

**BENCHMARKING CONSTRUCTION AUDITING: A  
FRAMEWORK FOR ASSESSING CONSTRUCTION PROJECTS  
PERFORMANCE IN TANZANIA**

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**MSc. (Construction Economics and Management)**

**Ardhi University**

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**BENCHMARKING CONSTRUCTION AUDITING: A FRAMEWORK FOR  
ASSESSING CONSTRUCTION PROJECTS PERFORMANCE IN  
TANZANIA**

**By**

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**A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the  
Degree of Master of Science (Construction Economics and Management) of  
Ardhi University**

**Ardhi University  
November, 2022**

### **CERTIFICATION**

The undersigned certifies that she has read and hereby recommends for examination a dissertation titled “**Benchmarking Construction Auditing: A Framework for Assessing Construction Projects Performance in Tanzania**” in fulfillment of the requirements for the degree of Master of Science (Construction Economics and Management) of Ardhi University.

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(Supervisor)

Date: \_\_\_\_\_

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May the Almighty God bless you all!

**DEDICATION**

To the Virgin Mary; the Mother of All.

I am grateful for your prayers.

## ABSTRACT

The absence of audit standards has been noted as an obstacle towards achieving the envisioned goals, including in the construction industry. Hitherto, in Tanzania, performance audit of public construction projects is done by various institutions, all of which have their own varying indicators, yielding potentially varying outputs, in piece meals, and in some cases less detailed. The aim of this study was to synthesize, from the existing guidelines, a harmonized audit framework for construction projects performance in Tanzania, towards enhancing the envisioned goals.

A sequential exploratory mixed method was utilized. The first set of performance indicators was identified through a review of four (4) key audit institution guidelines, including National Audit Office (NAO), Public Procurement Regulatory Authority (PPRA), the National Construction Council (NCC), and the Ministry of Finance and Planning (MoFP), and mapped onto the five commonly acceptable phases of a construction project (i.e., Planning, Design, Procurement, Construction, and Completion & Close-out), to examine their adequacy. A follow up interview with 9 purposively selected auditors who had worked with at least two of the four audit institutions was conducted to further refine the indicators. From the contemporary literature, additional indicators were identified and mapped along to synthesize a harmonized framework. The framework indicators were then tested through a survey of practicing auditors sampled through a chain referral method, yielding a total of 43 fully completed questionnaires. The qualitative and quantitative data were analyzed through qualitative content analysis and descriptive statistics, with the aid of IBM SPSS version 25 respectively.

A harmonized framework was then synthesized, including five phases (*i.e. planning, design, procurement, construction, and closeout*), along with their respective significant indicators. The framework was validated through a purposively selected sample of auditors who had audited more than 20 projects and had confirmed their willingness to participate. Validation Results showed that all indicators were significant and worthy considering during performance audits. The study further recommends that, for consistency, auditing practices be monitored by a single institution, NAOT, since it is the one mandated by the law to conduct audits in Tanzania.

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**LIST OF ABBREVIATION**

BOQ	Bill of Quantities
GCC	General Condition of Contract
KPIs	Key Performance Indicators
MoFP	Ministry of Finance and Planning
NAOT	National Audits Office of Tanzania
NAO	National Audits Office
NCC	National Construction Council
PPA	Public Procurement Act
PPE	Personal Protective Equipment
PPRA	Public Procurement Regulatory Authority
QA	Quality Assurance
RII	Relative Importance Index
SCC	Special Conditions of Contract
VOs	Variation Orders
TB	Tender Board

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

The purpose of project auditing is to ascertain the fair administration of the project cost and identify lessons learned that can help improve the performance of a project. It is also connected to increasing the performance of future projects by conducting a forensic review to uncover problems to be avoided (Usman & Sani, 2015). Project performance is the most crucial issue in the construction industry that is mostly benchmarked through key deliverables such as time, cost, and customer satisfaction, to measure the project success. Due to its complexity in nature, as it involves a large number of participants such as clients, consultants, contractors, shareholders, stakeholders, regulators and so many, a project manager must effectively perform his job with the intended efficacy (Nyangwara & Datche, 2015).

Cai et al (2012) defines auditing as a planned and documented activity by a qualified expert to determine the objectives evidence, compliance with procedures and its adequacy, or applicable documents and the effectiveness of its implementation through a critical examination, investigation, or evaluation. Auditing worldwide was started in the mid of 1800s and 1900s where it was only to check the conformance. But currently, auditors do not look at the conformance and credibility of financial statements only but go further and provide value-added services (Heang & Ali, 2008).

Ibiamke et al (2016), Nalewaik (2007), and Supplemental guidance (2012) emphasize that to ensure high ethical standards, stakeholders such as owners, audit committees should introduce and promote proactive strategies such as technical or forensic auditing. This is because of development projects are largest and involving most complex financial expenditures as it consumes much time, expensive and taxing on the administrative infrastructure. Construction projects audit may produce measurable cost drops for the owner through the recovery of overcharges and identification of errors as construction projects are subjected to considerable financial risks for both the owner and the contractor, therefore any reduction of those represents cost-saving (Nalewaik, 2007).

Lack of recognition of audit on construction projects has led to bad procurement practices, fraud, inadequate designs, poor quality works, failure to attain value for money, poor project inception and initiation. This has direct effects on the interest of clients for being unsatisfied with the final product, this is for both developed and developing countries (Bondinuba et al,

2017). In line with that Wang (2017) pointed out that audit of construction projects is quite complex as it faces various obstacles, lack of perfect audit management system and ignoring of audit management system being the prone challenges.

Rauf (2019) stated that auditors are faced with different challenges while auditing mega projects notwithstanding that they are from the contractor's or developer's side. The study went further and suggested that to overcome those challenges there is a need to adopt suitable and effective audit strategies that will help the auditors. Not only that but also the development of effective audit methodologies will assure all stakeholders as they expect to have value-added recommendations that are fruitful in the management of the project and action plan.

Moreover, Liu (2015) in the study of auditing of tender documents for construction projects suggests the use of a checklist as an approach while auditing the tender documents. The checklist includes a definition of the scope of tender, quality, and duration of the project, rights, and responsibilities of client and contractor, a special requirement for technical standards, preparation and review of bills of quantities, and dispute resolution issues.

Auditing is very important in ensuring the organization is performing well per the rules and regulations set. However, it is faced with several challenges that make it ineffective. When assessing the challenges of internal auditing in the public sector, Kapepo (2017) found that lack of audits standards and lack of internal audit framework are among the key challenges facing internal audits in Namibia. The study recommends the formulation of a regulatory framework to enhance the performance of auditing in the public sector.

Furthermore, Usman & Sani (2015b) in their other study on professional perception on contract audit systems in construction projects found out that most of the construction contract audits are limited to appraisals related to finance. It was recommended that there should be comprehensive training for the professionals to enhance their efficiency in contract auditing. Also, operating institutions should establish a good appraisal system that responsible organs shall make it compulsory for all projects to be audited before commencements.

The auditing process in Tanzania, particularly the one carried out by Public Procurement Regulatory Authority (PPRA) is guided by the Public Procurement Act 2011 and its Regulations of 2013, along with their amendments. "Regulation 88" provides that procuring



entities with high rates of complaints or misconduct in procurement proceedings and those with cases that require investigation will be included in the list of those entities that will be audited. The selected procuring entity before the investigation will be required to make available all necessary documents that will enable the auditors to conduct their task efficiently (Simaya & Maro, 2018).

National Construction Council (NCC) 1991 produced a guideline for technical auditing for construction projects, but the guideline is still missing some important indicators when compared to other guidelines by PPRA and National Audits Office of Tanzania (NAOT). The missing indicators include contractual documents such as performance guarantee and advance payment guarantee that should be assessed during the construction stage, likewise procurement plans and project budget at the planning stage. Also, the close-out phase is missing in that guideline when compared to NAOT and PPRA. Furthermore, the NCC guideline does have a procurement phase as NAOT and PPRA, where auditors check the compliance with Public Procurement Act and its Regulations. (Refer to Table 1.1). Moreover, other institutions that are conducting audits such as NAOT, PPRA, Ministries, and others they have their guidelines and areas to look at. For instance, PPRA is much focused on value for money and compliances (PPRA, 2010). Besides, NAOT under Section 28 of the Audit Act of 2008 also focuses on value for money as PPRA does to ensure that there is efficiency, economy, and effectiveness of any expenditure by a public body or institution. This shows that there is a need of harmonizing auditing practices in Tanzania to formulate the standardized framework that can be used by any institution to assess the performance of public projects.

Lack of standard guidelines for performance auditing that ensuring the project has been audited in all aspects may lead to a misjudgment on the performance of the project, because there are several standards to judge the performance of the project such as cost, time, quality, risk management, health and safety, environmental aspect and the like. Fung (2017) points out that errors in auditing may affect the supervision of the project, also project stakeholders may lose confidence in the cost of the project.

Auditing standards are very important and should be complied with in cases where there is a matter of material importance and its interpretation is technical. For auditing institutions auditing standards are so important because those institutions act as "watchdogs" for public interests. According to the Audit Procedures Manual (2006), public awareness has increased

currently plus the political influence on issues of accountability; hence, audits should be of higher quality and consistency. Therefore, this calls for a harmonized framework of audit practices in Tanzania to guide auditors to check the most important issues during auditing of construction projects' performance.

### **1.2 Problem Statement**

Despite having construction project performance audits in Tanzania, however, every institution has been conducting audits on public projects basing on individual guidelines. This implies that there is no a harmonized system of auditing public construction projects. Kapepo (2017) and Rauf (2019) pointed out that the lack of audits standards and audit framework are the impediments towards achieving the intended goals of auditing. Kombe (2015) further emphasizes that there is a need to create an enforceable guideline that will be used for technical auditing in Tanzania. On top of that Wang (2017) demonstrates that an imperfect project auditing system is a major challenge for the whole construction project to be supervised effectively. Likewise, through construction project audit the project cost can be truly reflected, this will guarantee the investors that their interests are protected. So, a perfect audit management system is much required. OBONDI (2020) noted that risks are poorly audited in construction projects because there is no systematic audit of risks by project managers.

Therefore, there is a need to harmonize construction project audits practices in Tanzania. To address this problem this study will develop an auditing framework that will encompass key criteria for assessing the performance of construction projects in Tanzania.

### **1.3 Knowledge Gap**

A standard guideline is important when conducting an audit as it acts as a road map for auditors to ensure that all aspects concerning the project performance have been captured and assessed. Supplement guide (2012) noted that having standard audit guidelines will minimize the risk of fraud in the public sector. Wang (2017) further supports the idea of having a basic auditing system because it gets the construction projects executed smoothly and everyone becomes comfortable with the construction costs.

Extant literature has been conducted that addresses the issue of auditing in construction projects, meanwhile identifying key performance indicators (KPI's) (Vancouver Regional Construction Association, 2018; Fonnum, 2018; The KPI Working Group, 2000; Habib, et al 2019). The literature analyzes how such indicators affect performance of construction

projects, but mostly in separation. For example, Matto (2017) did a review of audit reports by analyzing on how internal control, staff capacity, and corruption can lead to underperformance of procurement functions in Local Government Authorities.

Contract auditing practices is very important at the stage where the contract is active compared to other stages in construction. (Usman & Sani, 2015), this study has only recommended extensive auditing for only one stage of construction when the contract is active. Stages like planning, design, procurement, and closeout, are not addressed.

Jamadagni & Birajdar (2017) did a study on construction quality auditing, highlighting the factors that affect the project quality. Some other studies have highlighted the challenges facing internal auditors when conducting auditing (Kapepo, 2017; Rauf, 2019). Furthermore, Manaf (2010), Nalewaik (2007), Ibiame et al (2016), and Supplemental guidance (2012), pointed out the impacts of performing audits on the projects and organization in general. Meanwhile, Nalewaik & Mills (2014) developed a model that will guide performance audits in construction projects. However, the developed model inadequately captures key indicators for judging the performance of the project, including business, environmental performance, and the procurement stage.

Palaneeswaran et al (2014) conducted a study on how design audits can reduce errors and reworks during the construction stage. This study only captured the design aspect, hence, cannot be used when auditing the entire project. Other aspects such as good planning and procurement are not addressed. Cole and Rousseau (1992) and Glasson et al (2020) covered the aspect of environmental audits in a construction project. OBONDI (2020) did a study on the impact of risk audit on the performance of construction projects. The study found out that there is a positive and significant relationship between risk audits and project successes. Some of the studies have highlighted the challenges that are facing internal auditors when they are conducting auditing (Rauf 2019).

The aforementioned literature, while rich in construction auditing practice, does not provide a comprehensive guideline that addresses all stages of a construction project in its entirety. Despite the stated importance, Nalewaik and Mills (2014) noted that project performance audit standards are almost non-existent. Little has been documented about the audit standards for assessing construction projects performance. There is a paucity of knowledge specifically in developing countries, Tanzania in particular, on how different indicators and audits systems can be harmonized to develop a standard framework that will capture all aspects.

Therefore, this study evaluates different audits guidelines and maps their key indicators onto five commonly acceptable stages of a construction project. The study finally uses the identified indicators to synthesize a framework that harmonizes audit practices of construction project performance within the Tanzanian context.

## **1.4 Objectives of the Study**

### **1.4.1 Main Objective**

The main objective of this research is to synthesize a harmonized framework for auditing construction project performance in Tanzania.

### **1.4.2 Specific Objectives**

- i. To evaluate the current practices of auditing construction projects performance in Tanzania.
- ii. To identify the critical indicators for auditing construction projects performance in Tanzania.
- iii. To synthesize a framework that harmonizes the current practices of auditing construction projects performance in Tanzania towards enhanced efficiency and consistency of audits results.

## **1.5 Research Questions**

- i. What practices are currently applied in auditing construction projects performance in Tanzania?
- ii. What key indicators are to be addressed in construction projects performance audits in Tanzania?
- iii. How should the current audit approaches of construction projects performance be harmonized for consistency and efficiency?

## **1.6 Significance of the Study**

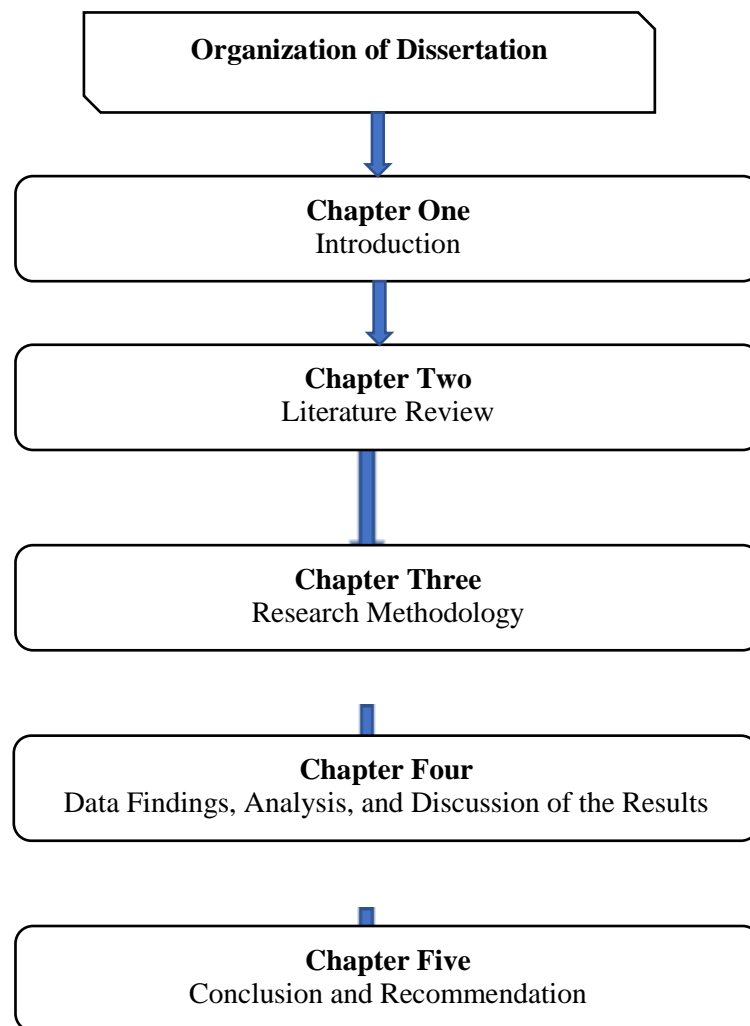
This study contributes the knowledge in performance audits of construction projects in Tanzania, and developing countries at large. It will assist government institutions that perform construction project audits and independent auditors to be aware of critical audit indicators that should be assessed during audits. Furthermore, it will enable audit institutions to have consistency results because this study develops the framework that harmonizes the current practices of auditing construction projects performance in Tanzania.

### 1.7 Scope of the Study

This research has studied only four institutions that perform audit in Tanzania, namely National Construction Council (NCC), Public Procurement Regulatory Authority (PPRA), National Audit Office Tanzania (NAOT) and Ministry of Finance and Planning (MoFP). The rationale of choosing this is they are major institutions that conduct audit in Tanzania, also time was a limit. Moreover, this study is limited to public building construction projects.

### 1.8 Organization of Dissertation

This study is organized into four (4) chapters. Figure 1.2 shows the structure and arrangement of the chapters.



**Figure 1.1 Organization of Dissertation**

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter reviews the literature on the key definition and concepts of auditing of construction projects. First, this chapter reviews definitions of audit by various scholars, the historical background of audit generally, and in the construction industry in particular. Types of audits were identified to equip the researcher on types of audits centered on a performance audit of projects. The chapter also discusses the key performance indicators of a construction project as it is necessary to identify those indicators to enable a researcher to acquire enough knowledge on what should be checked when assessing the performance, a construction project. The chapter has extended to cover the project life cycle phases by discussing the important parameters or items in which the auditors should check when conducting audit.

#### **2.2 Meaning of Auditing**

Hyytimen & Kallunki (2014) define auditing as a systematic process purposely for obtaining and evaluating evidence regarding economic actions and events. In order to establish the degree of correspondence between those proclamations and established criteria and sharing the findings with the users.

#### **2.3 Historical background of auditing**

The evolution of auditing was rapidly taking place after industrial evolution in the 18<sup>th</sup> century where there was a great growth of joint-stock ventures. This resulted in separation of ownership of companies and management; therefore, audits were introduced to provide trustworthiness of the financial information submitted by the managers to the shareholders (Kumar & Mohan, 2015). According to Ajao et al (2016), the primary function of auditors by then was to assist the principals to detect if there is any kind of fraud in financial statements submitted by the agent as auditing was emerged to separate the roles of agents (managers) from the principal (shareholders).

Teck-Heang & Ali (2008) opined that the evolution of auditing shows that its aim and roles of auditors are constantly changing due to the reasons such as decisions of courts, the collapse of big companies, and the advancement of technology. In conclusion with the aforementioned evolution of auditing has reached a point whereby auditors may continue with the traditional standards or change the mode and opt for future audit approaches. This will require regulators, auditors, or institutions that perform audits to changes the modality of

audits, provision of education and analytical method, adoption of the entire population analysis instead of using samples, and mandating the provision of auditing data standards (Byrnes et al, 2012).

## **2.4 Types of Audits**

According to Hayes et al (2005), there are three classifications of audits that are audits of financial statements, operational audits, and compliance audits.

### **2.4.1 Audit of financial statement**

This scrutinizes the financial statements to check whether they provide a true and fair view as per specified standards with a specific country or international standards.

### **2.4.2 Operational Audits**

This is purposely done to examine the specific unit within an organization with the aim of measuring its performance. Under operational audits, the efficiency and effectiveness of an organization are evaluated, whereby effectiveness checks whether the organization meets its goals and objectives. Organization efficiency is measured by assessing the utilization of resources to attain its goals. This form of audits is not limited to accounting only but it can further assess the organization structure, marketing, computer operation, and market goals.

### **2.4.3 Compliance Audits**

This kind of audit is purposely done to assess certain organization's procedures to check if the organization is following certain rules, procedures, regulations, or policies set by certain authorities. For instance, Tanzania has the Public Procurement Act of 2011 and its Regulations of 2013 where all procuring entities should adhere to. Compliance audits are mostly related with public projects, because, the government usually sets certain rules and regulation to be followed by different entities/organization or any activities undertaken.

However, Hayes (2005) differs a little bit from other authors in the categorization of audits. Supplement guide (2012) and Matthews & Komoto (2010) identified other types of audits which are performance audits.

### **2.4.4 Performance audits**

General Accepted Government Auditing Standards define performance audits as actions that provide assurance or conclusion based on an assessment of sufficient, suitable evidence against definite criteria such as specified requirements, measures, or defined business practices.

Supplement guide (2012) opined that performance audits objectives might assess the following;

- Effectiveness- assess program accomplishments, to check whether the program has achieved its intended goals.
- Efficiency-this, evaluate the productivity, unit cost, or indicators such as utilization rates, backlogs, service wait times.
- Economy- examines the efficient utilization of available resources such as money, labor, and equipment or facilities without affecting the quality of the product produced. This is the issue of cost control.
- Compliance- it checks whether the organization or activity carried is conforming to the laws, rules, regulations, contract requirements, or policies and procedures.
- Risk assessment- it is very important to identify risks that may hinder the achievement of intended goals and objectives and determine the way forward to deal with the identified risk.

Other different categories of audits as identified by Kumar and Mohan (2015) are; external audit, internal audits, forensic audit, investigative audits, and information systems audits as elaborated next.

An external audit can either be a financial or statutory audit. It is carried by an independent auditor out of the organization to check the trustworthiness and fairness of financial statements. Internal audit is known as operation audit as it is carried by the organization employee and reports the results to the board of directors. The main purpose is to provide the guarantee of the efficacy of internal controls, risk management, and governance to achieve company goals.

Forensic audits come where there is a need for a detailed investigation on matters such as fraud, money laundering, insider trading, tax evasion, and quantification of loss in case of an insurance claim. It requires investigative skills as it may lead to legal implications. Investigative audits are not far forensic audits the only difference is investigative audits focus on alleged violations of laws, regulations, or policies. An information system audit is based on assessing the information systems their use by checking system input, output, process control, backup, and recovery plan.



## **2.5 Auditing in Construction Industry**

According to Usman & Sani (2015), the construction auditing service is one of the popular kinds of service in the construction management and engineering industry at large. Audits in construction contracts are an internal control tool essentially to maximize capital progress effectiveness. On top of that construction, contract audits have a direct impact on cost management as it reduces project cost and failure. Furthermore, construction audits and their practice are the pivotal and best way of separating good and bad project performance practices from inception to the last stage of a project which is the demolition stage of a construction project (Nelewaik, 2007).

This is to say that construction project audits have purposely emerged to ensure that project achieves the intended goals which are cost-effectiveness, quality, and time. Parallel to that completion of project, is to be done without unethical practices.

### **2.5.1 Auditing in Tanzania Construction Industry**

In Tanzania, there are different institutions that conduct construction performance auditing. Each of the institutions has its own guideline/manual along with varying procedures.

#### **Public Procurement Regulatory Authority (PPRA)**

This is the public organization that is responsible to regulate all procurement activities that take place in Tanzania, to ensure that procedures are followed as per provided Act and Regulations. As per the PPA Act of 2011 section 11, among the powers enacted to PPRA is the authority may commission and undertake investigations and institute procurement, contract, and performance audits. Public Procurement Regulations of 2013, regulation number 88, highlighted the procedures for the PPRA when conduct audits on procurement and contract performance. The following are the procedures identified.

- i. The authority shall inform the relevant procurement entity of its intention to conduct an audit and the compliance indicators should be informed.
- ii. The intended procuring entity shall make available all relevant documents that will assist the authority.
- iii. For easy access to the documents, the procuring entity must properly keep the documents as per authority guidelines.
- iv. After preparing the report the Authority should share it with the procuring entity and the procuring entity must respond within fourteen days.

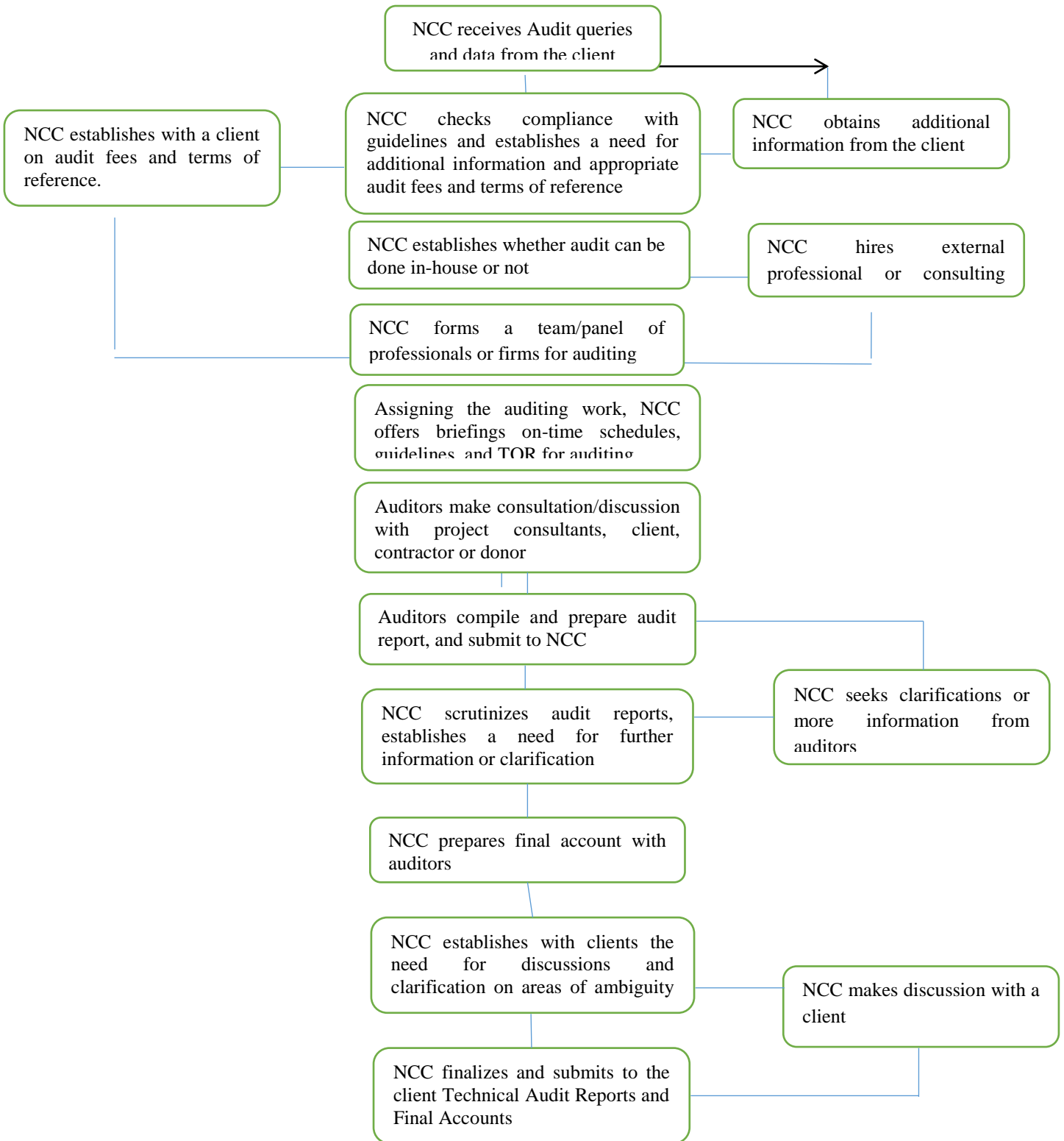
- v. Then the after approval by the boards the authority shall share with procuring entity the report with recommendations.

## **2.6 Selection of Auditors**

Tanzania Public Procurement Regulations of 2013, Regulation 269 states that auditors should be selected based on quality and cost. In this selection, cost will be a substantial factor.

## **2.7 National Construction Council**

National Construction Council (NCC) provides audit services for both public and private entities, the council has set the following procedures for auditing. Figure 2.1 shows the procedures that are followed by NCC when performing a technical audit in construction projects.



**Figure 2.1 Auditing construction flow chart (NCC, 1991)**

## **2.8 Construction Project Key Performance Indicators**

Key Performance Indicators (KPIs) are important factors that are used to measure the performance of construction projects. Most of the construction projects are measured used golden triangle criteria that are time, quality, and cost, that is to say, if the project will be completed within time, cost and quality set that project is successful. But this is not always true because there are other important indicators to look at (Sibiya et al, 2015).

Sibiya et al (2015) find out that apart from time, quality and cost there are other indicators such as project management, materials ordering, handling and management, risk assurance, and quality assurance. Taking & Akintoye (2002) gone further and find that successful construction project performance can be classified into three categories that are procurement, process, and results, whereby factors such as construction time and construction cost, defects, customer satisfaction are considered as results orientation. While the predictability of design cost and time and predictability of construction time and cost falls under procurement. And lastly is safety is considered process-oriented.

Toor & Ogunlana (2010) concur with Sibiya et al (2015) contention that however construction projects should be measured based on time, cost, and quality as key performance indicators there are other important indicators such as safety, efficiency, and precision should be considered too. The author further stated that it is doubtful to say that the project is successful while it does not offer a safe environment to the workers, also it is questionable to achieve the deadlines if the tasks are not accomplished with efficiency and precision.

**Table 2.1 Summary of the Key Performance Indicators (KPIs)**

<b>S/N</b>	<b>AUTHOR/S</b>	<b>KEY PERFORMANCE INDICATORS (KPIs)</b>
<b>1</b>	Latorre et al (2010)	<ol style="list-style-type: none"> <li>1. Cost</li> <li>2. Time</li> <li>3. Safety</li> <li>4. Productivity</li> <li>5. Defects</li> <li>6. Environment</li> <li>7. Investment in staff</li> </ol>
<b>2</b>	Toor & Ogunlana (2009)	<ol style="list-style-type: none"> <li>1. Time</li> <li>2. Cost</li> <li>3. Safety</li> <li>4. Meet specification</li> <li>5. Efficiently (use of resources)</li> <li>6. Doing the right thing (effectiveness)</li> <li>7. Free from defects (high quality of workmanship)</li> <li>8. Conform to stakeholders' perception</li> <li>9. Minimize construction aggravation, disputes, or conflicts.</li> </ol>
<b>3</b>	Sibiya et al (2015)	<ol style="list-style-type: none"> <li>1. Construction time</li> <li>2. Profitability</li> <li>3. Project management</li> <li>4. Material ordering, handling, and management</li> <li>5. Risk management</li> <li>6. Quality assurance</li> <li>7. Client satisfaction</li> <li>8. Safety</li> <li>9. Time predictability</li> <li>10. Productivity</li> <li>11. Procurement</li> <li>12. Construction cost</li> <li>13. Defects</li> <li>14. Human resource management</li> </ol>
<b>4</b>	Butcher & Sheehan (2010)	<ol style="list-style-type: none"> <li>1. Time</li> <li>2. Cost</li> <li>3. Quality</li> <li>4. Health, safety, and environmental</li> <li>5. Absence of claims and disputes.</li> </ol>
<b>5</b>	Chan & Chan (2004)	<ol style="list-style-type: none"> <li>1. Time</li> <li>2. Cost</li> <li>3. Health and safety</li> <li>4. Environmental performance</li> <li>5. Quality</li> <li>6. User satisfaction</li> </ol>

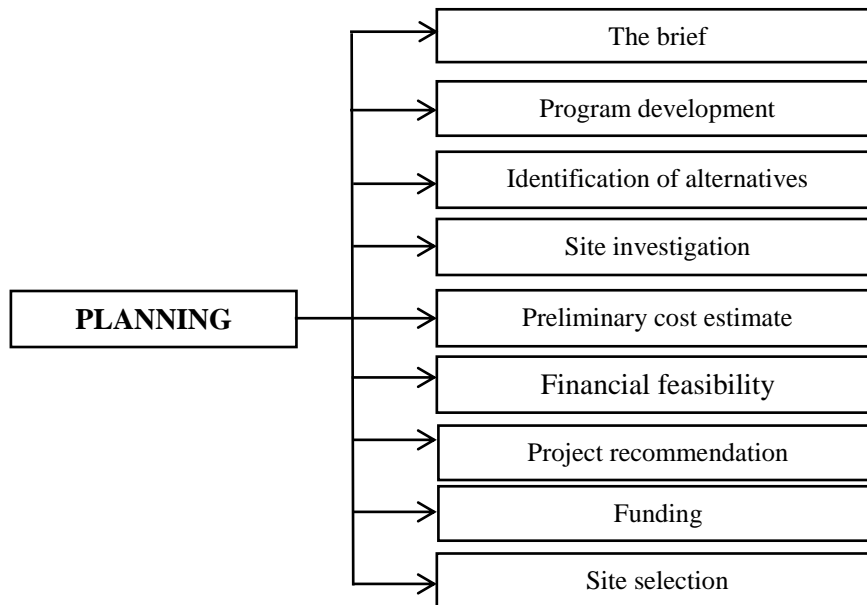
Table 2.1 shows the key performance indicators as identified by different scholars, it indicates that time, cost, quality, safety, environmental are the critical indicators that most of the researchers have discussed.

## 2.9 Stages of construction projects/Project Life Cycle

### 2.9.1 Planning Phase

Adams-Mott (2018) pointed out that construction project audit should be more detailed to ensure that it covers a wide range, pre-construction and planning reviews phase reviews are crucial to ensure the project budgets are maintained.

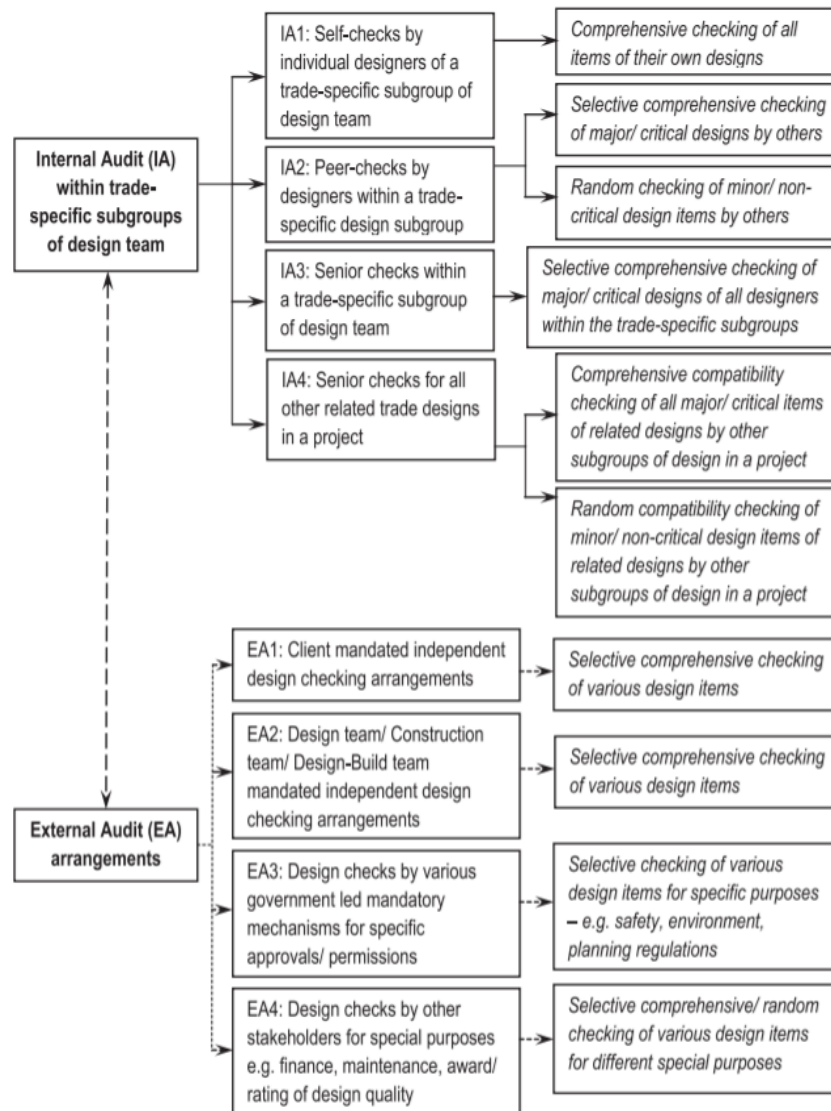
During the planning and feasibility study, stage two important keys should be achieved. Firstly, objectives, purposes, scope, and nature of the project, including project brief and other relevant documents must be identified by both the owner/client and the firm that will carry out the project. Another important key aspect is the relationship between the project owner and the organization that will deliver the project must be formulated.



**Figure 2.2 Planning phase deliverables**

### 2.9.2 Design Phase

Palaneeswaran et al (2014) find out that audits during design are very important, as effective auditing at this stage tends to reduce errors and reworks during the implementation phase.



**Figure 2.3 Design Audits by Palaneeswaran et al (2014)**

NCC technical audit guideline of 1991 have highlighted the items which the auditor should assess when conducting an audit at the design stage of the project, it includes project brief, design standards, design assumptions, structural idealization, design calculations, specification of materials, and method of construction, design drawing, the economy of design solution, compliance to local authority by-law, design considerations for future expansion, considerations for routine and periodic maintenance, and adequacy of infrastructural services.

Bennett (2003) divided the design stage into two parts that are schematic design and design development. For a schematic design, the architect will prepare the preliminary drawings freehand sketched as well as a written report for approval by the owner. The sketches must be compact with the surrounding area, planning, zoning, exterior, appearance, and the general

structural concept. Not only that but also during the schematic design the rough cost estimate should be prepared. In design development, the design professional will submit detailed drawings accompanied by precise cost estimates and a written report which includes technical specifications. Shadan & Fleming (2012) added that during the final design the designer should also have design calculations attached.

Errors in design can extremely affect the performance of the construction project, because it may lead to effects such as delays, wastage, and client dissatisfaction. However, design errors cannot be completely removed, but a proper audit at this stage can reduce some of the effects (Palaneeswaran et al, 2008). Project delivery and procurement method can also be included in design audit knowledge base provisions (*ibid*).

### **2.9.3 Procurement Phase**

In Tanzania, procurement works are governed by the Public Procurement Act of 2011 and its regulations of 2013 are read together with their amendments of 2016. Therefore, procuring entities are expected to comply with the Act and Regulations from the initial stage of procurement up to the award of contract to a winning bidder. For the case of tender documents, there are important areas the auditor or audit team should audit. Liu (2015) outlines the important area to review in tender documents, it includes tender drawings, the scope of the tender, specifications, quality and project duration, rights and responsibilities of employer and contractor, payment arrangements, dispute resolution, review of bills of quantities by assessing the quantities, description of sub-items, coding and measurement units. Review of tender control price is also an important item to crosscheck as it may be on the lower or higher side, this will directly mislead the tenderers (*ibid*).

### **2.9.4 Construction Phase**

Under this phase, the contractor who is procured by Agency (Owner) together with the agency's forces (consultants) construct the project facilities, fabricate and install equipment. Construction is done basing on drawings and specifications prepared during the design stage (Shadan & Fleming, 2012). The construction phase has an uppermost level of activities as it includes a large number of personnel and cashflows. This automatically attract cost overruns due to changes, delays, and disputes. During the construction phase, there are important parameters the auditors should consider when conducting auditing.



**Quality**

Jamadagni & Birajdar (2017) opined that quality is the most important factor during the construction phase, where auditing at this stage is very crucial as it ensures that the quality is maintained and achieved as per specification stipulated. The study further pointed out the factors that affect the project quality and auditors should look upon, those factors are skilled labours, technical staff employed, quality of materials, curing works, materials variance, materials re-use, compliance of work, employee qualifications, and decision making. Shadan & Fleming (2012) stated that the developer quality management plan should include periodic audits to ensure that the Project Manager and Contractor are implementing and complying with the quality plan. Not only that but also re-audit of deficiency parts should be conducted to check if the corrections have been addressed.

**Cost**

General Condition of Contract by PPRA from clause 47 to 64 provides a general guideline of matters of cost control in construction projects. Clause 47 requires the Bills of Quantities to contain items for construction, installation, testing, and commission for work that the contractor will undertake. There can be changes in quantities, in this case, the project manager shall not change the original rate if the initial contract is not exceeding 15%. Also, the variations should be paid based on the rates in the BOQ if the work is similar to what is in the BOQ, for new works the Contractor shall submit new rates.

The condition also requires the Contractor to furnish the Project Manager with an updated cash flow forecast.

**Time**

According to NAOT (2010), there are different ways of measuring delays in construction projects, it can be measured by comparing the original time set with the actual date of completion, comparing between the revised date set with the date of completion or it can be measured with the last revised time if several revisions were made. During auditing, the auditor should check the time variations or delays, causes of delays, and the consequences resulted from delays.

**Health and safety**

Project performance can not only be measured by using the iron triangle that involves cost, schedule, and quality but safety issues should also be addressed. Although increasing the safety environment at the site will result in increased cost but safe working environment

always increases productivity (Latorre et al, 2010). This has also been acknowledged by PPRA through the General condition of contract clause 26.1 requires the contractor to take all reasonable precautions to ensure safety at the site.

### **Risk Assessment**

Risk assessment is the process of identifying the nature and degree of risk, it purposely for underpinning the development of policies and strategies for disaster risk management. Risk assessment is very important in identifying, estimating, and ranking the risk which is likely to occur to a certain project (Rovins et al 2015). In risk assessment, the key information required is context and objectives of risk assessment, extent, and type of tolerable risks, methods, and techniques that will be used for risk assessment. On top of that who will undertake and be responsible for risk assessment, available resources, and mechanism of reporting and reviewing risk assessment (*ibid*). According to Nelewaik & Mills (2014), in project performance audits; risk identification assessment and management are infrequently addressed.

Risk audits are useful to consider the effectiveness of risk management process. Therefore, project managers should ensure that risk audits are performed at an appropriate level as been stipulated in risk management plan (PMI, 2017).

### **Non-completion of works**

According to Mwiya (2009), in case the contractor fails to complete the works under contract on time, the project manager should issue the certificate of non-completion together with a list of unfinished works. An auditor at this stage should ensure that the liquidated and ascertained damages have been charged as stipulated in the contract. Also, the insurer and relevant banks are informed.

### **Environment performance**

Clause 23.1 of General of Conditions of Contract requires the contractor to take all reasonable procedures to ensure that environment is well protected, by limiting damage and nuisance to people and property resulting from pollution, noise, and other results of the activities undertaken by him. Glasson et al (2020) demonstrated that the construction has major impact to the environment if not managed well. Therefore, monitoring and auditing of actual against planned is best approach towards minimization of impact to the environment.

## Document control

This is the overall management of records engendered throughout the construction stage. The site records that are important to control and make sure that are filed in safe custody include but not limited to, request for information, changes, progress reports, quality assurance, and quality control reports, safety management and accident reports, daily site records that include occurrences, weather, equipment, personnel, and communications. Hellard (1993) has highlighted the key items for the auditor to crosscheck when conducting an audit for the project in progress, as shown in Table 3.2.

**Table 3.2 Auditing Work in Progress during Construction Phase**

Construction Phase	Auditor checklist
<b>Construction in progress</b>	Insurance that covers all risks including third parties and neighbor premises
	Reviewed and accepted program of work.
	Progress monitoring to such as time graph, critical path analysis, computer network planning, or target completion dates
	Check if a system of monitoring information-required schedules is in hand
	Are the consultants providing adequate information to the contractor within time?
	Are the consultants supervising or monitoring the site adequately?
	To check if communication with the client is regular and if facilities exist for him to attend the site.
	Ensure that project meeting and design meetings are continuing
	Are the site progress meetings run frequently and formally, with minutes recorded and disseminated?
	Ensure that site inspection are made frequently, both with and without members of the design team.
	Are the Architect instructions/variation communicated to all design team members?
	Ascertain if there would be an agreed maximum value of instructions/variations above which the client must be first consulted.
	Are the valuations prepared on time?
	Is Architect notifying the quantity surveyor regarding any defective work?
	Ascertain if the value of variations is being agreed quickly and as the work proceeds.
	Are the cost forecasts produced frequently basing on any updated information?
	Does the Architect issue the certificate on time?
	Does the client make payment within the stated period?
	Check if there are any tell-tale signs that the contractor may be in financial difficulty
	To check if there are occurring delays in contractor program of works, also to crosscheck if an extension of time is in order and the related cost/delay implications to the project/client.
Ascertain if it is appropriate to recommend deduction of liquidated damages	
Ascertain if the quantity surveyor and contractor are maintaining the momentum of the contract period in settling variations and agreeing on the draft final account.	

### **2.9.5 Closeout Phase**

According to Bennett (2003) many contractors always put less emphasis at the closeout stage of the project as most of the construction projects proceed efficiently up to 95%, and thereafter remain 95% forever. To ensure that the project is closed in a proper way, the phase should be planned, programmed, and must be effectively executed to ensure time, cost, and quality.

Project closeout is the most important stage for the successful completion of a project because any fault during this stage may result in an open project that will require extra time and resources. Also, a closeout is time-sensitive as requires enough time to be committed. Hence, delays to it will result in an overall delay of the project. In the case of cost-related components, ineffective closeout may affect contractor cash flow and profit as it may attract issues of liquidated damages because closeout is the stage where the contractor collects any balance due, such as retention fund (Cabello et al, 2020).

The following are the important items/components that should be adhered to during the closeout stage of the project.

#### **Test and Startup**

The main purpose of doing tests is to provide authentication of functional performance and contract compliance. It involves proof of construction tests/materials tests, installation tests such as air conditioning, electrical, fire, telephone just mentioning a few (Shadan & Fleming, 2012). According to Bennett (2003) amount of testing and startup of the various systems will depend on the nature of the project but mostly involving electrical and mechanical installations. Other tests include fire, communications, lift, heating, and security.

#### **Snag list/ Punch list**

A project manager is responsible to prepare a punch list showing all incomplete or defective works that require remedying by the contractor. Although the punch list does not affect the intended use of the project the contractor is contractually required to complete all the listed defects (Cabello et al, 2020).

#### **Final Account/Final payment and release of Retention**

Clause 67.1 of General Condition of Contract requires the contractor to furnish the Project Manager with a detailed Final Account of the total amount that the contractor considers payable under the contract. The Project manager is required to verify the account up to his

satisfaction then issue final payment due to the contractor within fifty-six (56) days including a defect liability certificate.

### **As-built drawing and Operating and Maintenance Manuals**

According to General Condition of Contract (GCC), clause 68.1 states that the contractor shall supply the employer as-built drawings/operating and maintenance and other related documents during the handover of the project. If the contractor fails to do so by the dates stipulated in the special condition of condition, the Project Manager shall withhold the amount stated in the special condition of the contract from the payment due to the contractor.

### **Risk Management**

Risk management is a continuous process from inception up to the completion of the project where at this stage of project closeout the auditor reviews the procedures taken by the project team to respond to the project risks that may hamper the project cost and time (Mwiya, 2019).

### **Certificates**

At the close-out stage, there is several certificates are issued, it includes payment certificate, practical completion certificate, certificate of occupancy. The general condition of the contract as provided by PPRA *clause 65.1* provides for the project manager to issue a certificate of practical completion of the said work upon request from the contractor. But the Project Manager shall issue that certificate after satisfying himself that the work is practically completed.

Table 2.3 gives a summary of the project phase with their respective items. This is a compilation of some of the items to be checked during the construction project audit. However, there is a minor difference on phase highlighted where other authors do not point to programming as a phase instead procurement is considered as a phase or one among the stages of the construction phase.

**Table 2.3 Phases of the construction program**

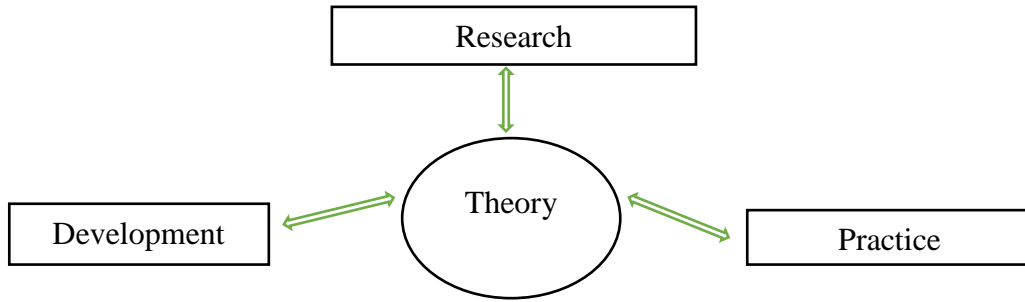
<b>Planning</b>	<b>Programming</b>	<b>Design</b>	<b>Construction</b>	<b>Completion &amp; Close-out</b>
<ul style="list-style-type: none"> <li>• Project scope definition session</li> <li>• Communications process and progress meetings</li> </ul>	<ul style="list-style-type: none"> <li>• Staffing model</li> <li>• Procurement practices</li> <li>• Project control structure</li> <li>• Contractual control</li> <li>• Project scheduling</li> </ul>	<ul style="list-style-type: none"> <li>• Project objective and plans</li> <li>• Project management processes, reporting, and change order control</li> <li>• Design and planning performance</li> </ul>	<ul style="list-style-type: none"> <li>• Project progress and quality</li> <li>• Cost measurement and payment controls</li> <li>• Contractor cost records, financial/budgetary reporting, and control processes</li> <li>• Safety program and insurance best practices.</li> </ul>	<ul style="list-style-type: none"> <li>• Final cost and contract practices</li> <li>• Learning for improvement on future projects.</li> </ul>

**Source: Matthews & Komoto (2010)**

## 2.10 Theoretical Framework

The term "theory" originates from the Greek verb that means "contemplate". Different scholars define theory in their way but they do not differ that much and all fall in common definition as theory is a description of a phenomenon and the interaction of its variables that are used to attempt to clarify and predict (Thomas, 2017). Benny (2015) concurs with Thomas (2017) by explaining that, theories are created to explain, predict, and master the phenomena such as relationships, behavior, or events. Theory generalizes observations and entails an interrelated, articulate set of ideas and models.

There is a strong relationship between theory, research, development, and practice. Together they form an important cycle that allows ideas to be progressively refined as they evolve from the theory to practice than from practice to theory (Swanson & Holton, 2005). Figure 2.4 shows the relationship between theory, research, development, and practice through this linkage there is the generation of knowledge can start at any point within the cycle. A researcher may start at any point and proceed in any direction.



**Figure 2.4 Theory – Research – Development – Practice Cycle. Source: (Ntiyakunze, 2011).**

### **Theory of change**

Theory of change shows how the project, program, or policy may lead to expected results and impacts through a graphic representation. It shows the relationship between the input and output, that is how the inputs to the program, policy, or project may affect the output that is expected. This tool has an important effect on the value of results of auditing as it may help to achieve the following; have a clear knowledge of the audited activities and policies, identify other factors that have a direct relationship with the program, policy, and audited government activities and defining the control points of the audited program (Mafra, 2016).

For a successful audit, a suitable guideline is so important, as it enable the auditor to identify the key criteria to look at when measuring the performance of the project. Theory of change is very useful in Tanzania as it needs improvement on the way audits are conducted, where every institution has its guideline. Moreover, as a country, we need common guideline by improving the existing guidelines and changing others which seems to be too old that is not suitable for the current construction industry. As stated by (*ibid*) a theory of change enabled the identification of the key issues to be evaluated, the key criteria for measuring the advanced activity or government policy, and identifying the program's key elements which have an important role in its success.

Therefore, the theory of change helped this study to develop the criteria that should be used or considered when conducting audits, to ensure that the project has been measured in all aspects.

### **2.2 Existing Construction Audit Framework**

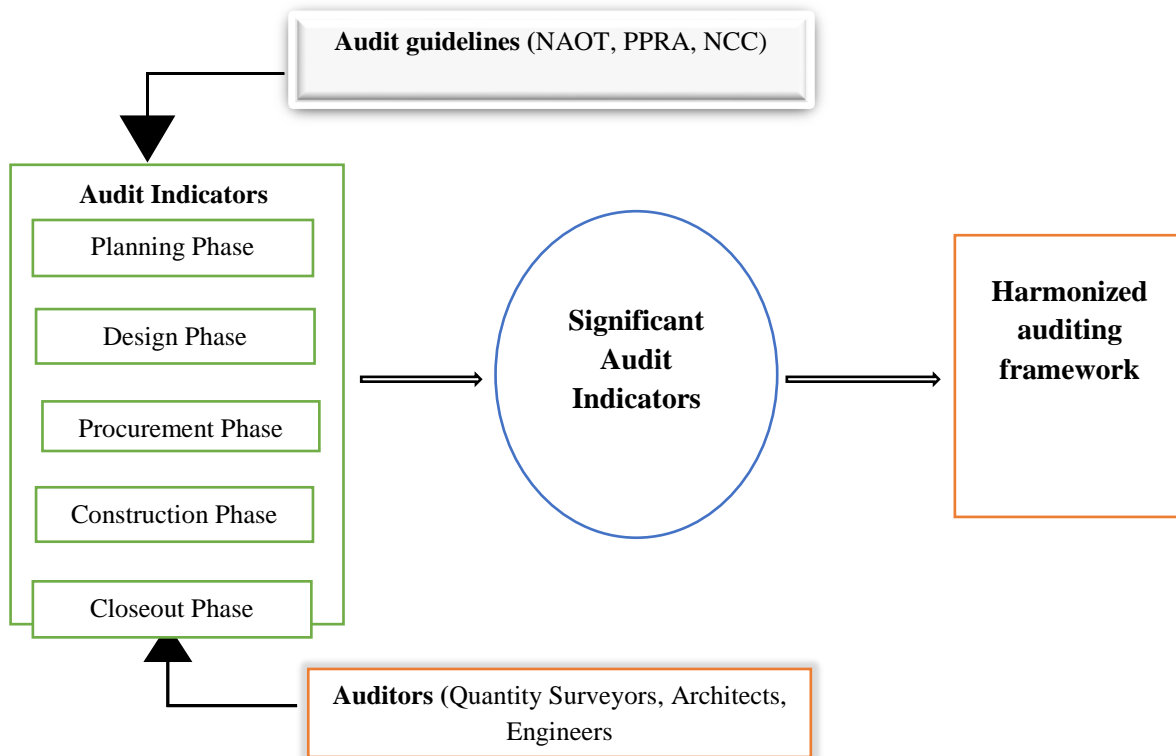
Three existing audit frameworks/models were reviewed in this study. It was observed that some of the audit models are lacking some important indicators which should be considered during performance of the construction project. Also, the framework developed by Nelewaik

and Mills (2014) have listed the project performance audit modules and the modules were grouped into four project lifecycle phases. As compared to other models for instance Mwiya (2009), some indicators such as risk assessment, master cost plan at initiation stage were missing. Another existing model is a modal developed by Mwiya (2009) for technical auditing of construction project. This model has been grouped into three major stages of the construction project which are pre-contract audit, post contract audit and final audits. However, this framework it not a comprehensive as procurement was not in detail. As compared to existing practices in Tanzania audits, procurement is more detailed and there are additional items. Hanna et al (2014) developed a framework that assesses the construction project performance; however this framework is limited to contractors only. This study is therefore, harmonizing existing frameworks and audit practices in Tanzania and develop a comprehensive audit framework to assess performance of construction projects.

### **2.3 Conceptual Framework**

The conceptual framework in Figure 2.5 shows the way forward toward the development of the harmonized framework. Where the first step was the identification of audit indicators in each project's phase (planning, design. Procurement, construction, and closeout), they can be identified through a review of audit guidelines/manuals and tools from audit institutions and additional information from the auditors. Then significant indicators were identified to have a framework that has harmonized audit practices. According to Supplement guide (2012) performance audit objectives should be to assess the following; effectiveness, efficiency, economy, Compliance, and risk assessment.





**Figure 2.5: Conceptual Framework (Author)**

### 2.3 Chapter Summary

This chapter provides an overview of auditing practices by highlighting key issues related to construction project audits. Audit history, indicators and theory related to the topic were discussed.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter covers the research methodology that was adopted in this study. The chapter contains the research approach and research design that suit the study population and sample design. Criteria that were used to judge the quality of this study, including study validity and reliability were also discussed.

#### **3.2 Research Approach**

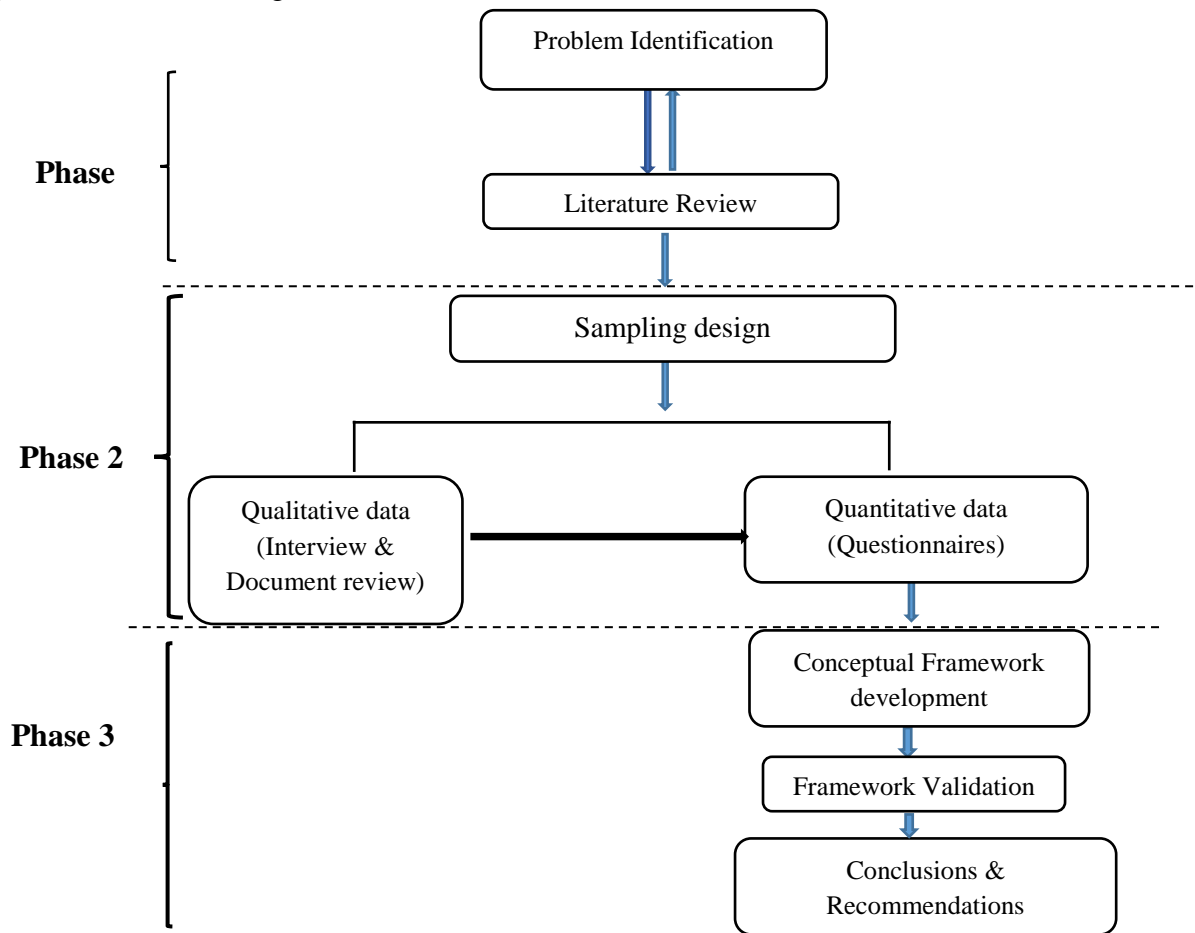
This study has based on information from the audit guidelines, manuals, and tools including interviews with audit practitioners in the construction industry, which enabled a researcher to explore information on the current practice of performance audits in Tanzania. After the exploration of the information through interviews and document reviews the indicators obtained were tested using a survey study to establish their significances. Basing on the nature of the study and procedures followed, a mixed method approach was adopted. The study involved both qualitative (interviews and documents) and quantitative (questionnaires) data.

Furthermore, according to Creswell (2014), there are different types of mixed approaches, which include the sequential explanatory approach, sequential exploratory approach, sequential transformative approach, and concurrent convergence triangulation approach. For Sequential exploratory research, qualitative data are firstly collected followed by quantitative data that were founded by qualitative data obtained in the first round. Therefore, this study used a sequential exploratory approach as its qualitative data were collected in the first phase to capture what is done in the practice of performance audits of construction projects, and then quantitative data were collected to test significance level of the information obtained in the first phase.

#### **3.3 Research Design**

Research design is the roadmap and structure of investigation formulated by the researcher to answer the research questions. It gives an outline of what the researcher do from writing hypotheses to the final analysis of data (Cooper and Schindler, 2013). Kothari (2004) defines research design as the entire process of the study from the stage of hypothesis formulation and its operational implication up to the final analysis of data. The main purpose of this research was to develop a framework that will guide auditors in conducting construction

project performance audits. The main road toward achieving this main objective had three phases as shown in Figure 3.1.



**Figure 3.1 Research Design**

Phase one covered problem identification and literature review, basing on this study, the problem was identified through the currently undertaken audit practices in Tanzania construction projects, which shows that most of the audits are done with the aid of guidelines and manuals individually produced by the respective institutions that conduct audits. It was noted, however, that there are variations among the prepared guidelines and manuals in that some of the key issues are left out which makes the audits to be done in piece meals and less detailed. A literature review is very important as it gives a clear understanding of the key issues regarding the topic. Under this stage definition and concepts related to the topic was reviewed. Books, reports, journals, articles, and manuals were used to gather the relevant information, and identify the knowledge gap.

Phase two forms the main part of the study whereby the method of undertaking the entire study was established. As shown in Figure 3.1 the study employed a mixed approach

narrowed to a sequential exploratory method where the researcher collected information through interviews with auditors and document review to explore the current practices of auditing in the Tanzania construction industry. Then data obtained were tested by a questionnaire survey to establish the significant indicators before formulating a framework that harmonizes the construction projects' performance audit practices.

The last phase was framework development and validation. At this stage a researcher developed a framework through the findings obtained from the survey results. A framework was further validated through purposively selected respondents. A researcher opted for specific respondents with knowledge of construction project audits because framework validation requires knowledgeable participants (Kavishe, 2018).

### **3.4 Population and Sampling Design of the study**

To collect accurate and reliable data, precise sources were considered. In this study, the construction project auditors and audit guidelines were considered as the population of the study. A total of four (4) audit guidelines were purposively obtained from the four institutions that are performing audits in Tanzania (NCC, NAOT, PPRA and MoFP) as each institution has one guideline they use. Therefore, since the guideline population is small, all documents were considered as a sample size.

For interview, the study adopted purposive sampling technique. According to Rowley (2014), purposive sampling is used when the researcher has prior information about the issue, and intentionally selects specific ones because they are expected to provide the most valuable data. Therefore, respondents who are believed to have rich information about audits were selected, considering their experience by being participated in auditing with two or more institutions. Audit institutions were approached to obtain a list of auditors with such experience.

For the questionnaire survey, the study adopted a chain referral sampling technique, since in Tanzania there is no specific register of auditors in construction projects, which made difficult to establish a sample size. Initial respondents apart from interviewees were further obtained from the four key institutions. The same approach has previously been used in construction management-related studies (Kavishe 2018; Chan et al. 2017; Chileshe et al. 2020) to sample from unknown population sizes.

## **3.6 Data Collection**

### **3.6.1 Document Review**

To obtain the parameters/indicators that should be incorporated in the audit framework, it was important to review the existing documents which are audits guidelines, manuals, and tools to gather information of what is included or considered and make a note of what are important items missing. In this study guidelines and manuals from NAOT, PPRA and NCC were reviewed to enable the researcher to determine the major issues that are captured by these institutions when conducting performance audits on construction projects. Documents were obtained through a physical visit at the respective offices as some of the documents were not in softcopy. Other documents were obtained through emails after being requested from the respective institutions. Common criteria across guidelines from all institutions were identified. Criteria that appeared to be common at least between two institutions were identified, and finally, the criteria that were unique to each institution were also included. All criteria were then mapped onto the five project life cycle phases.

### **3.6.2 Interview**

Documents review alone were not enough to gather all the important indicators required to develop a harmonized framework for assessing the performance of construction projects in Tanzania. Therefore, interview with auditors in the construction industry was conducted to explore more audit indicators to develop a framework. This information was fruitful to the study as it has been stated earlier that the existing audit guidelines or manuals vary in their contents. The criteria obtained from interviews complemented the criteria from the audit reports. This helped the researcher to come up with complete and more comprehensive indicators to guide construction projects performance audits.

The tape recorder was used to record interviews; however, recording the interview was only to those respondents who agreed to be recorded. For those who refused to be recorded, data were recorded by taking notes. All recorded interviews were transcribed to convert the audio information into written words.

### **3.6.3 Questionnaire Survey**

Questionnaires were developed to determine the most significant indicators in performance audits. This was conducted after evaluating the current construction audits practices in Tanzania to capture the indicators that are used to assess the performance of construction

projects. A literature review of similar studies was conducted to obtain additional indicators. Finally, all the indicators obtained through interviews, documents review, and the contemporary literature were combined in a survey questionnaire and distributed to the auditors to obtain their views regarding the significances identified indicators.

Questionnaires had two sections, where the first section covered the demographic information of the respondents that include professional background, experience in auditing industry, number of projects audited, and type of audit performed. Section two is the main part where respondents were asked to provide their opinions regarding the significance of the indicators listed. Furthermore, the indicators were divided in accordance to project phases which are planning, design, procurement, construction, and closeout phase.

Questionnaires were administered to the construction industry participants who have experience in auditing building projects. Questionnaires were electronically administered using Google forms via email addresses because most of the auditors are scattered geographically which would be difficult to physically deliver the questionnaires.

### **Framework Development**

Framework development was done through three stages: (1) literature review of similar studies to capture what is being done in other countries (Chapter 2), (2) evaluation the current practices of construction auditing in Tanzania to establish indicators and procedures that are considered important. This was achieved through documents review and interviews with auditors. Thereafter, the combined indicators from literature and current practices were tested through a questionnaire survey to establish the significant indicators that formulate the framework.

The identified critical indicators were then divided into two major stages of a construction project that are pre-contract and post-contract stages. According to Al-Reshaid et al (2005), pre-contract phase encompasses the planning, design and tender documentation, and procurement phase. Post contract includes construction and close-out phases. The researcher proposed these to enable an auditor to audit the project in two stages. The same approach was also adopted in by (Mwiya, 2009) when developing a model for auditing.

### **3.7 Framework Validation**

Validation of the framework is so important to check if the framework formulated has the quality and is workable. Therefore, respondent validation (member checking) was employed

to check the validity of the output produced, which is the audit framework for assessing the performance of construction projects. The framework was sent to the respondent (auditors and audit institutions representatives) to comment on its accuracy and convenience. Then comments received were considered to improve the framework formulated.

A different questionnaire was developed for validation of the framework. The questionnaire had four main sections which are background information of respondents, the introduction of a framework, validation questions, and questions regarding the effectiveness, applicability, adaptability, and recommendations.

### **3.7.1 Sampling of survey respondents for framework validation**

To get the right respondents for validation, purposive sampling was used to obtain respondents. A three-stage methodology was used to obtain respondents for framework validation. The first stage involves identifying the suitable respondents (experts) who qualify. The second stage was to use pre-defined criteria to identify initial respondents. The last stage was to communicate with the identified respondents to confirm their willingness to participate in the validation process.

Different respondents can participate in framework validation. It includes the use of the same participants who participated in data collection, different experts, end-users, knowledge users, sponsors of the project, or independent validators (O'Leary's 1991 as cited by Kavishe, 2018). First, two respondents were used in this study for validation of the framework. The same approach was also used by other mixed approach studies (Luvara, 2020; Maro, 2020 and Kavishe, 2018). Therefore, auditors who had audited more than 20 projects were considered, as it was believed that they had enough experience on project audits. Also, representatives from audit institutions were selected to obtain their views on the proposed harmonized audit framework. This is because the development of the framework involved the harmonization of audit tools/guidelines from those institutions.

## **3.8 Data Analysis**

### **3.8.1 Qualitative Data Analysis**

Qualitative data were analyzed using a standard qualitative analysis technique which is qualitative content analysis. This method is commonly used to analyse qualitative data (Elo et al, 2014). Parveen and Showkat (2017) define content analysis as the analysis of what is being said, written, or recorded. Meriam (2009) stated that all qualitative data analysis is

content analysis because what is being analyzed is the content of the interview, observation, or documents. Moreover, Elo and Kyngas (2007) pointed out that content analysis may be used for both quantitative and qualitative data and it is further divided into inductive and deductive approaches.

The inductive approach is when the themes are created from raw information while the deductive is creating themes or codes from existing theoretical ideas. The researcher considered the inductive approach to obtain themes /codes from the raw data (documents and interviews). Therefore, all qualitative data were analysed using qualitative content analysis with an inductive approach whereby the process involved open coding, creating categories, and abstraction. Correspondingly, in the study done by Kavishe & Chileshe (2018) content analysis was adopted to analyze qualitative data from the interview. Matto (2017) used the same method to analysis the data gathered from the documents reviewed.

### **3.8.2 Quantitative Data Analysis**

Quantitative data were analysed using descriptive statistics. All quantitative data obtained through questionnaires were coded and entered into computer IBM statistical package software SPSS Version 25 due to its capacity of handling large amounts of data, saves time, and assurance of quality. Ranking of the indicators was done using the frequencies analysis that includes mean score and standard deviation (SD). Standard deviation was used to check how the respondents are deviating from a mean score, where a small value of standard deviation was indicating that there is slight deviation.

To measure the significance of audit indicators, a one-sample t-test was used. Since the study adopted a 5-point Likert scale, a test value of 3.5 was used at a 95% confidence level. T-test requires two hypotheses to be tested, the same was used by Kavishe (2017). The study assumed  $H_0: \leq 0.05$  and  $H_1: > 0.05$  (where  $H_0$ : stands for audit indicators provided are significant to be assessed in performance audits.  $H_1$ : stands for audit indicators provided are not significant to be assessed in performance audits).

The Relative Importance Index (RII) was used to measure the level of importance of the indicators identified from literature reviews, interviews, and documents from audit institutions. The relative importance index is adopted to describe the relative importance of the specific causes and effects (Aibinu and Jagboro, 2002 as cited in Kassem et al, 2020). It



was further stated that the higher the relative important index is the critical cause. The Relative Importance Index is given by the formula below.

$$RII = \frac{\sum W}{(A * N)}$$

Where: RII-Relative Importance Index, W-weight was given to each factor by respondents from 1,2,3,4 & 5. A-Higher weight and N=total number of respondents.

### **3.8.3 Unit of Analysis**

Auditing is a process; it involves several procedures when conducted to ensure that important aspects are captured and audited. To get a good understanding of what is being done in auditing, procedures, and parameters measured, the researcher should understand well the audit process, as through it he can capture what is missing and what should be added to improve the overall process through reviewing the audit reports and interviews with practitioners. Therefore, based on the objectives and questions of this study, the appropriate unit of analysis was construction project auditors and documents.

## **3.9 Validity and Reliability**

### **3.9.1 Validity**

The validation test was performed to ensure that the data collected and presented are valid and trustworthy. The researcher ensured that there is the adequate engagement of data collection. According to Merriam (2009), the rule of thumb in ensuring this is when you find that there is a saturation of data and emerging findings by starting experiencing repetition of information. Since this study employs both documentary review and interviews, this happened, where there is the repetition of information from interviewees and information in audit manuals/guidelines/tools starting conquering with the interview data. For questionnaires the study adopted the content validity test. According to Kothari (2004), content validity is the content of measuring instrument provides the adequate coverage of the topic under study. Therefore, to ensure this sample of a questionnaire instrument was taken to several experienced auditor to check its validity.

### **3.9.2 Reliability**

Drost (2011) defines reliability as the extent to which the study reveals the same measurements when done by one another, with different instruments, occasions, and conditions. Merriam (2009) further stated someone may use multiple methods of data

collection to ensure the reliability of the study. This method is famously known as triangulation. This study is more of a documentary review where most of the information was obtained from available audits manuals, tools, and guidelines prepared by institutions that conduct audits in Tanzania. But interviews were also used to support the study by acquiring other supporting information from the practitioners. Not only that but also the obtained information from the interviews and documents was tested using a questionnaire survey, hence, successfully triangulating the information.

Mohajan (2017) defines reliability as the belief that someone can have on the data that have been collected by the use of an instrument. Cronbach's Alpha reliability test was used to test the reliability of the data obtained. Different methodologists have pointed out that the Alpha value of 0.70 and above is the most acceptable threshold (Hajar, 2014). Therefore, Cronbach's Alpha test was also used to check the reliability of the data collected from the questionnaire survey.

### **3.10 Ethical consideration**

Fleming (2018) pointed out that there should be a high level of confidentiality of the identity of the research contestants, as the researcher should not disclose their names and should avoid statements that will identify those who have participated in the study. To ensure that there was ethical consideration in this study, firstly, during interviews interviewees, respondents were asked if they were willing to be recorded. Moreover, during analysis the researcher did not identify the interviewees by their names rather fictitious identity were used. Secondly, for questionnaires, there were no questions that asked respondents to fill in their names.

### **3.11 Chapter summary**

The chapter has covered important issues about research methodology and design. The study adopted a mixed approach which has been central to the sequential exploratory method. Also, data were collected through interviews, documents, and questionnaire surveys, where nonprobability purposive sampling was used to obtaining the sample. On top of that, qualitative content analysis and descriptive statistics were identified as methods of analyzing qualitative and quantitative data respectively. In the end issues of framework validation, data validity, and ethical consideration are been explained.

## CHAPTER FOUR

### DATA FINDINGS, ANALYSIS, AND DISCUSSION OF RESULTS

#### 4.1 Introduction

In this chapter, both qualitative and quantitative findings are presented, analyzed, and interpreted regarding the specific objectives and research questions as outlined in chapter one of this study. Since the study used a sequential exploratory mixed approach, qualitative data were firstly collected and analyzed as per the first specific objective, followed by quantitative data for the second specific objective.

#### 4.2 Evaluation of current practices of construction projects audits in Tanzania

The first specific objective was to evaluate the current practices of construction projects audits in Tanzania. This was to identify the parameters or indicators that are considered important in construction performance audits in Tanzania. The information was gathered through a Documentary review followed by interviews with Auditors, whereby Construction projects auditors were interviewed to provide their views on how and which parameters they assess when performing an audit on construction projects.

##### 4.2.1 General information of interview respondents

This study engaged construction projects auditors from different institutions that conduct audits of construction projects in Tanzania. Some of the auditors were individual consultants who worked with the audit institutions. Interviews were conducted in Dar es salaam between mid-March 2021 and early April 2021. The time for one interview ranged from 65 to 80 minutes. Table 4.1 shows the demographic information of the interviewees.

**Table 4.1 Interviewee's profile**

S/N	Interviewee	Professional	No. of projects audited	Type of audit(s) conducted before
1	Interviewee <sup>1</sup>	Quantity Surveyor	15+	Performance /technical & Compliance audits
2	Interviewee <sup>2</sup>	Quantity Surveyor	4	Performance /technical
3	Interviewee <sup>3</sup>	Engineer	70+	Performance /technical & Compliance audits
4	Interviewee <sup>4</sup>	Engineer	100+	Performance /technical & Compliance audits
5	Interviewee <sup>5</sup>	Building Surveyor	25+	Performance /technical & Compliance audits
6	Interviewee <sup>6</sup>	Engineer	100+	Performance /technical & Compliance audits
7	Interviewee <sup>7</sup>	Engineer	75+	Performance /technical & Compliance audits
8	Interviewee <sup>8</sup>	Engineer	50+	Value for Money, Compliance & Preventive audits
9	Interviewee <sup>9</sup>	Quantity Surveyor	16+	Performance /technical & Compliance audits

A total of 9 interviews were conducted, whereby 6 of them involved Civil Engineers, adding up to 66.6%. The remaining 3 were Quantity Surveyors (33.4%). Lopez & Whitehead (2013) pointed out that for qualitative research where the sample size is not predetermined at the beginning of the research, the number of participants may range from 8 to 15 because what matters is the richness and saturation of information. The table shows that most of the interviewees have enough experience in auditing as most of the respondents have audited more than 50 construction projects with a concentration in performance/technical audit. Hence, the sample provides the reliability of the data obtained from interviewees.

Through interviews and document review, this research has revealed that audit institutions in Tanzania perform audit in accordance with the construction project phases which are planning, design and tender documentation, procurement, construction stage, and closeout phase. However, PPRA and NAOT have a section that is specifically to assess project quality. This is quite different from NCC and MoFP where quality is only assessed in the construction phase and at a closeout stage. The following are the indicators identified that are used to audit the performance when auditing the construction project.

#### **4.2.2 Planning phase**

##### **Feasibility study**

The feasibility study is the most important stage to be considered in any construction project. The feasibility study is mainly to show whether the project is viable in aspects such as financial, environmental, technical and social aspects. Most of the interviewees responded that an auditor must request the feasibility study report; first to confirm that it was conducted before the project started, and second is to check the validity of the document and see whether all aspects were covered and taken into consideration. The feasibility study is very important to any project as one of the interviewees revealed that;

*As an auditor you must assess the feasibility study report to check if was conducted or not, because sometimes you may find that it was considered but was not a depth analysis. For instance, there is one project I audited, the feasibility study report was there but some of the important issues were not considered, for example, geotechnical survey. This mistake has led to major variation during the execution of the project because during construction they found that the water table was higher, so they were forced to introduce a basement that was not part of the initial design.*

Another respondent added that

*When assessing the feasibility study, you should also check the environmental impact assessment report to check how the issues of the environment were tackled.... As you know environment impact assessment always addresses all important matters related to the environment for example how construction waste will be disposed of. I have one experience of one project where the EIA proposed that all dredged materials for the proposed expansion of a port should be disposed of inside the ocean, unfortunately, the contractor disposed of it somewhere else, this was a very sensitive issue.*

### **Project Budget**

Budget is the overall cost that is expected to cover the project from its initial stage up to completion, whereby the procuring entity should set the budget before commencing the planned project. The budget should be approved by the respective authorities. According to NAOT audit guidelines, it is stated that "*the auditor should check if the approved budget reflects the construction costs as referred to engineering estimate*" In addition to that one of the interviewees pointed out that;

*Most of the budgets that are prepared by the PE's do not reflect the reality as you may find that during the execution of the project there will be a budget deficit which will require the PEs to request the additional amount to cover the deficit. So, I would advise that auditors should be very careful when assessing the budget as we are not only supposed to end up checking whether the budget was approved but also go further and check the reliability of such budget with what has been expended.*

### **Procurement plans**

According to the PPA of 2011, there are three procurements plans which the Procuring Entity should adhere to, including Annual Procurement Plan, General Procurement Plan (GPN), and Specific Procurement Plan. So, the auditor should check whether the proposed project was listed or included in the aforementioned procurement plans, not only mentioned but also with its respective budget. This was also mentioned by all the interviewees.

### **Conditional Survey**

This is specifically for renovation/ rehabilitation projects. According to Loy & Coleman (2006), the conditional survey is purposely to provide 'face value' information to the building owners or occupants on the virtual state of their building. Thus, before starting a project that

involves renovations, it is important to carry out a conditional survey to identify the defects and correction measures. One of the interviewees revealed that;

*It is very important to carry out a conditional survey for the projects that requires renovation or maintenance as through conditional survey the defects will be identified along with their correction measures. It is also important because it will enable the PE to ascertain a budget that is enough for the project, so for this nature of the project, it is better if an Auditor checks whether or not the conditional survey was done without forgetting the quality of the survey.*

## **Discussion**

The findings show that in Tanzania, auditing in the planning phase has much based on assessing the feasibility study, procurement plans, and issues of budget. There is a slight difference when compared to other studies, for instance, Mwiya (2009) identified extra indicators to check when auditing the project at this stage. Those indicators include master program, master cost plan, risk management plan, and land acquisition matters. A study by Nalewaik and Mills (2015) concurs with Mwiya (2009) on issues of risk assessment at the planning stage of the project. OBONDI (2020) also emphasizes that risk audits have a significant and positive impact on the performance of the project. This implies that it is important for the auditor to check if a risk management plan and assessment were prepared and taken into consideration because it has impacts on the project.

### **4.2.3 Design and Tender Documentation**

#### **Design**

After assessing the planning stage, auditors shift to check the designs to be sure that all the criteria and design requirements have been considered. In the Tanzania context at this stage auditor assess the design if it conforms with the client requirements including terms and reference, also the design versus the building regulations. In addressing this issue one of the interviewees said

*A proper design must meet the client requirements and conform with building regulations, example the issues of provision of ramps and lifts for a public building to enable disables to use the building, so Auditor should review the client requirements and through physical observation to confirm that the design is accuracy.*

Another respondent added;

*You are not supposed to only check if the design conforms to the client requirements, as an Auditor you must also check if that design corresponds to that client.... because you may find out that some of the client requirements are exaggerated, others demand more than what is supposed to be.*

### **Specification, design calculations, Bills of Quantities**

The auditor needs to assess specifications, design calculations, and bills of quantities. Most of the auditing institutions in Tanzania do assess these important items, whereby the auditor compares the specification in drawings if are similar with those in the bills of quantities. Also, the auditor assesses the completeness of the specification if are well written and reflect the reality.

Under PPRA practice which is quite different from other institutions like NAO and MoF., auditors are also required to review the geotechnical report to check its accuracy and whether the foundation was designed based on the information from the report. This is most important as it was reported by one of the interviewees that;

*There is one project located somewhere in Dar es salaam city, where the foundation was designed without having a geotechnical investigation. So, during construction, they found out that there was a high-water table, to solve the issue they introduced a basement foundation which was not part of the design.*

### **Tender and Contract Documentation**

This always follows after assessing the detailed design, at this stage, the Auditor checks the completeness, arrangements, relevance, accuracy, and adequacy of the documents. Tender documents should be reviewed first before the contract documents as it provides information to the Auditor on a form of contract that was adopted. NAOT guideline states that;

*For completeness, the auditor compares if there is a misrepresentation of tender documents and contract documents, also checking if there is a repetition of contract documents and tender documents..., On arrangement, the Auditor checks to determine whether the tender/contract documents used for the project under audit are complete (contains all the relevant documents). To check if they do not have serious mistakes or omissions), and relevant (they apply to the project) when assessing the accuracy of the document, and lastly to check if they apply to a specific project.*

To bold the aforementioned narration, one member of the technical audit department under the Ministry of Finance pointed out that;

*It is pivotal to check the tender and contract documents to be certain if they concur with a particular project. For instance, there is one project we audited, while cross-checking the contract documents we found out that the form of contract/documents that were adopted was contrary to the nature of the project.*

#### **4.2.4 Procurement Phase**

The study finds out that when auditing the construction project at this stage, the auditor checks the compliances with the Public Procurement Act of 2011 and its Regulations of 2013, reading alongside their amendments of 2016. So, the implementing agent should ensure that all the activities under this stage follow the Act and regulations otherwise it will be termed as an audit query. The study also revealed that all public agencies that performing audits coincides with each other when it comes to procurement phase audits as they are all guided by the procurement act and regulations.

However, it was noted that indicators such as “vetting of draft tender documents by AG/Legal officer”, “Contract awarded with tender validity period” and “Process of tender rejection” were only considered by the PPRA guideline/audit tool. Table 4.2 shows the indicators that are assessed under the procurement stage, where the auditor assesses to ensure that the identified sections of the Act, Regulations, and their amendments have been confirmed.

To emphasize how it is important for the auditor to check the competitiveness of the rates tendered by the contractor as shown in serial number 8 in Table 4.2, one of the interviewees said;

*Checking the competitiveness of rates in tender documents is very important to an auditor, some of the rates quoted are scarring, for instance, we found in one project contractor quoted a timber door more than five hundred million per peace.... 'Just a normal timber door' so, it is a tendency of some of the contractors to exaggerate the rates.*

For the procurement phase, the findings show that auditing at this stage is governed by the Public Procurement Act of 2011 and its Regulations of 2013, along with their amendments of 2016. All institutions performing audits abide by this. However, there is a slight difference



between institutions on indicators they look at this stage. For instance, PPRA has gone further to assess in detail the issues of tender rejections and vetting of contract documents by the Attorney-general.

**Table 4.2 Indicators used to assess the performance of the project at the Procurement Stage (NAOT & PPRA)**

S/N	INDICATOR	REQUIREMENTS BY ACT	AUDIT CHECKLIST
1	Appropriateness of the method of procurement	Procuring entity engaging in the procurement required to comply with Section 64 (1) of PPA 2011, reads together with its amendment of public procurement (amendment) act, 2016 and seventh schedule of Public procurement (Amendment) regulations of 2016.	<i>To establish the appropriateness of the procurement method used The Auditor reviews Annual Procurement Plan (APP), TB minutes, approved budget to determine the budgeted amount (Engineer's estimates), and tender notice.</i>
2	Compliance with the procurement process with PPA 2011 and its Regulations (GN 446 of 2013)	Reg. 108 of GN. No. 446 as amended by PPR (amendment) of 2016, section 68 (1) PPA 2013], Section 64, of PPA 2011 as amended by Public Procurement (Amendment) Act No. 5 of 2016, (Section 52(1) of PPA, 2011, Reg. 122(4) and 281 of GN No. 446 of 2013,	
3	Evaluation process and award of contract		
4	Negotiation process		
5	Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer	Vetting of contract required to be done as per Reg. 59 of GN No. 446 of 2013 read together with the amendment of Reg. 59(1) & Reg. 60(1 and 2) of GN No. 121 of 2016	<i>Were the draft contract documents sent to the AG/ legal Officer for ratification? Were the comments of the legal officer incorporated into the documents?</i>
6	Contracts awarded within the tender validity period	The contract should be awarded before the expiration of the validity period as required under Reg. 62, 192 and Reg. 232(2) of GN. No. 446 of 2013 read together with the amendments of regulation 232 of G.N No. 333 of 2016	Were tenders awarded before the expiry of the tender validity period?
7	Process for tender rejection	Sec. 59 of PPA 2011, as amended on section 59 of (PPA) of 2016 and Reg. 16(1&2) of GN No. 446 of 2013 provides circumstances to which Procuring Entities may reject all tenders or all proposals taking into account that relevant justification are provided.	If there were justification for tender rejection (if any) and approval was asked by AO from PPRA.
8	Competitiveness of rates	NIL	▪ Were unit rates normal?

S/N	INDICATOR	REQUIREMENTS BY ACT	AUDIT CHECKLIST
	quoted for major items of construction when compared with prevailing market prices		<ul style="list-style-type: none"> <li>▪ Were unit rates averagely prepared?</li> <li>▪ Were unit rates above normal?</li> </ul>
9	Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors	NIL	Is the tender in question abnormally low, moderate or high?

#### 4.2.5 Construction Stage

##### Site possession

An Auditor needs to assess the procedures that were followed when the Procuring Entity handed over the site to the contractor. Both PPRA and NAO guidelines highlighted this important indicator. During the audit process, the auditor will check to form the contract documents and available project files to find out when exactly was the site handed to the contractor by comparing the dates to establish whether it was handed on time or there were delays. Not only that the auditor should also assess if the contractor was given full access as per contract or there are some barriers. One of the interviewees said that

*Always contractor will find a reason to ask for an extension of time when she finds that the project will not be completed with the stipulated time, so if there were delays in handing over the site or the contractor was not given full access to the site, the contractor will use that opportunity. So, it is important to check how the site was handed as when you find there is an extension of time or delays, that might one of the reasons for you auditor to report" (Interview, 2021).*

##### Quality of program of work and adherence

While assessing the project during the construction stage it is better to check the quality of the submitted program of work by the contractor. National Audit Office in their audit guideline manual states that;

*The auditor should check whether the Programme of work included in the contract both the contract program of work during the signing of the contract and updated programme(s) of work to be submitted in the course of execution of the contract were, or are of satisfactory quality"*

The guideline further stated that

*The standard programme of work should be complete enough to show all activities under the contract including their sub-activities. It should be realistic when compared with the available resources contained in the contractor bid and updated from time to time per the provisions of the contract"*

### **Quality of Contractors Site Organization and Staffs**

Site organization and staff play a vital role in determining the performance of the project, a poor site organization and results may result in poor quality of work and unnecessary delays. Thus, the auditor is supposed to check how the contractor has organized his site, and the key personnel employed at the site are meeting the criteria stated in the bid/contract document. This was insisted by one of the interviewees who stated that

*Contractors are very tricky as sometimes they bring different key personnel against who were submitted/listed in the tender documents; therefore, an auditor needs to confirm all key staffs that are present at the site if are those who were in the bid documents, this can be done through checking the site organization chart. Also, the site arrangement should be assessed to check the organization of stores, offices, and latrines..."*

NAOT guideline further elaborated that;

*The auditor should check if the staff of the contractor was those contained in his tender, or if a replacement had been made, the replacement should have similar or superior qualifications and experience. The replacement of the staff in the contractor's site organization obtained the employer's written approval.*

### **Quality Assurance Programme and Adherence**

Storey et al (2000) define Quality Assurance (QA) as a management technique that encompasses all the planned and efficient actions required to provide sureness that a product or service will placate given the requirement for quality be in a good position for use. This is very important to ensure that the intended quality of the project is met, therefore, the auditor should much care when assessing the Quality assurance program and check whether the contractor is complying with it. To ensure that Both NAO and PPRA audit manuals state that;

*The Auditor should check if specifications were adequate i.e., whether they are detailed enough to measure and ensure quality compliance in terms of checks and balances, and*

*laboratory has been established to ensure compliance as per provision of the contract" ...Also, if there is a clear approving mechanism of inspecting, rejecting, and accepting the works done. It is worth noting that the contractor has the primary responsibility of ensuring the works complied with specifications and standards specified in the contract.*

One of the interviewees further elaborated that.

*To be sure that the submitted tests are valid and reflecting what has been constructed, as an Auditor you may perform another test to ascertain the results submitted...for example, there one project I audited the result submitted shows that the strength of the concrete bed was 180N/mm<sup>2</sup>, but after performing our test we find that strength is only 120N/mm<sup>2</sup> which was contrary to the specifications.*

Additional to that, another auditor responded that;

*To ensure that contractor is complying with quality issues, as an auditor I always assess the materials that are used, for example, the type of cement used is it conforming with what has been specified? Size of aggregates are they complying? by picking a piece at the site and test it in the laboratory. Sometimes I go further and ask labours how are they mixing mortars instead of asking the contractor.*

### **Environmental Management**

Environmental impact assessment always recommends how to preserve the surrounding environment when construction is ongoing. Therefore, the auditor should ensure that s/he assess whether the project is adhering to the recommendations provided. NAO guideline states that;

*The auditor should check if there is some destruction of vegetation; water pollution; reduced air quality due to dust emission; vibrations due to compactions; noise (from construction vehicles and plants); disturbance on the cultural heritage; waste generation; accidental spills/contamination; poor sanitation; occupational hazards/accidents; and loss of land.*

Similar to that, one of the interviewees said

*There is one scenario we found when we were auditing one of the mega projects that involve dredging of the ocean bed, the environmental impact assessment report*

*recommended that all excavated materials should be dumped back into the ocean in a specific coded area identified, surprisingly all the materials were dumped outside the ocean, this very contrary to environmental conversation issues.*

### **Health and Safety**

Health and safety issues are very important to be assessed during the construction stage. The findings show that the PPRA audit guideline has been considered the important item during the audit. The auditor will check whether the health and safety plan was prepared, checking its accuracy and if the contractor is adhering to it. This is contrary to NAOT and the Ministry of finance where this indicator is not considered at this phase. However, NAOT considers it at the completion stage of the project. This concurs with one member from the ministry of finance who said *"To be honest we are not considering this aspect of health and safety, although it is an important indicator to be assessed during auditing"*

### **Contractual Documents**

Contractual documents involve advance payments guarantee, performance guarantee, insurance covers, and power of attorney. These are important documents that the contractor submits at an early stage during the execution of the project and are always assessed by auditors at the construction stage, the auditor should be very careful when assessing these documents because some of the contractors used to tamper with wording, dates, and amounts. To emphasis this one of the auditors pointed out this way;

*Every word in those documents (advance payments and performance guarantee) has meaning, the contractor should adapt the format provided in the tender document. So, the auditor should compare words to words between the submitted documents and those in the tender document. Also, we always check the dates and amounts covered.*

Concurrently to that, another auditor said

*Contractors are very tricky, they used to play with words in advance or performance guarantee, I experienced this when I was auditing one of the projects, where I found out that the words stated in advance payment guarantee are different from form what standards forms in tender documents even the dates were not correct.*

### **Quality and Contractual Document Management**

Any construction project involves many documents that are produced and circulated throughout the life of the project. Through documentary review, the study finds out that

during the construction stage of projects, the following documents in table 4.3 are commonly assessed by auditors to check their conformity and authenticity.

**Table 4.3: Document's Checklist**

S/N	DOCUMENT	AUDITOR CHECKLIST
1	Site instructions	<ul style="list-style-type: none"> <li>▪ Were instructions include site instruction number, subject of instruction, its implications on time and cost, date, and signature of the PM.</li> <li>▪ Were instructions and approvals timely issued?</li> </ul>
2	Minutes of site meetings	<ul style="list-style-type: none"> <li>▪ Were site meetings held?</li> <li>▪ Were site meetings are dated, properly recorded showing persons who attended the meeting, agenda, issues discussed and agreed and properly signed by the parties</li> </ul>
3	Progress reports	<ul style="list-style-type: none"> <li>▪ Were progress reports timely prepared as required under the contract?</li> <li>▪ Does it reflect actual site conditions?</li> </ul>
4	Work measurements and inspection records	
5	Materials testing records	<ul style="list-style-type: none"> <li>▪ Adequacy and correctness of test records carried out by the IAs for the materials incorporated in the works.</li> </ul>
6	Payments certificates	
7	Variation orders	<ul style="list-style-type: none"> <li>▪ Check whether all VOs are numbered, dated, background about the VO, its time and cost implications, and should be signed by all parties.</li> <li>▪ Were variations appropriately assessed?</li> <li>▪ Were variations approved by the TB?</li> <li>▪ Were the variations relevant to their scope and timing?</li> <li>▪ Were there works that were executed before TB approval</li> <li>▪ Were the variations approved by TB executed?</li> </ul>

### Discussion

The study finds out that there is no difference in how institutions in Tanzania audit the project at the construction stage. Most of the important items such as cost, time, quality, environmental issues, and health and safety are assessed by those institutions. However, the Ministry of finance does not assess indicators such as environmental performance and health and safety, although they declared that are very important items to check. However, as it was found at the planning stage that, auditors are not assessing the issues of risk management, the

same was found during the construction stage. This concurs with OBONDI (2020) who finds out that risks are poorly audited in a construction project. PMBOK (2017) has also emphasized that project managers should ensure that risk audits are conducted. Concerning the issues of environmental audits, Tanzania practices concur with other studies such as Glasson et al (2020) who emphasizes on environmental audits before and during construction stage.

#### **4.2.6 Closeout Phase**

##### **As-built Drawings**

The contractor needs to submit as-built drawings at the end of the project. Pettee (2005) pointed out that as-built drawings are prepared to provide crucial required information during the construction and subsequently period, they are so important because they inform the owner on changes that were made during construction. Also, the information of what has been constructed. This is one of the items that auditors check when performing auditing. According to the NAOT guideline, it states that

*The Auditor is required to check if the preparation of the As-built drawings was a requirement in the contract when were they to be submitted and if there was any penalty for delayed submission or non-submission of the same.... Also, whether the As-built drawings submitted are complete, correct, and of good quality*

##### **Snag List**

A snag list is one of the parameters that Auditors always assess when the project is at the practical completion stage. The condition of the contract requires the project manager to jointly with a contractor to identify all defects or errors (snags) which the contractor will rectify during the defect liability period. This was pointed by one of the Auditors who said

*The project manager should identify all the defects during the pre-handover meeting, prepare a list of the defects identified, and submit it to the contractor to rectify. Also, an Auditor should check the time that the Contractor was given to rectify the defects if it is the same as what has been stipulated in the contract documents...On top of that, an Auditor should make sure that all the defects identified were attended to by the Contractor.*

## **Management of Defect Liability Period**

The study found out that, the management of defect liability period is crucial as it involves activities that have both financial and quality impact on the project. This is currently practiced in construction projects audits. At this point the Auditor is emphasized to assess all the activities that were supposed to be undertaken during that period. Both PPRA and NAOT guidelines concur with each other on the aspect of the Management of Defect Liability Period. The guidelines narrate that;

*The Auditor should check whether the inspection was conducted, and Snag list was prepared before issue the Substantial Completion Certificate,...Check whether the contractor complied with contractual obligation defects in the Snag List before issuing the Final Completion Certificate,.....Check if the contractor fulfilled his contractual obligation or not, in case not, what remedy measures were taken by the Employer as per provision of the contract.....and Check and be certain that the 50% of remaining retained monies was released after final inspection and acceptance of all corrected defects and pending minor works.*

## **Final Account**

The final account is prepared to show the final cost of the project whereby the final quantities of each item in the bills of quantities will be known. Auditor has a task to check if the quantities reflect what has been constructed. Not only that but also be certain on issues of retention fund as during the final account stage the second moiety is released. At this stage, the auditor should be very careful. One of the Auditors revealed that.

*At this stage, you must do a thorough assessment of all documents related to cost, measurement sheets, variations, fluctuations if any, because there are mistakes that happen sometimes. For instance, there is a project where we found out that in the final account there was an overpayment of more than thirteen billion due to contractor, this was a very serious and shocking issue. So, we always check this item very carefully.*

In addition to that NAOT guideline pointed out as follows

*The auditor should compare the final quantities on major items versus as-built drawings on major items only. Where it is impractical to compare the two or as-built drawings are missing, the Auditor should compare final quantities in the Final Completion Certificates and jointly measurement taken at the site (sign-off by the*



*Auditor and Employer's representative) ...he should select only major items and on a random basis because the intention is to establish whether what is shown on the As-built drawings reflect relatively accurate quantities contained in the final accounts.*

### **Final Quantities Versus As-built-drawings**

As-built drawings are final drawings that reflect what has been constructed. Therefore, auditors measure quantities of some of the items to check if the quantities in the final accounts reflect reality.

*The Auditor should compare the final quantities on major items versus as-built drawings on major items only. Where it is impractical to compare the two or as-built drawings are missing, the Auditor should compare final quantities in the Final Completion Certificates and jointly measurement taken at a site (sign-off by the Auditor and Employer's representative)*

### **Claims, Outstanding Payments, and Disputes**

Auditors also check if there are claims, outstanding payments due to contractor or consultant, and disputes if any, at the close-out stage of the construction project. As the Because at the closeout stage the contract between parties comes is on final stage, therefore, it is crucial to report these. This was brought forward by one of the auditors who said:

*Delays of payments are there but it is better to be paid within the construction period, however, it might happen that until the closure of the project there are some payments due to contractor/consultant that are still pending...you have to comment on this as you cannot say that the project has performed well while there are pending claims and payments.*

The findings have revealed that there are important indicators that were left out when assessing the project at the completion stage. The findings from the interview show that it is not always the issues of dispute, claims, and outstanding payments assessed by auditors at the completion stage. Not only that but also, they are not even listed in the guidelines and tools used by audit institutions in Tanzania, regardless of their importance. In addition to that, the issues of risk management, cost management, and schedule management are still being ignored up to this stage. This is contrary to previous studies (Nelewaik and Mills, 2015; Mwiya, 2009; OBONDI, 2020).

Table 4.4 shows the summary of audit indicators obtained from the guidelines that are used by the four audit institution in Tanzania, that are NAOT, NCC, PPRA and MoFP. The findings show that there are common indicators which appear to most of the guidelines that are used. However, there are other indicators which are unique, they appear either in only one guideline or two guidelines only.

**Table: 4.4 Auditing indicators from different audit institutions**

S/N	PHASE	NAOT	NCC	PPRA	MoFP
1	Planning stage	Feasibility study Procurement plans Project budget	Project feasibility	Feasibility study Procurement plans Project budget	No specific guideline
2	Design & Tender stage	Client requirements/ TOR's/ The brief Adherence to building regulations Specifications Design calculations Engineer's estimate Bills of Quantities Tender documentation Contract documentation	Project brief Design standards Design calculations Design drawings Design assumptions, conditions and loads Structural idealization Specifications The economy of design solution Compliance with local authority Consideration for routine and periodic maintenance Tender documents Consultant estimates Conditions affecting tendering Contract strategy, documentation and procedures Availability of funds Tender reports	Client requirements/ TOR's/ The brief Adherence to building regulations Specifications Geotechnical survey Design calculations Engineer's estimate Bills of Quantities Tender documentation Contract documentation	No specific guideline (Terms of reference are used)
3	Procurement	Appropriateness of the method of procurement Compliance of the procurement	NIL	Appropriateness of the method of procurement Compliance of the	No specific guideline (Terms of reference are used)

S/N	PHASE	NAOT	NCC	PPRA	MoFP
		<p>process with PPA 2011 and its Regulations (GN 446 of 2013)</p> <p>Evaluation process and award of contract</p> <p>Negotiation process</p> <p>Contracts awarded within the tender validity period</p> <p>Competitiveness of rates quoted for major items of construction when compared with prevailing market prices</p> <p>Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors</p> <p>Capacity and competence of the selected contractor in relation to project size and complexity</p>		<p>procurement process with PPA 2011 and its Regulations (GN 446 of 2013)</p> <p>Evaluation process and award of contract</p> <p>Negotiation process</p> <p>Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer</p> <p>Contracts awarded within the tender validity period</p> <p>Process for tender rejection</p> <p>Competitiveness of rates quoted for major items of construction when compared with prevailing market prices</p> <p>Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors</p> <p>Capacity and competence of the selected contractor in relation to project size and complexity</p>	
4	Construction	<p>Site possession</p> <p>Contractual documents</p> <p>(Advance payment &amp;</p>	<p>Organization and management</p> <p>Organization structure of the</p>	<p>Site possession</p> <p>Contractual documents</p> <p>(Advance payment &amp;</p>	<p>No specific guideline (Terms of reference are used)</p>

S/N	PHASE	NAOT	NCC	PPRA	MoFP
		performance guarantee) Quality of program and adherence Project delays and extensions of time Quality of contractor site organization and staffs Health and safety Quality assurance and adherence Environmental performance Document control	project Quality control measures Health and safety Existence of any site related problem Contractual provisions Management of claims Deployment of adequate and suitable equipment and plants Project duration/Program Financing of project	performance guarantee) Quality of program and adherence Project delays and extensions of time Quality of contractor site organization and staffs Health and safety Quality assurance and adherence Environmental performance Document control	
5	Closeout	As-built drawings Snag list Substantial Completion Certificate, Final Certificate, and Settlement of Final Account. Final Quantities Versus As-built-drawings Final Project Cost Versus Accepted Tender Price Actual Project Completion Time Versus Original Contract Period.	NIL	As-built drawings Snag list Substantial Completion Certificate, Final Certificate, and Settlement of Final Account. Final Quantities Versus As-built-drawings Final Project Cost Versus Accepted Tender Price Actual Project Completion Time Versus Original Contract Period.	No specific guideline (Terms of reference are used)

**PPRA/NCC/NAOT Guidelines**

### **4.3 Significant Indicators in Performance Audits of Construction Projects in Tanzania**

The second specific objective was to identify the significant indicators to assess the performance of construction projects in Tanzania. Data were collected using a questionnaire survey that was administered from April 2021 to May 2021. A total of 52 questionnaires were distributed to the construction project auditors who were identified through a chain referral method, 43 questionnaires were successfully returned. Kavishe (2018) adopted the same methods for data collection from hidden populations and succeeded to obtain 28 questionnaires out of 40. Moreover, 43 responses are considered reasonable because sample respondents were selected based on specific criteria that a respondent must be a construction professional and s/he must have conducted audits on construction projects. Even though the response rate looks small but according to Ott and Longnecker (2016) if the sample size is greater than 30, statistical analyses can be performed as the central limit theorem holds. Moreover, Chan et al (2018) did a statistical analysis with the same response rate of 43 returned questionnaires.

The questionnaire aimed at establishing significant indicators in construction project audits. Indicators from auditing practices obtained through document review and interview were combined with those from the literature review. Then indicators were grouped into mainly five construction project phases which are planning, design, procurement, construction, and closeout phase in a Questionnaire. According to Matthews & Komoto (2010) construction program covers five phases which are planning, programming, execution, and close-out, in which procurement falls under the programming phase. Al-Reshaid et al (2005) narrates that the pre-contract stage comprises three phases namely the planning (pre-design) phase, design phase, tendering, and award phase. Data were analyzed using the Statistical Package for Social Sciences (SPSS) software version 25.

#### **4.3.1 Demographic Information of the Respondents.**

Auditors with construction professionals were the main target of this study as shown in Table 4.5. Most of the auditors 22 out of 43 (51.2%) were engineers by professionals, followed by Quantity surveyors 20 out 43 (46.5%). This implies that construction project auditing is dominated by engineers. The table also shows that most of the auditors 27 out of 43 (62.8%) in the industry were shortlisted by the institutions that are performing audits as compared to 16 out of 43 (37.2%) who have been employed by those institutions. Furthermore, the findings reveal that value for money is the most type of audit that has been performed by the

respondents (86%). Then, followed by compliance audits (53%), performance audits (46.5%) then preventive audits (9.3%). This implies that preventive audits are not so common or have been practiced without knowing if they are preventative audits.

**Table 4.5: Demographic information of respondents**

<b>Variables</b>		<b>Frequency</b>	<b>Percent</b>
<b>Professional</b>	Engineer	22	51.2
	Quantity Surveyor	20	46.5
	Building Surveyor	1	2.3
	<b>Total</b>	<b>43</b>	<b>100.0</b>
<b>Origin</b>	Employed in audit firm	16	37.2
	Shortlisted by audit institution	27	62.8
	<b>Total</b>	<b>43</b>	<b>100.0</b>
<b>Performance audit</b>	Yes	20	46.5
	No	23	53.5
	<b>Total</b>	<b>43</b>	<b>100.0</b>
<b>Preventative audit</b>	Yes	4	9.3
	No	39	90.7
	<b>Total</b>	<b>43</b>	<b>100.0</b>
<b>Compliance audit</b>	Yes	23	53.5
	No	20	46.5
	<b>Total</b>	<b>43</b>	<b>100.0</b>
<b>Value for Money</b>	Yes	36	83.7
	No	7	16.3
	<b>Total</b>	<b>43</b>	<b>100.0</b>
<b>Number of projects audited</b>	1-5	7	16.3
	6-10	5	11.6
	11-20	9	20.9
	21-50	13	30.2
	More than 50	9	20.9
	<b>Total</b>	<b>43</b>	<b>100.0</b>

Moreover, Table 4.4 shows that 7 out of 43 (16%) have audited 1-5 projects, 5 out of 43 (11.6%) audited 6-10 projects, 9 out of 43 (20.9%) audited 11-20 projects, 13 out of 43 (30.2%) audited 21-50 and 9 out of 43 (20.9) have more than 50 projects. This implies that most of the auditors (72%) have audited more than 10 projects.

For this specific objective, respondents were asked to rate the level of significance of the audits indicators that were categorized into phases of the construction project that are planning, design and tender documentation, procurement, construction and close out phase.

Indicators were determined through evaluating the current practices of audits in Tanzania and other indicators were obtained through literature review, then combined indicators were tested for their level of significance using a five-point Likert. Very significant (5), Significant (4), Neutral (3), Not significant (2), and Not at all (1) were used to measure the level of significance of the identified indicators.

#### 4.3.2 Reliability

Table 4.6 shows that the data that was collected through a questionnaire to identify the significant indicators for auditing a project at different phases are reliable as all phases have scored a minimum Alpha coefficient of 0.70.

**Table 4.6 Cronbach's Alpha test results**

Factor	Cronbach's Alpa
Planning phase	0.716
Design and tender documentation phase	0.797
Procurement phase	0.765
Construction phase	0.898
Closeout phase	0.856

Tables 4.7, 4.8, 4.9, 4.10, and 4.11 demonstrate the results, using descriptive statistics which includes t-test value, degree of freedom, sig (2-tailed), mean, standard deviation (SD), and Relative Important Index (RII).

#### 4.3.3 Planning Stage

Table 4.7 illustrates that 8 out of 10 indicators/parameters are statistically significant with a p-value that is less than 0.05. This is supported by their mean where most of the indicators have a mean score above 4.00, the mean was ranging from 4.67 for procurement plans (APP, GPN, SPP) as the most significant indicator to 4.09 (Health and safety plan) as a least significant indicator. Land acquisition and communication plan were revealed as not significant indicators with a mean score of 3.72 and 3.58, correspondingly to their p-values 0.167 and 0.559 respectively which are greater than 0.05. This implies that they are not statistically significant.

The topmost significant indicators identified were "Procurement plans (APP, GPN, SPP). This was ranked first with (mean=4.67, SD=0.606,  $t(42) = 12.701$ ,  $p = 0.000 < 0.05$  and RII=0.935). According to PPRA (2011), a procurement plan is very important as it ensures that the procuring entity avoids unnecessary emergency procurement. Also, it helps the



procuring entity to aggregates all its requirements to achieve value for money and reducing procurement costs. This was followed by “Project budget” with scores (mean=4.65, SD=0.573,  $t(42) = 13.185$ ,  $p = 0.000 < 0.05$ ), with RII=0.930.

**Table 4.7 Indicators for auditing performance of construction project at the planning phase.**

Indicator	TNR	df	Sig. (2-tailed)	Mean	S. D	RII	Rank	Significant (p<0.05)
Procurement plans (APP, GPN, SPP)	43	42	.000	4.67	.606	0.935	1	✓
Project budget	43	42	.000	4.65	.573	0.930	2	✓
Feasibility study	43	42	.000	4.37	.725	0.874	3	✓
Condition survey	43	42	.000	4.30	.832	0.860	4	✓
Master cost plan	43	42	.000	4.28	.826	0.856	5	✓
Master program	43	42	.000	4.14	.774	0.828	6	✓
Risk management plan	43	42	.000	4.14	.560	0.828	7	✓
Health and safety plan	43	42	.000	4.09	.570	0.819	8	✓
Land acquisition	43	42	.167	3.72	1.031	0.744	9	×
Communication plan	43	42	.559	3.58	.906	0.716	10	×

Notes: TNR-Number of respondents, df-degree of freedom, S.D -Standard Deviation, RII-Relative Importance Index.

The third-ranked indicator was "Feasibility study" that scored (mean=4.37, SD=0.725,  $t(42) = 7.893$ ,  $p = 0.000 < 0.05$ ). Scholars such as Mohammed et al (2019) stated that feasibility study in Iraq construction projects is neglected and there is abuse on using it which has led to cost and time overruns, negligence in assessing the environmental impact may also cause delays and cost overrun. Mukherjee and Roy (2017) also pointed out that a project can be incomplete during implementation due to the absence of a feasibility study at the earliest stage of the project. This is to emphasize how feasibility study is a very important indicator that the auditor should assess.

#### 4.3.4 Design Stage

Table 4.8 shows the response to the indicators that are used to audit the project performance at the design and tender documentation phase. The findings reveal that all the indicators that were listed are significant as their p-values were less than 0.05. Client requirements were listed as the most significant indicator to assess at this stage with a mean score of 4.86, this is also supported by having the lowest standard deviation (0.351). Engineer's estimate was ranked as the least significant indicator with a mean (4.35) and the highest standard deviation (0.783).

Moreover, in Table 4.7 the most ranked indicators at this stage were “Client requirements /terms of reference/the brief” with (mean=4.86, SD=0.351,  $t(42) = 25.445$ ,  $p = 0.000 < 0.05$ ) and RII=.0972). This was also emphasized by Miron and Formoso (2003) as they pointed out that client requirements management should be taken into consideration since the initial stages of the construction project because the success of the project depends much on how client requirements are prioritized and linked to the design team during the product development process. The second one was “Contract documentation” that scored (mean=4.77, SD=0.48, RII=0.953,  $t(42) = 17.317$ ,  $p = 0.000 < 0.05$ ).

Specifications was third-ranked indicator that is very important to assess when auditing the project at design and tender documentation stage with (mean =4.74, SD=0.441) statistically significant ( $t(42) = 18.48$ ,  $p = 0.000 < 0.05$ ). Construction specifications should well be written because they contribute to the success of the project. Due to the modern and complexity of building nowadays, a project manager is required to write a specification in a detailed way by avoiding phrases such as "as directed by Engineer" (Construction specifications, 2005).

**Table 4.8 Indicators for Auditing Performance of Construction Project at Design Phase.**

Indicator	N	t-test ( $\mu = 3.5$ )	df	Sig. (2-tailed)	Mean	S. D	RII	Ran k	Significa nt ( $p < 0.05$ )
Client requirement/ TOR's/The brief	43	25.445	42	.000	4.86	.351	0.972	1	✓
Contract documentation	43	17.317	42	.000	4.77	.480	0.953	2	✓
Specifications	43	18.480	42	.000	4.74	.441	0.949	3	✓
Tender documentation	43	17.641	42	.000	4.72	.454	0.944	4	✓
Bills of Quantities	43	17.641	42	.000	4.72	.454	0.944	5	✓
Adherence to building regulation	43	10.939	42	.000	4.49	.592	0.898	6	✓
Geotechnical survey	43	10.474	42	.000	4.44	.590	0.888	7	✓
Design calculations	43	10.069	42	.000	4.40	.583	0.879	8	✓
Engineer's estimate	43	7.106	42	.000	4.35	.783	0.870	9	✓

Notes: TNR-Number of respondents, df-degree of freedom, S.D -Standard Deviation, RII-Relative Importance Index.

#### 4.3.5 Procurement Stage

Table 4.9 revealed the indicators that are used to audit the performance of a construction project at the procurement phase. Ten (10) indicators were first identified through a document review of audit guidelines and tools from the institution that are conducting auditing in Tanzania. All the predetermined indicators were ranked as significant indicators by respondents as they scored a mean greater than 3.50 and were statistically significant ( $t(43)$  all positive values,  $p = 0.000 < 0.05$ ).

The most ranked indicators in procurement phase as illustrated in table 4.8 are 'Appropriateness of the method of procurement' with (mean=4.77, SD=5.27), statistically significant ( $t(42) = 15.76$ ,  $p = 0.000 < 0.05$ ), also with RII=0.972. This is supported by Osanyinro and Aghimien (2017) who argue that the procurement method is a key factor that contributing to the success of the project, but many procuring entities choose a procurement method because they are conversant with rather than an informed choice based on project requirements assessment.

The second-ranked indicator was 'Evaluation process and award of contract' with (mean=4.67, SD=5.22), statistically significant ( $t(42) = 14.75$ ,  $p = 0.000 < 0.05$ ), (RII=0.953). These findings concur with Machibya (2020) who finds out that, most of the appeals submitted by contractors were due to poor evaluation process and award of contract, where some of the PE's use discriminatory evaluation, selection, and disqualification criteria in tender documents, this is alarming that there is a problem in evaluation and awards of contract, therefore, auditors should invest their time to assess this indicator.

"Capacity and competence of the selected contractor in relation to project size and complexity" was the third ranked indicator with (mean=4.67, SD=6.44), statistically significant ( $t(42) = 11.97$ ,  $p = 0.000 < 0.05$ ), (RII=0.949).

The least identified indicators at this stage were 'Process for tender rejection' with (mean=3.95, SD=0.815), statistically significant ( $t(42) = 4.513$ ,  $p = 0.000 < 0.05$ ) followed by 'Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors' (mean=0.40, SD=1), statistically significant ( $t(42) = 3.648$ ,  $p = 0.000 < 0.05$ ).

#### 4.3.6 Construction Stage

Table 4.10 illustrates the auditing indicators when assessing the performance of the construction project at the construction stage. Eighteen (18) indicators were identified through a document review of audit tools and manuals used by different institutions in Tanzania, where other indicators were predetermined through literature review. The study finds out that there was common agreement from the respondents that all eighteen (18) listed are significant, as they score a mean which is greater than 3.50 and having a p-value that does not exceed 0.05.

The findings show that the topmost ranked indicators at this stage are "Contractual documents (Advance payment & performance guarantee)" that scored (mean= 4.65, SD=0.573, RII=0.930), statistically significant ( $t(42) = 13.18, p = 0.000 < 0.05$ ). In modern international payment transactions, bank guarantees are most commonly used as collateral payment, this is to ensure that all contractual obligations are implemented as per agreements (Knezevic and Lukic, 2016).

"Quality assurance and adherence" was ranked as the second significant indicator with (mean= 4.58, SD=0.626, RII=), statistically significant ( $t(42) = 11.32, p = 0.000 < 0.05$ ). This is supported by Salvi and Kerkar (2020) who pointed out that quality issues have been a major concern for several years in the construction industry, thus the cost to our economy is affected. However, this could be abridged if the concept of quality assurance were embraced. Furthermore, Jamadagni and Birajdar (2017) asserted that auditing plays a pivotal role in ensuring the quality of the project, the study pointed different factors that should be assessed to ensure quality. It includes skilled laborers, technical staff, and materials quality.

Moreover, "Interim payments certificates" and "Quality of program and adherence" were ranked third with the same scores (mean=4.53, SD=0.631) with RII=0.907. These findings concur with Mwiya (2009) who pointed out that the auditor should ensure that the payments made reflect the actual works executed at the site, and the rates used are those in the contract document. Also, variations, adjustments of price, value-added tax, retention, and re-measurements should be confirmed.

**Table 4.9 Indicators for Auditing Performance of Construction Project at Procurement Phase.**

<b>Indicator</b>	<b>N</b>	<b>t-test (<math>\mu = 3.5</math>)</b>	<b>df</b>	<b>Sig. (2- tailed)</b>	<b>Mean</b>	<b>SD</b>	<b>RII</b>	<b>Rank</b>	<b>Significant (<math>p &lt; 0.05</math>)</b>
Appropriateness of the method of procurement	43	15.76	42	.000	4.77	.527	0.953	1	✓
Evaluation process and award of contract	43	14.75	42	.000	4.67	.522	0.935	2	✓
Capacity and competence of the selected contractor in relation to project size and complexity	43	11.95	42	.000	4.67	.644	0.935	3	✓
Compliance with the procurement process with PPA 2011 and its Regulations (GN 446 of 2013)	43	10.506	42	.000	4.51	.631	0.902	4	✓
Negotiation process	43	8.419	42	.000	4.44	.734	0.888	5	✓
Competitiveness of rates quoted for major items of construction when compared with prevailing market prices	43	6.400	42	.000	4.35	.870	0.870	6	✓
Contracts awarded within the tender validity period	43	7.428	42	.000	4.30	.708	0.860	7	✓
Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer	43	4.513	42	.000	4.07	.828	0.814	8	✓
Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors	43	3.279	42	.002	4.00	1.00	0.800	9	✓
Process for tender rejection	43	3.648	42	.001	3.95	.815	0.791	10	✓

**Notes: TNR-Number of respondents, df-degree of freedom, S.D -Standard Deviation, RII-Relative Importance Index.**

**Table 4.10 Indicators for Auditing Performance of Construction Project at Construction Phase.**

<b>Indicator</b>	<b>TNR</b>	<b>t-test (<math>\mu =</math> 3.5)</b>	<b>df</b>	<b>Sig. (2- tailed)</b>	<b>Mean</b>	<b>SD</b>	<b>RII</b>	<b>Rank</b>	<b>Significant (<math>p &lt; 0.05</math>)</b>
Contractual documents (Advance payment & performance guarantee)	43	13.18	42	.000	4.65	.573	0.930	1	✓
Quality assurance and adherence	43	11.32	42	.000	4.58	.626	0.916	2	✓
Interim payments certificates	43	10.76	42	.000	4.53	.631	0.907	3	✓
Quality of program and adherence	43	10.76	42	.000	4.53	.631	0.907	4	✓
Site possession	43	10.50	42	.000	4.51	.631	0.902	5	✓
Timely payment of interim certificates	43	8.807	42	.000	4.49	.736	0.898	6	✓
Progress reports	43	9.823	42	.000	4.44	.629	0.888	7	✓
Site instructions	43	9.621	42	.000	4.42	.626	0.884	8	✓
Minutes of site meetings	43	10.26	42	.000	4.42	.587	0.884	9	✓
Quality of contractor site organization and staffs	43	7.893	42	.000	4.37	.725	0.874	10	✓
Management of claims	43	7.106	42	.000	4.35	.783	0.870	11	✓
Variation orders	43	6.117	42	.000	4.30	.860	0.860	13	✓
Project delays and extensions of time	43	5.325	42	.000	4.28	.959	0.860	14	✓
Health and safety	43	7.405	42	.000	4.23	.649	0.856	15	✓
Risk management	43	5.418	42	.000	4.14	.774	0.847	16	✓
Non-completion of works	43	4.678	42	.000	4.07	.799	0.828	17	✓
Environmental performance	43	4.863	42	.000	4.07	.768	0.814	18	✓

**Notes: TNR-Number of respondents, df-degree of freedom, S.D -Standard Deviation, RII-Relative Importance Index.**

### 4.3.7 Closeout phase

As exemplified in table 4.11 the t-test results of the mean express that all audits' indicators identified were significant to be considered when auditing the construction project at the closeout stage. The mean values of the significant indicators were found to be greater than 3.00, it was ranging from 4.67 (Final account) to 3.84 (Dispute). Moreover, their p-values were found to be less than 0.05 which implies that these indicators are very crucial to be assessed by an auditor at this stage.

The top-ranked indicators were found to be 'Final account' with (mean=4.67, SD=0.778), statistically significant ( $t(43) = 9.895$ ,  $p = 0.000 < 0.05$ ), whilst RII=0. The final account was identified by Mwiya (2009) as an important indicator to assess when auditing the project at the completion stage because it has financial implication that may attract fraudulent practices. Snag list was listed as a second indicator scored (mean=4.63, SD=0.536,  $t(42) = 13.810$ ,  $p = 0.000 < 0.05$ ) with RII=0.926.

The third significant indicator was "Certificates" which scored (mean=4.53, SD=0.667,  $t(42) = 10.171$ ,  $p = 0.000 < 0.05$ ) with RII=0.907. Certificates and notices are recognized contractual statements regarding the responsibilities of the parties in terms of time, payment, and performance, as they serve two purposes, first, is recording an event such as a practical completion certificate, certificate of making good defects, and final certificate. The second is financial statements such as interim certificates. So, it is very important to the contracting parties to ensure that obligations are achieved in stated time (RICS, 2015).

**Table 4.11 Indicators for auditing performance of construction project at closeout phase.**

Indicator	TNR	t-test ( $\mu = 3.5$ )	df	Sig. (2- tailed )	Mean	S. D	RII	Rank	Significant ( $p < 0.05$ )
Final account	43	9.895	42	.000	4.67	.778	0.935	1	✓
Snag list	43	13.810	42	.000	4.63	.536	0.926	2	✓
Certificates	43	10.171	42	.000	4.53	.667	0.907	3	✓
Outstanding payments	43	7.892	42	.000	4.42	.763	0.884	4	✓
Final Project Cost Versus Accepted Tender Price	43	6.846	42	.000	4.35	.813	0.870	5	✓
Quality management	43	5.582	42	.000	4.35	.997	0.870	6	✓

Indicator	TNR	t-test ( $\mu = 3.5$ )	df	Sig. (2-tailed )	Mean	S. D	RII	Rank	Significant ( $p < 0.05$ )
As-built drawings +Test results	43	5.455	42	.000	4.30	.964	0.860	7	✓
Time management	43	4.391	42	.000	4.21	1.059	0.842	8	✓
Claims	43	4.963	42	.000	4.19	.906	0.837	9	✓
Cost management	43	4.370	42	.000	4.19	1.029	0.837	10	✓
Risk management	43	3.505	42	.001	4.05	1.022	0.809	12	✓
Disputes	43	2.215	42	.032	3.84	.998	0.767	13	✓

Notes: TNR-Number of respondents, df-degree of freedom, S.D -Standard Deviation, RII-Relative Importance Index.

#### 4.4 Framework Development

The third specific objective was to develop an audit framework that harmonizes different audit approaches used by different institutions in auditing construction projects in Tanzania. Framework development was done through reviewing the literature of similar studies to capture what is being done in other countries (Chapter 2). Moreover, the study evaluated the current practices of construction auditing in Tanzania to establish indicators and procedures that are considered important. This was achieved through documents review and interviews with auditors as discussed and pointed out in the findings of the first specific objective. Thereafter, the combined indicators from literature and current practices were tested through a questionnaire survey to establish the significant indicators that formulate the framework.

##### 4.4.1 Explanation of a developed framework

The framework developed has been divided into two major stages of a construction project that are pre-contract and post-contract stages. According to Al-Reshaid et al (2005), pre-contract phase encompasses the planning, design and tender documentation, and procurement phase. Post contract includes construction and close-out phases. The researcher proposed these to enable an auditor to audit the project in two stages. The same approach was also proposed in Zambia (Mwiya, 2009) which is a developing country like Tanzania. Before starting the actual auditing, the auditor should start with an entry meeting to introduce oneself with a letter from his institution. Entry meeting is the right time for auditors to list documents that they will require during auditing. Also, after completion of auditing, the auditor should perform an exit meeting to present the findings to the auditee for discussion and response to



the queries raised. The following are explanations of indicators identified at each phase in a proposed comprehensive audit framework.

#### **4.4.2 Planning Phase**

Project planning refers to the formulation of a set of directions in a detailed manner that enables the project team to understand the requirement and goals of the project in terms of scope, time, and resources that will be deployed to ensure that the project goal is archived (Meredith and Mantel, 2006; Szopik-Depczynska and Lanfranchi, 2016). Project planning is very significant for the project to succeed. Under the planning stage, the auditor should assess the following indicators as described hereunder.

##### **Procurement plans**

There are plans that the procuring entity should adhere to, it includes general procurement plan, annual procurement plan, and specific procurement plan. At this stage, an auditor should assess whether the proposed/ongoing project/s were in the procurement plans as required by the Public Procurement Act of 2011.

##### **Master Programme**

According to Mwiya (2009), an auditor when assessing a master program should ensure that the program is realistic and achievable, and it meets the requirement of the project. As explained in the master cost plan the same should apply in the master programme whereby in case of any changes in project duration the master programme must be revised to reflect the reality.

##### **Conditional Survey**

For any project that involves renovation or alteration, the conditional survey is very important for identifying defects and suitable measures for rectifying them. The auditor should assess the conditional survey report to check if it covers all the defects, also by comparing it with the bills of quantities prepared to check if all defects have been covered.

##### **Health and Safety Plan**

The project must have a health and safety plan describing how people at the site and the third party will be protected. As an auditor, it is important to confirm if the plan was prepared during the planning stage and check its completeness.

PROPOSED COMPREHENSIVE HARMONIZED CONSTRUCTION PROJECTS PERFORMANCE AUDIT				
PRE-CONTRACT STAGE			POST-CONTRACT STAGE	
ENTRY MEETING				
Planning phase	Design phase	Procurement phase	Construction phase	Closeout phase
Procurement	Client requirements	Appropriateness of the method of procurement	Contractual documents (Advance payment, performance guarantee & contract document)	Final account
Project budget	Quality/completeness of contract	Evaluation process & award of contract	Quality of work	Snag list
Feasibility study	Specifications	Capacity and competence of the selected contractor	Quality of program of work and adherence	Certificates
Conditional survey	Quality/completeness of tender documents	Negotiation process	Project delays and extensions of	Outstanding payments
Master cost plan	Bills of Quantities	Competitiveness of rates quoted.	Contractor site organization and	Final Project Cost versus Accepted Tender Price
Master program	Building regulations	Contracts awarded within the tender validity period	Health and safety	Quality management
Risk management plan	Geotechnical report	Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer	Site possession	As built drawings + Test results
Health & safety plan	Design calculations	Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors	Environmental performance	Time management
	Consultant's estimate	Process for tender rejection	Non-completion of works	Claims
			Risk management	Cost management
			Timely payment of interim	Risk management
			Documents management	Disputes
			Management of claim	



Figure 4.1 A Proposed Comprehensive Harmonized Framework for Auditing Performance of Construction Projects

### **Project Budget**

This is the total money that has been allocated to the project to ensure that the project goal is achieved. The project cannot run without having a project and it should be planned and approved before starting the project. Therefore, the auditor should ensure that the budget was allocated and all procedures were followed. Also, an auditor can assess if the proposed budget was feasible as compared to the extent of the proposed project.

### **Feasibility Study**

The auditor should assess the project feasibility study, first by checking whether it was conducted or not, and second is to assess its quality. For the feasibility study, the auditor should review the report to check all aspects that are expected to be conducted during the process of a feasibility study which includes financial viability, technical, social, and environmental viability. The auditor should be certain that the stated project has the economic or social advantage to the society and country at large with minimum impacts to the environment.

### **Master Cost Plan**

During the planning stage, it is very important to establish a master cost plan that will guide the entire project. According to Mwiya (2009), an auditor should authenticate the computation of the estimates to ensure that all items have been covered. It includes consultant charges and construction costs. Any alteration to the original design which may affect the master cost plan, the auditor should ensure it was reviewed to accommodate the changes made (*ibid*).

### **Risk Management Plan**

Meiryani (2018) pointed out that risk management is very important in the performance of any organization as its main purpose is to identify probable risks and the way to deal with them. A good risk management plan increases the possibility of success, reducing the likelihood of failure and uncertainty in leading the overall goals of an organization. Risk management is feasible to apply in government agencies (*ibid*). Therefore, an auditor should check if the risk management plan was prepared during the planning stage, not only that but also if the plan shows the mitigation measures in case certain risk happens.

### **4.4.3 Design Phase**

When auditing the project at this stage, the auditor should assess the following indicators

#### **Client requirements and Building regulation**

It is crucial to incorporate client requirements in a design without interfering with the building regulations for a specific project. At this stage, the auditor should first review all the client requirements and confirm if the design produced originated from them. However, client requirements should not contradict the building regulations for a specific project, both client requirements and building regulations should be taken into consideration. In the case of regulation, it should not be limited to local it might go further to international codes and standards. Not only that the auditor should assess if that design is economical basing on client basic requirements because sometimes clients exaggerate their requirements.

#### **Bills of Quantities and Specifications**

The auditor should assess the completeness of the bills of quantities prepared if they reflect the drawings. To check if all elements have been covered and their descriptions are well written. Also, the specifications must be well written and should be the same as what has been stated in the drawings. This is very important as it will avoid contradiction during the execution of the project.

#### **Design calculations, Geotechnical reports, and Drawings**

Accuracy and completeness of design calculation are very important when it comes to the safety of users. The auditor should assess the design calculations to check their accuracy, are they relevant to the design produced? Are they complete? Drawings must be well detailed and reflecting the project proposed. During the design stage, it is also important for the auditor to review the geotechnical report if the proposed building is high rising, this is because the geotechnical report will determine the type of foundation. For the geotechnical report, the auditor will confirm if the geotechnical survey was taken before designing a foundation.

#### **Completeness of Tender Documents**

Tender documents are always prepared at this stage, it is very important for the auditor to assess their quality and completeness, to check if all required documents have been incorporated in their main tender document. Those documents include but are not limited to Invitation for Tenders, instructions to Tenderers, tender Data Sheet, General Conditions of

Contract (GCC), Special Conditions of Contract (SCC), Specifications, Drawings, Bill of Quantities (BOQ), or Schedule of Requirements, Tender Forms, Forms of Security, Forms of Integrity.

### **Completeness of Contract Documents**

When assessing the completeness of contract documents, the auditor needs to know the form of contract adopted for such a project. The auditor should check if the form of contract used is relevant to that project. Also, contract documents must be complete, including all relevant documents such as Agreement, Letter of Acceptance, Contractor's Tender, Special Conditions of Contract (SCC), General Conditions of Contract (GCC), Specifications, Drawings, Bill of Quantities, and other documents listed in the special condition of the contract.

#### **4.4.4 Procurement Phase**

Under the procurement phase, the auditor's task is to assess if there was compliance with the public procurement act of 2011 and its regulations of 2013 reading together with their amendments of 2016. The following are the indicators that auditors should assess when auditing construction projects at the procurement stage.

#### **Appropriate Method of Procurement**

Every project suits a certain method of procurement as stipulated in the public procurement act of 2011 and its regulations of 2013 together with their amendments. The auditor should first identify the nature of the project and the type of procurement method that fits such project, then assess if the procuring entity has adopted the appropriate method as per Section 64 (1) of PPA 2011 and the seventh schedule in the regulation of 2016.

#### **Evaluation Process and Award of Contract**

At this stage auditor should assess the entire process of evaluation from the initial stage up to the award of contract, the auditor is required to evaluate how the evaluation team was composed, was it according to section 40 of PPA, 2011 and Regulation 202 (1 & 2) and Reg. 297(1 & 2) of GN No. 446 of 2013 read together with its amendment of Regulation 202 and Reg. 297 of GN No. 333 of 2016? Not only that but also, the auditor should check whether the evaluation criteria were stated in the tender document because the Procurement Act of 2011 section 72 of PPA, 2011 and Reg. 202 (3,4 &5) of GN No. 446 of 2013 read together with the amendment of regulation 202 of the G.N No. 333 of 2016 must be complied.

Notification of evaluation results should also be assessed at this stage, where the auditor is supposed to check if the results were communicated to all bidders within stipulated time as per Procurement Act. And bidders should be given enough time as per PPA 2011 to submit their claims if any.

### **Negotiation Process**

Section 76 of PPA 2011, read together with the amendment of Section 76, No. 5 of the public procurement act of 2016 and Reg. 226,227 of GN. 446 of 2013 requires a procuring entity to formulate a negotiation for every tender. The auditor is supposed to check whether the negotiation team was formulated and the plan for negotiation was prepared and approved by the tender board.

### **Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer**

The auditor is required to assess if the draft contract was vetted by the Attorney general if the amount exceeds the threshold stated in the Act where a legal officer within the procuring entity cannot endorse the document. Public procurement regulation of 2013, Regulation 59 requires the draft contract to be vetted by the Attorney general if it exceeds fifty million. The auditor should also check if the comments raised by Attorney General have been attended by the procuring entity.

### **Contract Awarded within Tender Validity Period**

The auditor should assess whether the contract was awarded before the expiration of the tender validity period as required by the procurement regulation Reg. 62, 192, and Reg. 232(2) of GN. No. 446 of 2013 read together with the amendment of regulation 232 of G.N No. 333 of 2016.

### **Process for Tender Rejection**

In case there is a rejection of tender the auditor should assess if there was justification for doing so, also if the rejection was submitted to PPRA by the accounting officer for approval. this is required to check if all procedures and criteria for tender rejection were followed by the procuring entity.

### **Competitiveness of Rates Quoted for Major Items**

Rates quoted in the tender should reflect the current market, the auditor should review the tender document to confirm if the rates are reasonable and competitive.

### **Capacity and Competence of the Selected Contractor**

The auditor should assess if the contractor selected to be awarded the contract meets the criteria that were stated in the tender document. The auditor should confirm if the contractor has enough capacity in terms of equipment, personnel, and financial aspect.

#### **4.4.5 Construction Phase**

It is also known as the project implementation phase; at this stage of the project, the auditor should assess the following items or indicators.

#### **Contractual Documents**

At the earliest stage construction phase, several documents are very important for the auditor to assess. It includes advance payment guarantee, performance guarantee and contractor's all risk insurance cover. The auditor should assess their wordings as they must be the same as those that were provided in the tender documents. Also, the auditor should check the amount and dates stated in those documents if are reflecting reality. The last thing to prove is if those documents are genuine, here the auditor should assess if there is a letter from the institutions that issued those proving that those documents are from their offices.

#### **Quality Management and Control (Quality of work)**

Quality management during the construction stage involves several items that the auditor should have to check to establish whether the project is achieving quality or not. The auditor should assess the quality of quality assurance submitted and if the contractor is adhering to it. Also, the auditor should pass through the materials test results, first to confirm if materials tests are conducted, then if there is a doubt auditor can perform a test to authenticate the results submitted by the contractor. Workmanship must also be assessed to be certain that the quality of work is super. Quality of materials used are they conforming to the specifications in the contract document?

#### **Time Management**

Time is one of the key indicators of assessing the performance of a construction project. The auditor should assess how construction time was managed. To achieve this auditor should assess the quality of the program of work submitted by the contractor is it realistic and achievable? Does it includes all work items for such a project? The auditor should note if there are delays when comparing the actual work status and program submitted. The auditor should also assess all extensions of time if there was a genuine reason to grant that time. In case of extension of time, was the programme of work updated to reflect changes made.

**Contractor Site Organization and Staffs**

In tender documents contractors always submit the list of technical staff with their qualifications. Then, during post evaluation of tender evaluation team will confirm if the submitted list of technical staff is true. But this is not enough, the auditor should check during the construction stage that all technical personnel at the site are those who were submitted at the tender stage. This can be done by comparing personnel in the site organization chart with those that appear in the tender document. In case of any changes, there should be a letter from a project manager approving that.

**Site Possession**

Foremost, the auditor has to check from the contract document when was the actual date contractor was supposed to be given a site. Then auditor should assess if the site was given to a contractor within time as stipulated in the contract document and no obstruction limits a contractor to start the project effectively.

**Health and Safety**

The auditor should check if the contractor is adhering to the health and safety plan to ensure that the site is safe for all people at a site and around the site. Issues like safety gear and personal protective equipment (PPE) should also be assessed if they are available at the site and used by workers.

**Environmental Performance**

A better project is that project has minimal impacts on the environment. The auditor should review the environmental impact assessment report to check if the recommended measures proposed are fulfilled by the contractor at the site. Issues like noise pollution, dust, and other waste must be well treated to avoid impact on the surrounding environment.

**Documents Quality and Management**

Throughout the construction phase, several documents are produced, it includes site meeting minutes, letters, site instructions, payment certificates, progress reports, works inspection reports, and the like. The auditor should check the quality of those documents and how are they handled. For instance, in site meetings, the auditor should check if site meetings are held on time as per contract and if the minutes are well prepared.



**Non-completion of Works**

In case the contractor fails to complete the works under contract within time, the auditor should assess respective action were taken such as liquidated damages from the contractor if a certificate of non-completion was issued. Mwiya (2009) further stated that the auditor should also check if the respective banks that issue guarantees were communicated regarding non-completion of work by the contractor.

**Cost Control**

All items related to the project cost should also be assessed during the construction stage, auditor should check all variation orders if any, to confirm their existence and if the procedures were followed to approve them. The auditor should not end up only on procedures s/he must also confirm that all the variations approved have been executed. Delayed payment should be assessed as well by the auditor to determine the extra cost resulted from interest charges on delayed payment to a contractor.

**Risk Management**

Concerning risk management during the construction stage, the auditor should assess how risks that occurred were treated or managed so as they did not affect the project. The risk register should be evaluated to identify risks that occurred, the way they were registered and managed.

**4.4.6 Closeout Phase**

Project closeout is the last phase and the most critical stage among construction project stages in the project life cycle, if there is poor management at this stage it may result in projects delay and cost overrun (Ziddah, 2016). Therefore, the auditor should be very keen when auditing the project at this stage. As shown in Figure 4.2 the following are the items that the auditor should check when auditing the project at the closeout stage.

**Final Account**

This shows the final cost of the project, the auditor should check the total final cost of the project with comparison to the original contract sum, in case there are deviations what were the source of variations. Also, the auditor should compare the quantities in a final account prepared with the actual quantities which can be established from the final drawings (as-built) submitted because as-built drawings reflect the actual. The auditor is advised to check major items only when during comparing of quantities in the final account and as-built drawings.

**Snag List**

They are also referred to as a punch list. The auditor should confirm if the snag list was prepared and officially submitted to the contractor for action. He/she must check if the time provided for attending the snag list was adequate and reasonable for a contractor to attend all the snags listed. In case the snags have been attended the auditor should pass through a snag list to be sure that the snags were fully attended to a required quality as per contract.

**Certificates**

At the completion stage, several certificates are issued, it includes certificates that records events such as practical completion certificates, certificates of making good defects, and the like. Other certificates are financial certificates (interim payment certificates, penultimate certificates, and final certificates). Therefore, the auditor should assess if certificates are complying with the specific condition of the contract applied to that project.

**Outstanding Payments**

Outstanding payments are still a problem in construction projects, the auditor should assess if there are any outstanding payments due to the contractor including the amount. Also, the auditor should identify the effect of delayed payment to a procuring entity as payment delays attract interest.

**As-built drawings & Test Results**

The auditor should check the quality and completeness of as-built drawings submitted by the contractor, as a contractor is required to submit both architectural and service engineering drawings and drawings must clearly show all changes that occurred during implementation of the project if any. Not only that auditor is required to check the time when the drawings were submitted. According to the PPRA general condition of the contract, the contractor is required to furnish the project manager with as-built drawings during the practical completion of the project. So, if the contract allows a penalty for late submission the auditor should confirm if the penalty was made.

Test results are very important to authenticate quality in terms of the function of the systems installed in a building. The auditor should first check if the test of the systems installed was done or not. Then, crosschecking test results submitted by the contractor if are reflecting the project under audit by checking their quality and completeness as specified in the contract document. Test results must be signed by the project manager and the contractor.

**Risk Management**

Mwiya (2009) stated that risk management is a continuous process throughout the project life cycle. During the completion stage, the auditor should assess the way risks were identified and handled during the execution of the project so as they cannot affect the project performance in terms of cost, schedule, and quality.

**Time Management**

The practical completion stage of the project is the right time to assess the actual deviation between the planned schedule and what has been archived in terms of time. The auditor should compare the two schedules (planned and actual) to conclude the issues of time management. The auditor should also check the mitigation measures that were employed if there were delays during the execution of the work. This is very important to obtain a lesson for future projects.

**Cost Management**

The auditor should assess how the costs were managed during the implementation of the projects, also comparing the actual cost in the final account with the planned cost in the master cost plan to draw the extent of deviations if any. Because risks of cost overruns in construction projects are common (Mwiya, 2009).

**Disputes**

It is also very important at this stage for the auditor to check if there are any unsettled disputes. The auditor is not supposed to identify the disputes alone, but also the report their current status.

**4.5 Validation of a Proposed Framework**

This segment presents the results of the validation of the framework. This is the final and very important section of this study. It proves the quality and validity of the framework developed. According to O'Keefe and O'Leary (1993) cited in Maro (2020) validation is so important which aimed to check the correctness and quality of the framework if it meets the requirement of the users. Validation of the framework was conducted through the distribution of questionnaires to the first, institutions that perform audits in Tanzania, and the second group was construction project auditors who have experience in construction project audit (those who have audited more than twenty projects).

#### **4.5.1 Survey Respondents**

A total of 16 questionnaires were sent to audit experts who met the specified criteria in chapter three. Questionnaires were distributed using Google Forms developed by the researcher and sent to the respondents via emails. Questionnaires were distributed between mid-August 2021 and early September 2021. However, out of 16 distributed questionnaires, only 11 (69%) were successfully returned. Kavishe (2018) and Maro (2020) pointed out that the response rate is always low when questionnaires are administered through email as compared to hand to hand. Sekaran and Bougie (2010) stated that a response rate of not less than 30% is enough survey study. The same approach was also used by (Kavishe, 2018; Maro, 2020 and Luvara, 2020).

#### **4.5.2 Respondent's Demographic Information**

Table 4.11 demonstrates the demographic information of the respondents. It illustrates that all respondents have a minimum education level of a bachelor's degree. In addition, 55% (6 out of 11) have a master's degree and the rest 45% (5 out of 11) got a bachelor's degree. Also, all respondents have enough experience on construction projects audits as they have audited more than 20 construction projects. Most important thing is that there is good proportionality of representatives from audit institutions. Table 4.11 shows that all major audit institutions in Tanzania that are NCC, NAOT, PPRA, and MoF have at least one representative who participated in the framework validation.

#### **4.5.3 Validation Results**

##### **Rating on Suggested Indicators**

Table 4.12 reveals the results obtained from the questionnaires that were distributed to the auditors. Respondents were asked to rate the level of significance on audit indicators proposed in a framework using a Five-point Likert Scale. Questions were divided according to the main construction stages which are planning, design, procurement, construction, and closeout, which represent the arrangement in the proposed framework.

**Table 4.12 Respondent's Demographic Information.**

<b>S/N</b>	<b>Professional Background</b>	<b>Education Level</b>	<b>Number of Projects Audited</b>	<b>Organization</b>
1	Quantity Surveyor	Master Degree	> 50	NCC
2	Engineer	Master Degree	> 50	Independent Consultant
3	Quantity Surveyor	Bachelor Degree	20-50	Government institute
4	Quantity Surveyor	Bachelor Degree	> 50	NAOT
5	Procurement Professional	Bachelor Degree	20-50	PPRA
6	Quantity Surveyor	Master Degree	> 50	NAOT
7	Engineer	Master Degree	> 50	Independent consultant
8	Financial and Compliance Auditor	Master Degree	> 50	NAOT
9	Engineer	Bachelor Degree	> 50	NCC
10	Engineer	Master Degree	> 50	PPRA
11	Quantity Surveyor	Bachelor Degree	> 50	MoFP

Due to a small number of respondents who responded, the mean value was calculated using Microsoft excel. Since the Five-point Likert Scale was used, audit indicators that scored above 3 mean values were considered as commonly agreed as significant indicators. This was also used in construction management-related studies that used a Five-point Likert scale (Maro, 2020; Kavishe 2018). Table 4.13 shows that all indicators that were proposed in a framework are significant and worthy to be considered during performance audits.

Table 4.13 Results of Validation from Questionnaire Survey

Phase	Validation Criteria	Respondents											Mean
		1	2	3	4	5	6	7	8	9	10	11	
Planning	Procurement plans (APP, GPN, SPP)	5	4	5	5	5	5	5	5	4	5	5	4.82
	Project budget	5	5	5	5	5	5	4	5	4	5	5	4.82
	Feasibility study	5	5	4	5	5	5	5	5	4	5	5	4.82
	Condition survey	5	2	5	5	4	5	3	4	4	5	4	4.18
	Master cost plan	4	2	4	4	5	5	4	4	4	4	5	4.09
	Master program	4	2	4	4	4	5	4	4	4	4	5	4.00
	Risk management plan	4	4	4	4	4	5	4	5	4	5	5	4.36
	Health and safety plan	3	5	4	4	3	5	4	4	4	5	4	4.09
Design	Client requirement/ TOR's/The brief	5	5	5	5	5	5	5	5	5	5	5	5.00
	Contract documentation	5	5	3	3	5	5	4	5	5	5	5	4.55
	Specifications	5	5	5	5	5	5	4	5	5	5	5	4.91
	Tender documentation	5	4	4	3	5	5	4	5	5	5	5	4.55
	Bills of Quantities	5	3	5	3	5	5	4	4	4	4	5	4.27
	Adherence to building regulation	4	4	5	5	5	5	5	4	4	5	5	4.64
	Geotechnical survey	4	4	5	5	5	5	5	4	4	5	5	4.64
	Design calculations	4	4	5	5	4	5	4	4	4	5	5	4.45
	Engineer's estimate	4	3	5	5	5	5	5	4	4	5	5	4.55
Procurement	Appropriateness of the method of procurement	5	2	5	5	5	5	5	5	5	5	5	4.73
	Evaluation process and award of contract	5	4	5	5	5	5	5	5	5	5	5	4.91
	Capacity and competence of the selected contractor in relation to project size and complexity	5	4	5	5	5	5	4	5	4	5	5	4.73
	Compliance of the procurement process with PPA 2011 and its Regulations (GN 446 of 2013)	5	4	5	4	5	5	4	4	5	5	5	4.64
	Negotiation process	4	3	5	4	5	5	4	4	5	5	5	4.45
	Competitiveness of rates quoted for major items of	4	1	5	5	5	5	5	5	5	4	5	4.45

	construction when compared with prevailing market prices												
	Contracts awarded within the tender validity period	5	4	4	4	5	5	4	4	5	5	3	4.36
	Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer	4	4	4	3	5	5	4	4	5	5	5	4.36
	Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors	5	1	4	4	5	5	3	4	4	4	5	4.00
	Process for tender rejection	3	1	3	4	5	5	3	4	4	5	5	3.82
<b>Construction</b>	Contractual documents (Advance payment & performance guarantee)	5	4	4	5	5	5	5	4	5	5	5	4.73
	Quality assurance and adherence	4	4	4	5	5	5	4	5	5	5	5	4.64
	Interim payments certificates	5	5	4	5	5	5	4	4	5	5	5	4.73
	Quality of program and adherence	5	5	4	5	5	5	4	4	5	5	5	4.73
	Site possession	3	4	4	2	5	5	5	4	5	5	5	4.27
	Timely payment of interim certificates	5	5	5	5	5	5	4	4	5	5	5	4.82
	Progress reports	4	2	4	5	5	5	4	5	4	5	5	4.36
	Site instructions	4	4	4	5	5	5	3	4	5	5	5	4.45
	Minutes of site meetings	4	4	4	5	5	5	5	4	5	5	5	4.64
	Quality of contractor site organization and staffs	5	4	4	5	5	5	4	4	4	5	5	4.55
	Management of claims	4	4	5	5	5	5	4	4	4	5	5	4.55
	Variation orders	5	4	5	4	5	5	4	4	5	5	5	4.64
	Project delays and extensions of time	5	5	5	5	5	5	4	4	5	5	5	4.82
	Health and safety	4	5	4	5	4	5	4	4	4	5	4	4.36
	Risk management	4	4	4	5	5	5	3	4	4	5	5	4.36
	Non-completion of works	3	3	5	4	5	5	3	4	4	5	5	4.18
	Environmental performance	3	4	5	5	4	5	3	4	4	5	5	4.27
<b>Closeout</b>	Final account	5	4	5	5	5	5	5	4	5	5	5	4.82

Snag list	5	5	5	5	5	5	5	4	5	5	5	5	4.91
Certificates	4	4	5	5	5	5	5	4	5	4	5	5	4.64
Outstanding payments	5	2	5	5	5	5	5	4	4	5	5	5	4.55
Final Project Cost Versus Accepted Tender Price	5	2	5	5	5	5	5	5	4	5	5	5	4.64
Quality management	5	2	5	4	5	5	5	5	5	5	5	5	4.64
As-built drawings +Test results	3	5	4	5	5	5	5	5	5	5	5	5	4.73
Time management	3	2	4	3	5	5	5	4	4	5	5	5	4.09
Claims	3	2	4	3	5	5	5	4	4	5	5	5	4.09
Cost management	3	2	4	3	5	5	5	4	4	5	5	5	4.09
Risk management	3	2	4	3	5	5	5	4	4	5	5	5	4.09
Disputes	5	2	5	3	5	5	5	3	4	5	5	5	4.27



#### 4.5.4 Applicability of the Proposed Framework

Respondents were asked to rate the applicability of the proposed framework. Three criteria were set which are applicability, effectiveness, and adaptability. The same Five-point Likert Scale was used to rate the applicability level of the framework. From the analysis in Table 4.14, it shows that in terms of applicability, effectiveness, and adaptability the framework was rated 4.36, 4.36, and 4.09 respectively. This is way higher than 3 which was the minimum threshold.

**Table 4.14 Results of Applicability of a Proposed Framework**

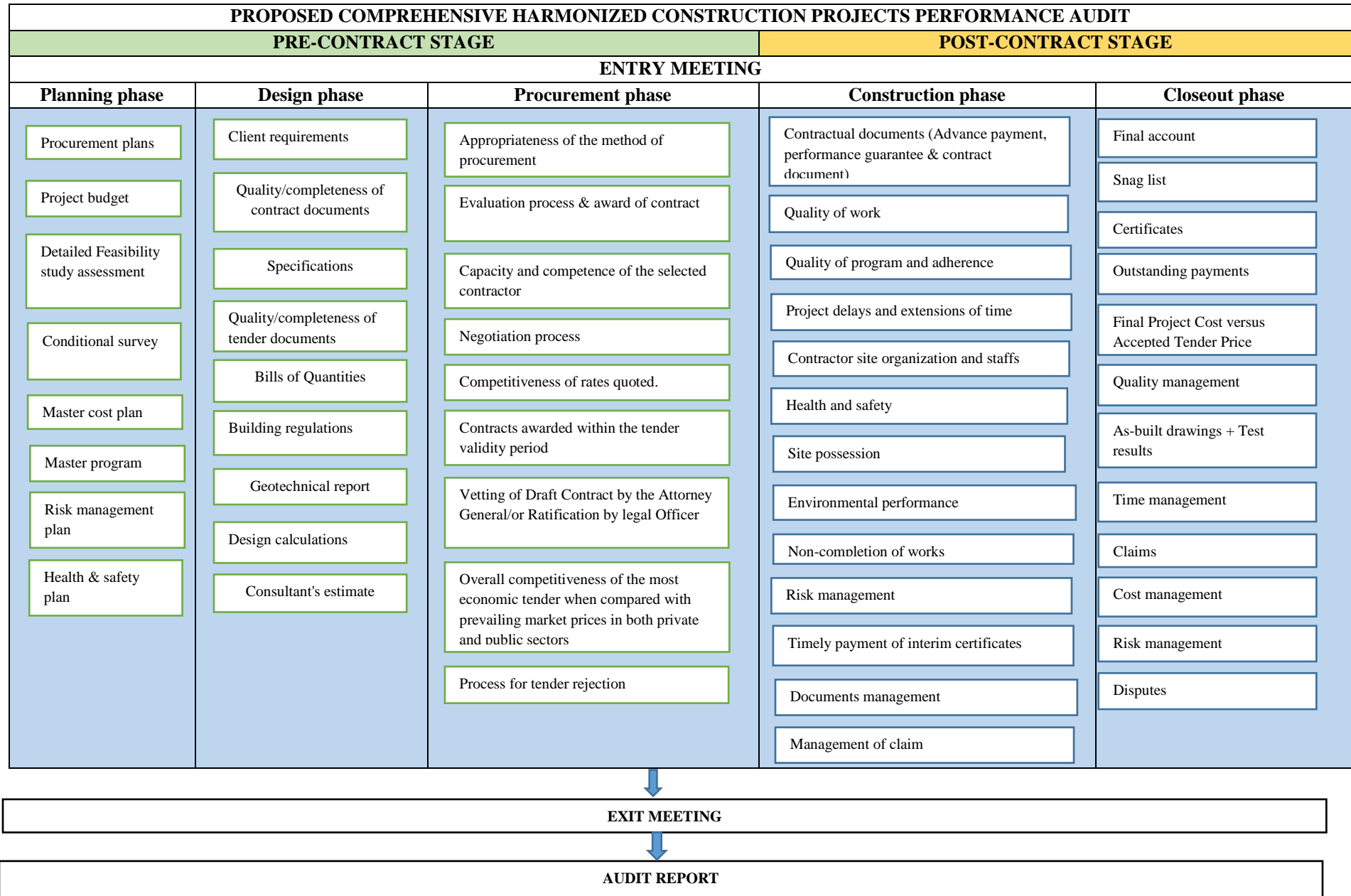
Validation criteria	Respondents											Mean
	1	2	3	4	5	6	7	8	9	10	11	
Applicability	3	3	5	4	5	5	5	4	4	5	5	4.36
Effectiveness	3	4	5	4	5	5	4	4	4	5	5	4.36
Adaptability	4	2	4	4	5	5	3	4	4	5	5	4.09

#### 4.5.5 Recommendation

Respondents were asked to suggest how the proposed framework should be improved. One of the respondents recommended that a feasibility study should be given the importance it deserves. This comment was considered in an improved framework by removing the word feasibility study and replacing it with 'detailed feasibility study assessment'. Also, it was recommended that procedures for analyzing contractual claims be provided in detail to give awareness to auditors and professionals. Another respondent commented that there should be a pass criterion at each stage. This comment is vital to the effective utilization of the proposed framework. However, due to time constraints, the study recommended it as an area for further research, which is currently under consideration.

#### 4.5.6 Improved and Validated Framework

From the results and recommendations obtained from the respondents, the improved framework was developed. The major recommendation captured was to give a feasibility study more weight at the planning stage. In a conceptual framework, it was written as 'feasibility study', but after receiving comments it was improved to a "detailed feasibility study assessment". The improved and validated framework is shown in Figure 4.2.



*Figure 4.2 A Validated Comprehensive Harmonized Framework for Auditing Performance of Construction Projects*

#### **4.6 Chapter Summary**

This chapter has presented and discussed the findings from documents, interviews, and questionnaires. Most of the findings were converging to each other. Furthermore, some of the findings were consistent with the literature, but other findings slightly differed from related literature. This chapter has also identified the critical audit indicators at each phase of the construction project, which were then used to develop a comprehensive harmonized framework for auditing the performance of construction projects. The succeeding chapter presents the conclusions and recommendations of this study.

## **CHAPTER FIVE**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Chapter Introduction**

This chapter concludes the study on Benchmarking Construction Auditing: A Framework for Assessing Construction Projects Performance in Tanzania. The main purpose of this study was to evaluate the current auditing practices in Tanzania, identify the critical indicators for auditing construction projects, and develop a framework that harmonizes different auditing practices in Tanzania. This was achieved through reviewing the documents from auditing institutions, including auditing tools, guidelines, and manuals. Interview was then conducted with auditors to capture more of what is being practiced in the audit industry. The questionnaire survey was employed to establish the most significant indicators that enabled the development of a comprehensive framework that is harmonized for assessing the performance of construction projects in Tanzania. The chapter contains three sections. The first section presents conclusions on findings from the specific objectives of the study. The second section encompasses the recommendations, and the last section presents the recommendation for future research.

#### **5.2 Conclusions**

Audit of construction projects in Tanzania is done separately in phases that are planning, design and tender documentation, procurement, construction, and closeout phase. But planning, design and tender documentation are considered as single phase by both PPRA and NAO. NAOT and PPRA got their guidelines/tools that guide auditors to assess the project, but NCC got their guideline which was published 1991 and it has not been updated to date. However, currently they use terms of reference to perform the audit. This is similar to the Ministry of Finance in their Department of Internal Auditor where there is no specific guideline or tool for auditing construction projects, rather, they work on terms of reference prepared by themselves or by the client. In addition, the study finds out that audit institutions have varying indicators within the phases (Table 1.1) which resulting to inconsistency results. Also, it was observed that there were missing indicators that found significant and worthy to be considered in performance audits. These indicators were mapped in framework developed (Figure 4.2).

The following is the conclusion regarding the first and second specific objectives. The purpose of these objectives was to evaluate the current practice of construction projects audits in Tanzania and to identify critical indicators for assessing the performance of construction projects respectively.

### **5.2.1 Planning Phase**

At planning stage, it was observed that project feasibility study, procurement plans (general procurement plan, specific procurement plan, and annual procurement plan), and project budget, were the common indicators that are assessed by both PPRA and NAO. Though NCC was only based on project feasibility at this stage as shown in Table 1.1. However, it was noted that some important indicators as identified from the extant literature were not considered by all institutions. It includes risk management plan, master cost plan, master program, and health and safety plan. In this current study, the four excluded indicators were all found significant in practice (refer to Table 4.6). Overall, the top most significant indicators identified in this phase were procurements plans, project budget, feasibility, and condition survey.

### **5.2.2 Design and Tender Documentation Phase**

The findings revealed that audit during the design stage all audit institutions covers indicators such as client requirements, building regulations, design calculations, bills of quantities, and engineer's estimate. However, it was observed that geotechnical report was only assessed by NAO at this stage. On top of that, through a questionnaire survey, it was found out that client requirements, contract documentation, and specification are the top most significant indicators that auditors should assess when auditing the construction project at this stage (see Chapter 4, Table 4.7).

### **5.2.3 Procurement Phase**

The study finds out that there is effectively auditing at this stage, but it is only two institutions (PPRA and NAO) that audit the construction project at this phase with similar indicators as shown in Table 1.1. But, NCC guideline is missing this important phase. At this stage auditors assess the compliance of Public Procurement Act of 2011, with its Regulations of 2013 as read along with their amendments of 2016. In addition to that all indicators that were identified through document review were found to be significant. Procurement plans, tender evaluation,

and award of contract and competence of selected contractors were the topmost significant indicators on the list (see Chapter 4, Table 4.8).

#### **5.2.4 Construction Phase**

For the construction phase, the study revealed that risk management and non-completion of works that were obtained from literature are not assessed by all institutions at this stage because of the absence of a risk management plan at the planning stage. In addition, NCC assess management of claim which both PPRA and NAO does not consider. Although this study found it as a significant indicator. All 17 identified indicators were found to be significant indicators. The top most significant indicators identified under this phase were, contractual documents (advance payment and performance guarantees), quality assurance and adherence, interim payment certificates, and program of work and adherence (Refer Table 4.9).

#### **5.2.5 Closeout Phase**

During project closure, the findings indicated that indicators that were commonly assessed by both PPRA and NAO include as-built drawings, test results, final quantities versus as-built drawings, and snag lists. The study also finds out this phase is not existing in the NCC audit guideline as compared to PPRA and NAO. On top of that, indicators such as risk management, claims, disputes, cost management, quality management, time management, and outstanding payments are very important indicators that were not considered by all institutions during auditing the project at this stage. But all ignored indicators were found significant and worthy to be assessed at this stage. The study also revealed that auditors ranked the following indicators that are most significant to be considered when auditing the project at the closeout stage, including final account, Snag List, Certificates (practical completion, certificate of making good defects and final certificate,) and outstanding payments (refers to Table 4.10).

#### **5.2.6 Development of the Auditing Framework for Assessing Project Performance**

The third specific objective was to propose an auditing framework, which is synthesized through the findings from the first and second specific objectives of the study. The most significant indicators were considered in formulating a framework. The framework was mapped onto the construction project life cycle stages that were grouped into two major categories, representing the Pre-contract and Post-contract Stages.

### **5.3 Recommendations**

From the findings regarding the main objective of the study and conclusions, the study recommends the following;

- There should be a common framework that will be used to assess the performance of construction projects in Tanzania. The framework should be implemented and monitored by the single institution which is NAOT. This institution has been mandated by the law to perform audits in Tanzania. This will firstly avoid repetitions of audits for the same public projects. Secondly, it will save cost as one institution can perform it well. Consequently, it is advised that PPRA remains the Regulator of public procurement activities which is its primary function. Other institutions should use the audit findings from NAOT, except where they are required to perform a special audit in which case it should be indicated that such required information was not covered by NAOT.
- Audits should be done in two stages that are, for pre-contract and post-contract stage as shown in the developed framework in Figure 4.1. This will ensure the efficiency of audits and prevent failures of projects during the post-contract stage as most of the critical issues will be identified at early stages of the project. Moreover, it will provide enough time for auditors to audit the project effectively as it is always difficult to audit the project through the entire phases at once due to time constraints.

### **5.4 Implications**

This research provides several implications to both practitioners and government. The most important is consistent results and interpretation will be achieved since the study involved harmonizing audit practices in Tanzania by identifying the key audit indicators. Therefore, to auditors who are the practitioners should ensure that the identified critical indicators are being considered when they perform audits. Nevertheless, to enhance the performance of the project at the construction stage, it is very important to audit the project at the pre-construction stage using the identified indicators because most of the problems result from poor performance at the PCS. Second, is to the Government, it is recommended that the identified critical indicators should be adopted by the government institutions that performing technical audits on construction projects to have consistent results and efficient audit across audit institutions because there are new

indicators identified such as master cost plan, risk management plan, master program which are critical to be considered.

#### **5.4 Recommendation for Further Study**

- This study has evaluated the current practices of construction projects audits and established the framework that harmonizes the key indicators to be assessed during the audit. The study, however, did not go further to establish the scores for each indicator that will be used to conclude whether the project has performed well or not. This is in further consideration to establish the scoring criteria that shall guide the auditor to conclude on whether or not the performance of the project is good, using the proposed indicators developed.
- Moreover, this study was limited to public construction projects. Further research could be conducted to develop a framework that will be used to assess private projects or both private and public construction projects.
- The study did not assess the challenges that may hinder the entire process of auditing construction projects. It is therefore advised for further studies to consider assessing the challenges during auditing and incorporate them in the framework so as the audit can be conducted more effectively and efficiently.



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## **APPENDICIES**

### **APPENDIX 1: INTERVIEW GUIDE**

#### **SECTION A: GENERAL INFORMATION**

1. Please state your profession background.
2. Have you been involved in auditing any construction building projects?
3. How many construction projects have you audited to date?
4. What type of audits have you done before?

#### **SECTION B: KEY/SPECIFIC INFORMATION**

##### **1. PLANNING STAGE**

- a) When auditing project at planning phase, what are the parameters do you assess?
- b) Could you explain the procedures and what is involved in the process?  
Probe: Which documents do you refer to obtain information?
- c) What are the criteria used to judge their performance?

##### **2. DESIGN STAGE**

- a) At design stage of a construction project, what are the parameters do you audit?
- b) Could you explain the procedures and what is involved in the process?  
Probe: Which documents do you refer to obtain information?
- c) How do you measure the performance of the project at this stage? (*whether design stage was successful or not*).

##### **3. PROCUREMENT STAGE**

- a) At procurement stage, what are the parameters do you audit?
- b) Could you explain the procedures and what is involved in the process?  
Probe: Which documents do you refer to obtain information?
- c) What are the criteria do you use to measure the performance of the project at this stage?

##### **4. CONSTRUCTION STAGE**

- a) What are the parameters do you audit at construction stage of project?
- b) Could you explain the procedures and what is involved in the process?  
Probe: Which documents do you refer to obtain information?
- c) What are the criteria used to assess/measure the performance at this stage?

**5. CLOSEOUT STAGE**

a) At closeout stage of the project, what are the items/parameters do you check?

b) Could you explain the procedures and what is involved in the process?

Probe: Which documents do you refer to obtain information?

c) What are the criteria used to assess/measure the performance at this stage?

**6.** What are the outputs of audit?

**-END-**

**THANK YOU**

## APPENDIX 2: QUESTIONNAIRE

### Dear respondent

My name is Aloyce Deogratias, a Master's student of Ardhi University pursuing a Master of Science degree in Construction Economics and Management. Currently I am conducting research with a topic titled "**Benchmarking Construction Auditing: A framework for Assessing Construction Projects Performance in Tanzania.**" The main purpose of this study is to harmonize construction projects audit practices in Tanzania.

With all due respect you are kindly requested to respond to the questions asked in relation to this research. Your valuable knowledge and experience in construction audits is very fruitful to this study as it will enable to improve audit practices in our country. Your identity will remain strictly confidential.

This survey will take 10-12 minutes to complete.

### PART A- DEMOGRAPHIC INFORMATION

1. Please tick your professional background

Engineer	<input type="checkbox"/>
Quantity surveyor	<input type="checkbox"/>
Architect	<input type="checkbox"/>
Building surveyor	<input type="checkbox"/>
Construction manager	<input type="checkbox"/>
Other, please specify.....	

2. How did you become an auditor of construction projects?

Employed in audit firm	<input type="checkbox"/>
Shortlisted by an audit institution	<input type="checkbox"/>
After attending short course	<input type="checkbox"/>

3. Please select the type of audits you have done before

Performance audits	<input type="checkbox"/>
Preventive audits	<input type="checkbox"/>
	<input type="checkbox"/>

Compliance audits

Value for Money audits

Other, please specify.....

4. How many projects have you audited to date?

1-5

6-10

11-20

21-50

50 and above

**PART B-AUDIT INDICATORS**

5. Please rate the level of significance of the following audit indicators used to assess the performance/compliance/value for money for construction projects. Please put only one tick for each item in the respective box, at a 5-point Likert scale.

<b>PLANNING STAGE</b>	Very significant	Significant	Neutral	Less significant	Not at all
Feasibility study					
Procurement plans (APP, GPN, SPP)					
Risk management plan					
Master program					
Project budget					
Health and safety plan					
Communication plan					
Land acquisition					
Master cost plan					
Conditional survey (Rehabilitation works)					
<b>Any other please add below</b>					

<b>DESIGN STAGE</b>	Very significant	Significant	Neutral	Less significant	Not at all
Client requirements/ TOR's/ The brief					
Adherence to building regulations					
Specifications					
Geotechnical survey					
Design calculations					
Engineer's estimate					
Bills of Quantities					
Tender documentation					
Contract documentation					
<b>Any other please add below</b>					

<b>PROCUREMENT STAGE</b>	Very significant	Significant	Neutral	Less significant	Not at all
Appropriateness of the method of procurement					
Compliance of the procurement process with PPA 2011 and its Regulations (GN 446 of 2013)					
Evaluation process and award of contract					
Negotiation process					
Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer					
Contracts awarded within the tender validity period					
Process for tender rejection					
Competitiveness of rates quoted for major items of construction when compared with prevailing market prices					
Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors					
Capacity and competence of the selected contractor in relation to project size and complexity					
<b>Any other please add below</b>					
<b>CONSTRUCTION STAGE</b>	Very significant	Significant	Neutral	Less significant	Not at all
Site possession					
Contractual documents (Advance					

payment & performance guarantee)					
Quality of program and adherence					
Project delays and extensions of time					
Quality of contractor site organization and staffs					
Health and safety					
Quality assurance and adherence					
Environmental performance					
Non-completion of works					
Risk management					
Variation orders					
Timely payment of interim certificates					
Site instructions					
Minutes of site meetings					
Progress reports					
Interim payments certificates					
Management of claims					
Consultant performance					
<b>Any other please add below</b>					

<b>CLOSE OUT STAGE</b>	Very significant	Significant	Neutral	Less significant	Not at all
As built drawings & Test results					
Snag list					
Disputes					
Outstanding payments					
Claims					
Final account					
Certificates					
Quality management					
Risk management					
Cost management					
Time management					
Final Project Cost Versus Accepted Tender Price					
<b>Any other please add below</b>					

***-THANK YOU-***

## APPENDIX 3- QUESTIONNAIRE FOR PROPOSED CONCEPTUAL FRAMEWORK VALIDATION

### PART A- Background Information

1) Please tick your professional background

Engineer  Quantity Surveyor  Architect  Building surveyor

Construction manager

Any other, specify.....

2) What is your highest educational qualification?

Bachelor Degree  Master's Degree  PhD

3) What is Audit institution are you working with?

PPRA  NCC  NAOT  MoF  Independent Consultant

4) How many projects have you audited to date?

21-50  50 and above

### Part B- Introduction to Proposed Comprehensive Harmonized Framework for Auditing Performance of Construction Projects

The framework development approach followed the efficient approach which enabled a researcher to formulate a conceptual framework. The process comprises of three stages which are literature review on previous studies related to audit, review of audit manuals/tools from audit institutions and interviews. The identified indicators from documents, interviews and literature were combined and sent to auditors through questionnaires to identify the critical audit indicators. Critical indicators were then used to develop a framework.

A Proposed framework has followed the main five stages of construction which are Planning, design, procurement, construction and closeout.



### Part C-Validation Questions

**Q1. To what extent do you agree that the following audit indicators are significant to be considered at planning stage?**

<b>PLANNING STAGE</b>	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Procurement plans (APP, GPN, SPP)					
Project budget					
Feasibility study					
Condition survey					
Master cost plan					
Master program					
Risk management plan					
Health and safety plan					

**Q2: To what extent do you agree that the following audit indicators are significant to be considered at design stage?**

<b>DESIGN STAGE</b>	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Client requirement/ TOR's/The brief					
Contract documentation					
Specifications					
Tender documentation					
Bills of Quantities					
Adherence to building regulation					
Geotechnical survey					
Design calculations					
Engineer's estimate					

**Q3: To what extent do you agree that the following audit indicators are significant to be considered at procurement stage?**

<b>PROCUREMENT STAGE</b>	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Appropriateness of the method of procurement					
Evaluation process and award of contract					
Capacity and competence of the selected contractor in relation to project size and complexity					
Compliance of the procurement process with PPA 2011 and its Regulations (GN 446 of 2013)					
Negotiation process					

Competitiveness of rates quoted for major items of construction when compared with prevailing market prices					
Contracts awarded within the tender validity period					
Vetting of Draft Contract by the Attorney General/or Ratification by legal Officer					
Overall competitiveness of the most economic tender when compared with prevailing market prices in both private and public sectors					
Process for tender rejection					

**Q4: To what extent do agree that the following audit indicators are significant to be considered at construction stage?**

<b>CONSTRUCTION STAGE</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>
Contractual documents (Advance payment & performance guarantee)					
Quality assurance and adherence					
Interim payments certificates					
Quality of program and adherence					
Site possession					
Timely payment of interim certificates					
Progress reports					
Site instructions					
Minutes of site meetings					
Quality of contractor site organization and staffs					
Management of claims					
Variation orders					
Project delays and extensions of time					
Health and safety					
Risk management					
Non-completion of works					
Environmental performance					

**Q5: To what extent do agree that the following audit indicators are significant to be considered at closeout stage?**

<b>CLOSE OUT STAGE</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>
Final account					
Snag list					
Certificates					
Outstanding payments					

Final Project Cost Versus Accepted Tender Price					
Quality management					
As built drawings +Test results					
Time management					
Claims					
Cost management					
Risk management					
Disputes					

**Part D-General Framework Validation Questions**

This section contains general validation questions which enquire on the applicability of the conceptual framework and suggestions for improvement.

• **D1: Applicability**

**Q6. To what extent do you agree that the proposed framework is applicable assessing performance of construction project in Tanzania?**

Strongly agree  Agree  Neutral  Disagree  strongly disagree

• **D2: Effectiveness**

**Q7. To what extent do you agree that the proposed framework model can effectively improve audit practices in Tanzania?**

Strongly agree  Agree  Neutral  Disagree  strongly disagree

• **D3: Adaptability**

**Q8. To what extent do you agree that the proposed framework is adaptable to different countries?**

Strongly agree  Agree  Neutral  Disagree  strongly disagree

**E. Recommendation**

What can you suggest to improve the proposed the framework?.....  
 .....  
 .....