management is the government's efforts, separate from, but in coordination and cooperation with the contractor, assure that the quality set by

the plans and specifications is achieved. Card quality management is the combined effort of the contractor and the Government. The contractor has primary responsibility for producing construction projects through compliance with plans, specifications, and accepted standards of the industry.

2.8 Factors affecting project time delay and cost overruns

The most important factors leading to time delays and cost/budget overruns are poor contract management, finance and payment problems, shortages of materials and changes in site conditions (Meng 2012). Moreover, Kaming et. al., (1997) reported that the most principal aspects leading to project time delays are inadequate planning, shortage of resources, poor labour productivity and design changes, while cost overrun is generally attributable to inaccurate material estimation, material cost increases and complexity of project. In addition, Budget overrun and time delay occur due to poor contractor management, payment difficulties, material shortages, escalation of material prices and poor technical ability (Frimpong et. al., 2003).

The reasons which maximize project budget could be the same reason which causes the project time delay (Chang, 2002). Delaying the time of construction automatically increases the construction cost of the project, due to their inherent link. For example, when the project is delayed, the organization generally must continue to pay salaries for construction teams.

Chartered Institute of Building carried out a survey and found that the UK complex construction projects are most probably to be completed within more half a year late

(CIOB, 2008). Regarding to the 332 the United States Air Force funded construction projects, it was out found that almost 72 percent of those construction projects were overdue within the quantified time of the project (Hoffman *et. al.*, 2007).

2.9 Critical success factors for quality management

The CSFs for the project success are different from the CSFs for the quality system implementation depending on the nature of study. Previous studies mainly focused on the CSF for the project success. For instance, Lam et. al., (2007) identified eleven CSFs for the design and build-based project success i.e. time, cost, quality, functionality, low accident rate, minimal claims and disputes, environmental consciousness, aesthetic purpose, learning value, expectations of project participants and professional image.

Haupt and Whiteman (2004) identified nine CSFs for implementing TQM on construction sites which included; top management commitment, top management involvement, primary customer focus, well developed planning, participative management style, continuous improvement measurements and rewards for TQM contributions.

Quality in the construction industry is meeting the customer's expectation (Jha & Iyer, 2006), for that reason, the success of QMS should be measured at project level rather than company level. According to Barrett (2000), quality implementation in the construction industry can be categorized into two levels: company-based quality system and project-based quality system. Implementation of Power Quality

Management System at project level is challenging. In the past two decades, quality level of the construction industry is claimed still poor despite the introduction of various new technologies and management system (Sullivan, 2010).

In Malaysia, the CIDBM has circulated a circular Bil.2/2006 to put a mandatory requirement for Grade 7 contractors, which is the highest level of contractor's registration to obtain ISO 9001 certification before 1st January 2009. Failure to do so will cause their registration be relegated or terminated. Besides, CIDBM also had taken a positive step by introducing a scheme namely Do-It-Yourself scheme to all the contractors in Malaysia with the aims to facilitate the contractors to obtain ISO 9001. Introduction of DIY scheme successfully increased the numbers of contractors certified with ISO 9001. In year 2006, total of 375 contractors were certified with ISO 9001 (CIDB, 2007) and additional total of 180 contractors were certified in year 2009 (CIDB, 2009).

Kaming et. al., (2013) identified cost overrun instigators on construction projects executed in Britain as unpredictable weather, high material cost, inaccurate project cost, and project complexity, contractor's lack of experience in conventional project cost, government regulation and time management. Bowen and Chimwaso (2011) conducted a research on perception of time, cost and quality management on building projects in South Africa. The study used stratified random survey. Surveyed participants comprised of architects, engineers, quantity surveyors, construction managers, builders, and project managers using membership directory of South Africa. The study found out among other things that, on residential projects, sampled

cost overrun was recorded with averagely $20,000,000 per project and time overrun to the range of 2 to 3 years project duration.

Koushki et. al., (2005) carried out a research in Saudi Arabia, measuring performance of construction projects in Saudi Arabia. The study identified 42 performance indicators, with the aid of comprehensive literature profiling. The study used random sampling technique to identify the samples, the study presented 10 key performance indicators that could be used to measure the performance of a project. According to the study, traditional financial measure is no longer the sole determinant of project performance, but there are a number of other factors that affect project cost and time performance. Some of the factors articulated include: customer satisfaction, business efficiency and planning effectiveness among others.

Similarly, in Singapore and Korea, developing countries, Lee and Kim (2013) conducted a research on projects executed by Korean construction firms, in a bid to establish performance of the firms on the construction projects executed. The study adopted random sampling technique and survey in picking samples and in conducting the research. The study identified key performance in terms of cost and time of construction projects completed by Korean construction firms, the study submitted that the construction projects met the cost and time requirements, also fulfilled customers need meeting the cost and time delivery target.

Gohari et. al., (2013) studied relationship among reward, employee performance and cost-time performance on construction project. The study sampled 77 employees in

Malaysian construction companies. It was noted that the extent of relationship between employee and reward, according to the study, has tendency to impart company's delivery, which was proved in the study. Also, the study used backward multiple regression technique in the data analysis. The results highlighted that, there is direct relationship between project cost and time performance and company's reward type's vis-à-vis positive relationship with employees.

In African countries like Ghana, Frimpong and Kofi (2003) conducted a research on factors that contribute to time and cost overrun on selected Ghana construction projects. The study came up with 26 factors. Some of the main factors identified include: monthly payment difficulties, poor contract management, material procurement difficulties, poor technical performance of machine and equipment on project, escalated cost of procuring human resources and materials among others.

There are four separate dimensions of CSFs in project success (Sadeh et. al., 2000). The first dimension is meeting design's goals (contract that was signed with the client). The second dimension is the benefit to the end users (benefit to the customers from the project end products). The third dimension is benefit to the developing organization (benefit gained by the developing organization as a result of executing the project). The last dimension is the benefit to the national technological infrastructure, as well as to the technological infrastructure of the firm that was engaged in the development process. The success criteria for a construction project is not only the cost, time and quality as a success factors but also including the successful

project management, organizational success and the customer satisfaction (Siguroursan, 2009).

Another perspective was stated by Salleh (2009) whereby the importance of organizational planning effort, project manger's commitment and safety precaution in order to complete the construction project complete by meeting cost, meeting on time, follow the schedule accurately and meeting the quality needed to ensure the project success. Reviewing of the relevant literature suggests that different criteria were hypothesized by different researchers (Chan, 2002).

2.10 Stakeholder framework and building construction

Harold (2010) argues that stakeholder involvement in building construction involves determining how to plan, developing the scope statement, selecting the planning team, identifying deliverables and creating the work breakdown structure, identifying the activities needed to complete those deliverables and networking the activities in their logical sequence, estimating the resource requirements for the activities, estimating time and cost for activities, developing the schedule and developing the budget.

Chinyio and Olomolaiye (2010) stated that stakeholders can affect an organization's functioning, goals, development and even survival. Successful engagement of stakeholders involves actively giving and getting their support and working together to devise, plan and develop new construction designs (Persson & Olander, 2004). Senior leaders in construction projects can adopt stakeholder engagement as an opportunity to influence other organizations and create alignment to structures and

processes to support the vision and mission of timeliness, quality, durability and minimizing costs (Quinn and Dalton, 2009).

2.11 Knowledge Gap

From the a foregoing review, there exist past studies on quality management practices on building construction firms but most studies focus on developed countries forexample Chin-Keng (2011) investigated quality management in construction projects in Malaysia, other studies were in Middle East countries by Baker et al. (2011) on total quality management practices in large construction companies in oman, in West African countries Abduralum, Abdulsalam and Zabairu (2016) assessed the quality management practices of building construction firms in Abuja, Nigeria and Olugboyega (2018) studied quality management practices among construction firms in Lagos state, in East African countries Siyad (2018) investigated total quality management practices and performance of manufacturing firms in Kenya. In Uganda, Otim et. al., (2012) studied the causes and impact of uncompleted buildings in Kampala City and no any study has been undertaken in Kamwenge, this prompted the research to focus on quality management practices on building construction firms in Uganda specifically Kamwenge district.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents methodology used to achieve study objectives and this included; research design, study area, study population, sample size and selection, sampling techniques and its procedures, data collection methods, data collection instruments, data management and analysis and measurement of variables.

3.2 Research Design

Bell (2010) defines a research design as the overall plan or strategy for conducting research. It is a master plan specifying the methods and procedure for collecting, analyzing and interpreting the data in order to get the desirable information.

The study adopted descriptive research design because it aims at accurately and systematically describing a population or phenomenon. The descriptive research is conclusive in nature and, it is concerned with the characteristics of the persons as well as the characteristics of the whole of the sample of the latter. The descriptive research gathers information quantifiable which can be in the form of tables along a continuum in digital form for the statistical inference on the target audience who help to reveal and to measure the strength of the opinion, the attitude or the behavior of a target group compared to a given subject. This information could then be studied at the nominal value, the measurement of trends over time, or for more advanced analysis of data such as drawing correlations, the segmentation, the comparative analysis and other statistical techniques.

In this study, descriptive design was used to describe characteristics of respondents and quantifiable data was collected using questionnaires. The quantitative data helped in drawing conclusions after regression of variables.

3.3 Study target Population

Population refers to an entire group of persons or elements which the targeted study population took (Valencia-GO, 2015). The study was conducted in Kamwenge district and target population that was covered were 10 local government officials in engineering and procurement departments and 50 employees of construction firms prequalified with Kamwenge District.

3.4 Sample Size and selection

A sample of 54 respondents was determined by Krejcie and Morgan (1970) table because the sample was from a known population. The objective was to allow for a representative sample, avoid bias and reduce sampling errors.

Table 3. 1: Research population by category and sample size

Category	Target population	Real people	Percent	Sampling Technique
Local government officials	10	10	100	Purposive sampling
Contractors staff	50	44	88	Simple random sampling
TOTAL	**60**	**54**		

Source: *Krejcie and Morgan tables (1970)*

3.5 Sampling Technique and procedure

3.5.1 Simple random sampling

Simple random sampling was used to select study sites and respondents whose categories is engineers' sites were listed on tags, and then the tags placed in a container and was well stirred. A tag was then drawn from the container and the process was repeated until the required number of tags is obtained. Simple random sampling was used because it is time saving and gives all the respondents equal chances of participating in the study. Dudovskiy (2017) states that the logic behind simples random sampling is that it removes bias from the selected procedure and result in representative samples.

3.5.2 Purposive sampling

The study made use of purposive sampling also known as judgmental or subjective. It is a non-probability sampling technique because it enables the researcher to use as many objectives with required information in regard to the objectives of the study (Creswell, 2013). In this study, the technique was used to select district engineers, contractors and staff in procurement department since they are specific and known in the district key informant interviews and they are assumed to be having detailed information about the study.

3.6 Sources of Data

The study used multiple sources of data because of the added benefits (such as the validity of the data gathered) associated with multiple sources fieldwork (primary data collection) and desk study (secondary data collection). The approach for collecting data in this study was divided into two main parts desk survey and field survey.

3.6.1 Desk Survey

The desk survey forms an essential aspect of the research since it sets the pace for the development of field survey instruments using questionnaires, and interview. Secondary sources of information were identified and collected in books, articles, technical journals and from databases. The secondary source of information for this research was collected from two sources; mainly internal and external sources.

3.6.1.1 Internal Secondary Sources

These are published within companies or organisations, such as annual reports, information booklets, brochures, magazines, financial information memoranda, financial reports, plant and equipment registers. This type of internal secondary source of information for the research was collected from the selected prequalified construction firms.

3.6.1.2 External Secondary Sources

External secondary source of data gathering is regarded as a primary literature source. Accordingly, it is the most accurate source of information as it contains the original research. Alternative sources of external secondary sources of information included textbooks, technical journals, newspapers, magazines and internet sources.

3.6.2 Field Survey: Primary Data Source

The study collected data using survey approach; a survey is used to collect original data for describing a population too large to observe directly. A survey obtains information from a sample of people by means of self-report, that is, the people

respond to a series of questions posed by the investigator. The researcher used surveys for relatively large number of respondents within a limited time frame.

3.6.3 Descriptive survey

The descriptive survey was selected because it provides an accurate portrayal or account of the characteristics, for example behaviour, opinions, abilities, and knowledge of a particular individual, situation or group. This design was chosen to meet the objectives of the study, namely to determine whether Ugandan contractors are committed to quality management practices, determine the extent of quality management practices and challenges encountered by contractors while implementing quality management during the execution of construction projects and finally to develop a framework for effective quality management practices in building construction firms.

3.7 Data collection instruments

Questionnaire survey is the collection of data using questionnaires. The research based on the fact that data were collected from a smaller representative set of the population to infer it on the entire population. Questionnaire surveys are known as one of the methods of data collection because it is less expensive to use as they focus on a sample rather than the entire elements of subjects (population) and could attract higher response rate (Amin 2005). Data from Kamwenge district was then gathered using self-administered questionnaires for data collection with close–ended questions whereby respondents got a chance to tick appropriately, the questionnaires were self-administered to local government officials and employees of the construction firms.

3.8 Pre-testing

3.8.1 Validity

The interview instrument was pre-tested on ten respondents selected from Kamwenge District. The ten employees were not part of the sample that was contacted during the study. The instrument was regarded valid basing on the respondents' advice and then the content validity index was determined using CVI formula (Equation 3.1) and the value should be above 0.7 (70%).

$$CVI = \frac{n}{N} \quad \text{.....Equation (3.1)}$$

Where: CVI= content validity of index,

n= Number of items indicated relevant,

N= Total number of items in the questionnaire.

Table 3. 2: Validity Analysis

S/No	Variable	Number of items	Number of valid items	CVI	Remark
1	Quality management practices	3	3	1	Accepted
2	Extent of quality management practices	4	3	0.75	Accepted
3	Challenges in implementing quality	7	6	0.86	Accepted

Source: Primary Source

The scales for the variables were reliable because all scales had a validity coefficient greater than 0.7. Basing on the rule of research, the research aimed at data CVI of at least 0.7 in accordance with Amin (2005).

3.8.2 Reliability

Reliability of an instrument is the degree to which it measures consistently whatever it measures. If a test is reliable then a greater weight can be put on the score of an individual (Torrington, 2002). The questionnaire was subjected to 10 respondents in Kamwenge District to measure the level of reliability. Data were entered and analysed in SPPS version 25 and reliability results obtained, then the instrument was considered reliable, dependable and yielded good results from the Table 3.3.

Table 3. 3: Reliability analyses

S/No	Quality management practice	Chrocbach's Alpha coefficient	Remark
1	Quality management practices	0.834	Accepted
2	Extent of quality management practices	0.812	Accepted
3	Challenges in implementing quality	0.789	Accepted

Source: Primary source

3.9 Data analysis

The filled questionnaires were collected, checked for accuracy, consistency and completeness before leaving the field. Raw data was entered into Statistical Package for Social Scientists (SPSS-version 25) and analyzed statistically. The contribution of

each of the factors to overall delays was examined and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of Relative Importance Index (RII) which was computed, the five-point likert scale ranged from 1 to 5 that was adopted and transformed to relative importance indices (RII) for each factor using equation (3.2);

$$RII = \frac{\sum W}{A \times N} \quad (0 \leq RII \leq 1) \quad \text{.....Equation (3.2)}$$

Where;

W= weighting given to each factor by the respondents (ranging from 1 to 5),

A = highest weight (5 in this case)

N = total number of respondents (N=54)

Variables with RII < 0.599 were deemed to be insignificant in quality management, variables were further considered to be critical or not where they were RII ≥ 0.73 (Muhwezi et. al., 2014). Therefore, in this study, RII ≥ 0.73 was considered to be critical, 0.599< RII<0.73 was considered to be significant, RII < 0.599were deemed to be insignificant in this study.

3.10 Achievement of specific objectives

In order to get the results of objective (i) that sought to determine the current quality management practices in building construction firms in Uganda, quantitative data was coded as; 1 representing Strongly Disagree, 2 as Disagree, 3 as Not sure, 4 Agree and 5 as Strongly Agree then entered into SPPS version 25, RII computed to determine the contribution of each of the factors then presented in chapter four.

Objective (ii) that was to determine the extent to which quality control is practiced in building construction firms in Uganda, quantitative data was coded as 1 representing strongly disagree, 2 as disagree, 3 as not sure, 4 agree and 5 as strongly agree, then entered into SPSS version 25, RII ran to find extent to which quality control is practiced then presented in chapter four.

Objective (iii) which sought to identify the challenges in implementation of quality management practices in building construction firms in Uganda was achieved by computing RII. Quantitative data was coded as 1 representing Strongly Disagree, 2 as Disagree, 3 as Not Sure, 4 Agree and 5 as Strongly Agree, then entered into SPPS version 25, RII was computed to find the extent of the effect of quality management as presented in chapter four.

Objectives (iv) that sought to develop a frame work for effective quality management practices in building construction firms in Uganda. A framework was developed that constitutes all stakeholders and each role in project life cycle which filled the gaps in quality management practices in Kamwenge district.

3.11 Measurement of tool

The independent variables were measured in terms of quality management practices, extent of quality management practices, challenges in implementing quality and the dependent variable was measured in timeliness and money. The questionnaire was scored on a 5-point likert scale whereby response statements were categorized on a scale of 1-5 where: (1) strongly Disagree, (2) Disagree, (3) not sure, (4) Agree and (5) Strongly Agree. The variables were put in sections starting with the independent

variable and its dimensions where as a dependent variable was put in sections separately that aided the research to find contribution of each of the factors using RII.

3.12 Ethical Considerations

The researcher secured a letter of introduction from Kyambogo University which provided appropriate identification of the researcher and the purpose of the research.

The researcher ensured confidentiality by encouraging respondents to participate willingly and the purpose of the research was declared to the respondents. The researcher also treated any information got from any individual confidentially without disclosing the respondent's identity. The researcher was very appreciative of all the literature that contributed in any way to his researcher.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents data analysis, presentation and interpretation of the findings. The data presented include background information of the respondents and a presentation of findings against each individual objective of the study data.

4.2 Demographic characteristics of respondents

The researcher sought to obtain data on selected socio-economic characteristics of the respondents which included sex, age, highest academic qualifications and working experience. This section presents a summary of the study findings about the age, level of education, profession and positions of the respondents.

4.2.1 Age of the respondents

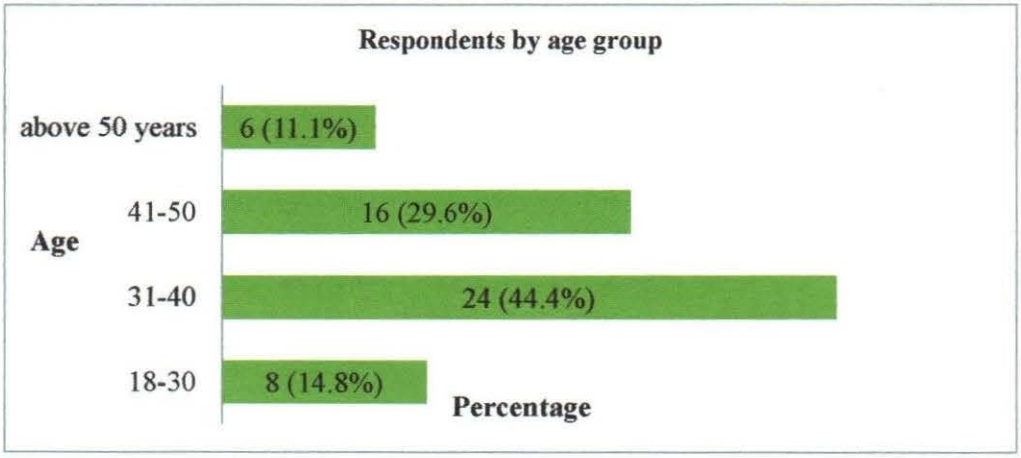

Figure 4. 1: Description of Respondents by Age group

The age of respondents was grouped and 18-30 were 8(14.8%), 31-40 were 24 (44.4%), 41-50 were 16(29.6%) and above 50 years were 6 (11.1%). The finding

implies that the study was comprehensive since it covered a cross section of different age brackets. This majority were in age bracket of 31-40 which signifies that respondents under that age bracket are strong have a greater potential for achievement of higher levels of quality in construction projects as it comprised majorly of the respondents from both categories (local government employees and contractors' staff).

4.2.2 Level of education

About the level of education as seen in Table 4.1 indicates that respondents with certificate and below were 12(22.2%), diploma holders were 23(42.6%), degree holders were 14(25.9%) and master's respondents were 5(9.3%) which shows that majority of the respondents were degree holders.

Table 4. 1: Description of respondents by level of education

Category	Variables	Frequency	Percent
Level of education	Certificate & Below	12	22.2
	Diploma	23	42.6
	Degree	14	25.9
	Masters	5	9.3

Source: Primary Data

This study finding also implies that all the respondents were able to fill a questionnaire since manage projects well. The different levels of academic qualifications indicated a mixed category of respondents who participated in providing data for this study.

4.2.3 Profession of respondents

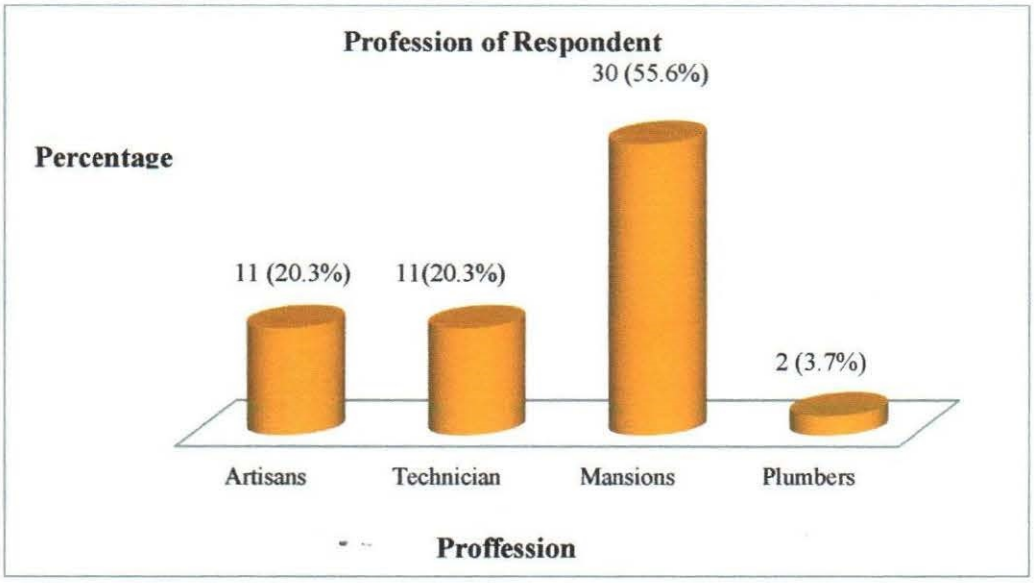

Figure 4.2: Description of Respondents by position

The professions of respondents were artisans, technicians, mansions and plumbers with 11(20.3%), 11(20.3%), 30(55.6%) and 3(2.7%) respectively. This implies that majority of respondents who participated in the study were engineers and the least were architect. The different levels of academic qualifications indicated a mixed category of respondents who participated in providing data for this study. By implication, the study findings are informative largely because they captured the views of the respondents from different academic calibres.

4.2.4 Position of respondents

The positions of respondents seen in Figure 4.3 shows that 25 (46.3%) were for masons, 12(22.2%) for carpenters, 5(9.3%) for electrician, 4(7.4%) for plumbers and 8(14.8%) for still fixers.

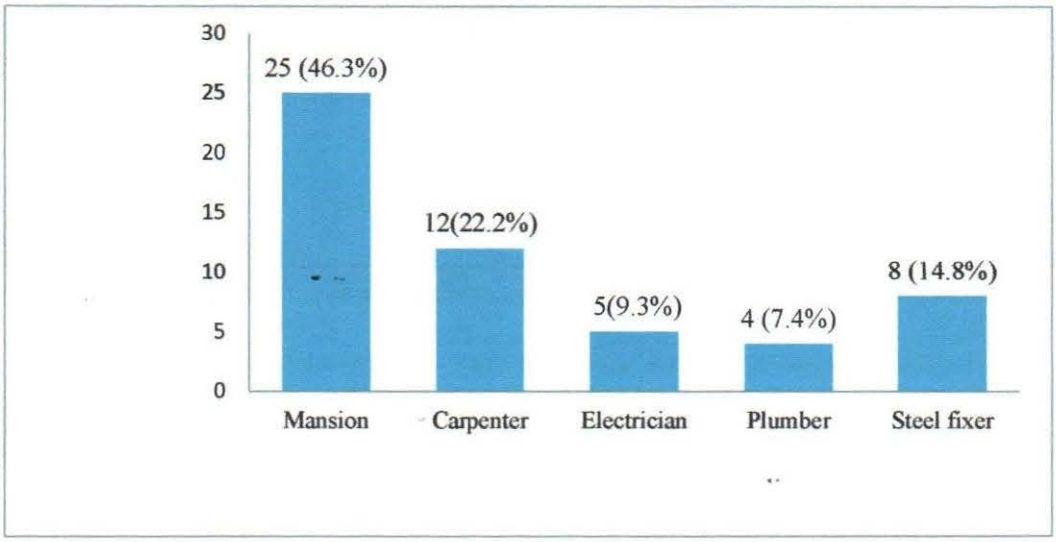

Figure 4.3: Description of position of respondent

This finding implies that majority of the respondents who participated in the study were masons who had skills in constructing the building projects hence responsible for the quality levels. The findings of the study therefore are believed to be credible and reliable because there was involvement of different professions responsible for prolonged life span of the building projects.

4.2.5 Sex of respondents

Respondents in Kamwenge district were asked about their sex and the results are presented in Figure 4.4

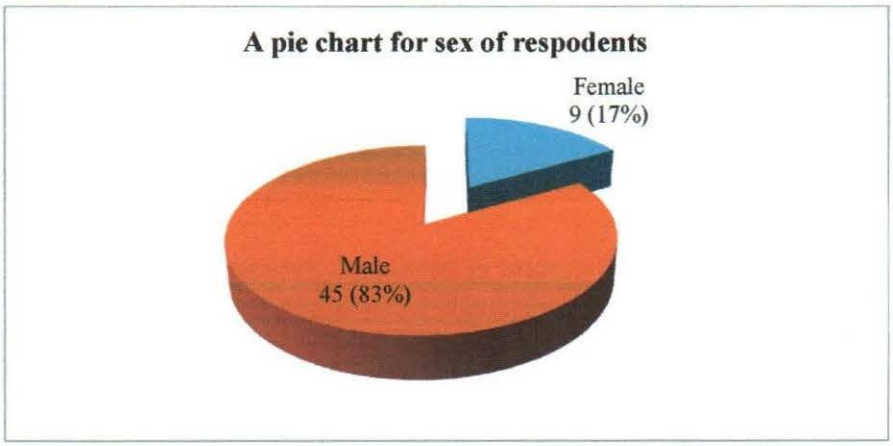

Figure 4. 4: Sex of respondents

The results in the figure 4.4 shows that the male respondents were 45(83%) and female 9(17%) which implies that majority were male who participated in the study. This signifies that males participated more in quality management of construction projects as compared to females. This implies that women most times are left out in managing quality as well as taking up new innovations in construction projects.

4.3 Quality management practices of construction of buildings

The first objective of the study sought to establish the quality management practices on construction buildings projects. The objective was operationalised in-terms of quality planning, quality control and quality assurance and results presented in Tables 4.2, 4.3 and 4.4 respectively.

4.3.1 Quality planning practice

Quality management practices identified through the study have been ranked in order with different values in Table 4.2.

Table 4.2: Quality planning

Variables	Statement	RII	Rank
	Realistic plans are drafted	0.84	1st
	Resources are mobilised in time	0.82	2nd
	There is job site quality plan	0.79	3rd
	Firms always train their employees on quality	0.65	4th
	Proper procurement systems are adhered to	0.54	5th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = significant, RII < 0.599= Insignificant

The results indicated that realistic plans being drafted were ranked 1st with the highest RII of 0.84. This shows that realist plans influence quality planning of building construction to a larger extent. Furthermore, table 4.2 shows that resources are mobilised in time ranked 2nd with relative importance index of 0.82 which shows that training influences quality planning of building construction to moderate extent. This is in agreement with Garavan (2016) who suggested that in order to facilitate the acquisition of skills and expertise for employees on quality of construction projects, training must become a mainstream function and an integral part of any firm's strategic direction.

Job site quality plan was ranked 3rd with RII of 0.79. This implies that site plans contribute moderately relatively less to quality management of construction projects. Firms always train their employees on quality and proper procurement systems are adhered to with RII of 0.65 and 0.58 ranked 4th and 5th respectively insignificantly

contribute to quality management practices since RII < 0.599.This is in line with works of Lynch (2014) who indicated that there was a tendency for firms to prefer using competitive procurement systems to promote transparency, economy and efficiency, and limit favouritism.

4.3.2 Quality control practice

Quality management practices identified through the study have been ranked in order with different values in Table 4.3.

Table 4.3: Quality control

Variables	Statement	R11	Rank
Quality Control	Client's work plan that are adhered to	0.93	1st
	There is team work among employees	0.89	2nd
	Compliance to standards of relevant agencies	0.72	3rd
	Project managers always conduct onsite-supervision	0.62	4th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

Results in Table 4.3 indicate that client's work plan that are adhered to and there is team work among employees with RII of 0.93 and 0.89 respectively, this shows that supervision and compliance to standards are critical in quality control of construction building projects. Team work among employees (RII=0.72), client adhering to a work plan (RII = 0.62) were significant in quality control of buildings projects since 0.599 < RII < 0.73.

This is in line with Scatterfield (2005) who claimed that quality control is critically important to a successful construction project and should be adhered to throughout a project from conception and design to construction and installation. Scatterfield (2005) continued to support that inspection during construction will prevent costly repairs after the project is completed; the inspector, engineer, contractor, funding agency, permit agency, and system personnel must work together to inspect, document, and correct deficiencies. However, Quality Management Systems, (2013) postulated that quality control is evaluating whether construction projects adhere to specific standards.

4.3.3 Quality assurance practice

The study revealed quality assurance indicators as presented in Table 4.4 in descending order of their relative importance index.

Table 4. 4: Quality assurance

Variables	Quality assurance practice	R11	Rank
Quality assurance	Third party certification	0.92	1st
	Adequate budget is always allocated for activities	0.78	2nd
	Implementers always pay attention to needs of clients	0.72	3rd
	Employees are motivated in every firm	0.67	4th
	There is quality appraisals in the firm	0.62	5th
	There are changes in administration	0.52	6th
	Customers are always satisfied about quality	0.46	7th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

Results in Table 4.4 indicate that third party certification and adequate allocation of resource with RII of 0.92 and 0.78 respectively were ranked highly thus critical in quality management of construction building. This shows that a quality assurance building in construction firms is greatly affected by third party certification and budget allocation.

The research also revealed there is moderate effect on the quality management practices of construction building projects were since implementers paying attention to needs of clients was ranked 3rd with RII of 0.72, employees are motivated in every firm (RII = 0.67) ranked 4th and quality appraisals in the firm (RII = 0.62) ranked 5th. This shows that paying attention to needs of clients, motivation of employees in firm and quality appraisal are very significant since 0.599 < RII < 0.73. Other Quality

assurance factors such as changes in administration (RII=0.52) and customer's satisfaction about quality (RII = 0.46) are insignificant since RII < 0.599.

These findings are in agreement with Adenuga (2013) pointed out that quality assurance is easily compromised and frequently lost since construction firms rely heavily upon the individual contributions to implementation from each designer, contractor, supplier and sub-contractor.

4.4 Extent to which quality management is practiced

The second objective of the study sought to establish the extent to which quality management is practiced in building construction projects in Kamwenge district. The research undertaken on building construction projects in Kamwenge district revealed that that testing materials before use with highest RII=0.95 was ranked top.

Table 4. 5: Extent to which quality management is practiced

Extent of practising quality management	RII	Rank
Testing materials before use	0.95	1st
Having a skilled work force	0.94	2nd
Regular meetings of staff	0.91	3rd
Meeting general construction standards	0.89	4th
Clearly defining goals and objectives	0.82	5th
Employing experienced worker	0.78	6th
Well-defined roles and responsibilities of workers	0.71	7th
Training and educating of team members on quality	0.66	8th
Subcontractors involvement in the quality process	0.62	9th
Building good storage facilities	0.51	10th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

This research revealed that skilled personnel (RII= 0.94), regular meetings of staff (RII= 0.91), meeting general construction standards (RII= 0.89), clearly defining goals and objectives (RII=0.82) and employing experienced worker (RII= 0.78) are critical since RII ≥ 0.73. This implies that they have high effect on the quality management practices of building projects in Kamwenge District.

Table 4.5 further shows that well-defined roles and responsibilities of workers (RII= 0.71) ranked 7th, training and educating of team members on quality (RII= 0.66) ranked 8th and sub-contractor's involvement in the quality process(RII=0.62) ranked

9th had moderate effect on the quality management of projects and were significant since 0.599 < RII < 0.73. Table 4.6 still indicate that building of good storage facilities (RII=0.51) ranked 10thhas less effect on quality management practices of projects since RII < 0.599.

4.5 Challenges of implementation of quality management

The third objective was to assess the challenges of implementation of quality management in construction projects in Kamwenge district. The research undertaken established that poor designs was the critical challenge on the facing the quality management of construction projects with relative importance index of 0.94 and was ranked top challenge of construction projects as indicated in Table 4.6.

Table 4. 6: Quality Planning Challenges

Variable	Quality planning challenges	RII	Rank
Quality planning	Poor designs	0.94	1st
	Lack of proper equipment available for use	0.93	2nd
	Lack of enough knowledge of the project	0.91	3rd
	Poor scheduling of projects	0.84	4th
	Setting unrealistic deadlines	0.72	5th
	Poor sanitation and health standards at the site	0.63	6th
	Bureaucracy of clients	0.52	7th
	Poor estimates	0.46	8th
	Clients setting of unrealistic deadlines	0.42	9th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

From the summary of results in Table 4.6, it can be observed that the key challenges that critically affect the quality in building construction projects in Uganda were lack of proper equipment available for use (RII=0.93), lack of enough knowledge of the project (RII= 0.91) and poor scheduling of projects (RII= 0.84) respectively.

Table 4.6 further shows that setting unrealistic deadlines (RII = 0.72) and poor health standards at the site (RII=0.63) significantly affect the quality planning of projects since $0.599 < RII < 0.73$.

The research, however, revealed that three (3) factors had minimal effect of quality planning and they include; bureaucracy of clients (RII= 0.52), poor estimates (RII=0.46) and clients setting of unrealistic deadlines (RII=0.42).These findings are in line with Manavazhi and Adhikari (2002) who revealed that the main causes of material and equipment procurement delay in quality management were organizational weaknesses, suppliers' defaults, governmental regulations, and transportation delays.

However, Harris and McCaffer, (2002) contends that construction project fails due to time and cost overruns resulting from; poor field investigation, under–estimates, lack of experience, inadequate project analysis, and poor investment decisions. Poor planning for implementation entails inadequacies in time plan, resource plan, equipment plan, coordination, organization, cost planning and improper pre/post contract actions.

Furthermore, findings are in agreement with Chitkara (2005) who claimed that that inefficient and ineffective working delays, low resources productivity, change in scope, affects the planning of buildings. Chitkara (2005) further argues that unclear objectives, unworkable schedules, failure to identify critical items, lack of understanding of operating procedures, and ignorance of appropriate planning techniques are all a manifestation of poor planning and poor management.

4.5.2 Quality control challenges

Results in Table 4.7 indicate that lack of management's commitment was a critical challenge affecting quality of building projects with RII of 0.96 and was ranked top challenge critically affecting the quality control of construction buildings.

Table 4. 7: Quality control challenges

Variable	Quality control challenges	RII	Rank
Quality control	Lack of management's commitment	0.96	1st
	Lack of enough funds	0.92	2nd
	It is very expensive in testing materials	0.87	3rd
	Poor testing procedures	0.86	4th
	Delay in delivering materials	0.72	5th
	Stakeholder's influence	0.68	6th
	Poor conduct of review meeting	0.59	7th
	No good stores at the site	0.56	8th
	No site safety measures	0.45	9th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

Furthermore, from Table 4.7, the challenges that critically significantly affect the quality control in construction projects are; lack of enough funds (RII = 0.92), very expensive in testing materials (RII = 0.87), poor testing procedures (RII = 0.86), delay in delivering materials (RII = 0.72) and stakeholder's influence (RII = 0.68) since RII > 0.599.

These challenges are in agreement with Angeles and Nath (2007) who revealed that contract managers often face challenge of quality management due to unclear project scope, and unrealistic timeline and budgets in controlling the quality of construction buildings.

4.5.3 Quality assurance challenge

Table 4.8 presents quality assurance challenges affecting quality management of projects.

Table 4.8: Quality assurance challenges

Variable	Quality assurance challenges	RII	Rank
Quality assurance	Lack of skilled personnel for implementation	0.97	1st
	Lack of a quality assurance team to lead the process	0.92	2nd
	High labour turnover in the firm	0.93	3rd
	Poor security in the area	0.86	4th
	No enough experience of workers	0.82	5th
	Poor decision making from clients	0.85	6th
	No timely completion of each phase	0.62	7th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

Results from Table 4.8 indicate that lack of skilled personnel for implementation (RII=0.97) was a critical challenge affecting quality assurance of construction projects in Kamwenge district. Challenges such as; lack of a quality assurance team to lead the

process (RII = 0.92), high labour turnover in the firm (RII = 0.93), poor security in the area (RII = 0.86), no enough experience of workers (RII = 0.82), poor decision making from clients (RII = 0.85) and no timely completion of each phase (RII = 0.62) respectively greatly affects the quality assurance of construction projects as presented in Table 4.8 since RII > 0.599.

Wilkinson (1991) found out that organizational segmentation, reluctant managers, industrial relation and short-term mission are some of the challenges of TQM implementation. Ismail (2012) also pointed out that organizational culture, lack of management commitment, and lack of teamwork, poorly thought out plans, focus on short term profit, poor measurement techniques, lack of education and training programs, employee fear of losing their jobs are some of the barriers of TQM implementation.

4.6 A framework that can be adopted by the district in quality management

Results in sub sections 4.4 and 4.5 have indicated that Kamwenge LG has deficiencies in the extent to which quality management is practised and challenges of implementations in quality management. Quality management practices as earlier indicated in chapter one must constitute of all the stakeholders (Ministries, political leaders and district committee) and these stakeholders claim a big share of their annual budgetary allocations.

In this sub section, efforts are made to provide strategies that have the capability of circumventing and mitigating the anomalies in the quality management of projects. The framework below is suggested as solution to the deficiencies in the quality

management processes and is considered an ideal solution that will correct the defects in the current and future quality management in Kamwenge district local government.

Quality management is an ongoing process in a building project life cycle which starts with initiation, planning, implementation, monitoring and evaluation then closure. This implies that all stakeholders must maintain quality in all stages to have quality of building projects in Kamwenge District as indicated by Figure 4.5

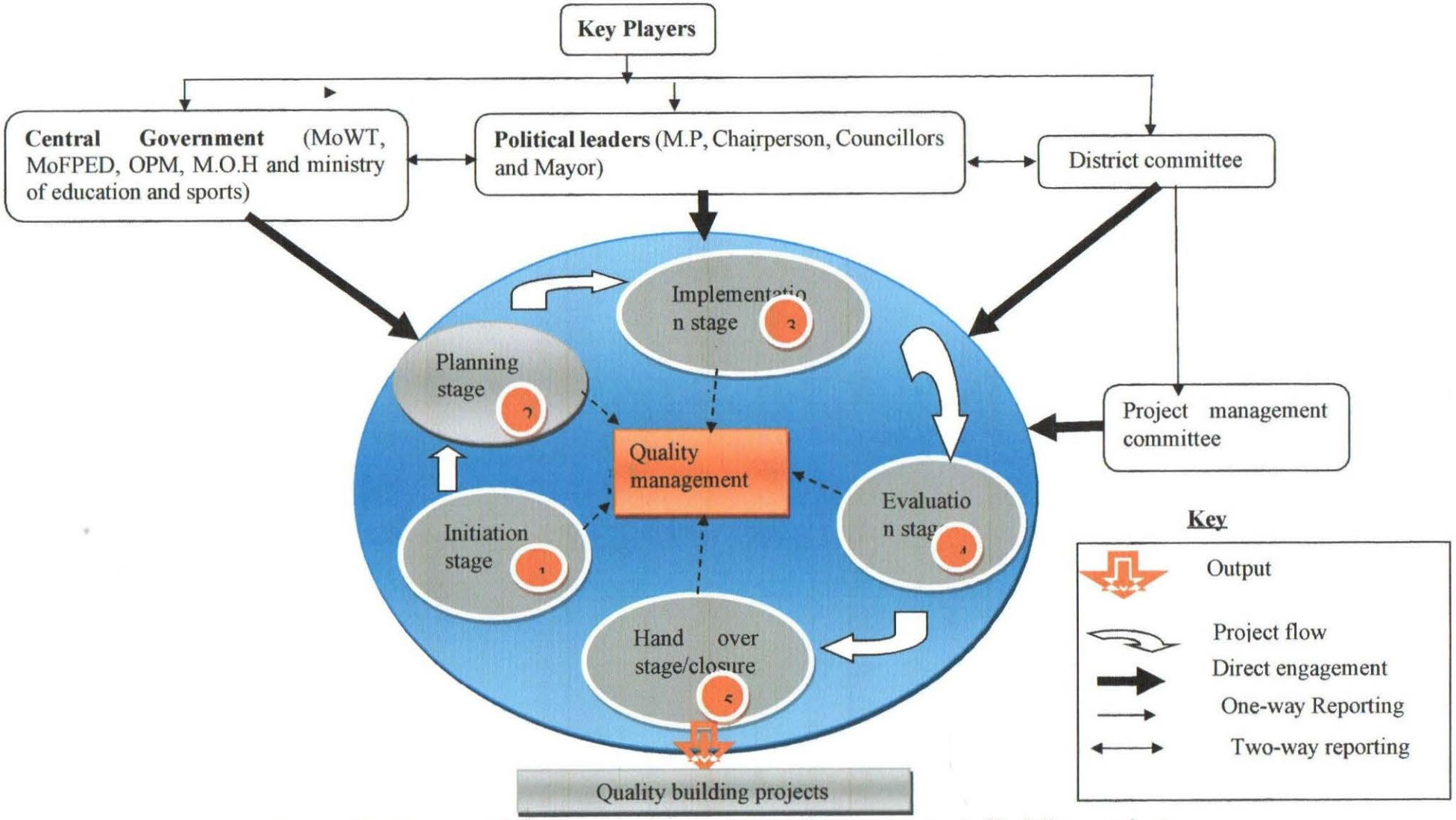

Figure 4. 5: Developed framework for improving quality management of buildings projects

4.7 Operation of the developed framework

4.7.1 Initiation Phase

This is the first phase of the construction project, client's work plan that are adhered to was ranked number one with RII 0.93, there is team work among employees ranked second with RII 0.89 and compliance to standards of relevant agencies was ranked number three with RII 0.72. A feasibility study is conducted by consultant to investigate whether each option addresses the project objective and a final recommended solution is determined. Once the recommended solution is approved, a construction project is initiated to deliver the approved solution and a project manager (District Engineer) is given an approval by CAO. The major deliverables and the participating work groups are identified, and the project team begins to take shape. Approval is then sought by the project manager to move into the detailed planning phase. Stakeholder that always participates at this phase is a consultant.

4.7.2 Planning Phase

The planning phase, Having realised that poor designs was ranked number 1 with RII of 0.94 , lack of proper equipment available for use was ranked second with RII of 0.93 and lack of enough knowledge of the project was ranked number 3 with RII of 0.91 as the key challenges in quality planning, ISO should be followed in developing structural designs, Architectural designs and Bills of quantities, in as much detail as possible and the steps necessary to meet the building project's objective are planned. In this step, the District planner, district engineer, CAO, political leaders identified all of the work to be done. The

building project's tasks and resource requirements are identified, along with the strategy for producing them. A building project plan is created outlining the activities, tasks, dependencies, amount needed and timeframes. District engineer, architects, procurement officers, planners and Chief finance officer coordinates the preparation of a project budget by providing cost estimates for the labour, equipment, and materials costs basing on designs of the project. Finally, a quality plan is documented, quality targets provided, assurance, and control measures, along with an acceptance plan, listing the criteria to be met to gain customer acceptance.

4.7.3 Implementation stage

Third party certification was ranked number one with RII 0.92, adequate budget is always allocated for activities was ranked number two with RII 0.78 and implementers always pay attention to needs of clients was ranked number 3 with RII 0.72. During the third phase, the building project plan is put into motion and the work of the project is performed. Materials are tested for their efficiency; recruitment of skilled workforce and regular site meetings of staff are emphasized. Progress is then continuously monitored and appropriate adjustments are made and recorded as variances from the original plan (from planning phase). The District engineer spends most of the time in this step. During project implementation, contractors are carrying out the tasks, and progress information is being reported to the Chief Administrative officer. District engineer uses this information to maintain control over the direction of the project by comparing the progress reports with the project plan to measure the performance of the project activities and take corrective action as required of him. Throughout this step, project funder and

other key stakeholders should be kept informed of the project's progress according to the agreed-on frequency and format of communication. Progress reports should always emphasize the anticipated end point in terms of cost, schedule, and quality of deliverables. Each project deliverable produced should be reviewed for quality and measured against the acceptance criteria.

4.7.4 Closing Phase

During the final closure, or completion phase, the emphasis is on having over the final deliverables to the community, handing over the project documentation to the community, terminating supplier contracts, releasing project resources, and at this stage the quality assurance team is dispatched to carry out quality checks before after which a report is made as well as commissioning of the project. A contractor is given liability period of 4 months or more depending on the terms of reference to return to the site to remedy defects which might be developing.

4.7.5 Role of each stakeholder

Central Government

Quality management process involves two ministries that include MoWT and MoFPED, MoFPED is charged with allocating funds to DLGs through CAO and District engineer. MoWT is responsible for supervision, monitoring and evaluation of performance of construction projects, making follow ups, supervision and audits of contracted projects. The Office of the Prime Minister is charged with monitoring and evaluation.

Chief Administrator Officer

This is the chief accounting officer for the whole project. He is charged with authorizing funds that are used in every activity of building project.

District Engineer

This charged with drawing construction plans, construction budgets, testing the materials before construction and supervising the whole process of construction projects from initiation stage to handover. He is also charged with maintaining the project to reduce defects in the project.

4.8 Closing the gaps in the quality management process

i. Training of Staff

In the framework developed, the researcher suggests that the only one way of closing the gaps in the quality management practices is by training staff on short courses. The training opportunities are provided for the purposes of enhancing the concerned intervention groups with skills and capacity to implement and maintain quality as indicated by doted black arrows. This could take form of refresher quality training that could be organized at the district or outside the district. This could help to maintaining quality in all stages of the building construction projects.

ii. Revising the budgetary allocations

Budget allocations are done by central government and in order to maintain quality of buildings. In closing the gaps in quality management, budget for building projects should be increased to because Kamwenge district has been facing a challenge of poor allocation

of resources. In other words, more pressing issues like quality management should be given first priority with big budget. From the framework, this is indicated by purple arrow from the ministry to DLGs represented by CAO.

iii. Providing Logistics to relevant stakeholders

This is what enables the relevant stakeholders to perform their duties in building construction projects for example supervision vehicles, material testing kits for quality assurance , protective gears, equipment like concrete mixers, excavators and many more, therefore, the central government/funder should provide the necessary logistical to Kamwenge Local Government to support the force account mechanism.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The study investigated quality management practices of building construction firms in Kamwenge District. The chapter was arranged according to the study objectives. It presents the summary, conclusions and recommendations arising out of the study findings according to the objectives.

5.2 Conclusions

The research analyzed data using RII, the results indicated that when proper procurement systems are adhered to influence quality planning to a greater extent with critical RII of 0.84. The findings also indicated that project managers always conduct supervision influences quality control to a greater extent with critical RII of 0.93. Furthermore, third party certification with critical RII of 0.92influences quality assurance to a greater extent in quality management of building construction projects.

In conclusion, therefore, onsite-supervision greatly influences quality management practices in construction firms of Kamwenge District.

The researcher used SPPS version 25 to run RII and ranks, and the results indicated that testing materials before use with RII of 0.95 was ranked top. Thus, the study concluded that testing materials before actual implementation increased the quality of building projects in construction firms of Kamwenge District.

SPSS version 25 to run RII was used to determine the challenges affecting quality management practices and the results found out that poor designs (RII = 0.94) was ranked top, lack of proper equipment available for use(RII = 0.93), lack of enough knowledge (RII = 0.91) and poor scheduling of work (RII = 0.84) were the major challenges affecting the quality of construction projects. The study then concluded that the top most challenge affecting quality management of construction of buildings was poor designs in construction projects in Uganda.

A framework was developed and all relevant stakeholders involved in all stages of construction building projects. The study concluded that the only way to fill the gaps were by training staff, effective allocation of resources and providing equipment to Local government.

5.3 Recommendations

- The study recommends that materials should be tested before actual implementation to increase the quality of building projects in construction firms of Kamwenge District
- There should be a quality assurance team to ensure quality of building construction projects in Kamwenge District. And proper procurement methods should be adhered to, to ensure quality of building construction projects in Kamwenge District.
- The study recommends having qualified architects and structural Engineers who can draw right buildings plans for buildings in Kamwenge district.

5.4 Limitations to the Study

There were a number of limitations associated with decisions made regarding the methodology. They relate to the choice of participants, the type of data collected and the analytic process. Another limitation was the time frame in which data was collected. The data constituted a snapshot of one point on the implementation continuum. Interview dates were limited in a number of ways including the limitations present in the questions themselves and also in the nature of the responses from. The participant's responses were based only on the questionnaire that the researcher drafted but there could have been more information through observation and interviews. Some respondents were not willing to give information unless paid and at some instances, the researcher had to wait till late in the evening when the respondents are through with their work so as to give them questionnaires.

There was also an absence of the respondents at the designated place of carrying out the study activity. Therefore, collecting data from them through the questionnaires proved to be a big challenge. The researcher managed these problems by making use of the supportive team leader who in one instance was willing to introduce the researcher in person to the respondents through sensitization of respondents on the importance and significance of the study. The absenteeism of some officials was tackled by frequent visits to their offices, and above all establishing good rapport. In general, the following measures were taken, aimed at reducing non-response for the initial mailing, an introduction letter on Kyambogo University logo was sent out and this emphasized academic relevance of this research project.

5.5 Areas for further Research

There is a need to carry out research on the effect of quality management on performance of buildings in Kamwenge district. More research is needed on determinants of quality management practices on construction buildings in Kamwenge district.

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APPENDICES

APPENDIX I: QUESTIONNAIRE FOR CONSTRUCTION FIRMS

KYAMBOGOUNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

Dear sir/madam, my name is **Baguma Andrew**, a student at the Kyambogo University. I am carrying out research on the assessment of quality management practices of building construction firms in Kamwenge District for partial fulfilment of the requirements for the award of a Master of Science in construction technology and Management degree. The tool used (questionnaire) is divided into two Sections, SECTION A which is for demographic data and SECTION B which has subsections which are of interest to the study. In case of any clarification you are free to contact the researcher. I'm therefore seeking your assistance to fill the questionnaires attached. The study is purely for academic purposes and your identity and information will not be shared with anyone else hence will be treated as confidential.

Thank you in advance for your participation.

SEC A: Bio-data/Demographic factors

1. Sex

   a) Male ☐ b) Female ☐

2. Age bracket

   a) 18-30 years ☐ b) 31-40 years ☐

   c) 41-50 years ☐ d) Above 50 years ☐

3. Level of Education

a) Certificate and Below ☐

b) Diploma ☐

c) Degree ☐

d) Masters ☐

e) Others specify.....

5. Profession

a) Q/s ☐ b) Land surveyors ☐ c) Engineer ☐

b) Architect ☐

6. Career/position in the firm

a) Masons ☐ b) Carpenters ☐ c) Electricians ☐ d) Plumbers

e) Steel fixers ☐

4. What is the number of employees in your firm?

a) 1.50 ☐

b) 51-100 ☐

c) Above 100 ☐

4. Are employees empowered in making significant change in the operations?

a) Fully empowered ☐

b) Only key employees empowered ☐

c) Empowerment not needed ☐

5. Is your company ISO certified

   a) Yes ☐

   b) No ☐

   c) Don't know ☐

6. How would you rate the customer satisfaction in forms of quality work delivered in your company?

   a) Satisfied ☐

   b) Unsatisfied ☐

   c) Not sure ☐

SECTION B

Please indicate by ticking the extent to which you agree/disagree with the following statements about Current quality management practices in building construction firms.

1= Strong Agree, 2=Agree, 3=Not sure, 4=Disagree and 5=Strongly disagree

Quality Management Practices		**1 (SA)**	**2 (A)**	**3 (NS)**	**4 (D)**	**5 (SD)**
Quality planning	Firms always train their employees on quality					
	There is job site quality plan					
	Proper procurement systems are adhered to					
Quality control	Project managers always conduct onsite-supervision					
	There is compliance to standards of relevant agencies					
	Client's work plan that are adhered to					
	There is team work among employees					
Quality Assurance	Customers/ clients are always satisfied about quality					
	Employees are motivated in every firm					

	Adequate budget is always allocated for activities					
	There is quality appraisals in the firm					
	There are changes in administration					
	Third party certification					
	Implementers always pay attention to needs of clients					

2.0 Please indicate by ticking the extent to which you agree with the following statements about the extent to which quality control is practiced in building construction firms.

1= Strong Agree, 2=Agree, 3=Not Sure, 4=Disagree and 5=Strongly Disagree

Extent to which quality control is practiced	**1 (SA)**	**2 (A)**	**3 (NS)**	**4 (D)**	**5 (SD)**
Meeting general construction standards					
Having a skilled work force					
Training and education for team members on quality					
Well-defined roles and responsibilities of workers					

Subcontractors involvement in the quality process					
Clearly defining goals and objectives					
Regular meetings of staff					
Employing experienced worker					
Testing materials before use					
Building good storage facilities					

3.0 Please indicate by ticking the extent to which you agree with the following statements about challenges of quality management practices.

1= Strong Agree, 2=Agree, 3=Not sure, 4=Disagree and 5=Strongly Disagree

Challenges of implementation of quality management	**1 (SA)**	**2 (A)**	**3 (N)**	**4 (D)**	**5 (SD)**
It is very expensive in testing Materials					
No timely completion of each phase					
No enough knowledge of the project					
No enough experience of works					
Poor sanitation and health standards at the site					
No site safety mechanism					
No good stores at the site					
Poor decision making from clients					
Lack of skilled personnel for implementation					
Delay in delivering materials					
Poor designs					
Poor testing procedures					
Lack of enough funds					
Poor estimates					
Poor scheduling of projects					
Stakeholder's influence					

Poor security in the area					
Bureaucracy of clients					
Poor conduct of review meeting					
Setting unrealistic deadlines					
Lack of proper equipment available for use					
High labour turnover in the firm					
Lack of a quality assurance team to lead the process					
Lack of management's commitment to quality assurance					
Clients setting of unrealistic deadlines					

Thank you for participating

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Assessment of Quality Management Practices of Building Construction Firms in Uganda: A Case of Kamwenge District

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Abstract: Quality management in the construction industry includes quality control, quality planning and quality assurance to reduce on the collapse of buildings. However, there have been challenges of cost variations, timeliness and delays in maintenance which affects quality management of buildings. The study assessed quality management practices of building construction firms in Uganda and the one of the specific objective was to develop a framework that can be used by construction firms to improve on the quality of buildings. Both qualitative and quantitative data were collected using survey questionnaire and documentary reviews. Data were analyzed using descriptive and multivariate analysis in SPSS V. 25. The findings indicated that procurement systems, third party certification and on site supervision greatly nfluenced the cost, timeliness and delivery of buildings hence affecting the quality management practices. The developed framework shall be used to engage stakeholders the phases of the construction projects mainly buildings to improve on cost estimation and timely delivery hence improving on quality management of buildings.

Keywords: Quality Management, Quality Planning, Quality Control, Construction Firms

1. Introduction

Construction industry has been widely criticized for its low quality of delivery of construction projects [1].Construction firms need to adopt quality management in order to solve quality problems in order to meet the demands of the clients [2]. Total quality management is defined as a management viewpoint that encompasses all functions of an entity like human resources, operations and marketing in order to focus on meeting customer needs and firm's objectives [3].

Globally, building construction sector is considered to be a basic sector on which the development of a country depends [4]. [5]revealed that quality of global firms in building projects is driven by practices adopted.It is asserted that the majority of the construction companies in all over the world face a lot of many challenges and problems such as workmanship defects, delay and cost overrun in complementing their construction projects for the past three decades [6].

Total quality Management culture has contributed to increased productivity of firms around the world [7]. Global international, regional and local firms always strive to gain competitive edge in building projects based on TQM initiatives that are customer centric in nature. In Africa, [8] pointed out that the collapse of buildings in Africa has been attributed to weak foundations, substandard construction materials, poor material mixing by construction workers, excessive load on strength of buildings and poor testing of building strength. [9] noted that many construction industries have criticized especially in terms of productivity quality and quality system because of implementing managers mainly focus on the cost and time instead of quality for construction projects.

Collapsed buildings are a growing problem where many buildings in the region's major cities are under construction or renovation [10]. [11] pointed out that Kenya has probably suffered the most building collapses in the last decade due to lack of quality and poor construction materials. In one of those instances, [12] remarked that although the developer served with a stoppage order due to violation of construction regulation and huge cracks that had developed in the said building, work continued and hence the collapse.

In Uganda, [13] postulated that building construction employs 1.3% of the total registered employees with ideal of quality output.The construction industry contributed 12% of the GDP by 2005 [14]. Despite this contribution, there have been reported cases of irregularity in the quality of buildings whereby for example a storied building collapsed in the city suburb of Kansanga and the causes were poor materials and inexperienced engineers. This, therefore, prompted the Government to shift the contracts to design-build with the notion that the contractor will do more testing to improve on the quality of designs and save construction costs [15].

1.1.Statement of the Problem

Building construction firms in Uganda implement ISO 9001 Quality Management System and obtain consequent approvals, rewards and certificates. The standard is based on a number of quality management principles including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement and using US ISO 9001:2015 helps to ensure that customers get consistent good quality products and services, which in turn brings many business benefits. The design and implementation of building construction's quality management system is influenced by varying prices of inputs for instance, there was highest 25.8 percent increase in average prices of inputs in the overall construction sector registered in 2011, followed by an increase of 11.4 percent in 2009 and the lowest increases in average prices for the whole sector was 2.2 percent which was registered in 2013 [16]. Despite the standard set by ISO 9001, the quality of buildings have continued to deteriorate in Kamwenge district whereby there has been a high death rate because of collapsed buildings during rainy seasons and earth quakes, they have experienced cost and time over run.The cause of the breakdown might becaused by un experienced personnel using poor materials to maintain the quality of building projects by many building firms and it is against this background that this study sought to assess the quality management practices of building construction firms in Uganda particularly Kamwenge District.

1.2.Objectives of the Study

The main objective of the study was to assess the quality management practices of building construction firms in Uganda and was guided bythe following specific objectives:

1. To determine the current quality management practices in building construction firms in Uganda;
2. To determine the extent to which quality management is practiced in building construction firms in Uganda.
3. To establish the challenges in implementation of quality management practices in building construction firms in Uganda.
4. To develop a framework for effective quality management practices in building construction firms in Uganda.

2. Literature Review

2.1.Stakeholder Theory

The study was guided by stakeholder theory that was propounded by [17]. According to [18], the "maximizing shareholder value" view is put forward as a "scientific" theory that is modeled and verified appropriately by ideologists called "economists." On the other hand, [19] argued that stakeholder ship involved a theory of organizational management and ethics which was distinct because it addressed morals and values as explicit central features of organizational management. He also pointed out that management for stakeholders involved attention to more than simply maximizing shareholder wealth.

2.2.Quality Management Systems in Construction Projects

Quality system is "the organizational structure, responsibilities, procedures, processes, and resources for implementing quality management" [20]. On the hand, Quality management system refers to the set of quality activities involved in producing a product, process, or service, and encompasses prevention and appraisal [21]. It is a management discipline concerned with preventing problems from occurring by creating the attitudes and controls that make prevention possible [22]. Quality activities include: determination of the quality policy, objectives and responsibilities and implementing them through quality planning, quality control, quality assurance and quality improvement, within the quality system [20].

2.3.Factors Affecting Project Time Delay and Cost Overruns

2.3.1.Quality Planning and Quality Assurance

Quality planning is defined as a set of activities whose purpose is to define quality system policies, objectives, and requirements, and to explain how these policies will be applied, how these objectives will be achieved, and how these requirements will be met [22]. Quality assurance is defined as a set of activities whose purpose is to demonstrate that an entity meets all quality requirements. Quality Assurance activities are carried out in order to inspire the confidence of both customers and managers, confidence that all quality requirements are being met. It is noted that quality requirements should be clear and verifiable so that all parties

in the project can understand them for conformance [23]. Quality assurance emphasizes defect prevention, unlike quality control that focuses on defect detection once the item is produced or constructed.According to [23], it was further established that quality assurance concentrates on the production or construction management methods and procedural approaches to ensure that quality is built into the production system.

2.3.2.Stakeholder Framework and Building Construction

[24] argues that stakeholder involvement in building construction involves determining how to plan, developing the scope statement, selecting the planning team, identifying deliverables and creating the work breakdown structure, identifying the activities needed to complete those deliverables and networking the activities in their logical sequence, estimating the resource requirements for the activities, estimating time and cost for activities, developing the schedule, developing the budget, risk planning and gaining formal approval to begin work in order to construct output with quality specification, time and cost.

Stakeholders can affect an organization's functioning, goals, development and even survival [25]. Successful engagement of stakeholders involves actively giving and getting their support and working together to devise, plan and develop new construction designs[26]. Senior leaders in construction projects can adopt stakeholder engagement as an opportunity to influence other organizations and create alignment to structures and processes to support the vision and mission of timeliness, quality, durability and minimizing costs [27].

3. Methodology

Research design as the overall plan or strategy for conducting research [28]. It is a master plan specifying the methods and procedure for collecting, analyzing and interpreting the data in order to get the desirable information.The study adopted descriptive survey design citing [29] that descriptive survey design is easy to manage and administer. The design is preferred because it will give a broad understanding that leads to a justifiable means of investigating the relationship between variables in the study. The study sample that was randomly selected constituted 10 local government officials in engineering and procurement departments and 50 employees of construction firms prequalified with Kamwenge District because they were believed to have enough knowledge for the study. Data were collected using a self-administered questionnaire, interviews, desk survey and a document review guide.The questionnaire was selected as the main data collection tool because it is cheap to administer and covers a wide geographical area; it provides a hard copy that can be filed for reference purposes. The questionnaire was equally used because the information had to be collected from a large sample in a short period of time.The questionnaire was pretested for content validity and a content validity index (CVI) value of 0.75 was obtained. These CVI values exceeded the 0.7 threshold implying a reliable questionnaire as suggested by [30].Interview guides were also administered to the top district management for in-depth data collection.

3.1.Data Collection

The study used multiple sources of data because of the added benefits (such as the validity of the data gathered) associated with multiple sources fieldwork (primary data collection) and desk study (secondary data collection). The approach for collecting data in this study was divided into two main parts desk survey and field survey.

3.2.Data Analysis

The filled questionnaires were collected, checked for accuracy, consistency and completeness before leaving the field. Raw data was entered into Statistical Package for Social Scientists (SPSS-version 25) and analyzed statistically. The contribution of each of the factors to overall delays was examined and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of Relative Importance Index (RII) which was computed, the five-point likert scale ranged from 1 to 5 that was adopted and transformed to relative importance indices (RII) for each factor using equation (2.2);

$$RII=\frac{\sum W}{A\times N}(0 \leq RII \leq 1)(1)$$

Where;

W= weighting given to each factor by the respondents (ranging from 1 to 5),

A = highest weight (5 in this case)

N = total number of respondents (N=54)

Variables with RII < 0.599 were deemed to be insignificant in quality management, variables were further considered to be critical or not where they were RII $\geq$ 0.73. Therefore, in this study, RII $\geq$ 0.73 was considered to be critical, 0.599< RII<0.73 was considered to be significant, RII < 0.599 were deemed to be insignificant in this study.

3.3.Frame work development

A framework was developed to show how different stakeholders are involved at different stages i.e. initiation stage, planning stage, implementation stage evaluation and handover stages to enhance the quality of buildings in Kamwengedistrict.

4. Results and Analysis

The results about demographic factors are presented in Table 1.

Table 1. *Demographic factors.*

Category	Variables	Frequency	Percent
Sex	Male	33	61.1
	Female	21	38.9
Age	18-30	8	14.8
	31-40	24	44.4
	41-50	16	29.6
	above 50 years	6	11.1
Level of education	Certificate & Below	12	22.2
	Diploma	23	42.6
	Degree	14	25.9
	Masters	5	9.3
Profession	Q/S	11	20.3
	Land surveyor	11	20.3
	Engineer	30	55.6
	Architect	2	3.7
Position	Manson	25	46.3
	Carpenter	12	22.2
	Electrician	5	9.3
	Plumber	4	7.4
	Steel fixer	8	14.8

Source: Primary data (2019)

The results in Table 1 show that the male respondents were 33 (61.1%) and female 21 (38.9%) which implies that majority were male who participated in the study. The ages of respondents were grouped and 18-30 were 8 (14.8%), 31-40 were 24 (44.4%), 41-50 were 16 (29.6%) and above 50 years were 6 (11.1%) which signifies that majority were aged 31-40. About the level of education, respondents with certificate and below were 12 (22.2%), diploma holders were 23 (42.6%), degree holders were 14 (25.9%) and masters respondents were 5 (9.3%) which shows that majority of the respondents were degree holders. The professional of respondents were Q/S, land surveyor, engineer and architect with 11 (20.3%), 11 (20.3%), 30 (55.6%) and 3 (2.7%) respectively. The positions of respondents were 25 (46.3%) for mansions, 12 (22.2%) for carpenters, 5 (9.3%) for electrician, 4 (7.4%) for plumbers and 8 (14.8%) for still fixers, the majority of the respondents who participated in the study were mansions.

4.1. Quality Management Practices of Construction Buildings

The results in Table 2 indicate that proper procurement systems were ranked 1st with the highest RII of 0.84. This shows that proper procurement systems influence quality planning of building construction to a larger extent. This is in agreement with [31] who indicated that there was a trend for firms to prefer using competitive procurement systems to promote transparency, economy and efficiency and limit favoritism. Furthermore, Table II shows that firms always train their employees on quality was ranked 2nd with relative importance index of 0.82 which shows that training influences quality planning of building construction to moderate extent. This is in agreement with [32] who suggested that in order to facilitate the acquisition of skills and expertise for employees on quality of construction projects, training must become a mainstream function and an integral part of any firm's strategic direction. Job site quality plan was ranked 3rd with RII of 0.79. This implies that site plans contribute moderately relatively less to quality management of construction projects. The factor that resources are mobilized in time and realistic plans are drafted were assessed with RII of 0.65 and 0.58 ranked 4th and 5th respectively insignificantly contribute to quality management practices

Table 2.*Quality Planning.*

S/No	Statement	RII	Rank
1	Proper procurement systems are adhered to	0.84	1st
2	Firms always train theiremployees on quality	0.82	2nd
3	There is job site quality plan	0.79	3rd
4	Resources are mobilized in time	0.65	4th
5	Realistic plans are drafted	0.58	5th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = significant, RII < 0.599= Insignificant

4.2. Quality Control

According to [33] quality control is critically important to a successful construction project and should be adhered to throughout a project from conception and design to construction and installation. He further asserted thatthat inspection during construction will prevent costly repairs after the project is completed, the inspector, engineer, contractor, funding agency, permit agency, and system personnel must work together to inspect, document, and correct deficiencies.Results in Table 3indicate that project

managers always conduct onsite-supervision and there is compliance to standards of relevant agencies with RII of 0.93 and 0.89 respectively, this shows supervision and compliance to standards are critical in quality control of construction building projects. Team work among employees (RII=0.72), client adhering to a work plan (RII = 0.62) were significant in quality control of buildings projects since 0.599 < RII < 0.73. This finding agrees with [33] who asserted that quality control is critically important to a successful construction project and should be adhered to throughout a project from conception and design to construction and installation. [33] continued to support that inspection during construction will prevent costly repairs after the project is completed; the inspector, engineer, contractor, funding agency, permit agency, and system personnel must work together to inspect, document, and correct deficiencies. However, [34] agreed that quality control is evaluating whether construction projects adhere to specific standards.

Table 3. *Quality Control.*

S/No	Statement	RII	Rank
1	Project managers always conduct onsite-supervision	0.93	1st
2	There is compliance to standards of relevant agencies	0.89	2nd
3	There is team work among employees	0.72	3rd
4	Client's work plan that are adhered to	0.62	4th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

4.3. Quality Assurance Practices

Results in Table 4 indicate that third party certification and adequate allocation of resource with RII of 0.92 and 0.78 respectively were ranked highly thus critical in quality management of construction building. This shows that quality assurance in construction firms is greatly affected by third party certification and budget allocation. The research also revealed there is moderate effect on the quality management practices of construction building projects were since implementers paying attention to needs of clients was ranked 3rd with RII of 0.72, employees are motivated in every firm (RII = 0.67) ranked 4th and quality appraisals in the firm (RII = 0.62) ranked 5th. This shows that paying attention to needs of clients, motivation of employees in firm and quality appraisal are very significant since 0.599 < RII < 0.73.

Table 4. *Quality Assurance Practices.*

S/No	Quality assurance practice	RII	Rank
1	Third party certification	0.92	1st
2	Adequate budget is always allocated for activities	0.78	2nd
3	Implementers always pay attention to needs of clients	0.72	3rd
4	Employees are motivated in every firm	0.67	4th
5	There is quality appraisals in the firm	0.62	5th
6	There are changes in administration	0.52	6th
7	Customers are always satisfied about quality	0.46	7th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

Other quality assurance factors such as changes in administration (RII=0.52) and customer's satisfaction about quality (RII = 0.46) are insignificant since RII < 0.599.These findings are in agreement with [35])who pointed out that quality assurance is easily compromised and frequently lost since construction firms rely heavily upon the individual contributions to implementation from each designer, contractor, supplier and sub-contractor.

4.4. Extent to Which Quality Management Is Practiced in Building Projects

The second objective of the study sought to establish the extent to which quality management is practiced in building construction projects in Kamwenge district. The research undertaken on building construction projects in Kamwenge district revealed in Table 5 that that testing materials before use with highest RII=0.95 was ranked top. This research revealed that skilled personnel (RII= 0.94), regular meetings of staff (RII= 0.91), meeting general construction standards (RII= 0.89), clearly defining goals and objectives (RII=0.82) and employing experienced worker (RII= 0.78) are critical since RII ≥ 0.73. This implies that they have high effect on the quality management practices of building projects in Kamwenge district.

Table 5 further shows that well-defined roles and responsibilities of workers (RII= 0.71) ranked 7th, training and educating of team members on quality (RII= 0.66) ranked 8th and sub-contractor's involvement in the quality process (RII=0.62) ranked 9th had moderate effect on the quality management of projects and were significant since 0.599 < RII < 0.73. Table 5 still indicate that building of good storage facilities (RII=0.51) ranked 10thhas less effect on quality management practices of projects since RII < 0.599.

Table 5. *Extent to Which Quality Management is practiced.*

No	Statement	RII	Rank

1	Testing materials before use	0.95	1st
2	Having a skilled work force	0.94	2nd
3	Regular meetings of staff	0.91	3rd
4	Meeting general construction standards	0.89	4th
5	Clearly defining goals and objectives	0.82	5th
6	Employing experienced worker	0.78	6th
7	Well-defined roles and responsibilities of workers	0.71	7th
8	Training and educating of team members on quality	0.66	8th
9	Subcontractors involvement in the quality process	0.62	9th
10	Building good storage facilities	0.51	10th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = significant, RII < 0.599= Insignificant

4.5. Challenges of Implementation of Quality Management in Building Projects

The third objective was to assess the challenges of implementation of quality management in construction projects in Kamwenge district. The research undertaken established that poor designs was the most critical challenge on the facing the quality management of construction projects with relative importance index of 0.94 and was ranked top challenge of construction projects as indicated in Table 6.

4.5.1. Quality Planning Challenges

From the summary of results in Table 6, it can be observed that the key challenges that critically affect the quality in building construction projects in Uganda were; Poor designs (RII=0.94); lack of proper equipment available for use (RII=0.93), lack of enough knowledge of the project (RII= 0.91) and poor scheduling of projects (RII= 0.84) respectively. Table VI further shows that setting unrealistic deadlines (RII = 0.72) and poor health standards at the site (RII=0.63) significantly affect the quality planning of projects since 0.599 < RII < 0.73. The research, however, revealed that three (3) factors had minimal effect of quality planning and they include; bureaucracy of clients (RII= 0.52), poor estimates (RII=0.46) and clients setting of unrealistic deadlines (RII=0.42).

Table 6. Quality Planning Challenges.

S/N	Quality planning challenges	RII	Rank
1	Poor designs	0.94	1st
2	Lack of proper equipment available for use	0.93	2nd
3	Lack of enough knowledge of the project	0.91	3rd
4	Poor scheduling of projects	0.84	4th
5	Setting unrealistic deadlines	0.72	5th
6	Poor sanitation and health standards at the site	0.63	6th
7	Bureaucracy of clients	0.52	7th
8	Poor estimates	0.46	8th
9	Clients setting of unrealistic deadlines	0.42	9th

Key: RII ≥ 0.73=critical; 0.599 < RII < 0.73 = Significant; RII < 0.599= Insignificant

These findings are in line with [36] who revealed that the main causes of material and equipment procurement delay in quality management were organizational weaknesses, suppliers' defaults, governmental regulations, and transportation delays. However, [21] contends that construction project fails due to time and cost overruns resulting from; poor field investigation, under–estimates, lack of experience, inadequate project analysis, and poor investment decisions. Poor planning for implementation entails inadequacies in time plan, resource plan, equipment plan, coordination, organization, cost planning and improper pre/post contract actions. Furthermore, findings are in agreement with [37] who claimed that that inefficient and ineffective working delays, low resources productivity, change in scope, affects the planning of buildings. [37]further argues that unclear objectives, unworkable schedules, failure to identify critical items, lack of understanding of operating procedures, and ignorance of appropriate planning techniques are all a manifestation of poor planning and poor management.

4.5.2. Quality Control Challenges

Table 7.Quality Control Challenges.

S/No	Quality control challenges	RII	Rank
1	Lack of management's commitment	0.96	1st
2	Lack of enough funds	0.92	2nd
3	It is very expensive in testing materials	0.87	3rd
4	Poor testing procedures	0.86	4th
5	Delay in delivering materials	0.72	5th
6	Stakeholder's influence	0.68	6th
7	Poor conduct of review meeting	0.59	7th
8	No good stores at the site	0.56	8th
9	No site safety measures	0.45	9th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

Results in Table 7 indicate that lack of management's commitment was a critical challenge affecting quality of building projects with RII of 0.96 and was ranked top challenge critically affecting the quality control of construction buildings. Furthermore, from table 7, the challenges that critically significantly affect the quality control in construction projects are; lack of enough funds (RII = 0.92), very expensive in testing materials (RII = 0.87), poor testing procedures (RII = 0.86), delay in delivering materials (RII = 0.72) and stakeholder's influence (RII = 0.68) since RII > 0.599.These challenges are in agreement with [38] who revealed that contract managers often face challenge of quality management due to unclear project scope, and unrealistic timeline and budgets in controlling the quality of construction buildings.

4.5.3. Quality Assurance Challenges

Results from Table 8 indicate that lack of skilled personnel for implementation (RII=0.97) was a critical challenge affecting quality assurance of construction projects in Kamwenge district. Challenges such as; lack of a quality assurance team to lead the process (RII = 0.92), high labourturnover in the firm (RII = 0.93), poor security in the area (RII = 0.86), no enough experience of workers (RII = 0.82), poor decision making from clients (RII = 0.85) and no timely completion of each phase (RII = 0.62) respectively greatly affects the quality assurance of construction projects as presented in Table 8 since RII > 0.599. [39] foundout that organizational segmentation, reluctant managers, industrial relation and short term mission are some of the challenges of TQM implementation. [40]also pointed out that organizational culture, lack of management commitment, lack of teamwork, poorly thought out plans, focus on short term profit, poor measurement techniques, lack of education and training programs, employee fear of losing their jobs are some of the barriers of TQM implementation.

Table 8. Quality Assurance Challenges.

S/No	Quality Assurance challenges	RII	Rank
1	Lack of skilled personnel's for implementation	0.97	1st
2	Lack of a quality assurance team to lead the process	0.92	2nd
3	High labour turnover in the firm	0.93	3rd
4	Poor security in the area	0.86	4th
5	No enough experience of workers	0.82	5th
6	Poor decision making from clients	0.85	6th
7	No timely completion of each phase	0.62	7th

Key: RII ≥ 0.73=critical, 0.599 < RII < 0.73 = Significant, RII < 0.599= Insignificant

4.6. Filling the Gap in Construction Projects

The study established that despite the identified pitfalls in procurement planning processes, the respondents had faith in the correction of the anomalies and loopholes identified in the planning process and made suggestions which have been incorporated in the Framework developed by this study to close the gaps quality management practices in Kamwenge district. According to Figure I, building construction should under the following phases for to maintain quality:

i) Initiation Phase

This is the first phase of the construction project and in this phase, the project objective or need is identified. A feasibility study is conducted to investigate whether each option addresses the project objective and a final recommended solution is determined. Once the recommended solution is approved, a construction project is initiated to deliver the approved solution and a project manager (District engineer) is given an approval by CAO. The major deliverables and the participating work groups are identified, and the project team begins to take shape. Approval is then sought by the project manager to move into the detailed planning phase. Stakeholders that always participate at this phase are CAO, district engineers, district planner and community represented by political leaders.

ii) Planning Phase

The planning phase, is where the building project solution is developed in as much detail as possible and the steps necessary to meet the building project's objective are planned. In this step, the District planner, district engineer, CAO, Political leaders identifies all of the work to be done. The building project's tasks and resource requirements are identified, along with the strategy for producing them. A project plan is created outlining the activities, tasks, dependencies, amount needed and timeframes. District engineer, procurement officers, planners and Chief finance officer coordinates the preparation of a project budget by providing cost estimates for the labour, equipment, and materials costs. Finally, a quality plan is documented, quality targets provided, assurance, and control measures, along with an acceptance plan, listing the criteria to be met to gain customer acceptance.

iii) Implementation stage

During the third phase, the building project plan is put into motion and the work of the project is performed. Progress is continuously monitored and appropriate adjustments are made and recorded as variances from the original plan. District engineer spends most of the time in this step. During project implementation, contractors are carrying out the tasks, and progress information is being reported to the Chief Administrative officer. District engineer uses this information to maintain control over the direction of the project by comparing the progress reports with the project plan to measure the performance of the project activities and take corrective action as required of him. Throughout this step, project funder and other key stakeholders should be kept informed of the project's progress according to the agreed-on frequency and format of communication. Progress reports should always emphasize the anticipated end point in terms of cost, schedule, and quality of deliverables. Each project deliverable produced should be reviewed for quality and measured against the acceptance criteria.

iv) Closing Phase

During the final closure, or completion phase, the emphasis is on having over the final deliverables to the community, handing over project documentation to the business, terminating supplier contracts, releasing project resources, and commissioning of the project.

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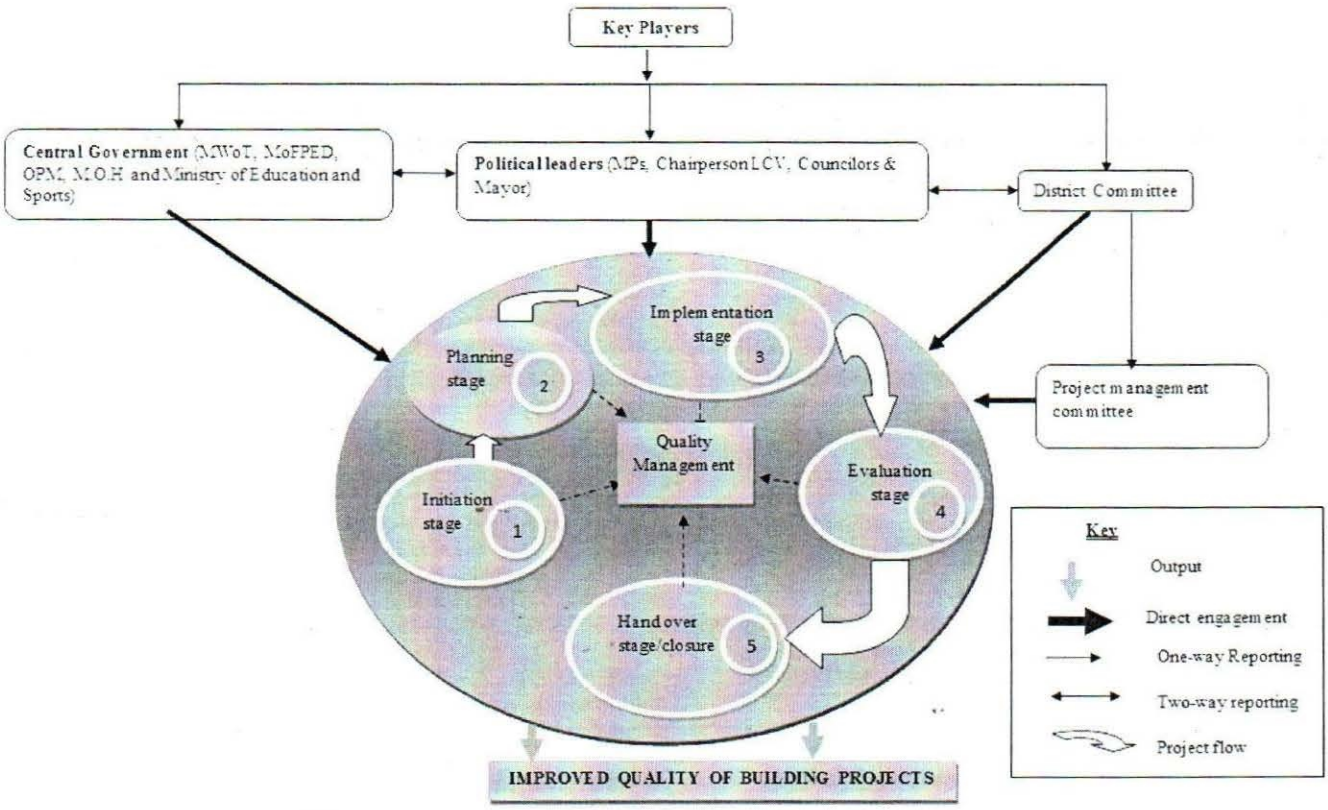

Figure 1. *Developed Framework for Improving Quality Management of Buildings Projects.*

4.7.Role of each Stakeholder

Central Government

Quality management process involves two ministries that include MoWT and MoFPED, MoFPED is charged with allocating funds to DLGs through CAO and District engineer. MoWT is responsible for supervision, monitoring and evaluation of performance of construction projects, making follow ups, supervision and audits of contracted projects. The Office of the Prime Minister is charged with monitoring and evaluation.

CAO

This is the chief accounting officer for the whole project. He is charged with authorizing funds that are used in every activity of building projects.

District Engineer

This charged with supervising the whole process of construction projects from initiation stage to handover. He is also charged with maintaining the project to reduce defects in the project.

4.8.Closing the Gaps in the Quality Management Process

Training of Staff

In the Framework (Figure 1), the researcher suggests that the only one way of closing the gaps in the quality management practices is by training staff on short courses. The training opportunities are provided for the purposes of enhancing the concerned intervention groups with skills and capacity to implement and maintain quality as indicated by doted black arrows. This could take inform of refresher quality training that could be organized at the district or outside the district. This could help to maintaining quality in all stages of the building construction projects.

Revising the budgetary allocations

Budget allocations are done by central government and in order to maintain quality of buildings. In closing the gaps in quality management, budget for building projects should be increased to because Kamwenge district has been facing a challenge of poor allocation of resources. In other words, more pressing issues like quality management should be given first priority with big budget. From the framework, this is indicated by purple arrow from the ministry to DLGs represented by CAO.

Providing Logistics to relevant stakeholders

This is what enables the relevant stakeholders to perform their duties in building construction projects for example supervision vehicles, material testing kits for quality assurance, protective gears, equipment like concrete mixers, excavators and many more, therefore, the central government/funder should provide the necessary logistical to Kamwenge Local Government to support the force account mechanism.

4.9. Conclusions and Recommendation

The study then concluded that the top most challenge affecting quality management of construction buildings was poor designs in construction projects in Uganda. The study recommended that proper procurement methods should be adhered to, there should also be third party certification, material testing should be done before actual implementation of works and there should be a quality assurance team to ensure quality of building construction projects in Uganda.

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