ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

ASSESSMENT ON THE PRACTICE AND IMPLEMENTATION OF ISO 9001 QUALITY MANAGEMENT SYSTEM: THE CASE OF ASER CONSTRUCTION AND RAMA CONSTRUCTION

A THESIS SUBMITTED TO THE DEPARTMENT OF BUSINESS ADMINISTRATION AS A PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF BUSINESS ADMINISTRATION (MBA)

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(SGS/0027/2013A)

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Addis Ababa, Ethiopia

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DECLARATION

I, Sofanit Mesfin Mekuria, hereby declare that this Master Thesis titled "Assessment on the Practice and Implementation of ISO 9001 Quality Management System: The Case of ASER Construction and Rama Construction' is an original work. I have carried out the present study independently with the guidance and support of my research advisor, Dr. Melaku Girma. Any other research or academic sources used here in this study have been duly acknowledged. Moreover, this study has not been submitted for the award of any program or any other institution.

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ENDORSEMENT

This is to certify that this Master Thesis titled “Assessment on the Practice and Implementation of ISO 9001 Quality Management System: The Case of ASER Construction and Rama Construction’, which is undertaken by Sofanit Mesfin, is an original work and not submitted earlier for any degree either at this University or any other University.

Research Advisor _____

Signature _____

Date _____

ACRONYMS/ABBREVIATIONS

EQA Ethiopian Quality Award

ISO International Organization for Standardization

PMI Project Management Institute

QMS Quality Management System

TQM Total Quality Management

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ABSTRACT

This study intends to evaluate the practice and implementation of ISO 9001 quality management system at ASER Construction and Rama Constrction, which are among the very few construction organizations with an ISO 9001 quality management system certification. The basic concerns and difficulties presented in this study, which are based on ISO 10006:2017 Quality Management in Projects, include comprehending the level of management accountability, resource management, and the extent of product realization in project activities. Data was collected from concerned staff members and specialists in the project environment using quantitative and qualitative methodologies to fulfill the research's aims. The data was collected from the disseminated sixty six questionnaires with an 76 percent response rate and analyzed using descriptive statistics focusing on the mean, standard deviation, and percentages, which were calculated using statistical program for the social sciences (SPSS) version 20. Content analysis was used to analyze the qualitative data, which was then triangulated with the quantitative data to summarize the findings, conclusions, and recommendations. The validity of the instrument was evaluated, and the instrument's internal consistency was measured using Cronbach Alpha, with a result of greater than 70%, indicating that the data was reliable. The findings were provided in a qualitative as well as quantitative format. The study's findings suggest that risk management, communication systems, procurement procedures, and follow-up on subcontractor performance are all performing poorly. On the other hand, management responsibility for understanding customer needs, top management commitment, empowering people, company decision-making strategy, cost management, and project resource optimization is handled very well. It is therefore recommended that, in order for ISO 9001 quality management system to be implemented effectively, it is important that both of the construction companies establish an appropriate degree of flexibility within the key and supporting processes and have a continued right level of leadership commitment, resource utilization and implement the right project management methodology in their systems.

CHAPTER ONE:

INTRODUCTION

This chapter among other things include: the background of the study, statement of the problem, research questions & objective, significance, scope and limitations of the study, and organization of the research report.

1.1 Background of the Study

The construction industry is a major economic growth driver for Ethiopia. Massive government investment in infrastructure and residential building projects is turning the country into one of the continent's highest performing economies. But the country's growing numbers of construction projects have inefficiencies that need careful management. With no doubt this activities is need to be managed in a proper quality management system to satisfy their clients. Implementing ISO 9001 quality management system based on (ISO 10006, 2017) are important in helping construction projects to become more competitive in the construction industry. (Mane, 2015), stated that the quality in the construction industry is linked with client's satisfaction, and the implementation of a quality management is a key tool in consistently and reliably managing the construction activities. For improving the level of performance of construction companies, ISO 9001 quality management system plays a great and important role. It helps the construction firms to seek and to sustain itself in the existing construction market which is highly challenging and competitive. From the perspective of a construction company, quality management means maintaining the quality of construction works at the required standard so as to obtain customer's satisfaction that would bring long term competitiveness and business survival for the companies and to guarantee that the project outputs are delivered fit-for-purpose. The process of implementing an ISO 9001 quality management system is an important opportunity to reorganize and modernize an organization. It is an external, widely accepted motive to change functions, procedures, and old habitudes in the organization. This effort would otherwise be considered an unnecessary and unjustified extra effort. It is also an excellent opportunity to introduce new tools and work techniques, thus restructuring the organization not only to achieve the certification but also to make it more effective and rational.

Secondary data from different studies showed that the practice and implementation of ISO 9001 quality management system in construction companies is found at its rudimentary level and is not a well understood subject in Ethiopian construction industry. Therefore this study focused on the implementation of ISO 9001 quality management system in construction activities and tried to reveal the existing situation regarding to its the practice and implementation.

Thus, this study predominantly uses the principles enumerated in the (ISO 10006, 2017) quality management in project which includes: Management responsibility in project, resource management in project, product/ service realization in project; and measurement, analysis and improvement in projects. These principles help in assessing the practice of ISO 9001 quality management system in construction companies. These principles together with their attribute are included in the questionnaire to survey the practice and implementation of ISO 9001 quality management system in the selected construction companies that are based in Addis Ababa, Ethiopia.

1.2 Statement of the Problem

The Ethiopian construction industry is widely denounced for the low quality material usage and late delivery of construction projects, having low quality in both the finished products and the processes used during the project design and construction stages. The research conducted by (Abreham, 2004), indicates that the performances of construction projects exhibited low accomplishment rates and this negatively impacted the completion time, cost overruns and strongly associated with quality related issues contributed to low performances. This can be associated with lack of knowledge or implementation of ISO 9001 quality management system in their activities. Secondary data showed that a considerable time and cost is spent in correcting problems during construction activities, and majority of projects suffer from time overrun and cost overrun.

Construction firms in the country have been struggling with quality issues for many years; while they have been wasting resources as a result of faulty construction. According to (Birhanu & Daniel, 2013), EQA self-assessment report evaluation, generally, quality management practices in Ethiopia was found to be low in all the tenets including leadership, policy and strategy, resources management, process management, customer satisfaction, business performance and impact on society. Among these factors, policy and strategy is the most critical problem area despite the least weight given by the EQA.

The limitation of full practice regarding to ISO 9001 quality management system resulted in a more complex projects. This could definitely lead construction activities to operate under some level of uncertainty and make the projects implementation liable to all sorts of external influence and unexpected events.

This research is important to the selected companies to know the level of their implementation of ISO 9001 quality management system, to identify their gap and to understand what they have to do in the future. The findings of this study are also expected to guide and show them proper direction

on how they can effectively implement ISO 9001 quality management system in their overall activities. Therefore, this study examined to what extent that the ISO 9001 quality management system is conducted by the selected construction companies and thereby to recommend a solution to the construction impediments and uncertainty in project activities.

1.3 Research Questions

In light of the problems discussed above, the research specifically aims to answer the following research questions:

- How is management responsibility practiced at ASER Construction and Rama Construction?
- How efficient are ASER Construction and Rama Construction in resource management?
- In what level is product/service realized in project activities at ASER Construction and Rama Construction.
- What are the challenges faced to implement ISO 9001 quality management system at ASER Construction and Rama Construction?

1.4 Research Objective

1.4.1 General Objective

The general objective of this research is to assess the implementation of ISO 9001 quality management system in the construction sector.

1.4.2 Specific Objectives

More specifically, the study is aimed to achieve the following objectives:

- To understand the level of management responsibilities within ASER Construction and Rama Construction.
- To know how resources are managed at ASER Construction and Rama Construction.
- To evaluate the realization of products or services within the project activities at ASER Construction and Rama Construction.
- To identify the major challenges faced by ASER Construction and Rama Construction in the implementation of ISO 9001 quality management system.

1.5 Significance of the Study

The study findings are a relevant input to the management of construction companies, where they can use the result of the work to improve quality related problems in construction projects. The study also serves as a stepping stone towards further studies in the area of quality management practices in the construction sector.

1.6 Scope of the Study

This study is limited to two ISO 9001 certified companies that are operating in the construction sector, namely, ASER Construction and Rama Construction. It assesses the implementation of ISO 9001 quality management practices at the stated companies, which are based in Addis Ababa, Ethiopia. The study focused on the modality and principles stated on (ISO 10006, 2017) QMS in projects. The participants in this study include: construction project manager, site supervisors, project consultant and project expert, quality manager and construction foreman. These participants are selected as they are the ones who are responsible for managing, monitoring and controlling the construction project activities.

1.7 Limitations of the Study

There was some forms of lack of cooperation from employees, and respondents was also not much dedicated enough to respond the questionnaires, and there was a fear that respondents might not convey their idea freely, on what they really believe in. Moreover, there was also some sort of difficulty in collecting questioners on time.

1.8 Organization of the Research Report

The sections of paper are organized in the following manner. This section focuses on the introduction of the research which includes: background of the study, statement of the problem, research questions, research objective, significance of the study, scope of the study, limitations of the study, and ethical considerations. The next section deals with theoretical and empirical review of the literatures and results of prior studies. In the third chapter, description of the study area/organization, research approach and design, data type and source, data collection methods and tools, and data analysis are discussed. Chapter four is dedicated to discuss the results and the findings obtained from the study. Finally, the summary of major findings, conclusions and recommendations are explained in chapter five.

CHAPTER TWO:

REVIEW OF RELATED LITERATURE

This section covered review of literature from different scholars and authors that have been examined in the area of business administration with special focus on quality management. The theoretical and practical findings of various studies related to ISO certification, quality management process, quality management tools and techniques, quality management implementation and management challenges were described. A reviewed literature from secondary sources such as published books, articles and related websites are also presented to reveal points, targeting at the attainment of the research objectives.

2.1 Theoretical Literature

2.1.1 ISO Standards

ISO standards are internationally agreed by experts. It can be used as a formula that describes the best way of doing something. It could be about making a product, managing a process, delivering a service or supplying materials. There are many different ISO Standards out there, the most popular ones are ISO 9001, ISO 14001, ISO 14001, ISO 27000, ISO/TS 16949, and ISO 22000.

ISO 9001- is by far the most popular family is that of ISO 9000. A family of quality management standards, there are fourteen in total. Of these, ISO 9001:2015 is the only one that can be certified to. It was first published in 1987, and has since been updated about every 7 years. The standard details how to put a Quality Management System (QMS) in place to better prepare an organization to produce quality products and services. It is customer focused, and places an emphasis on continuous improvement and top management processes that extended throughout the organization. The standard was updated in 2015, and now places a greater emphasis on risk management. The standard is generic, and can be used in any organization in any sector. Over 1,000,000 ISO certifications have been given out in over 170 countries according to the ISO Survey of Management System Standard Certifications.

ISO 14001 - is a family of standards relating to the environment. It includes multiple standards, similar to ISO 9000. ISO 14001:2015 is the most popular in the family, and is the only one in which an organization can be certified. It establishes requirements for an Environmental Management System (EMS) and is based on the continuous improvement model PDCA (Plan-Do-Check-Act). It is a voluntary standard, put in place by companies who want to improve their processes, and is very popular, with over 300,000 certifications in 171 countries worldwide.

ISO 27000 - this family of standards concerns information technology, with the goal of improving security and protecting company assets. Started in 2005, the two most popular standards are ISO 27001:2013 and 27002:2013. 27001 is management-based system, whereas 27002 is a technical document, focused on the individual and putting a code of conduct in place. Organizations can choose either standard; ISO 27001 has over 22,000 certifications worldwide. It is a broad standard, and for this reason the certification can be customized to fit the needs of the organization, and is not mandatory.

ISO/TS 16949 - one of the older standards, ISO/TS 16949 refers to the automotive industry. TS stands for Technical Specification. Prior to the standard, suppliers were asked by car manufacturers to standardize to the regulations of each individual country, which often led to suppliers needing multiple certifications for the same vehicle. According to the British Standards Institution (BSI), in 1999 the ISO/TS 16949 standard was created by the International Automotive Task Force (IATF) to help streamline this process. It focuses on avoidance of errors, and defines the requirements for the development, production, and installation of automotive-related products. Today certification is required by almost all tier 1 companies, and in turn many of them require their tier 2 and 3 suppliers to certify. The standard has over 50,000 certifications.

ISO 22000 - this standard is focused on the development and implementation of a food safety management system, and can help any organization that works in the food chain. With multiple standards including 22001 for food and drink, 22002 for food manufacturing, and more, this family is used in a variety of organizations directly or indirectly involved with food. These include obvious choices such as restaurants of any kind, and also companies such as food manufacturers or even food transportation services such as caterers. With over 26,000 certifications, ISO 22000:2005 is one of the more common standards. It can be applied on its own or integrated with ISO 9001. 22000 is currently under revision with the updated version expected to be released early 2017.

2.1.2 ISO 9001 Quality Management System

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

satisfies customers' expectations. The international standard for quality management (ISO 9001, 2015) adopts a number of management principles that can be used by top management to guide their organizations towards improved performance such as: customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making and relationship management.

2.1.3 Quality Management in Construction

Implementing a quality management system has been an endeavor for many construction companies in the last two decades. While the concept is receiving the utmost attention from large construction companies that seek a competitive edge (Bubshait & Al-Atiq, 1999) small- and medium-sized construction companies have tended to hesitate and postpone this step. Although they recognize the advantages of implementing an ISO 9001 compliant quality management system, the difficulty in fully perceiving what is involved has kept many companies from moving ahead. The comparison of literature with practice proves that there are recurrent issues that come up in implementations in different industries, company sizes, and geographic locations. Quality management systems can provide a solution for several ancient issues in construction companies. It can also constitute a good opportunity for restructuring and modernization, as well as changes in traditional ways that have been accepted without in-depth analysis.

Basically, the QMS in the construction housing industry refers to quality planning, quality assurance and quality control. For the implementation of quality management in construction housing projects, the concepts of quality planning (identification of quality standards), quality assurance (evaluation of overall project performance) and quality control (monitoring of specific project results) in the quality management processes were defined by (PMI, 2000). As a construction firm, the real estate developers need to emphasis on continuous improvement through quality management process to achieve the customer needs. This is an important proper solution for the housing construction developers to solve problems like workmanship defects, time, and cost overrun. According to (Rumane, 2011), construction project quality management is defined as the fulfillment of owner’s needs per defined scope of works within a budget and specified schedule to satisfy the owner’s requirements. The phenomenon of these three components can be the construction project trilogy. Construction projects are custom oriented and custom designed, having specific requirements set by the customer to be completed within a finite duration and assigned budget. Every project has elements that are unique that means no two projects are identical. It is always the owner’s desire that his project be unique and better. To a great extent, each project has to be designed and built to serve

a specified need. Construction projects are more customized than a routine and repetitive business (Rumane, 2011). This shows that a comprehensive and proper quality management system that encompass all the components and participants in the construction activities need to be addressed for successful implementation of a practical plan to ensure that the required standards of quality construction will be achieved. The process of implementation always means an extra effort to all in the organization. A well-implemented QMS will impact all sectors in the company. For the head of the company there is often the belief that this process can be achieved without impacting its own functions. According to (Fixsen et al., 2001), implementation is defined as a specified set of activities designed to put into practice an activity or program of known dimensions. According to this definition, implementation processes are purposeful and are described in sufficient detail such that independent observers can detect the presence and strength of the "specific set of activities" related to implementation. In addition, the activity or program being implemented is described in sufficient detail so that independent observers can detect its presence and strength.

2.1.4 Implementation of ISO 9001 Quality Management in the Construction Sector

Implementing ISO 9001 quality management for construction projects does not guarantee perfect projects, but provides a framework for consistently maximizing the quality of the overall project activities. This framework should include provisions for training and qualification of specific construction procedures, audits and corrective actions. Incorporating these elements at an early stage of these processes will help to ensure project quality objectives are consistently met.

According to (ISO 9001, 2015) the implementation of a QMS implies planning, defining, verifying, and updating processes and procedures. This is defined in the (ISO 9001, 2015) norm as the “plan-do-check-act cycle.” It encourages a change of attitude from a reactive to a proactive attitude. Planning and prevention gain ground to replace the daily solving of unexpected urgent problems. (Griffith & Watson, 2004), described that, there are different QMS that construction companies use including Investors in People (IIP), ISO 9000, EFQM, custom designed systems and or third party certifications. According to (Hakim et al., 2006) Quality management system is defined as “all activities of the overall management function that determine the quality policy, objectives and responsibilities, and implement them by means such as quality planning, quality control, quality assurance and quality improvement within the quality system”. To ensure the continually improvement of ISO 9001 quality management system, it is essential that the top management to provide their full support and commitment especially to the development and implementation of construction project/s. This indicates that quality should be managed in ways that which are clearly

identified, well documented and efficiently planned, implemented and controlled. A project quality plan (PQP) is prepared to establish project level quality procedures bringing together the project information and the companies' policies, procedures and inspection routines' (Griffith & Watson, 2004). This concept is practically and theoretically related to all the participants in construction project activities.

The internal and external customer of a construction project can be both the employees and the society at large, which can represent important stakeholders for the construction firm. Therefore, the project achievement depends on the knowledge, skills, creativity, and motivation of its employees and partners. Thus, construction firms should demonstrate commitment to the employees, provide opportunities for development and growth. Construction quality depends on the availability of skilled personnel, construction material including raw material, finished products, semi-finished products, components' and parts. Moreover the technology and innovation in the construction machinery and equipment are essential for the modern construction, reflecting the construction capabilities of the firm, which have a direct and a significant impact on the project progress and quality. The concept of continuous improvement can be achieved through enhancing values to the customer by the deployment of modern, new and innovative products and services, through minimizing wastes and their related costs, through effective utilization of resources for boosting productivities and finally through improving responsiveness and minimizing customer complaints and poor quality of inputs to the construction activities. According to (Crawford, 2002) the overall aim of quality management is to satisfy the customer, conform to requirements, ensure fitness for purpose, and to ensure the product for use. Project model looks at quality management as set of activities or tasks that are required to ensure the project satisfies all the needs for which it was undertaken based on documented in the state of work and includes a focus on quality management from the perspective of product, processes, and the people needed to make quality an effective and efficient aspect of successful project completion.

2.1.5 Quality Management System in Projects as per ISO 10006:2017

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

guide to project management itself. Guidance on quality in project management processes is presented in it. Guidance on project management and related processes is covered in ISO 21500. (ISO 10006, 2017) addresses the concepts of both "quality management in projects" and quality management systems in projects". These are distinguished by being addressed separately by the following topics and clauses: - Quality management in projects includes: quality management systems in projects (Clause 4); management responsibility in projects (Clause 5); resource management in projects (Clause 6); product/service realization in projects (Clause 7); and measurement, analysis and improvement in projects (Clause 8); Moreover, Quality management systems in projects includes: project characteristics (4.1); quality management principles in projects (4.2); project quality management processes (4.3); and a quality plan for the project (4.4). The explicit explanation of the (ISO 10006, 2017) is described on the table below.

Table 1: Overview of Processes for Quality Management in Projects as Per ISO 10006; 2017

Clause	Sub clause	Sub clause	Process	Process Description
Clause 5 Management responsibility in projects	5.2 Strategic process	—	Strategic	A direction-setting process which includes planning the establishment and implementation of the quality management system based on the application of the quality management principles.
Clause 6 Resource management in projects	6.1 Resource-related processes	6.1.2	Resource planning	Identifying, estimating, scheduling and allocating all relevant resources.
		6.1.3	Resource control	Comparing actual usage against resource plans and taking action if needed.
	6.2 Personnel-related processes	6.2.2	Establishment of the project organizational structure	Defining a project organizational structure tailored to suit the project needs, including identifying roles in the project and defining authority and responsibility.
		6.2.3	Allocation of personnel	Selecting and assigning sufficient personnel with the appropriate competence to suit the project needs.
		6.2.4	Team development	Developing individual and team skills and the ability to enhance project performance.
Clause 7 Product/service realization in projects	7.2 Interdependent processes	7.2.2	Project initiation and project management plan development	Evaluating customer's and other interested parties' requirements, preparing a project management plan and initiating other processes.
		7.2.3	Interaction management	Managing interactions during the project.
		7.2.4	Change management	Anticipating change and managing it across all processes.
		7.2.5	Process and project closure	Closing processes and obtaining feedback.
	7.3 Scope-related processes	7.3.2	Concept development	Defining the broad outlines of what the project product will do.

		7.3.3	Scope development and control	Documenting the characteristics of the project product in measurable terms and controlling them.
		7.3.4	Definition of activities	Identifying and documenting activities and steps required to achieve the project objectives.
		7.3.5	Control of activities	Controlling the actual work carried out in the project.
	7.4 Time-related processes	7.4.2	Planning of activity dependencies	Identifying interrelationships and the logical interactions and dependencies among project activities.
		7.4.3	Estimation of duration	Estimating the duration of each activity in connection with the specific conditions and the resources required.
		7.4.4	Schedule development	Interrelating the project time objectives, activity dependencies and their durations as the framework for developing general and detailed schedules.
		7.4.5	Schedule control	Controlling the realization of the project activities, for confirming the proposed schedule or for taking adequate actions for recovering from delays.
	7.5 Cost-related processes	7.5.2	Cost estimation	Developing cost estimates for the project.
		7.5.3	Budgeting	Using results from cost estimation to produce the project budget.
		7.5.4	Cost control	Controlling costs and deviations from the project budget.
	7.6 Communication-related processes	7.6.2	Communication planning	Planning the information and communication systems of the project.
		7.6.3	Information management	Making necessary information available to project organization members and other interested parties.
		7.6.4	Communication control	Controlling communication in accordance with the planned communication system.
	7.7 Risk-related	7.7.2	Risk identification	Determining risks in the project.

	processes	7.7.3	Risk assessment	Evaluating the probability of occurrence of risk events and the impact of risk events on the project.

		7.7.4	Risk treatment	Developing plans for responding to risks.
		7.7.5	Risk control	Implementing and updating the risk plans.
	7.8 Procurement processes	7.8.2	Procurement planning and control	Identifying and controlling what is to be purchased and when.
		7.8.3	Documentation of procurement requirements	Compiling commercial conditions and technical requirements.
		7.8.4	External provider management and development	Evaluating and determining which external providers and subcontractors should be invited to supply products.
		7.8.5	Contracting	Issuing invitations to tender, tender evaluation, negotiation, preparation and placing of the subcontract.
		7.8.6	Contract control	Ensuring that subcontractors' performance meets contractual requirements.
Clause 8 Measurement, analysis and improvement in projects	8.1 General	—	Improvement	Gives guidance on how both the originating and project organizations should learn from projects.
	8.2 Measurement and analysis	—	Measurement and analysis	Gives guidance on the measurement, collection and validation of data for continual improvement.
	8.3 Improvement	8.3.1	Improvement by the originating organization	The steps the originating organization should take for continual improvement of the project process.
		8.3.2	Improvement by the project organization	The information that the project organization should supply to the originating organization to enable continual improvement.

Source: ISO 10006; 2017 Quality Management in Projects

2.2 Empirical Review

The empirical literature provides pragmatic support of quality management practices in construction projects. Nowadays for solving quality problems and to meet the needs of the customer, construction companies have adopted ISO 9001 quality management system in their activities. Hence, this section is concerned with other studies conducted on in similar discipline.

One of the earlier empirical studies conducted in the QM area by (Saraph et al., 1989) have used data obtained from 162 managers of 20 manufacturing and service industries collected in the region of USA to identify the CSFs of TQM. They identified eight factors: top management leadership, role of quality department, training, product design, supplier quality management, process management, quality data reposting, and employee relations.

For empirical review purpose this study selected the study conducted by (Agbenyega, 2014), which focuses on quality management practices of construction firms in Ghana. The study emphasis on solving the potential barriers, which are to be the main measures to be taken, namely: management commitment, communication between managers and employees, employee involvement, detailed and logical work program, regular inspection, quality audit report, lack of training and education of team members and review and analysis. The other study conducted by Birhanu, who identified that lack of effective supervision, communication, management of commitment, proper equipment and materials available for use, inefficient resource management and problems with contractors are some of the challenges to the attainment of project quality (Birhanu, 2014).

The research conducted on Quality Management in Construction Projects" in Malaysia, is also be considered for empirical review of this study. This Malaysian researcher explores preliminarily the practices of quality management, management commitment in quality management, and quality management implementation problems in construction projects in the context of Malaysian construction industry. The findings of the study indicate that the state of quality management in construction projects in Malaysia needs to be strengthened and there are problems in relation to quality management implementation that require attention.

The identified problems by the scholars are more or less similar even though there is variation due to their practical context of the projects. Hence, these variables are also considered in this study.

2.3 Conceptual Frame Work

This section showed the distinct dimensions related to ISO 9001 quality management system as presented in the literature reviews. This has formed the basis for a comprehensive framework that encompasses the different features of ISO 9001 quality management system. The key dimensions of quality management system as per (ISO 10006, 2017) have been identified with emphasis on their critical value in the framework. The dimensions of quality management system described in this section have all been thoroughly documented by many authors and experts on the subject. This is also captured in the conceptual framework which shows a relationship between the independent variables and dependent variable. The three important scopes in the model are management responsibility in project, resource management in project, product realization in project. These scope have further divided into factor describing them such as customer focus, leadership capabilities, factual based decision, improvement, process approach, people engagement and relationship management which an potentially explain the implementation and practice of ISO 9001 quality management system as per (ISO 10006, 2017). These elements in conceptual model show the relationship among the variables to describe the practice and the extent of implementation of ISO 9001 quality management system in construction companies. **The study was guided by the formulated conceptual framework as described on the figure below.**

Independent Variable

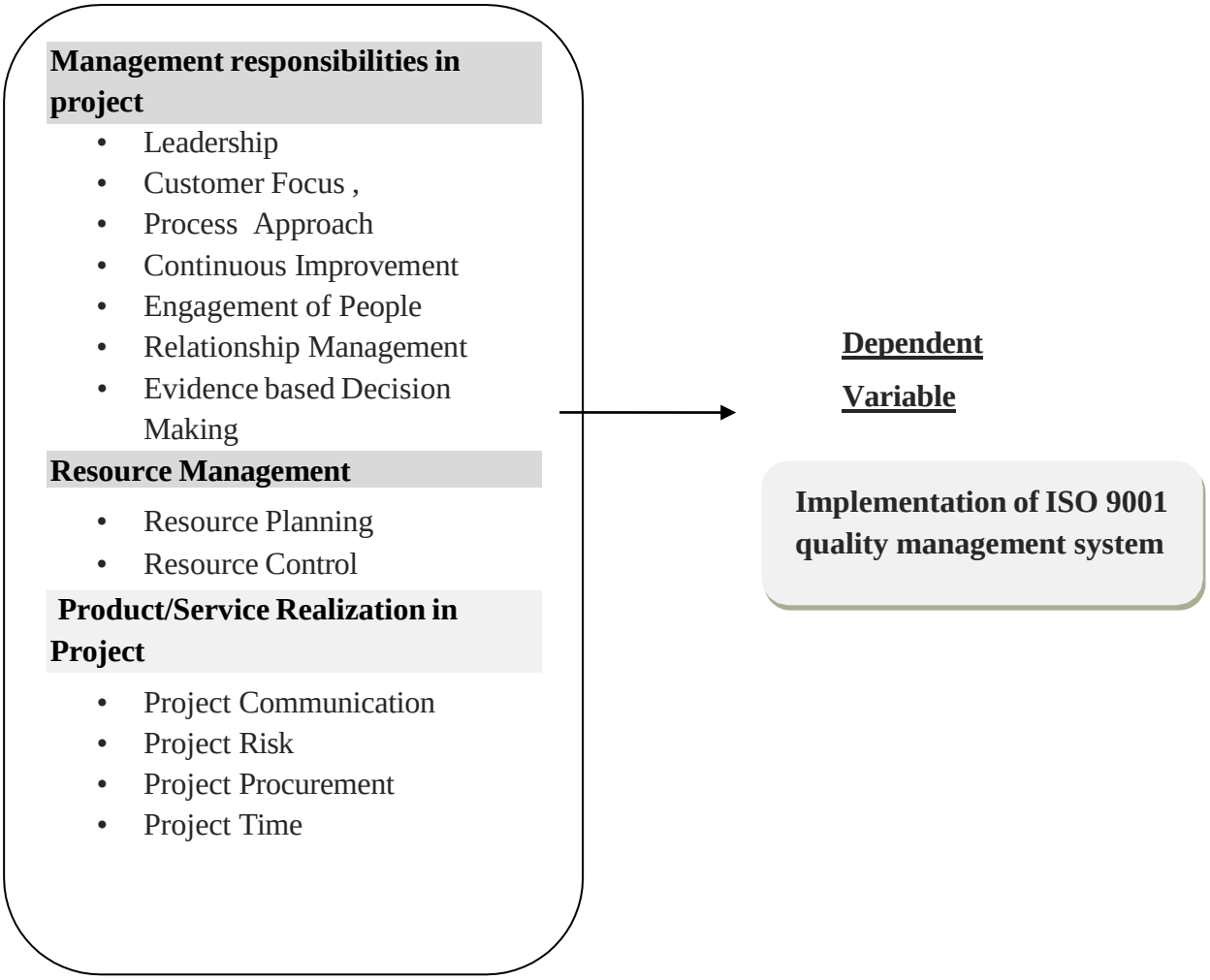

Figure 1: Conceptual framework to analyze the implementation of ISO 9001 quality management system in construction firms

2.4 Ethical Considerations

The originality of the research is maintained as well as all facts and previous research findings were well acknowledged with the respective authors.

CHAPTER THREE:

RESEARCH METHODOLOGY

This chapter presents the research design and methodology that was used to carry out the research. It presents: the research approach, the target population, sample size, sampling technique, data collection and data analysis.

3.1 Research Approach

This study used a mixed method of design. (Creswell, 2007) described that a strong mixed design study should start with a mixed methods research question, to shape the methods and the overall design of a study. Mixed type approach was used for both qualitative and quantitative methods. According to (Saunderset et al., 2007), research design is defined as the general plan of how the research questions would be answered. It is the conceptual structure within which research is conducted. Therefore, the research design for this study was the cross-sectional field survey method because data were collected at one point of time during a period of three weeks to assess the quality management practice in the construction industry sector. In this study, a descriptive survey method was used to measure the characteristics described in the research question. In connection with the application of descriptive survey method, it was stated that this method is a method of investigation that attempts to describe and interpret what exists at present in the form of conditions, practice, process, trends, effects, attitudes, beliefs, etc. (Crosswell & Plano Clark, 2011).

3.2 Target Population

The study is focused on two ISO 9001 certified companies from the construction industry sector, namely, **ASER Construction** and **Rama Construction**.

3.3 Sample Size

In order to select the sample from the targeted population random sampling method is used. The population size of the study is 66 staff members from both construction companies who are working directly on construction projects.

3.4 Sampling Technique

During designing samples, (Copper & Schindler, 2008) suggested that the following should be clearly described: the target population, parameters of interest, sampling frame, appropriate

sampling method and the required sample size from the target population that will be taken. The sampling size was determined by the equation cited on (Israel, 2013) provided a simplified formula to calculate a sample size as presented hereunder.

$$n=N/(1+N*e2)$$

Where n stands for number of sample, N stands population size, and 'e' stands for margin of error. In this study the confidence interval used was a 95% and 'e' can be 0.05. Therefore the sample size obtained using this formula was 66 and this was equally divided into 33 participants to each of the selected companies, which are under the study. As a sample, project manager, project supervisor, project consultant, contract administration team, and technical team members are taken using random sampling techniques. A purposive sampling technique from the population of interest was used. The reason for choosing this technique was that the selected participants are the ones that are the most responsible in the practice and implementation of ISO 9001 quality management system in their respective companies. Moreover, these samples could help in understanding the problem and answer the research questions.

3.5 Instruments of Data Collection

Both primary and secondary data collection methods were used in this study. According to (Kothari, 1985) questionnaires, interviews and direct observations are the most important means of data collection tools. Therefore, in this study, both closed and open ended questionnaires and semi structured interviews were employed as a primary data collection. And the secondary data that is relevant to the study was collected through literature review, journals, and periodicals. A Likert Scale, which is a five point scale was used to allow the individual to express how much they agree or disagree with a particular statement in the questionnaire. The questionnaire was developed by referring different literatures and modifying according to the objectives of this study. The questionnaire had five parts which enabled to collect information on quality management practice in real estate construction firms. The questionnaire had been developed in English and after conducting a test for reliability and the pilot test, the data gathering instruments was edited. Then after, data was collected.

3.6 Validity and Reliability of the Data Collection Instrument

3.6.1 Validity

The researcher did not have any relations with the research participants, which provided an unbiased perspective for the participants. Participants were encouraged to speak openly and honestly, as stated in the confidentiality agreement, their identity will be protected in the published results. According to (Paul, 1998) validity is defined as how much any measuring instrument measures what it is intended to measure. Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. There are three types of validity check for data according to (Kothari, 1985) (i) Content validity; (ii) Criterion-related validity and (iii) Construct validity. In this study content validity of the research was performed.

3.6.2 Reliability

The validity of the data gathering tools were checked by selecting ten respondents, who have high experience on the issue under the study. And then the reliability of the tools were checked using Cronbach's alpha values. The descriptive statistics helped to determine uni-dimensionality and construct validity of the measures, and the Cronbach's alpha values of the factors helped to show the reliability of data that would explain the practice of quality management with in the real estate housing construction activities. The Cronbach's alpha measures the internal consistency of a group of items by measuring the homogeneity of the group of items. "It is an indication of how well the different items complement each other in their measurement of different aspects of the same variable or quality" (Litwin, 2003).

The Crobnach alpha value for the test under Part II of the questionnaire, which focuses in identification of basic information regarding to ISO quality management system implementation, is calculated as 0.885. This indicates that there is a high internal consistency among the data.

Table 2: Case processing summary and reliability statistics for pilot-test for identification of basic information regarding ISO implementation within the project areas

Case Processing Summary			
		N	%
Cases	Valid	10	100.0
	Excluded[a]	0	.0
	Total	10	100.0
a. List wise deletion based on all variables in the procedure.			
Reliability Statistics			
Cronbach's Alpha	N of Items		
.885	5		

Source: Survey questionnaire (2022)

Secondly, the Crobnach alpha value for the test is under Part III of the questionnaire, which helps to know the level of the management responsibility in project activities, is calculated as 0.722. This also indicates that there is internal consistency among the data.

Table 3: Case processing summary and reliability statistics for pilot-test for understanding the level of the management responsibility of the companies

Case Processing Summary			
		N	%
Cases	Valid	10	100.0
	Excluded [a]	0	.0
	Total	10	100.0
a. List wise deletion based on all variables in the procedure.			
Reliability Statistics			
Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items	N of Items
.722		.750	19

Source: Survey questionnaire (2022)

Then, the Crobnach alpha value for the test under Part IV of the questionnaire which focused on resource management in projects activities, is calculated as 0.709. This also indicates that there is internal consistency among the data.

Table 4: Case processing summary and reliability statistics for pilot-test for understanding resource management in projects activities

Case Processing Summary			
		N	%
Cases	Valid	10	100.0
	Excluded [a]	0	.0
	Total	10	100.0
a. List wise deletion based on all variables in the procedure.			
Reliability Statistics			
Cronbach's Alpha		N of Items	
.709		4	

Source: Survey questionnaire (2022)

Finally, the Crobnach alpha value for the test under Part V of the questionnaire, which focused on the realization of product or service in project activities, is calculated as 0.809. This indicates that there is a high internal consistency among the data.

Table 5: Case Processing Summary and Reliability Statistics for Pilot-Test for the realization of product or service in project activities

Case Processing Summary			
		N	%
	Valid	10	100.0

Cases	Excluded[a]	0	.0
	Total	10	100.0
a. List wise deletion based on all variables in the procedure.			
Reliability Statistics			
Cronbach's Alpha		N of Items	
.809		11	

Source: Survey questionnaire (2022)

3.7 Methods of Data Analysis

The quantitative data first was organized and put into tables to suit for analysis. Then after, these data were analyzed using descriptive statistical methods like mean, standard deviation and percentages and calculated suing statistical package for the social sciences (SPSS) version 20. The statistical tools were align with the objectives of the research. Moreover, the qualitative data was transcribed and then coded and put into categories and discussed. As a system of analyzing qualitative data, the content analysis could be used as it had been focused on identifying text about the different theme. Idea were grouped together and gathering evidence about views on each theme.

For easy understanding of the level of practice and implementation ISO 9001 quality management system of the two companies, a rating system has been formulated which encompasses an Excellent, Very Good, Moderate, and Unsatisfactory rating to summarize and conclude the practice and implementation of ISO 9001 quality management system based on the participants response.

- Excellent is rated to the activities that are very well known and very well implemented ISO 9001 quality management systems which is equal and above 80% of the response.
- Very Good is rated for the activities that are well known and well implemented ISO 9001 quality management systems, which include from 65% to 80% of the response.
- Moderate is rated for the activities that are fairly known, implemented ISO 9001 quality management systems but not in-depth, which include from 50% to 65% of the respondents.
- Unsatisfactorily is rated for the activities, which are implemented inadequately, which include less than 50% of the respondents.

Finally the qualitative and the quantitative data were be triangulated to forward summaries, conclusions and recommendations.

3.8 Research Ethics

Participation in the study was on the voluntary basis. Participants were asked for their willingness before they were provided with the questionnaire. The subjects were also assured that their responses are used only for the purpose of the study. An attempt was also made to explain the objectives and significance of the study to the respondents. Name and other identifying information were not used in the study. All information related to the participants were safeguarded. Their privacy, identity and confidentiality was maintained by assigning them code numbers instead of names (anonymity).

CHAPTER FOUR:

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Overview of Companies under Consideration

4.1.1 Rama Construction

As per the data obtained from the official website of the company, Rama Construction Private Limited Company was established in 1995 in Addis Ababa, Ethiopia. The Company is certified in Integrated System of Quality and Environmental Management System (ISO 9001:2015 and 14001:2015). The company is certified in OHSAS Occupational Health and Safety (ISO 18001:2007). The certification is awarded in December 2017.

4.1.2 ASER Construction

As per the data obtained from the company website, ASER Construction PLC was established in year 20009. ASER Construction is registered as Grade 1 General Contractor (GC 1) by Ministry of Urban Development & Construction.

ASER Construction PLC has been certified ISO 9001:2015 starting from dated April 14, 2020, up to April 13, 2023. The Ethiopian Conformity Assessment Enterprise states that the company fulfilled all the requirements to be certified. Accordingly, to the enterprise statement, the company confirms the requirement of the Quality Management system, ISO 9001:2015.

4.2 Research Findings

In this study, a total of 66 questionnaires were circulated and 50 were received, out of which 11 questionnaires were unfilled and 5 questionnaires were discarded due to missing data. Therefore, 50 questionnaires were considered for the study and the respondents are staff members working in the selected organizations. This shows that 76% response rate was secured so there is significant response rate to conduct the analysis smoothly. Results and discussions are devised in five sections in line with the objectives of the research. The first section states the demographic characteristics of the respondents. The second section states the findings regarding the basic information on ISO 9001 quality management system implementation at ASER Construction PLC and Rama Construction. The third section states the findings based on ISO 10006, 2017, which is a guideline for the application of quality management in projects, this section includes the findings towards the status of management responsibility, resource management in projects activities and product/service realization in project activities of the respective companies.

4.2.1 Demographic Characteristics of the Respondents

In order to record the staff members' profile for this research, the demographic characteristics of the respondents has been collected. Accordingly, the following variables about the respondents were summarized in the following tables.

The variables include: gender, age, educational level, and employment position.

Table 6; Gender, age, and educational level of respondents

	Frequency	**Percentage**
Gender		
Male	32	64%
Female	18	36%
Age		
18-25	9	18%
26-35	18	36%
36-45	13	26%
Above 45	10	20%
Level of Education		
Diploma	2	4%
Bachelor's degree	30	60%
Master's degree	18	36%

Source: Survey questionnaire (2022)

As shown on the table above, out of all of the total respondents, 64% of them are males and the remaining 36% are females. Although the age distribution was fallen in all age categories, most of the respondents which are 36% are between the ages of 26-36. With respect to the academic qualifications of the respondents, most of the respondents, which are 60% of the respondents, are Bachelor's degree holders.

Table 7: Employment position of respondents

Employment position of the respondents	Company	Experience(Years)				Total
		<5	6 to 10	11 to 15	>16	
Office Engineer	Rama Construction		x			2
	ASER Construction		x			
Construction Forman	Rama Construction	xx	x			8
	ASER Construction	xxx	x			
Contract Administration Team	Rama Construction	x	xx	X		8
	ASER Construction	xx	xx			
Project Consultancy	Rama Construction		x			2
	ASER Construction		x			
Technical Team Member	Rama Construction	xx	xx			10
	ASER Construction	xxx	xx	X		
Project Manager	Rama Construction	xx	xx	X		9
	ASER Construction		xx	X	X	
Project Expert	Rama Construction	xxxx	x	X		11
	ASER Construction	xxxx	x			
Total No.		23	20	6	1	50
Percent		46%	40%	12%	2%	100%

Source: Survey questionnaire (2022)

The above table shows the work experience of the participants from both companies. Accordingly, 23 (46%) of respondents have an experience of one up to five years, 20 (40%) have an experience of six up to ten years, 6 (12%) have an experience of eleven to fifteen years and only one respondent (2%) have served above 15 years in their respective organizations.

4.2.2 Basic Information on ISO 9001 Quality Management System

Table 8: Basic Information Regarding ISO 9001 Quality Management System Implementation

Item	Statement	Response	ASER Construction		Rama Construction	
			Frequency	**Percent**	**Frequency**	**Percent**
I	Have you used any of quality management systems within the construction company you're currently working with?	No	3	12.0	13	52.0
		Yes	22	88.0	12	48.0
		Total	25	100.0	25	100.0
II	Have you ever been informed about ISO 9001 quality management system from senior management?		**Frequency**	**Percent**	**Frequency**	**Percent**
		No	5	20	19	76.0
		Yes	20	80.0	6	24.0
		Total	25	100.0	25	100.0
III	Do you think each site should have a quality manager responsible for implementing quality plans and checklists?		**Frequency**	**Percent**	**Frequency**	**Percent**
		No	3	12.0	4	16.0
		Yes	22	88.0	21	84.0
		Total	25	100.0	25	100.0
IV	Do you agree that ISO 9001 quality management system helps in reducing defective work and a number other problems corrections in executing a project?		**Frequency**	**Percent**	**Frequency**	**Percent**
		No	2	8.0	4	16.0
		Yes	23	92.0	21	84.0
		Total	25	100.0	25	100.0
V	Have you ever received training in ISO 9001 quality management system?		**Frequency**	**Percent**	**Frequency**	**Percent**
		No	11	44.0	21	84.0
		Yes	14	56.0	4	16.0
		Total	25	100.0	25	100.0

Source: Survey questionnaire (2022)

As can be seen from the results stated on the above table, more than 80% of **ASER Construction** respondents have positively responded to the given statements. This shows that the application and information of ISO 9001 quality management system is performed well in their project activities. The respondents also understand that a quality manager is responsible for implementing quality plans and checklists. Moreover, the respondents were asserted that of ISO 9001 quality management system could help them in reducing defective work and problems in their respective projects.

This implies the respondents are well informed about of ISO 9001 quality management system and have practiced it in their respective projects. But, the response dictates that the provision of training to them seems to be not adequate.

Rama constriction respondents showed a positive response in the responsibility of quality managers in the implementation of ISO 9001 quality management system. This result could show that they think the practice and implementation of the ISO 9001 quality management system is the responsibilities of the quality manager. Furthermore, the information and training of ISO 9001 quality management system in this company is found to be low.

4.2.3 Findings based on ISO 10006, 2017 Guideline

The questionnaire is designed based on **ISO 10006, 2017**, which is a **guideline** for the application of quality management in projects. The three important scopes in the guideline are management responsibility in project, resource management in project, product realization in project. These scope have further divided into factor describing them such as customer focus, leadership capabilities, factual based decision, improvement, process approach, people engagement and relationship management which an potentially explain the implementation and practice of ISO 9001 quality management system as per (ISO 10006, 2017).

4.2.3.1 Status of Management Responsibility

Table 9: Customer Related Issues

I. The company understands the needs of existing and future customers					**III. The company measures customer satisfaction**				
	ASER Construction		**Rama Construction**			**ASER Construction**		**Rama Construction**	
Response	Frequency	Percent	Frequency	Percent	Response	Frequency	Percent	Frequency	Percent
Very good	--	--	--	--	Very good	--	--	2	8
Poor	--	--	2	8	Poor	9	36	10	40
Average	10	40	11	44	Average	5	20	8	32
Good	7	28	10	40	Good	9	36	4	16
Very Good	8	32	2	8	Very Good	2	8	1	4
Mean	3.92		3.48		Mean	3.16		2.68	
Std. Deviation	0.862		0.77		Std. Deviation	1.028		0.988	
II. The project activities of the company can meet customer requirements					**IV. The projects executed within the company aims to exceed customer expectations**				
	ASER Construction		**Rama Construction**		Response	**ASER Construction**		**Rama Construction**	
Response	Frequency	Percent	Frequency	Percent		Frequency	Percent	Frequency	Percent
Very poor	--	--	1	4	Very poor	--	--	7	28
Poor	4	16	10	40	Poor	5	20	1	4
Average	11	44	6	24.0	Average	5	20	12	48
Good	8	32	7	28.0	Good	12	48	5	20
Very Good	2	8	1	4.0	Very Good	3	12	--	--
Mean	3.32		2.88		Mean	3.52		2.6	
Std. Deviation	0.852		1.013		Std. Deviation	0.963		1.118	

Source: Survey questionnaire (2022)

As can be seen from the above table, under item I, 15(60%) of ASER Construction and 12(48%) of Rama Construction respondents replied good and very good that their respective company understands the needs of existing and future customers. Moreover the average mean value (3.92) and (3.48) shows that the ASER Construction understands the needs of existing and future customers better than Rama Construction.

Regarding item II, 11(44%) of Rama Construction respondents replied that project activities of the company to meet customer requirements is poor and very poor, and only eight (32%) of them have rated the statement good and very good. The average mean value (3.32) and (2.88), respectively, showed that the project activities of both ASER Construction and Rama Construction meet the customer requirements in an average manner. This shows that there could be a challenge in tailoring their level of service to suit their customers' needs. The result indicates both companies are providing basic level of service while there is a need to go beyond customer expectations.

Regarding item III, 9 respondents (36%) from ASER Construction and 12(48%) from Rama Construction said that measuring customer satisfaction is poor and very poor. Moreover, the average mean value (3.16) of ASER Construction and (2.66) of Rama Construction showed that their projects does not adequately measure customer satisfaction. It is also learned that majority of the respondents on the open ended questionnaire indicates that they are rarely measure customer satisfaction.

Regarding item IV, 15 (60%) of ASER Construction respondents confirmed that their project aims to exceed customer satisfaction in a good and very good way, whereas only five (20%) of Rama Construction respondents replied it is good. Moreover, the average mean value (2.66) of Rama Construction showed that there was a tendency that the projects do not sufficiently aim to exceed customer satisfaction. This might imply that Rama Construction could nearly fail to meet customer expectations, which might make customers look in to other construction companies in the long run. On the other hand, response on the open ended questionnaire and interview responses dictates that ASER Construction have tried to go beyond customer expectations as the company introduced initiatives like; customer focus groups, customer survey cards or a suggestion box. These initiatives send a clear message to customers that the company is interested in their input.

Table 10: In Regard to Leadership Perspectives

I. There is top management support in the project activities				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	1	4.0
Poor	--	--	--	--
Average	1	4.0	8	32.0
Good	16	64.0	8	32.0
Very Good	8	32.0	8	32.0
Mean	4.28		3.88	
Std. Deviation	0.542		1.013	
II. The leadership establishes a vision and direction for the organization				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	--	--
Poor	--	--	1	4.0
Average	4	16.0	10	40.0
Good	12	48.0	12	48.0
Very Good	9	36.0	2	8.0
Mean	4.20		3.60	
Std. Deviation	0.707		0.707	
III. The leadership is able to establish trust				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	1	4.0
Poor	2	8.0	6	24.0
Average	8	32.0	10	40.0
Good	10	40.0	7	28.0
Very Good	5	20.0	1	4.0
Mean	3.72		3.04	
Std. Deviation	0.891		0.935	

Source: Survey questionnaire (2022)

For item I in the above table, the result shows that 24(96%) of ASER Construction respondents and 16(64%) of Rama Construction respondents asserted that their project activities were supported by the top management as good and very good. Moreover, the mean value (4.22) and (3.88) could explain that the top management support is good in both companies. This might imply that the top management of both companies promote the importance of the project and its management for their organization, and also able to develop a vision, mission and strategy for the projects. This could help them to make resources available and balance the needs of the projects in view of the organization's strategic intentions.

For item II, the result shows that 21(84%) of the respondents of ASER Construction stated that the leadership establishment of a vision and direction for their organization was good and very good, for the same response 14(56%) of the Rama Construction respondents replied it is good and very good. Moreover, the average mean value (4.2) and (3.6) showed that the leadership of their respective companies establishes a vision and direction for their organization.

The response from Rama Construction respondents regarding item III showed that 7(28%) of the respondents rated the establishment of trust by the leadership is poor and very poor, whereas 8(32%) of the respondents asserted that it is good and very good. The average mean value (3.04) can explain that the establishment of trust by the leadership is found to be on an average level at Rama Construction. On the contrary, 15(60%) of ASER Construction respondents emphasized that establishment of trust by their leadership is found to be good and very good. The average mean value (3.77) also supported that the leadership was able to establish trust in a good way in this company. This shows that project leaders were able to build trust with their colleagues to gain legitimacy and to empower others.

Table 11: In relation to Engagement of People

Item I. The company ensures that people's abilities are used and valued				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	2	8.0
Poor	--	--	1	4.0
Average	8	32.0	14	56.0
Good	9	36.0	7	28.0
Very Good	8	32.0	1	4.0
Mean	4.00		3.16	
Std. Deviation	0.816		0.898	
Item II. There is evaluation of individual performance in the project activities				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	--	--
Poor	--	--	3	12.0
Average	10	40.0	12	48.0
Good	11	44.0	9	36.0
Very Good	4	16.0	1	4.0
Mean	3.76		3.32	
Std. Deviation	0.723		0.748	
Item III. The company facilitates learning and knowledge sharing within the project activities				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	-	--
poor	--	--	1	4.0
Average	6	24.0	12	48.0
Good	15	60.0	8	32.0
Very Good	4	16.0	4	16.0
Mean	3.92		3.60	
Std. Deviation	0.640		0.816	

Source: Survey questionnaire (2022)

The results for item I on the above table shows that, 17(68%) of the ASER Construction respondents replied their project ensures that people's abilities are used and valued at good and very good level. But from Rama Construction respondents only 8(32%) agreed for good and very good. The average mean value (4.00) and (3.16) also assures that usage and valuation of people's abilities are at good and average level, respectively, at ASER Construction and Rama Construction. These findings shows that the leadership at ASER Construction is aware of and supports personal perspectives, values, beliefs, and preferences incorporating the variety of characteristics that make individuals unique, including race, ethnicity, gender, age and physical abilities much better than the leadership at Rama Construction.

The result of item II shows that 15(60%) of ASER Construction respondents agreed good and very good for the response of evaluation practice of individual performance in their respective project activities, whereas 10(40%) respondents from Rama Construction asserted good and very good for the same response. The average mean value (3.76) and (3.32) for respondents of ASER Construction and Rama Construction, respectively, shows that there is good and an average practice of evaluation of individual performance in their respective project activities.

The open ended questionnaire response also showed that the performance reports provide them a basis for managerial decisions on how to manage the project team. This employee performance could include the employee’s work results such as: quality and quantity of outputs, work behavior (such as punctuality) and job-related attributes (such as cooperation and initiative).

Based on the results of item III, 19(76%) and 12(48%) of respondents from ASER Construction and Rama Construction, respectively, have responded that their project facilitation on learning and knowledge sharing within the project activities are good and very good. Moreover, the average mean value (3.92) and (3.6) also indicates that there is good learning and knowledge sharing within the project activities. This could imply that they have good knowledge sharing systems that supports the process through which explicit or tacit knowledge is communicated to other individuals. Therefore this result indicates that there is good understanding and coordination amongst the people in the projects, also this might provide fast solution to problems and improves response time, and an increase to acceptance of new ideas.

Table 12: The Perspectives of Process Approach

Item I. The company manages activities as processes				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Frequency**	**Percent**	**Frequency**
Very poor	--	--	--	---
Poor	--	--	1	4.0
Average	9	36.0	11	44.0
Good	5	20.0	13	52.0
Very Good	11	44.0	--	--
Mean	4.08		3.48	
Std. Deviation	0.909		0.586	
Item II. Linkages between project activities are identified				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	1	4.0
Poor	1	4.0	2	8.0
Average	8	32.0	18	72.0
Good	7	28.0	3	12.0
Very Good	9	36.0	1	4.0
Mean	3.96		3.52	
Std. Deviation	0.935		0.653	
Item III. The company prioritize improvement opportunities				
Response	**ASER Construction**		**Rama Construction**	
	Frequency	**Percent**	**Frequency**	**Percent**
Very poor	--	--	1	4.0
Poor	--	--	2	8.0
Average	12	48.0	18	72.0
Good	11	44.0	3	12.0
Very Good	2	8.0	1	4.0
Mean	3.60		3.04	
Std. Deviation	0.645		0.735	

Source: Survey questionnaire (2022)

The results on the above table regarding item I shows that 16(64%) of the respondents from ASER Construction have agreed good and very good, while 13(52%) of respondents of Rama Construction asserted that their project is good at managing their respective project activities as a process. Moreover, the average mean value (4.08) shows that project activities are managed in a very good manner as a process at ASER Construction while the mean value (3.48) shows that Rama Construction's project activities are averagely managed. This might show that ASER Construction is able to identify closely related and similar activities

which are grouped into division and departments. This could help its management process to design and maintain an environment in which staffs can accomplish tasks efficiently.

Regarding the identification of linkage in project activities, the response from item II showed that 16(64%) and 4(16%) of the respondents from ASER Construction and Rama Construction, respectively, have replied good and very good. The average mean value (3.96) and (3.52) also showed that identification of linkage between projects is found to be good at ASER Construction and average at Rama Construction. This implies that their project's link any two tasks in a project to show their relationship, which drive the project schedule for which they link the tasks.

The response from for item III shows that 13(52%) ASER Construction respondents and only 4(16%) of Rama Construction respondents asserted that there is good and very good situations in prioritizing improvement opportunities in project activities. This could indicate that the companies need to implement techniques that encompass collection and identification of a list of all their tasks, in order to prioritize improvement opportunities in project activities.

Table 13: Improvement Aspect within the Project

Item I. Activities are performed to improve company's performance and capabilities				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Very poor	--	--	--	--
Poor	--	--	2	8.0
Average	8	32.0	15	60.0
Good	6	24.0	7	28.0
Very Good	11	44.0	1	4.0
Mean	4.12		3.56	
Std. Deviation	0.881		0.821	
Item II. The company empowers people to make improvements				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Very poor	--	--	--	--
Poor	1	4.0	2	8.0
Average	7	28.0	15	60.0
Good	10	40.0	7	28.0
Very Good	7	28.0	1	4.0
Mean	4.00		3.28	
Std. Deviation	1.080		0.678	

Source: Survey questionnaire (2022)

The results shown on the above table for item I shows that 17(68%) of ASER Construction respondents have assured that activities performed are good and very good to improve the company's performance and capabilities. But, in the case of Rama Construction responses only eight (32%) of respondents replied good and very good. The calculated average mean value (4.12) shows that activities are performed well to improve performance and capabilities at ASER Construction. And the calculated average mean value of Rama Construction which is (3.56) shows project activities are conducted in an average manner to improve company's performance and capabilities.

Regarding item II, it is showed that 17(68%) of ASER Construction respondents have replied that it is good and very good that their company empowers people to make improvements, and eight (32%) of Rama Construction respondents replied the same thing. This could show that the companies tried to motivate their employees to take more responsibility and create a more positive work environment for everyone involved. As it was observed from the written response, empowerment was demonstrated and practiced through developing trust, through communicating a clear vision and providing confidence for self-improvement within the project activities.

Table 14: Evidence-Based Decision-Making

Item I. The company ensures there is the accessibility of accurate and reliable data				
Response	ASER Construction		Rama Construction	
	Frequency	Frequency	Percent	Frequency
Very poor	--	--	4	16.0
Poor	1	4.0	7	28.0
Average	7	28.0	1	4.0
Good	10	40.0	11	44.0
Very Good	7	28.0	2	8.0
Mean	3.92		3.00	
Std. Deviation	0.862		1.323	
Item II. Decisions taken by the company are made based on analysis				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Very poor	--	--	--	--
Poor	1	4.0	4	16.0
Average	2	8.0	10	40.0
Good	15	64.0	9	36.0
Very Good	6	24.0	2	8.0
Mean	4.08		3.36	
Std. Deviation	0.702		0.860	
Item III. The company balances data analysis with practical experience				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent

Very poor	1	4.0	--	--
poor	--	--	9	36.0
Average	4	16.0	8	32.0
Good	14	56.0	7	28.0
Very Good	6	24.0	1	4.0
Mean	3.96		3.00	
Std. Deviation	0.889		0.913	

Source: Survey questionnaire (2022)

The results on the above table for Item I shows that 17(68%) and 13(52%) of ASER Construction and Rama Construction respondents, respectively, asserted that their company ensures the accessibility of accurate and reliable data in a good and very good manner. This could indicate that ASER Construction is working on data integrity, which is maintaining and assuring the accuracy and consistency of data over its entire life cycle, better than Rama Construction. This result shows that ASER Construction is quite good in measuring its business performance against company goals, good in resource deployment and allocation, and also good at understanding and managing customer and partner satisfaction.

The results for item II showed that 21(84%) and 11(44%) of ASER Construction respondents and Rama Construction respondents, respectively, claimed that decisions taken by the company are made based on analysis is good and very good. This could indicate that at ASER Construction there is a rational decision making procedure which is suitable with the existing goals within the given conditions and constraints.

The results for item III showed that 20(80%) of ASER Construction respondents asserted that the company balances data analysis with practical experience in a very good way. This might show that the company continuously uses check lists in every items of work, and helps in collecting data and information for decision making process.

Table 15: Relationship Management

Item I. Relationships considering both the short and long term is established within the company				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Very poor	--	--	--	--
poor	--	--	2	80
Average	4	16.0	11	44.0
Good	21	84.0	12	48.0
Very Good	--	--	--	--
Mean	3.84		3.40	
Std. Deviation	0.374		0.645	
Item II. There is good share of expertise, resources, information, and plans with partners				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Very poor	1	4.0	--	--
poor	1	4.0	8	32.0
Average	5	20.0	9	36.0
Good	16	64.0	5	20.0
Very Good	2	8.0	3	12.0
Mean	3.68		3.12	
Std. Deviation	0.852		1.013	
Item III. The company can identify and select suppliers to manage costs, optimize resources, and create value.				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Very poor	--	--	1	4.0
poor	--	--	4	16.0
Average	4	16.0	7	28.0
Good	13	52.0	6	24.0
Very Good	8	32.0	7	28.0
Mean	4.16		3.56	
Std. Deviation	0.688		1.193	

Source: Survey questionnaire (2022)

The results on the above table for item I shows that 21(84%) of ASER Construction respondents agreed that the relationships that is established within the company is found to be at good level. On the other hand, the average mean value (3.4) of the Rama Construction respondents states that relationship within the company is found to be on average level. This might indicate a lesser communication in Rama Construction which could affect coordination and relationship to deliver projects successfully**.**

The results for item II shows that 18(72%) and 13(42%) of ASER Construction and Rama Construction respondents, respectively, replied that there is good and very good share of expertise, resources, information, and plans with partners in the project activities.

The results for Item III, shows that 21(84%) and 13(52%) of ASER Construction and Rama Construction respondents, respectively, responded good and very good. The average mean value of ASER Construction (4.16) also shows that the company is good at identifying and selecting suppliers. This implied that there is a good practice of choosing the right suppliers, which depend on a wide range of factors such as value for money, quality, reliability and service.

4.2.3.2 Assessment of Resource Management in Projects Activities

Table 16: Identification of Project Resources

The company can identify, estimate, schedule and allocate all relevant resources.				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly Disagree	1	4.0	--	--
Slightly Disagree	3	12.0	5	20.0
Moderately Agree	13	52.0	7	28.0
Strongly Agree	5	20.0	11	44.0
Very strongly Agree	3	12.0	2	8.0
Mean	3.24		3.4	
Std. Deviation	0.970		0.913	

Source: Survey questionnaire (2022)

Result from the above table shows that eight (42%) of ASER Construction respondents moderately agreed that the project can identify, estimate, schedule and allocate all relevant resources, while the majority of Rama Construction respondents 12(52%) strongly and very strongly agreed. Moreover, the average mean value for both company's respondents shows the response to this item is moderate. This could show that both companies moderately use the description of project scope for which they can determine key start and end dates, major assumptions behind the plan, and key constraints and restrictions.

Table 17: Comparison of Project Resources

The company can compare actual usage against resource plans and taking action needed.				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	--	--	--	--
Slightly Disagree	8	32.0	9	36.0
Moderately Agree	8	32.0	8	32.0
Strongly Agree	5	20.0	4	16.0
Very strongly agree	4	16.0	4	16.0
Mean	3.20		3.12	
Std. Deviation	1.080		1.092	

Source: Survey questionnaire (2022)

The average mean value (3.20) and (3.12) for ASER Construction and Rama Construction, respectively, represented in the above table shows that their companies might not be able to frequently compare actual usage against resource plans. Moreover, majority of the written responses have reinforced this finding by asserting that the companies are moderately estimating the duration of an activity and fairly working with the project team to come up with an estimate.

Table 18: Assignment of Personnel to Project Needs

The company can select and assign sufficient personnel with the appropriate competence to suit a project's needs				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	1	4.0	--	--
Slightly Disagree	3	12.0	5	20.0
Moderately Agree	10	40.0	8	32.0
Strongly Agree	6	24.0	10	40.0
Very strongly agree	5	20.0	2	8.0
Mean	3.44		3.36	
Std. Deviation	1.083		0.907	

Source: Survey questionnaire (2022)

Results in the above table shows that the average mean value (3.44) and (3.36), respectively, for ASER Construction and Rama Construction, respondents moderately agreed to the statement. This could show that the companies can reasonably select personnel based on their competences, personal effectiveness and achievement.

Table 19: Development of Skills for Project Performance

The company develops individual and team skills to enhance project performance				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	--	--	--	--
Slightly Disagree	12	48.0	6	24.0
Moderately Agree	8	32.0	10	40.0
Strongly Agree	5	20.0	7	28.0
Very strongly agree	--	--	2	8.0
Mean	2.72		3.20	
Std. Deviation	0.792		0.913	

Source: Survey questionnaire (2022)

The result from the above table shows that 12(48%) of ASER Construction respondents slightly disagreed to the statement. This shows that there is a need to develop good interpersonal skills to a successful team development. In this regard, the project manager and the team members need to work together to recognize each other's strengths and weaknesses.

4.2.3.3 Identification of Product/Service Realization in Project Activities.

Table 20: **Prediction of Change and its Management**

The company can predict change and manage it across all processes				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly Disagree	--	--	15	60.0
Slightly Disagree	17	68.0	5	20.0
Moderately Agree	4	16.0	2	8.0
Strongly Agree	2	8.0	3	12.0
Very strongly agree	2	8.0	--	--
Mean	2.56		2.72	
Std. Deviation	0.961		1.061	

Source: Survey questionnaire (2022)

The result in the above table confirms that 17(68%) of ASER Construction respondents slightly disagreed that their company predicts change and manage it across all processes. Likewise, the majority of Rama Construction respondents 20(80%) have slightly and strongly disagreed to the statement. This could show that both companies can hardly predict change and manage it. This finding is also supported by majority of the written responses for which they claim that there are few practices in prediction in project activities.

Table 21: Project Closing and Feed Back.

The company conducts closing processes and obtains feedback.				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	1	4.0	--	--
Slightly Disagree	17	68.0	8	32.0
Moderately Agree	2	8.0	13	52.0
Strongly Agree	5	20.0	3	12.0
Very strongly agree	--	--	1	4.0
Mean	2.44		2.88	
Std. Deviation	0.870		0.781	

Source: Survey questionnaire (2022)

The result in the above table shows that 18(72%) of ASER Construction respondents asserted that they slightly and strongly disagree that their company conducts closing processes and obtaining feedback. The average mean value (2.44) also explains that respondents disagreed on the statement. This might show that the company considers project closing as an overburden activity and of little significance. While 17(68%) of Rama Construction respondents showed an agreement to the statement. Moreover, the majority of written response and interview discussion with Rama Construction respondents also asserted that their company can successfully conduct project closing.

Table 22: Project Documentation

Characteristics of the company's projects are documented in measurable terms				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	9	36.0	--	--
Slightly Disagree	7	28.0	6	24.0
Moderately Agree	5	20.0	13	52.0
Strongly Agree	4	16.0	2	8.0
Very strongly agree	--	--	4	16.0
Mean	2.16		3.16	
Std. Deviation	1.106		0.987	

Source: Survey questionnaire (2022)

As can be seen from the above table, the average mean value (2.16) of ASER Construction response shows that their company's projects are not documented in measurable terms. While, the average mean value (3.16) of Rama Construction respondents asserted that characteristics of their company's projects are is moderately documented in measurable terms. This could show that documentation of company's projects may not be traceable. Majority of the written response also claimed that tracking of records concerning the measurement and monitoring of processes are frequently forgotten activities in both companies.

Table 23: Estimation of Duration in Project Activities

The company estimates the duration of each project's activity in connection with the specific conditions and the resources required				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	9	36.0	--	--
Slightly Disagree	--	--	4	16.0
Moderately Agree	9	36.0	16	64.0
Strongly Agree	6	24.0	2	8.0
Very strongly agree	1	4.0	3	12.0
Mean	2.60		3.16	
Std. Deviation	1.323		0.850	

Source: Survey questionnaire (2022)

The result on the above shows that seven (28%) of ASER Construction respondents and five (20%) of Rama Construction respondents agreed that their company estimates the duration of each project's activities. But, generally the average mean value (2.6) for ASER Construction and (3.16) for Rama Construction indicates that there is a moderate agreement on the statement. This could imply that the two companies could have some forms of barrier in practicing work breakdown techniques to reduce the activity to smaller tasks.

Table 24: Development of Cost Estimates for Project Activities

The company develops cost estimates for the project activities.				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	2	8.0	--	--
Slightly Disagree	8	32.0	2	8.0
Moderately Agree	6	24.0	9	36.0
Strongly Agree	4	16.0	12	48.0
Very strongly agree	5	20.0	2	8.0
Mean	3.08		3.56	
Std. Deviation	1.288		0.768	

Source: Survey questionnaire (2022)

As it can be seen from the above table, 15(60%) of ASER Construction respondents and almost all the respondents of Rama Construction 23(92%) stated that they agreed to the statement that their company develops cost estimates for the project activities. Moreover, the majority of the respondents on the written response asserted that there is good cost estimation procedure in their project activities. Hence, according to the respondents this might show that there is a possibility for a problem associated with cost overrun, which will be avoided with a credible, reliable, and accurate cost estimate.

Table 25: Information and Communication Systems of the Company

The company plans the information and communication systems of projects				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	1	4.0	--	--
Slightly Disagree	8	32.0	3	12.0
Moderately Agree	7	28.0	9	36.0
Strongly Agree	5	20.0	8	32.0
Very strongly agree	4	16.0	5	20.0
Mean	3.12		3.60	
Std. Deviation	1.166		0.957	

Source: Survey questionnaire (2022)

The result from the above table shows that 16(64%) of ASER Construction respondents and 22(88%) of Rama Construction respondents have shown an agreement that their company

have good information and communication systems. This could show that they are keeping everybody in the loop, which concerns defining the types of information.

Table 26: Development of Plans for Risk Response.

The company develops plans for responding to risks				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	11	44.0	2	8.0
Slightly Disagree	--	--	8	32.0
Moderately Agree	8	32.0	10	40.0
Strongly Agree	2	8.0	4	16.0
Very strongly agree	4	16.0	1	4.0
Mean	2.96		2.76	
Std. Deviation	1.098		0.970	

Source: Survey questionnaire (2022)

The average mean value (2.96) and (2.76) shown on table above shows that both respondents asserted that their company develops plans for responding to risks. This might show that the company could moderately reduce any threats. This implies that planning of risk responses is found at its rudimentary level in both companies.

Table 27: The Project Identification for Procurement

The company identifies and controls what is to be purchased and when it is purchased				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly Disagree	7	28.0	--	--
Slightly Disagree	2	8.0	5	20.0
Moderately Agree	1	4.0	14	56.0
Strongly Agree	11	44.0	2	8.0
Very strongly Agree	4	4.0	4	16.0
Mean	3.12		3.20	
Std. Deviation	1.536		0.957	

Source: Survey questionnaire (2022)

The result on the table above exhibits that the average mean value (3.12) and (3.20) for ASER Construction and Rama Construction, respectively, revels that they moderately agree that their company identifies and controls what is to be purchased and when. This might indicate that the company's procurement statement of work is not that clear, complete and as concise as possible.

Table 28: Compilation of Commercial Conditions and Technical Requirements

The company can compile commercial conditions and technical requirements				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	--	--	2	8.0
Slightly Disagree	7	28.0	15	60.0
Moderately Agree	9	36.0	2	8.0
Strongly Agree	7	28.0	6	24.0
Very strongly agree	2	8.0	---	--
Mean	3.16		2.48	
Std. Deviation	0.943		0.963	

Source: Survey questionnaire (2022)

The average mean value (3.16) in the table above shows that ASER Construction is in a better position to compile commercial conditions and technical requirements than Rama Construction. This could indicate that Rama Construction needs to establish an understanding with its management regarding the services to be performed for compilation of documents. The significant decrease of positive response may signify that technical requirements like verification, calibration of equipment, and their maintenance of equipment seems vulnerable at Rama Construction to some extent.

Table 29: Issuing of Invitations to Tender and Tender Evaluation

The company performs invitations to tender, tender evaluation, negotiation, preparation and placing of a subcontract				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	8	32.0	--	--
Slightly Disagree	10	40.0	1	4.0
Moderately Agree	1	4.0	10	40.0
Strongly Agree	3	1.0	13	52.0
Very strongly agree	3	12.0	1	4.0
Mean	2.32		3.56	
Std. Deviation	1.376		0.651	

Source: Survey questionnaire (2022)

The above table shows the calculated average mean value (2.32) for ASER Construction respondents demonstrated a disagreement to the statement. On the other hand the average mean value (3.56) for Rama Construction respondents moderately agreed to the statement. This could imply that ASER Construction could need to properly examine the tenders from the perspectives of price, relevant experience, understanding of the requirements, technical skills, and management skills.

Table 30: Project Assurance of Contractual Requirements

The company ensures that subcontractors' performance meets contractual requirements				
Response	ASER Construction		Rama Construction	
	Frequency	Percent	Frequency	Percent
Strongly disagree	8	32.0	10	40.0
Slightly Disagree	2	8.0	5	20.0
Moderately Agree	9	36.0	5	20.0
Strongly Agree	4	16.0	4	16.0
Very strongly agree	2	8.0	1	4.0
Mean	2.60		2.24	
Std. Deviation	1.323		1.268	

Source: Survey questionnaire (2022)

The result of the above table shows that 10(40%) of ASER Construction and 15(60%) of Rama Construction respondents disagreed to the statement that their company ensures that sub contractor's performance meets contractual requirements. In addition, the average mean value (2.60) and (2.24) also shows that the two company's project activities may hardly ensures the sub-contractors performance. This finding could indicate that the company's project's current commercial models and contracts are weakly supported by a clear performance measurement model. This might lead to ineffective contract management and assurance in infrastructure projects which can in turn prevent corporate objectives from being met.

CHAPTER FIVE:

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

In this section the summary, conclusions and recommendation were derived from the research findings. The main purpose of this study is to assess the practice and implementation of ISO 9001 quality management system at ASER Construction and Rama Construction. The results of the questionnaire survey and discussion of the findings in line with the literature review were presented in section four of this paper.

5.1 Summary of Major Findings

Before jumping in to the main analysis of the study, a reliability test was administered to check whether the questionnaire is reliable or not. In this regard, all four parts of the questionnaires were reliable and acceptable with Cronbach's Alpha result greater than 0.70.

Table 31: Summary of major findings

	I. Management responsibilities in the implementation of ISO 9001 quality management system	II. Resource management in the implementation of ISO 9001 quality management system	III. Product or service realization in project activities
ASER Construction	80.17%	63%	54.80%
Rama Construction	65.80%	65.40%	60.60%

Major findings regarding to the first objectives, which focused on the understanding of management responsibilities within ASER Construction and Rama Construction, are listed below.

a) From customer perspective, ASER Construction have demonstrated a very good practice and implementation regarding to understanding the need of customers and exceeding their expectations, whereas at Rama Construction, it is found to be at a moderate level.
b) From leadership point of view, ASER Construction has exhibited an outstanding implementation of ISO 9001 quality management system in comparison to Rama Construction. The empirical finding also reflects that those construction companies who implement ISO 9001 quality management system has a good management commitment.
c) Regarding engagement of people, it was found to be a very good achievement for both companies. Moreover, it can be learnt that there is qualified and experienced people in

both companies to support the ISO 9001 quality management system and the key processes within the project activities.

d) In relation to improvement within the project, the result showed that ASER Construction is better at determining activities, which are performed to improve project performance and capabilities for further improvement opportunities. This also proves that the company established management of change to incorporate improvements with processes and procedures.
e) Concerning to practice in related within relation management both companies have a very good performance in identification and selection of suppliers to manage costs, optimize resources and create value in the project environment.

In general, the management responsibilities in the practice and implementation of ISO 9001 quality management system at ASER Construction is found to be 80.17%, which signifies it is at the excellent level, whereas at Rama Construction it is found to be 65.80%, which shows it is on a very good level.

Major findings regarding management of resources at ASER Construction and Rama Construction.

a) It can be seen that there is qualified and experienced people at both companies to support the ISO 9001 quality management system and the key processes within the project activities.
b) It is also observed that at both companies selection of personnel are based on their competences, personal effectiveness and achievement are found on a moderate level.

Major findings in regard to the realization of products or services within the project activities of ASER Construction and Rama Construction projects.

a) ASER Construction have showed an unsatisfactory implementation regarding to prediction of change in project activities and documenting the characteristics of the project product in measurable terms.
b) Rama Construction also exhibit an unsatisfactory implementation related with subcontractors' performance and satisfying technical requirements in the project life time.

Generally, the product or service realization in both project activities is found to be on a moderate level.

Based on the interview questions conducted, the following challenges are faced by ASER Construction and Rama Construction, respectively:

- ❖ Major Challenges Faced by ASER Construction

a) More difficult application of documentation
b) Lack of constant follow up and continuous improvement
c) Client and supervisor understanding is limited to ISO 9001 quality management system
d) Lack of continuous ISO 9001 quality management system training
e) High turnover of qualified personnel.

- ❖ Major Challenges Faced by Rama Construction

a) Poor documentation from previous projects and unable to trace information and some project activities, and there is no clear responsible person for updating and monitoring the system;
b) Lack of creativities and innovation
c) The ISO 9001 quality management system might not be compatible with companies strategy and operation
d) Lack of employees' commitment

The reviewed empirical literature also showed that some of the above listed barriers also prevail in some of the construction companies while they are practicing and implementing ISO 9001 quality management system. The identified problems and the findings of this research are more or less similar even if there is variation due to their practical context of the projects.

5.2 Conclusions

The following conclusions, which are made from the research findings, could help in giving insight to both companies in their management responsibilities.

a) This finding is self-assertive to conclude that the leadership support to the mission and vision of the ISO 9001 quality management system provides a quality culture that could motivate the project team in overall project environment in both companies.
b) It can be concluded that good engagement of staff members helps both companies to be competent in the construction market.
c) Regarding to practice related with process approach, it can be concluded that both companies are able to recognize the processes needed for the ISO 9001 quality management system and its application throughout the project activities by identifying and realizing the processes and establish the interaction between them.
d) It can be concluded that Rama Construction explicitly showed underperformance regarding with gathering, monitoring, measuring, and analyzing reliable data for its further decision making.

Regarding implementing efficient resource management at ASER Construction and Rama Construction

a) It can be concluded that both companies are lagging in creating successful teams, which could lead to less effectiveness in coordinating individual efforts, make it difficult t to tackle complex tasks and to utilize the expertise knowledge.

The following is a conclusion made on product realization in the implementation of ISO 9001 quality management system.

a. It can be concluded that there is a modest product and service realization in both companies' project activities. This can be explained as ASER Construction have showed unsatisfactory implementation regarding the prediction of change in project activities, documenting the characteristics of the project product in measurable terms, and issue related to tender and tender evaluation.
b. It can be concluded that Rama Construction is able to develop cost estimates for project activities, which helps the company to minimize failures/rework, improve conformance to project specifications and to maintain compliance with regulations. Moreover, issue of invitation for tender and its evaluation at Rama Construction is practiced in a very good manner compared to ASER Construction. This shows that the potential benefit of a structured ISO 9001 quality management system at Rama Construction is achieved.
c. It has been observed that both companies don't use risk management techniques in their projects and that could be associated with lack of awareness about its significance and a

fear of hiring additional staff and acquire more resources. Poor contract management is identified to be the most important cause of risk with a very high level of occurrence and a high level of impact on companies' objectives.

Generally, it can be concluded that at Rama Construction, the implementation ISO 9001 quality management system is found to be at moderate level while at ASER Construction it has been found to be at a very good practice level.

5.3 Recommendations

The following recommendations are suggested to enhance the level of management responsibilities at ASER Construction and Rama Construction.

a. It is recommended that dependable actions need to be taken to improve customer service, like: investigate the areas of issue, train staff in customer service and customer relation management, introduce system related to rotation of staff so they can increase their knowledge of other areas and encourage and support teamwork.
b. It is recommended that people operating within the ISO 9001 quality management system need to be evaluated for performance and continued competency.
c. In order to improve the accessibility of accurate and reliable data, both companies need to understand what data is and why its reliability is important and therefore they need to work on effective collection and management of data. It is recommended that these companies need to collect data through various methods such as implementing Customer Relationship Management (CRM) System and Enterprise Resource Planning (ERP) System, which are a business process management software that integrates several facets of a company activities.
d. To improve relationship and coordination in a project both companies need to determine proper communication flows for project members and develop a way to inform what information needs to be informed to project members.

The following recommendations are suggested to assist how resources are managed at ASER Construction and Rama Construction.

a. It is recommended that both companies establish team building by improving and maintaining motivation and confidence to make team members consider that they are supported and involved, and encourage synergy of ideas to solve problems.
b. Both companies need to conduct an assessments periodically to ensure the integrity, reliable and continual improvement of work processes and to ensure the practice of ISO 9001 quality management system within their project activities.

The following recommendations are suggested for ensuring an effective realization of products or services within the project activities of ASER Construction and Rama Construction.

a. It is recommended to introduce a comprehensive and holistic document control system which may include records of ISO 9001 quality management system, especially noncomplying issues, preventive and corrective actions, verification or calibration of measurement and monitoring devices. This could ensure characteristics of the project product is documented in measurable terms.
b. Cost estimates need to be an accurate enough in both companies to make their comparisons meaningful and to confirm the amount of time and resources used to make the estimates appropriate to the size and complexity of a project.
c. Establishing a risk management team is highly recommended in both companies. This team need to design risk response planning process, which uses information gathered and obtained during risk estimation.
d. It is advisable that the companies should define their scope for assuring stakeholder requirements, define scope boundaries and know their key boundaries in the contract management. This could ensure a well-designed and effectively operated contract that can be accommodated within the budget, schedule and risk profile.

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APPENDIX

Appendix I: Research Schedule (Time Frame)

Proposal Writing	November 17, 2021 – February 10, 2022
Submitting the proposal to the advisor	February 11, 2022
Refining the proposal based on the advisor feedback	February 12 – 27, 2022
Data collection	March 12 – 25, 2022
Writing analysis and interpretation of results, conclusions and recommendations	March 26 - April 20, 2022
Submitting 1st draft to advisor and improving based on the feedback	April 21 – 27, 2022
Writing the final version of research report	April 28 – May 19, 2022
Submitting final research paper signed by the advisor to the school	May 20 – 30, 2022

Appendix II: Questionnaire

QUESTIONNAIRE

ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF BUSINESS ADMINISTRATION

This questionnaire is filled by groups of selected respondents from the selected ISO 9001 certified construction companies in Addis Ababa.

Dear Respondents:

This questionnaire is designed to collect information regarding the implementation of ISO 9001 quality management system in your respected construction companies. The study will contribute towards the fulfillment of the researcher's Master of Business administration (MBA) program.

I kindly ask you in all regard to fill the questionnaire carefully at your best knowledge. The accuracy of information you provide determines the ultimate reliability of the study.

Note: Your answers will be strictly confidential and will only be used for academic purposes.

Contact Address: Sofanit Mesfin

Tel:-+251921402999 or **E-mail:**-sofanit1mesfin@gmail.com

Thank you in advance for your cooperation and timely response!

Part One: Demographic Information - Please put 'X' in the box

1. What is your role in the construction firm you are employed?

☐ Project Manager, ☐Contract administration team , ☐Project Consultancy,

☐ Resident engineer , ☐ Technical Team member ☐Project supervisor , ☐Project

2. Your total work experience in housing construction activities

☐ Less than 5 years, ☐ 6-10years, ☐11-15 years, ☐ 16 and above

Part Two. Questions to be responded Yes or No, and with Comments

This part helps the researcher to identify basic information regarding ISO 9001 quality management system implementation in your respected construction activities. Please respond to each of the listed statement by saying yes or no and put you comment on it.

No	Statement	Yes	No	Comment
1	Have you used ISO 9001 quality management system in your current construction industry?			
2	Have you ever been communicated about ISO 9001 quality management system from Senior Management in your current project?			
3	Do you think each site should have a Quality Manager responsible for implementing Quality Plans and Checklists?			
4	Do you agree ISO 9001 quality management system help reduce defective work and the number of problem corrections in your current project?			
5	Have you ever received training regarding ISO 9001 quality management system?			

Part Three

This part of the questionnaire was developed based ISO 10006:2017(E) standard, which focuses on seven quality management principles that senior management can apply for organizational improvement: Therefore, the following questions are helpful to the researcher **to know the level of the management responsibility at your company.** Can you please show your response to the statements by circling the numbers in the column using the following rating scale (Likert Scale). Where: 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good.

Item	**Statement**	**Rating**				
With respect to customer focus						
1	The company understands the needs of existing and future customers	1	2	3	4	5
2	The company activities can meet customer requirements	1	2	3	4	5
3	The company measures customer satisfaction.	1	2	3	4	5
4	The company aims to exceed customer expectations.	1	2	3	4	5
In regard to Leadership						
5	There is top management support in the project activities	1	2	3	4	5
6	The leadership establishes a vision and direction for the organization	1	2	3	4	5
7	The leadership is able to establish trust	1	2	3	4	5
In relation to engagement of people						
8	The company ensures that people's abilities are used and valued	1	2	3	4	5
9	There is evaluation of individual performance in the project activities	1	2	3	4	5
10	The company facilitates learning and knowledge sharing within the project activities.	1	2	3	4	5
With a view of process approach						
11	The company manages activities as processes	1	2	3	4	5
12	Linkages between project activities are identified.	1	2	3	4	5
13	The company prioritizes improvement opportunities	1	2	3	4	5
With respect to improvement within the project						
14	Activities are performed to improve projects performance and capabilities	1	2	3	4	5
15	The company empowers people to make improvements	1	2	3	4	5
In regard to Evidence-based decision-making						
16	The company ensures the accessibility of accurate and reliable data	1	2	3	4	5

17	Decisions taken by the company are made based on analysis of data	1	2	3	4	5
18	The company balances data analysis with practical experience	1	2	3	4	5
Regarding to Relationship Management						
19	The company can identify and select suppliers to manage costs, optimize resources, and create value.	1	2	3	4	5
20	Relationships considering both the short and long term is established within the company	1	2	3	4	5
21	There is good share of expertise, resources, information, and plans with partners	1	2	3	4	5

Part Four.

This part of the questionnaire helps the researcher to identify the **resource management in projects** activities. The following scale rating description: 5 = Very Strongly Agree, 4= Strongly agree, 3= Moderately agree, 2= Slightly Disagree, 1= Strongly Disagree

Item	Statement	Rating				
22	The company can identify, estimate, schedule and allocate all relevant resources.	1	2	3	4	5
23	The company can compare actual usage against resource plans and taking action if needed.	1	2	3	4	5
24	The company can select and assign sufficient personnel with the appropriate competence to suit the project needs.	1	2	3	4	5
25	The company develops individual and team skills and the ability to enhance project performance.	1	2	3	4	5

Part Five.

*This part of the questionnaire helps the researcher to identify **product/service realization in project activities.** The following scale rating description: 5 = Very Strongly Agree, 4= Strongly Agree, 3= Moderately Agree, 2= Slightly Disagree, 1= Strongly Disagree*

Item	Statement	Rating				
26	The company can predict change and manage it across all processes.	1	2	3	4	5
27	The company conduct closing processes and obtaining feedback.	1	2	3	4	5
28	Characteristics of the company's projects are documented in measurable terms.	1	2	3	4	5
29	The company estimates the duration of each activity in connection with the specific conditions and the resources required.	1	2	3	4	5

30	The company develops cost estimates for the project activities.	1	2	3	4	5
31	The company plans the information and communication systems of the project.	1	2	3	4	5
32	The company develops plans for responding to risks.	1	2	3	4	5
33	The company identify and control what is to be purchased and when.	1	2	3	4	5
34	The company can compile commercial conditions and technical requirements.	1	2	3	4	5
35	The company perform invitations to tender, tender evaluation, negotiation, preparation and placing of the subcontract.	1	2	3	4	5
36	The company ensures that subcontractors' performance meets contractual requirements.	1	2	3	4	5

Part Six. Open ended questions

1. What kinds of activities do you use in order to ensure quality in your current project?

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2. What is the importance of quality management in your construction project?-
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3. What kind of quality tools used in your organization and to what extent it is successful in the project implementation?

4. How do you express your project activities from cost, schedule and quality performance?

5. What are the major challenges faced by your construction firms in practicing quality management system?

6. What is your overall suggestion to bring quality management system in your project activities?

Thank you!